ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

CHƯƠNG TRÌNH ĐÀO TẠO KHÓA 2023 – NGÀNH KỸ THUẬT MÔI TRƯỜNG TRÌNH ĐỘ ĐẠI HỌC

(Kèm theo Quyết định số 1001/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

1. Thông tin chung

- Tên ngành đào tạo:
  + Tiếng Việt: Kỹ thuật Môi trường
  + Tiếng Anh: Environmental Engineering
- Mã ngành đào tạo: 7520320
- Trình độ đào tạo: Đại học
- Loại hình đào tạo: Chính quy
- Thời gian đào tạo: 4,5 năm
- Tên văn bằng sau khi tốt nghiệp:
  + Tiếng Việt: Kỹ sư Kỹ thuật Môi trường
  + Tiếng Anh: Engineer in Environmental Engineering
- Nơi đào tạo: Trường Đại học Quốc tế, Đại học Quốc gia Thành phố Hồ Chí Minh.

2. Thông tin tuyển sinh và kế hoạch đào tạo

a. Đối tượng tuyển sinh

Đối tượng tuyển sinh căn cứ theo quy chế tuyển sinh đại học của Bộ Giáo dục và Đào tạo và Đề án tuyển sinh hàng năm của Đại học Quốc gia TP.HCM và Đề án tuyển sinh của trường Đại học Quốc tế.

b. Hình thức tuyển sinh

Trường Đại học Quốc tế thực hiện tuyển sinh theo Quy chế tuyển sinh Đại học ban hành hàng năm bởi Bộ Giáo dục và Đào tạo, căn cứ theo Đề án tuyển sinh hàng năm của Đại học Quốc gia TP.HCM và Đề án tuyển sinh của trường Đại học Quốc tế.

c. Tổ hợp môn xét tuyển

A00: Toán, Vật lý, Hóa học

A02: Toán, Vật Lý, Sinh học

B00: Toán, Hóa học, Sinh học

D07: Toán, Hóa học, Tiếng Anh

d. Dự kiến chỉ tiêu tuyển sinh, quy mô đào tạo

Năm	2023	2024	2025	2026	Từ 2027 trở đi
Tuyển sinh mới	30	30	30	30	30
Quy mô đào tạo	30	60	90	120	150

3. Mục tiêu đào tạo

a. Mục tiêu chung:

Sinh viên tốt nghiệp có kiến thức đại cương, cơ sở ngành, chuyên ngành và kiến thức bổ trợ liên quan đến các kỹ thuật xử lý nước – nước thải, kiểm soát ô nhiễm không khí, và quản lý chất thải rắn để có thể ứng dụng vào giải quyết các vấn đề môi trường và tiếp tục học tập ở bậc cao hơn. Sinh viên tốt nghiệp có khả năng nhận diện vấn đề, hình thành ý tưởng, thiết kế, triển khai và vận hành các thiết bị và hệ thống xử lý môi trường phù hợp với nhu cầu xã hội và tiêu chuẩn ngành. Sinh viên tốt nghiệp có kỹ năng nghề nghiệp, thái độ cá nhân; kỹ năng làm việc theo nhóm và giao tiếp hiệu quả trong môi trường chuyên nghiệp để giải quyết các vấn đề liên quan đến kỹ thuật môi trường.

Bảng 1. Sự phù hợp của mục tiêu đào tạo với Tầm nhìn, sứ mạng và Mục tiêu giáo dục của Luật giáo dục đại học.

Mục tiêu đào tạo của CTĐT	**Tầm nhìn**	**Sứ mạng**	**Luật giáo dục***
Sinh viên tốt nghiệp có **kiến thức** đại cương, cơ sở ngành, chuyên ngành và kiến thức bổ trợ liên quan đến các **kỹ thuật** xử lý nước – nước thải, kiểm soát ô nhiễm không khí, và quản lý chất thải rắn để có thể **ứng dụng** vào **giải quyết** các vấn đề **môi trường** và tiếp tục học tập ở bậc cao hơn. Sinh viên tốt nghiệp có **khả năng nhận diện vấn đề, hình thành ý tưởng, thiết kế, triển khai và vận hành các thiết bị và hệ thống xử lý môi trường** phù hợp với **nhu cầu xã hội và tiêu chuẩn ngành.** Sinh viên tốt nghiệp có **kỹ năng nghề nghiệp**, **thái độ cá nhân**; kỹ năng làm việc theo nhóm và **giao tiếp hiệu quả trong môi trường chuyên nghiệp** để **giải quyết** các vấn đề liên	*Hướng tới xây dựng Khoa Kỹ thuật Hóa học và Môi trường thuộc tốp đầu tại Việt Nam và khu vực Đông Nam Á; là nơi vun đắp và phát triển* ***nguồn nhân lực chất lượng cao*** *cho* ***thị trường lao động trong nước*** *và* ***quốc tế*** *trong lĩnh vực Kỹ thuật Hóa học và* ***Kỹ thuật Môi trường***.	*Là Khoa đào tạo* ***chất lượng giáo dục quốc tế,*** *mang bản sắc văn hóa Việt Nam.* *Đào tạo* ***chất lượng cao*** *ngành Kỹ thuật Hóa học và* ***Kỹ thuật Môi trường.*** *Đạt chuẩn kiểm định chất lượng giáo dục theo tiêu chuẩn quốc tế.* *Giảng dạy và nghiên cứu thực hiện bằng* ***tiếng Anh*** *là điểm khác biệt nâng tầm quốc tế của Khoa. Người học được đào tạo và rèn luyện để trở* ***thành công dân toàn cầu*** *và có* ***trách nhiệm*** *với xã hội, dẫn dắt xã hội trong tương lai.* ***Nghiên cứu*** *cơ bản với hàm lượng tri thức lớn song hành với nghiên cứu* ***ứng dụng, đáp ứng yêu***	*1. Đào tạo* ***nhân lực trình độ cao,*** *nâng cao dân trí, bồi dưỡng nhân tài; nghiên cứu khoa học và công nghệ tạo ra tri thức, sản phẩm mới,* ***phục vụ nhu cầu phát triển kinh tế - xã hội****, bảo đảm quốc phòng, an ninh,* ***hội nhập quốc tế.*** *2. Đào tạo người học phát triển toàn diện về đức, trí, thể, mỹ;* ***có tri thức, kỹ năng, trách nhiệm nghề nghiệp****; có khả năng nắm bắt tiến bộ khoa học và công nghệ tương xứng với trình độ đào tạo,* ***khả năng tự học, sáng tạo, thích nghi với môi trường làm việc; có tinh thần lập nghiệp, có ý thức phục vụ*** *Nhân dân.*

Mục tiêu đào tạo của CTĐT	Tầm nhìn	Sứ mạng	Luật giáo dục*
quan đến **kỹ thuật môi trường.**		***cầu*** *đổi mới sáng tạo và phát triển bền vững của* ***doanh nghiệp, địa phương và xã hội****; quan tâm, thúc đẩy các hoạt động kết nối và* ***phục vụ***	

*Luật số: 43/2019/QH14, Luật Giáo Dục, Điều 39. Mục tiêu của giáo dục đại học

b. Mục tiêu cụ thể (Program Objectives - POs)

Mục tiêu cụ thể của CTĐT được xác định từ mục tiêu chung, bao gồm 07 mục tiêu, trong đó có 01 mục tiêu về kiến thức, 05 mục tiêu về kỹ năng và 01 mục tiêu về tự chủ và trách nhiệm, được trình bày như sau:

PO1. Kiến thức

PO1.1. Sinh viên tốt nghiệp có kiến thức vững chắc về toán, khoa học tự nhiên, cơ sở ngành, và kiến thức chuyên sâu về kỹ thuật chuyên ngành để có thể ứng dụng vào giải quyết các vấn đề kỹ thuật trong lĩnh vực môi trường. Sinh viên tốt nghiệp có kiến thức và hiểu biết rộng để hiểu được tác động của các giải pháp kỹ thuật môi trường trong bối cảnh toàn cầu, kinh tế, và xã hội

PO2. Kỹ năng

PO2.1. Phân tích kỹ thuật

Sinh viên tốt nghiệp có khả năng phân tích kỹ thuật để nhận diện, diễn đạt, cân nhắc các phương pháp kỹ thuật và lựa chọn giải pháp kỹ thuật phù hợp nhất, giải quyết hiệu quả các vấn đề môi trường sử dụng các phương pháp nghiên cứu lý thuyết, các phần mềm hỗ trợ, và thực nghiệm xử lý chất thải.

PO2.2. Thiết kế kỹ thuật

Sinh viên tốt nghiệp có khả năng tiến hành thiết kế kỹ thuật phù hợp với mức kiến thức và hiểu biết từ chương trình đào tạo, hợp tác với các thành viên trong nhiều lĩnh vực khác nhau; có khả năng sử dụng các kỹ thuật, công cụ, quá trình và phương pháp để thiết kế ra sản kỹ thuật trên cơ sở cân nhắc đến bối cảnh toàn cầu, kinh tế, xã hội, an toàn sức khỏe và môi trường.

PO2.3. Nghiên cứu, khảo sát và đánh giá chất lượng môi trường

Sinh viên tốt nghiệp có khả năng áp dụng các phương pháp tiêu chuẩn để tiến hành khảo sát hoặc đánh giá chi tiết các vấn đề chất lượng môi trường trong phạm vi kiến thức và sự hiểu biết. Nội dung khảo sát đánh giá bao gồm thiết kế kế hoạch giám sát và các thí nghiệm, giải thích và phân tích dữ liệu thu được cũng như mô phỏng trên máy tính.

PO2.4. Thực hành kỹ thuật

Sinh viên tốt nghiệp có khả năng sử dụng kiến thức và sự hiểu biết để phát triển các kỹ năng thực hành cần thiết cho việc giải quyết các vấn đề môi trường, tiến hành thực nghiệm, phát triển các mô hình và các quá trình ứng dụng trong khoa học kỹ thuật môi trường.

PO2.5. Kỹ năng mềm

Sinh viên tốt nghiệp có kỹ năng giao tiếp trong phạm vi lĩnh vực môi trường và có khả năng làm việc hiệu quả trong nhóm đa lĩnh vực.

PO3. Tự chủ và Trách nhiệm

PO3.1. Sinh viên tốt nghiệp có ý thức đạo đức nghề nghiệp, nhận thức được ảnh hưởng của hoạt động nghề nghiệp đến môi trường xung quanh. Sinh viên tốt nghiệp cũng nhận thức được tầm quan trọng và có khả năng học tập suốt đời.

4. Chuẩn đầu ra của chương trình đào tạo (Program Learning Outcomes –PLOs)

STT	Chuẩn đầu ra
	Kiến thức
1	Áp dụng các kiến thức toán, khoa học tự nhiên, kỹ thuật để giải quyết các vấn đề trong kỹ thuật môi trường (Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems)
2	Áp dụng kiến thức rộng để xem xét tác động của các giải pháp kỹ thuật môi trường trong bối cảnh toàn cầu, kinh tế,và xã hội (Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context)
	Kỹ năng
3	Nhận diện, diễn đạt và giải quyết các vấn đề kỹ thuật môi trường (Identify, formulate, and solve environmental engineering problems systematically)
4	Thiết kế và tiến hành thí nghiệm, cũng như phân tích và giải thích dữ liệu (Design and conduct classical and modern experimentations, as well as analyze and interpret data)
5	Thiết kế các hệ thống môi trường, các thành phần hoặc các quy trình để đáp ứng các nhu cầu thực tiễn về kinh tế, môi trường, sức khỏe nghề nghiệp và an toàn lao động. (Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety)
6	Sử dụng các kỹ thuật, kỹ năng và các công cụ kỹ thuật hiện đại cần thiết cho việc thực hành trong kỹ thuật môi trường

STT	Chuẩn đầu ra
	(Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering)
7	Thể hiện khả năng giao tiếp hiệu quả, viết báo cáo và trình bày các vấn đề chuyên môn bằng tiếng Anh (Display the ability to communicate effectively in English, writing reports, and presenting professional topics)
8	Làm việc hiệu quả trong nhóm đa ngành để thực hiện các mục tiêu chung (Work effectively on multidisciplinary teams to accomplish a common goal)
	Mức tự chủ và trách nhiệm
9	Thể hiện trách nhiệm đạo đức và nghề nghiệp trong thực tiễn ngành kỹ thuật môi trường (Demonstrate professional and ethical responsibilities in the practice of environmental engineering)
10	Nhận ra nhu cầu, liên tục phát triển chuyên môn và học tập suốt đời (Recognize the need and continue the professional development and lifelong learning)

5. Ma trận giữa mục tiêu đào tạo và chuẩn đầu ra

Bảng 2. Mối quan hệ giữa CĐR của CTĐT và mục tiêu đào tạo

	PLOs(1)	**POs(2)**						
		PO1	**PO2**					**PO3**
		PO1.1	PO2.1	PO2.2	PO2.3	PO2.4	PO2.5	PO3.1
Kiến thức	PLO1	x						
	PLO2	x						
Kỹ năng	PLO3		x					
	PLO4				x			
	PLO5			x				
	PLO6					x		
	PLO7						x	
	PLO8						x	
Tự chủ và trách nhiệm	PLO9							x
	PLO10							x

6. Quy trình đào tạo, điều kiện tốt nghiệp

Căn cứ Quyết định số 1342/QĐ-ĐHQG ngày 30 tháng 9 năm 2022 của Giám đốc Đại học Quốc gia Thành phố Hồ Chí Minh về việc ban hành Quy chế đào tạo trình độ đại học.

Căn cứ Quyết định số 719/QĐ-ĐHQT ngày 06 tháng 12 năm 2021 của Hiệu trưởng trường Đại học Quốc tế về việc ban hành Quy chế đào tạo trình độ đại học theo hệ thống tín chỉ tại trường Đại học Quốc tế.

7. Thang điểm (theo thang điểm chính thức của trường)

Trường quy định thang điểm đánh giá kết quả học tập của người học (Quy chế đào tạo trình độ đại học theo hệ thống tín chỉ tại trường Đại học Quốc tế)

Bảng 3: Thang điểm

Xếp loại	**Thang điểm 100**	**Thang điểm 10**	**Thang điểm 4**	**Thang điểm chữ**
Đạt				
Xuất sắc	90≤ ĐTBTL ≤ 100	9,0 ≤ ĐTBTL ≤ 10	4,0	A^+
Giỏi	80≤ ĐTBTL < 90	8,0 ≤ ĐTBTL < 9,0	3,5	A
Khá	70≤ ĐTBTL < 80	7,0≤ ĐTBTL < 8,0	3,0	B^+
Trung bình khá	60≤ ĐTBTL < 70	6,0≤ ĐTBTL < 7,0	2,5	B
Trung bình	50≤ ĐTBTL < 60	5,0≤ ĐTBTL < 6,0	2,0	C
Không đạt				
Yếu	40 ≤ ĐTBTL < 50	4,0≤ ĐTBTL < 5,0	1,5	D+
Kém	30 ≤ ĐTBTL < 40	3,0≤ ĐTBTL < 4,0	1,0	D
	ĐTBTL < 30	ĐTBTL < 3,0	0,0	F

8. Khối lượng kiến thức toàn khoá

Tổng số tín chỉ: 150 tín chỉ, trong đó phân bổ kiến thức như Bảng 4 (không bao gồm giáo dục thể chất và giáo dục quốc phòng):

Bảng 4. Cấu trúc chương trình đào tạo

TT	**Các khối kiến thức**	**Khối lượng**	
		Số tín chỉ	**%**
I	Khối kiến thức giáo dục đại cương	64	42.7
II	Khối kiến thức cơ sở ngành	32	21.3
III	Kiến thức chuyên ngành	31	20.7
IV	Kiến thức bổ trợ	3	2.0
V	Thực tập, khóa luận/luận văn tốt nghiệp	20	13.3
	Tổng cộng	**150**	**100**

9. Nội dung chương trình đào tạo

Bảng 5. Các môn học thuộc CTĐT

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
I	**Kiến thức giáo dục đại cương**							
I.1	**Lý luận chính trị**							
1.	PE015IU	Triết học Mác Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
2.	PE016IU	Kinh tế chính trị Mác Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	
3.	PE017IU	Chủ nghĩa xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	
4.	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	
5.	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	
		Giáo dục quốc phòng	Military education	Bắt buộc	0	0	0	
				Tổng	**11**			
I.2	**Khoa học xã hội - Nhân văn - Nghệ thuật**							
6.	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
7.	PE008IU	Tư duy phản biện	Critical Thinking	Bắt buộc	3	3	0	
8.	PE020IU	Đạo đức và kỹ năng nghề nghiệp	Engineering Ethics and Professional Skills	Bắt buộc	3	3	0	
				Tổng	**9**			
I.3	**Ngoại ngữ**							
9.	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	
10.	EN008IU	Tiếng Anh chuyên ngành	Listening AE1	Bắt buộc	2	2	0	

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
		1 (kỹ năng nghe)						
11.	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	
12.	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	
				Tổng	**8**			
I.4	**Toán - Tin học - Khoa học tự nhiên - Công nghệ - Môi trường**							
13.	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
14.	CH011IU	Hóa đại cương	Chemistry for Engineers	Bắt buộc	3	3	0	LA1.501
15.	CH012IU	Thực hành hóa đại cương	Chemistry lab	Bắt buộc	1	0	1	
16.	ENEE1015IU	Hóa sinh	Biochemistry	Bắt buộc	3	3	0	
17.	ENEE1016IU	Thực hành hóa sinh	Biochemistry Lab	Bắt buộc	1	0	1	LA2.502
18.	ENEE2013IU	Vi sinh vật môi trường	Environmental Microbiology	Bắt buộc	2	2	0	
19.	ENEE2016IU	Thực hành vi sinh vật môi trường	Environmental Microbiology Lab	Bắt buộc	2	0	2	LA2.502
20.	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
21.	ENEE2017IU	Nhập môn tính toán	Introduction to Computing	Bắt buộc	3	3	0	
22.	ENEE1013IU	Vẽ kỹ thuật	Engineering Drawing	Bắt buộc	2	2	0	
23.	ENEE1014IU	Thực hành vẽ kỹ thuật	Engineering Drawing Lab	Bắt buộc	1	0	1	LA1.505
24.	ENEE2001IU	Nhập môn Kỹ thuật Môi trường	Introduction to Environmental Engineering	Bắt buộc	3	3	0	

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
25.	ENEE2008IU	Sinh thái môi trường	Environmental Ecology	Bắt buộc	3	3	0	
				Tổng	**30**			
I.5	**Kinh tế - Quản lý (sinh viên tự chọn tối thiểu 3 tín chỉ)**							
26.	IS020IU	Kinh tế kỹ thuật	Engineering Economy	Tự chọn	3	3	0	
27.	IT120IU	Khởi nghiệp	Entre- preneurship	Tự chọn	3	3	0	
28.	ENEE4011IU	Quản lý dự án kỹ thuật	Engineering Project Management	Tự chọn	3	3	0	
				Tổng	**3**			
I.6	***Nhóm môn học tự chọn tự do (chọn tối thiểu 03 tín chỉ)***							
29.	*BA115IU*	*Nhập môn Quản trị kinh doanh*	*Introduction to Business Administration*	*Tự chọn*	*3*	*3*	*0*	
30.	*BA154IU*	*Khởi nghiệp và quản lý doanh nghiệp nhỏ*	Entrepreneurship and Small Business Management	*Tự chọn*	*3*	*3*	*0*	
31.	*BT010IU*	*Sinh lý học thực vật*	*Plant physiology*	*Tự chọn*	*3*	*3*	*0*	
32.	CHE3211IU	*Vật liệu nano*	*Nanomaterials*	*Tự chọn*	*3*	*3*	*0*	
33.	*CHE3221IU*	*Vật liệu sinh học*	*Biomaterials*	*Tự chọn*	*3*	*3*	*0*	
				Tổng	**3**			
I.7	**Giáo dục thể chất**							
	PT001IU	Thể dục 1	Physical Training 1	Bắt buộc	3	3	0	
	PT002IU	Thể dục 2	Physical Training 2	Bắt buộc	3	3	0	
				Tổng	**0**			
				Tổng (I)	**64**			
II	**Kiến thức cơ sở ngành**							
34.	ENEE1019IU	Thống kê ứng dụng	Applied Statistics	Bắt buộc	2	2	0	

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
35.	ENEE1020IU	Thực hành thống kê ứng dụng	Applied Statistics Lab	Bắt buộc	1	0	1	LA1.608
36.	ENEE1017IU	Cơ sở hóa phân tích	Fundamental of Analytical Chemistry	Bắt buộc	2	2	0	
37.	ENEE1018IU	Thực hành cơ sở hóa phân tích	Fundamental of Analytical Chemistry Lab	Bắt buộc	1	0	1	LA2.502
38.	ENEE2002IU	Hóa môi trường 1	Environmental Chemistry 1	Bắt buộc	2	2	0	
39.	ENEE2010IU	Thực hành Hóa môi trường 1	Environmental Chemistry 1 Lab	Bắt buộc	2	0	2	LA2.502
40.	ENEE2005IU	Hóa môi trường 2	Environmental Chemistry 2	Bắt buộc	2	2	0	
41.	ENEE2011IU	Thực hành Hóa môi trường 2	Environmental Chemistry 2 Lab	Bắt buộc	2	0	2	LA2.502
42.	ENEE2024IU	Sức bền vật liệu	Mechanics of Materials	Bắt buộc	2	2	0	
43.	ENEE2025IU	Kết cấu công trình môi trường	Basic Theory of Environmental Structures	Bắt buộc	2	2	0	
44.	ENEE2014IU	Truyền nhiệt và truyền khối	Heat and Mass transfer	Bắt buộc	3	3	0	
45.	ENEE1011IU	Thủy lực môi trường	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	
46.	ENEE1012IU	Thực hành thủy lực môi trường	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	LA1.103
47.	ENEE2020IU	Các quá trình hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	2	2	0	
48.	ENEE2021IIU	Thực hành các quá trình hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	LA2.502

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
49.	ENEE2022IIU	Các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering	Bắt buộc	2	2	0	
50.	ENEE2023IU	Thực hành các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	LA2.502
51.	CHE2081IU	Sức khỏe nghề nghiệp, an toàn và môi trường	Occupational Health Safety and Environment (HSE)	Bắt buộc	2	2	0	
Tổng (II)					**32**			
III	**Kiến thức chuyên ngành**							
52.	ENEE3012IU	Xử lý nước cấp	Water Treatment	Bắt buộc	3	3	0	
53.	ENEE3013IU	Thực hành xử lý nước cấp	Water Treatment Lab	Bắt buộc	1	0	1	LA2.502
54.	ENEE3014IU	Xử lý nước thải sinh hoạt	Municipal Wastewater Treatment	Bắt buộc	3	3	0	
55.	ENEE3015IU	Thực hành xử lý nước thải sinh hoạt	Municipal Wastewater Treatment Lab	Bắt buộc	1	0	1	LA2.502
56.	ENEE3016IU	Xử lý nước thải công nghiệp	Industrial Wastewater Treatment	Bắt buộc	2	2	0	
57.	ENEE3017IU	Thực hành xử lý nước thải công nghiệp	Industrial Wastewater Treatment Lab	Bắt buộc	2	0	2	LA2.502
58.	ENEE3018IU	Quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management	Bắt buộc	3	3	0	
59.	ENEE3019IU	Thực hành quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management Lab	Bắt buộc	1	0	1	LA2.502

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
60.	ENEE3020IU	Kiểm soát ô nhiễm không khí	Air pollution control	Bắt buộc	3	3	0	
61.	ENEE3021IU	Thực hành kiểm soát ô nhiễm không khí	Air pollution control Lab	Bắt buộc	1	0	1	LA2.502
62.	ENEE3110IU	Đồ án 1	Project 1	Bắt buộc	2	0	2	
63.	ENEE3111IU	Đồ án 2	Project 2	Bắt buộc	2	0	2	
				Tổng	**24**			
	Tự chọn kỹ sư (chọn tối thiểu 07 tín chỉ)							
64.	*ENEE4016IU*	*Đo bóc khối lượng và ước tính chi phí xây dựng*	*Construction Measurement and Cost Estimating*	*Tự chọn*	*3*	*3*	*0*	
65.	*ENEE3105IU*	*Vận hành nhà máy xử lý*	*Treatment Plant Operation*	*Tự chọn*	*3*	*3*	*0*	
66.	ENEE4019IU	*Thiết kế thí nghiệm*	*Experimental Design*	*Tự chọn*	*2*	*2*	*0*	
67.	ENEE4020IU	*Thực hành thiết kế thí nghiệm*	*Experimental Design Lab*	*Tự chọn*	*2*	*0*	*2*	
68.	ENEE4021IU	*Thiết kế đường ống và thiết bị*	*Pipe and Instruments Design*	*Tự chọn*	*2*	*2*	*0*	
69.	ENEE4022U	*Thực hành thiết kế đường ống và thiết bị*	*Pipe and Instruments Design Lab*	*Tự chọn*	*2*	*0*	*2*	
70.	*ENEE3103IU*	*Hệ thống cấp thoát nước*	*Water Supply and Drainage Systems*	*Tự chọn*	*3*	*3*	*0*	
71.	ENEE3112IU	*Đồ án 3*	*Project 3*	*Tự chọn*	*1*	*0*	*1*	
72.	ENEE3113IU	*Đồ án 4*	*Project 4*	*Tự chọn*	*2*	*0*	*2*	
				Tổng	**7**			
				Tổng (III)	**31**			

STT	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
IV	**Kiến thức bổ trợ**							
73.	ENEE4017IU	Vẽ kỹ thuật nâng cao	Advanced Engineering Drawing	Bắt buộc	2	2	0	
74.	ENEE4018IU	Thực hành vẽ kỹ thuật nâng cao	Advanced Engineering Drawing Lab	Bắt buộc	1	0	1	LA1.505
				Tổng (IV)	**3**			
V	**Thực tập, khóa luận/luận văn tốt nghiệp**							
75.	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	
76.	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	
77.	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	
78.	ENEE5000IU	Đề cương Luận văn tốt nghiệp	Pre-thesis	Bắt buộc	2	0	2	
79.	ENEE5003IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	
				Tổng (V)	**20**			
	Tổng số (tín chỉ)				**150**			

10. Dự kiến kế hoạch giảng dạy *(phân bổ các môn học theo từng học kỳ)*

Tùy vào trình độ tiếng Anh của người học đạt trình độ AE1, IE2, IE1 và IE0, kế hoạch giảng dạy các môn học được cụ thể tương ứng được trình bày trong các Bảng 6, Bảng 7, Bảng 8 và Bảng 9.

10.1. Trình độ AE1

Bảng 6. Kế hoạch giảng dạy đối với người học đạt trình độ AE1

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
I (17)	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	
	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
	CH011IU	Hóa đại cương	Chemistry for Engineers	Bắt buộc	3	3	0	
	CH012IU	Thực hành hóa đại cương	Chemistry Lab	Bắt buộc	1	0	1	SH: CH011IU
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	SH: PE015IU
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	3	0	
II (17)	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	HT: EN007IU
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	HT: EN008IU
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	HT:PE015IU; PE016IU
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
	PE021IU	Pháp luật đại cương Việt Nam	General Law	Bắt buộc	3	3	0	
	PE008IU	Tư duy phản biện	Critical Thinking	Bắt buộc	3	3	0	
	PE020IU	Đạo đức và kỹ năng nghề nghiệp	Engineering Ethics and	Bắt buộc	3	3	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
			Professional Skills					
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	3	0	
III (18)	ENEE2017IU	Nhập môn tính toán	Introduction to Computing	Bắt buộc	3	3	0	
	ENEE1017IU	Cơ sở hóa phân tích	Fundamental of Analytical Chemistry	Bắt buộc	2	2	0	HT: CH011IU
	ENEE1018IU	Thực hành cơ sở hóa phân tích	Fundamental of Analytical Chemistry Lab	Bắt buộc	1	0	1	HT: CH012IU SH: ENEE1017IU
	ENEE1015IU	Hóa sinh	Biochemistry	Bắt buộc	3	3	0	
	ENEE1016IU	Thực hành hóa sinh	Biochemistry Lab	Bắt buộc	1	0	1	SH: ENEE1015IU
	ENEE1013IU	Vẽ kỹ thuật	Engineering Drawing	Bắt buộc	2	2	0	
	ENEE1014IU	Thực hành vẽ kỹ thuật	Engineering Drawing Lab	Bắt buộc	1	0	1	SH: ENEE1013IU
	ENEE2024IU	Sức bền vật liệu	Mechanics of Materials	Bắt buộc	2	2	0	
	ENEE2008IU	Sinh thái môi trường	Environmental Ecology	Bắt buộc	3	3	0	
IV (18)	ENEE2001IU	Nhập môn Kỹ thuật Môi trường	Introduction to Environmental Engineering	Bắt buộc	3	3	0	
	ENEE2013IU	Vi sinh vật môi trường	Environmental Microbiology	Bắt buộc	2	2	0	
	ENEE2016IU	Thực hành vi sinh vật môi trường	Environmental Microbiology Lab	Bắt buộc	2	0	2	SH: ENEE2013IU
	ENEE2002IU	Hóa môi trường 1	Environmental Chemistry 1	Bắt buộc	2	2	0	HT: ENEE1017IU
	ENEE2010IU	Thực hành hóa môi trường 1	Environmental Chemistry 1 Lab	Bắt buộc	2	0	2	HT: ENEE1018IU SH: ENEE2002IU
	ENEE2005IU	Hóa Môi trường 2	Environmental Chemistry 2	Bắt buộc	2	2	0	SH: ENEE2011IU
	ENEE2011IU	Thực hành hóa môi trường 2	Environmental Chemistry 2 Lab	Bắt buộc	2	0	2	
	ENEE1019IU	Thống kê ứng dụng trong môi trường	Applied Statistics	Bắt buộc	2	2	0	HT: ENEE2017IU
	ENEE1020IU	Thực hành thống kê ứng	Applied Statistics Lab	Bắt buộc	1	0	1	SH: ENEE1019IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
		dụng trong môi trường						
Hè (0)		Giáo dục quốc phòng	Military education	Bắt buộc	0			
V (18)	ENEE1011IU	Thủy lực môi trường	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	
	ENEE1012IU	Thực hành thủy lực môi trường	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	SH: ENEE1011IU
	ENEE2020IU	Các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE2002IU
	ENEE2021IIU	Thực hành các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE2010IU SH: ENEE2020IU
	ENEE2022IIU	Các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE1015IU; ENEE2013IU
	ENEE2023IU	Thực hành các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE1015IU; ENEE2013IU SH: ENEE2022IU
	PE018IU	Lịch sử Đảng cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	HT: PE017IU
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	HT: PE017IU
	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	HT: ENEE2001IU
	Sinh viên tự chọn tối thiểu 3 tín chỉ				3	3	0	
	IS020IU	*Kinh tế kỹ thuật*	*Engineering Economy*	*Tự chọn*	*3*	*3*	*0*	
	IT120IU	*Khởi nghiệp*	*Entre-preneurship*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4011IU	*Quản lý dự án kỹ thuật*	*Engineering Project Management*	*Tự chọn*	*3*	*3*	*0*	
VI (17)	ENEE2025IU	Kết cấu công trình môi trường	Basic Theory of Environmental Structures	Bắt buộc	2	2	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE4017IU	Vẽ kỹ thuật nâng cao	Advanced Engineering Drawing	Bắt buộc	2	2	0	HT: ENEE1013IU
	ENEE4018IU	Thực hành vẽ kỹ thuật nâng cao	Advanced Engineering Drawing Lab	Bắt buộc	1	0	1	HT: ENEE1014IU SH: ENEE4018IU
	ENEE3012IU	Xử lý nước cấp	Water Treatment	Bắt buộc	3	3	0	HT: ENEE2010IU; ENEE2020IU
	ENEE3013IU	Thực hành xử lý nước cấp	Water Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2010IU; ENEE2020IU SH: ENEE3012IU
	ENEE3014IU	Xử lý nước thải sinh hoạt	Municipal Wastewater Treatment	Bắt buộc	3	3	0	HT: ENEE2022IU; ENEE2010IU
	ENEE3015IU	Thực hành xử lý nước thải sinh hoạt	Municipal Wastewater Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2022IU; ENEE2010IU SH: ENEE3014IU
	ENEE3016IU	Xử lý nước thải công nghiệp	Industrial Wastewater Treatment	Bắt buộc	2	2	0	HT: ENEE2010IU
	ENEE3017IU	Thực hành xử lý nước thải công nghiệp	Industrial Wastewater Treatment Lab	Bắt buộc	2	0	2	HT: ENEE2010IU SH: ENEE3016IU
Hè (3)	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	HT: ENEE5004IU
VII (14)	ENEE3110IU	Đồ án 1	Project 1	Bắt buộc	2	0	2	HT: ENEE3012IU; ENEE4017IU
	ENEE3111IU	Đồ án 2	Project 2	Bắt buộc	2	0	2	HT: ENEE3014IU; ENEE4017IU
	ENEE2014IU	Truyền nhiệt và truyền khối	Heat and Mass Transfer	Bắt buộc	3	3	0	
	Nhóm môn học kỹ sư (chọn tối thiểu 07 tín chỉ)							
	ENEE4016IU	*Đo bóc khối lượng và ước tính chi phí xây dựng*	*Construction-Measurement-and-Cost-Estimating*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3105IU	*Vận hành nhà máy xử lý*	*Treatment Plant Operation*	*Tự chọn*	*3*	*3*	*0*	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE4019IU	*Thiết kế thí nghiệm*	*Experimental Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1019IU*
	ENEE4020IU	*Thực hành thiết kế thí nghiệm*	*Experimental Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4019IU*
	ENEE4021IU	*Thiết kế đường ống và thiết bị*	*Pipe and Instruments Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1011IU*
	ENEE4022U	*Thực hành thiết kế đường ống và thiết bị*	*Pipe and Instruments Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4021IU*
	ENEE3103IU	*Hệ thống cấp thoát nước*	*Water Supply and Drainage Systems*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3112IU	*Đồ án môn học 3*	*Project 3*	*Tự chọn*	*1*	*0*	*1*	*HT: ENEE3020IU; ENEE4017IU*
	ENEE3113IU	*Đồ án môn học 4*	*Project 4*	*Tự chọn*	*2*	*0*	*2*	*HT: ENEE3018IU; ENEE3019IU*
VIII (15)	CHE2081IU	Sức khỏe nghề nghiệp, An toàn và Môi trường	Occupational Health Safety and Environment	Bắt buộc	2	2	0	
	ENEE5007IU	Đề cương luận văn tốt nghiệp	Pre-thesis	Bắt buộc	2	0	2	HT: ENEE5006IU
	ENEE3018IU	Quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management	Bắt buộc	3	3	0	HT: ENEE2005IU; ENEE2011IU
	ENEE3019IU	Thực hành quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management Lab	Bắt buộc	1	0	1	HT: ENEE2005IU; ENEE2011IU SH: ENEE3018IU
	ENEE3020IU	Kiểm soát ô nhiễm không khí	Air pollution control	Bắt buộc	3	3	0	HT: ENEE2014IU; ENEE2011U
	ENEE3021IU	Thực hành kiểm soát ô nhiễm không khí	Air pollution control Lab	Bắt buộc	1	0	1	SH: ENEE3020IU
	Nhóm môn học tự chọn tự do (chọn tối thiểu 3 tín chỉ)							
	BA115IU	*Nhập môn quản trị kinh doanh*	*Introduction to Business Administration*	*Tự chọn*	*3*	*3*	*0*	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	BA154IU	*Khởi nghiệp và quản lý doanh nghiệp nhỏ*	*Entrepreneurship and Small Business Management*	*Tự chọn*	*3*	*3*	*0*	
	BT010IU	*Sinh lý học thực vật*	*Plant physiology*	*Tự chọn*	*3*	*3*	*0*	
	CHE3211IU	*Vật liệu nano*	*Nanomaterials*	*Tự chọn*	*3*	*3*	*0*	
	CHE3221IU	*Vật liệu sinh học*	*Biomaterials*	*Tự chọn*	*3*	*3*	*0*	
Hè (3)	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	HT: ENEE3110IU; ENEE3111IU; CHE2081IU
IX (10)	ENEE5003IU		Thesis		10	0	10	HT: ENEE5007IU
	Tổng			**150**				

10.2. Trình độ IE2

Bảng 7. Kế hoạch giảng dạy đối với người học đạt trình độ IE2

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
I (5)	ENTP02	Tiếng Anh tăng cường 2 - Chương trình liên kết	Intensive English 2 – Twinning Program	Bắt buộc	13	13	0	
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	SH: PE015IU
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	3	0	
II (19)	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	
	EN008IU	Tiếng Anh chuyên ngành	Listening AE1	Bắt buộc	2	2	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
		1 (kỹ năng nghe)						
	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
	CH011IU	Hóa đại cương	Chemistry for Engineers	Bắt buộc	3	3	0	
	CH012IU	Thực hành hóa đại cương	Chemistry Lab	Bắt buộc	1	0	1	SH:CH011IU
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	HT:PE015IU; PE016IU
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	3	0	
III (22)	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	HT: EN007IU
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	HT: EN008IU
	ENEE2017IU	Nhập môn tính toán	Introduction to Computing	Bắt buộc	3	3	0	
	ENEE1017IU	Cơ sở hóa phân tích	Fundamental of Analytical Chemistry	Bắt buộc	2	2	0	HT: CH011IU
	ENEE1018IU	Thực hành cơ sở hóa phân tích	Fundamental of Analytical Chemistry Lab	Bắt buộc	1	0	1	HT: CH012IU SH: ENEE1017IU
	ENEE1015IU	Hóa sinh	Biochemistry	Bắt buộc	3	3	0	
	ENEE1016IU	Thực hành hóa sinh	Biochemistry Lab	Bắt buộc	1	0	1	SH: ENEE1015IU
	ENEE1013IU	Vẽ kỹ thuật	Engineering Drawing	Bắt buộc	2	2	0	
	ENEE1014IU	Thực hành vẽ kỹ thuật	Engineering Drawing Lab	Bắt buộc	1	0	1	SH: ENEE1013IU
	ENEE2024IU	Sức bền vật liệu	Mechanics of Materials	Bắt buộc	2	2	0	
	ENEE2008IU	Sinh thái môi trường	Environmental Ecology	Bắt buộc	3	3	0	
IV (21)	PE008IU	Tư duy phản biện	Critical Thinking	Bắt buộc	3	3	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE2001IU	Nhập môn Kỹ thuật Môi trường	Introduction to Environmental Engineering	Bắt buộc	3	3	0	
	ENEE2013IU	Vi sinh vật môi trường	Environmental Microbiology	Bắt buộc	2	2	0	
	ENEE2016IU	Thực hành vi sinh vật môi trường	Environmental Microbiology Lab	Bắt buộc	2	0	2	SH: ENEE2013IU
	ENEE2002IU	Hóa môi trường 1	Environmental Chemistry 1	Bắt buộc	2	2	0	HT: ENEE1017IU
	ENEE2010IU	Thực hành hóa môi trường 1	Environmental Chemistry 1 Lab	Bắt buộc	2	0	2	HT: ENEE1018IU SH: ENEE2002IU
	ENEE2005IU	Hóa Môi trường 2	Environmental Chemistry 2	Bắt buộc	2	2	0	SH: ENEE2011IU
	ENEE2011IU	Thực hành hóa môi trường 2	Environmental Chemistry 2 Lab	Bắt buộc	2	0	2	
	ENEE1019IU	Thống kê ứng dụng trong môi trường	Applied Statistics	Bắt buộc	2	2	0	HT: ENEE2017IU
	ENEE1020IU	Thực hành thống kê ứng dụng trong môi trường	Applied Statistics Lab	Bắt buộc	1	0	1	SH: ENEE1019IU
Hè (0)		Giáo dục quốc phòng	Military education	Bắt buộc	0			
V (18)	ENEE1011IU	Thủy lực môi trường	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	
	ENEE1012IU	Thực hành thủy lực môi trường	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE2002IU
	ENEE2020IU	Các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE2010IU SH: ENEE2020IU
	ENEE2021IIU	Thực hành các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	SH: ENEE2020IU
	ENEE2022IIU	Các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE1015IU; ENEE2013IU
	ENEE2023IU	Thực hành các quá trình sinh	Biological Processes for	Bắt buộc	1	0	1	SH: ENEE2022IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
		học trong kỹ thuật môi trường	Environmental Engineering Lab					
	PE018IU	Lịch sử Đảng cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	HT: PE017IU
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	HT: PE017IU
	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	HT: ENEE2001IU
	Sinh viên tự chọn tối thiểu 3 tín chỉ				3	3	0	
	IS020IU	*Kinh tế kỹ thuật*	*Engineering Economy*	*Tự chọn*	*3*	*3*	*0*	
	IT120IU	*Khởi nghiệp*	*Entre-preneurship*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4011IU	*Quản lý dự án kỹ thuật*	*Engineering Project Management*	*Tự chọn*	*3*	*3*	*0*	
VI (17)	ENEE2025IU	Kết cấu công trình môi trường	Basic Theory of Environmental Structures	Bắt buộc	2	2	0	
	ENEE4017IU	Vẽ kỹ thuật nâng cao	Advanced Engineering Drawing	Bắt buộc	2	2	0	HT: ENEE1013IU
	ENEE4018IU	Thực hành vẽ kỹ thuật nâng cao	Advanced Engineering Drawing Lab	Bắt buộc	1	0	1	HT: ENEE1014IU SH: ENEE4018IU
	ENEE3012IU	Xử lý nước cấp	Water Treatment	Bắt buộc	3	3	0	HT: ENEE2010IU; ENEE2020IU
	ENEE3013IU	Thực hành xử lý nước cấp	Water Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2010IU; ENEE2020IU SH: ENEE3012IU
	ENEE3014IU	Xử lý nước thải sinh hoạt	Municipal Wastewater Treatment	Bắt buộc	3	3	0	HT: ENEE2022IU; ENEE2010IU
	ENEE3015IU	Thực hành xử lý nước thải sinh hoạt	Municipal Wastewater Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2022IU; ENEE2010IU SH: ENEE3014IU
	ENEE3016IU	Xử lý nước thải công nghiệp	Industrial Wastewater Treatment	Bắt buộc	2	2	0	HT: ENEE2010IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE3017IU	Thực hành xử lý nước thải công nghiệp	Industrial Wastewater Treatment Lab	Bắt buộc	2	0	2	HT: ENEE2010IU SH: ENEE3016IU
Hè (3)	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	HT: ENEE5004IU
VII (17)	PE020IU	Đạo đức và kỹ năng nghề nghiệp	Engineering Ethics and Professional Skills	Bắt buộc	3	3	0	
	ENEE3110IU	Đồ án 1	Project 1	Bắt buộc	2	0	2	HT: ENEE3012IU; ENEE4017IU
	ENEE3111IU	Đồ án 2	Project 2	Bắt buộc	2	0	2	HT: ENEE3014IU; ENEE4017IU
	ENEE2014IU	Truyền nhiệt và truyền khối	Heat and Mass Transfer	Bắt buộc	3	3	0	
	Nhóm môn học kỹ sư (chọn tối thiểu 07 tín chỉ)							
	ENEE4016IU	*Đo bóc khối lượng và ước tính chi phí xây dựng*	*Construction-Measurement-and-Cost-Estimating*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3105IU	*Vận hành nhà máy xử lý*	*Treatment Plant Operation*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4019IU	*Thiết kế thí nghiệm*	*Experimental Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1019IU*
	ENEE4020IU	*Thực hành thiết kế thí nghiệm*	*Experimental Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4019IU*
	ENEE4021IU	*Thiết kế đường ống và thiết bị*	*Pipe and Instruments Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1011IU*
	ENEE4022U	*Thực hành thiết kế đường ống và thiết bị*	*Pipe and Instruments Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4021IU*
	ENEE3103IU	*Hệ thống cấp thoát nước*	*Water Supply and Drainage Systems*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3112IU	*Đồ án môn học 3*	*Project 3*	*Tự chọn*	*1*	*0*	*1*	*HT: ENEE3020IU; ENEE4017IU*
	ENEE3113IU	*Đồ án môn học 4*	*Project 4*	*Tự chọn*	*2*	*0*	*2*	*HT: ENEE3018IU; ENEE3019IU*

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
VIII (15)	CHE2081IU	Sức khỏe nghề nghiệp, An toàn và Môi trường	Occupational Health Safety and Environment	Bắt buộc	2	2	0	
	ENEE5007IU	Đề cương luận văn tốt nghiệp	Pre-thesis	Bắt buộc	2	0	2	HT: ENEE5006IU
	ENEE3018IU	Quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management	Bắt buộc	3	3	0	HT: ENEE2005IU; ENEE2011IU
	ENEE3019IU	Thực hành quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management Lab	Bắt buộc	1	0	1	HT: ENEE2005IU; ENEE2011IU SH: ENEE3018IU
	ENEE3020IU	Kiểm soát ô nhiễm không khí	Air pollution control	Bắt buộc	3	3	0	HT: ENEE2014IU; ENEE2011IU
	ENEE3021IU	Thực hành kiểm soát ô nhiễm không khí	Air pollution control Lab	Bắt buộc	1	0	1	SH: ENEE3020IU
	Nhóm môn học tự chọn tự do (chọn tối thiểu 3 tín chỉ)							
	BA115IU	*Nhập môn quản trị kinh doanh*	*Introduction to Business Administration*	*Tự chọn*	*3*	*3*	*0*	
	BA154IU	*Khởi nghiệp và quản lý doanh nghiệp nhỏ*	*Entrepreneurship and Small Business Management*	*Tự chọn*	*3*	*3*	*0*	
	BT010IU	*Sinh lý học thực vật*	*Plant physiology*	*Tự chọn*	*3*	*3*	*0*	
	CHE3211IU	*Vật liệu nano*	*Nanomaterials*	*Tự chọn*	*3*	*3*	*0*	
	CHE3221IU	*Vật liệu sinh học*	*Biomaterials*	*Tự chọn*	*3*	*3*	*0*	
Hè (3)	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	HT: ENEE3110IU; ENEE3111IU; CHE2081IU
IX(10)	ENEE5003IU		Thesis		10	0	10	HT: ENEE5007IU
			Tổng	**150**				

10.3. Trình độ IE1

Bảng 8. Kế hoạch giảng dạy đối với người học đạt trình độ IE1

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
I (0)	ENTP01	Tiếng Anh tăng cường 1 – Chương trình liên kết	Intensive English 1 – Twinning Program	Bắt buộc	17	17	0	
	ENTP02	Tiếng Anh tăng cường 2 - Chương trình liên kết	Intensive English 2 – Twinning Program	Bắt buộc	13	13	0	
II (19)	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
	CH011IU	Hóa đại cương	Chemistry for Engineers	Bắt buộc	3	3	0	
	CH012IU	Thực hành hóa đại cương	Chemistry Lab	Bắt buộc	1	0	1	SH: CH011IU
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	SH: PE015IU
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	3	0	
III (20)	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	HT: EN007IU
	ENEE2017IU	Nhập môn tính toán	Introduction to Computing	Bắt buộc	3	3	0	
	ENEE1017IU	Cơ sở hóa phân tích	Fundamental of Analytical Chemistry	Bắt buộc	2	2	0	HT: CH011IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE1018IU	Thực hành cơ sở hóa phân tích	Fundamental of Analytical Chemistry Lab	Bắt buộc	1	0	1	HT: CH012IU SH: ENEE1017IU
	ENEE1015IU	Hóa sinh	Biochemistry	Bắt buộc	3	3	0	
	ENEE1016IU	Thực hành hóa sinh	Biochemistry Lab	Bắt buộc	1	0	1	SH: ENEE1015IU
	ENEE1013IU	Vẽ kỹ thuật	Engineering Drawing	Bắt buộc	2	2	0	
	ENEE1014IU	Thực hành vẽ kỹ thuật	Engineering Drawing Lab	Bắt buộc	1	0	1	SH:ENEE1013IU
	ENEE2024IU	Sức bền vật liệu	Mechanics of Materials	Bắt buộc	2	2	0	
	ENEE2008IU	Sinh thái môi trường	Environmental Ecology	Bắt buộc	3	3	0	
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	3	0	
IV (23)	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	HT: EN008IU
	PE008IU	Tư duy phản biện	Critical Thinking	Bắt buộc	3	3	0	
	ENEE2001IU	Nhập môn Kỹ thuật Môi trường	Introduction to Environmental Engineering	Bắt buộc	3	3	0	
	ENEE2013IU	Vi sinh vật môi trường	Environmental Microbiology	Bắt buộc	2	2	0	
	ENEE2016IU	Thực hành vi sinh vật môi trường	Environmental Microbiology Lab	Bắt buộc	2	0	2	SH: ENEE2013IU
	ENEE2002IU	Hóa môi trường 1	Environmental Chemistry 1	Bắt buộc	2	2	0	HT: ENEE1017IU
	ENEE2010IU	Thực hành hóa môi trường 1	Environmental Chemistry 1 Lab	Bắt buộc	2	0	2	HT: ENEE1018IU SH: ENEE2002IU
	ENEE2005IU	Hóa Môi trường 2	Environmental Chemistry 2	Bắt buộc	2	2	0	SH: ENEE2011IU
	ENEE2011IU	Thực hành hóa môi trường 2	Environmental Chemistry 2 Lab	Bắt buộc	2	0	2	
	ENEE1019IU	Thống kê ứng dụng trong môi trường	Applied Statistics	Bắt buộc	2	2	0	HT: ENEE2017IU
	ENEE1020IU	Thực hành thống kê ứng dụng trong môi trường	Applied Statistics Lab	Bắt buộc	1	0	1	SH: ENEE1019IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
Hè (0)		Giáo dục quốc phòng	Military education	Bắt buộc	0			
V (19)	ENEE1011IU	Thủy lực môi trường	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	
	ENEE1012IU	Thực hành thủy lực môi trường	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	SH: ENEE1011IU
	ENEE2020IU	Các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE2002IU
	ENEE2021IIU	Thực hành các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE2010IU SH: ENEE2020IU
	ENEE2022IIU	Các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE1015IU; ENEE2013IU
	ENEE2023IU	Thực hành các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE1015IU; ENEE2013IU SH: ENEE2022IU
	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	HT:PE015IU; PE016IU
	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	HT: ENEE2001IU
	Sinh viên tự chọn tối thiểu 3 tín chỉ				3	3	0	
	IS020IU	*Kinh tế kỹ thuật*	*Engineering Economy*	*Tự chọn*	*3*	*3*	*0*	
	IT120IU	*Khởi nghiệp*	*Entre-preneurship*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4011IU	*Quản lý dự án kỹ thuật*	*Engineering Project Management*	*Tự chọn*	*3*	*3*	*0*	
VI (21)	ENEE2025IU	Kết cấu công trình môi trường	Basic Theory of Environmental Structures	Bắt buộc	2	2	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE4017IU	Vẽ kỹ thuật nâng cao	Advanced Engineering Drawing	Bắt buộc	2	2	0	HT: ENEE1013IU
	ENEE4018IU	Thực hành vẽ kỹ thuật nâng cao	Advanced Engineering Drawing Lab	Bắt buộc	1	0	1	HT: ENEE1014IU SH: ENEE4018IU
	ENEE3012IU	Xử lý nước cấp	Water Treatment	Bắt buộc	3	3	0	HT: ENEE2010IU; ENEE2020IU
	ENEE3013IU	Thực hành xử lý nước cấp	Water Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2010IU; ENEE2020IU SH: ENEE3012IU
	ENEE3014IU	Xử lý nước thải sinh hoạt	Municipal Wastewater Treatment	Bắt buộc	3	3	0	HT: ENEE2022IU; ENEE2010IU
	ENEE3015IU	Thực hành xử lý nước thải sinh hoạt	Municipal Wastewater Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2022IU; ENEE2010IU SH: ENEE3014IU
	ENEE3016IU	Xử lý nước thải công nghiệp	Industrial Wastewater Treatment	Bắt buộc	2	2	0	HT: ENEE2010IU
	ENEE3017IU	Thực hành xử lý nước thải công nghiệp	Industrial Wastewater Treatment Lab	Bắt buộc	2	0	2	HT: ENEE2010IU SH: ENEE3016IU
	PE018IU	Lịch sử Đảng cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	HT: PE017IU
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	HT: PE017IU
Hè (3)	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	HT: ENEE5004IU
VII (17)	PE020IU	Đạo đức và kỹ năng nghề nghiệp	Engineering Ethics and Professional Skills	Bắt buộc	3	3	0	
	ENEE3110IU	Đồ án 1	Project 1	Bắt buộc	2	0	2	HT: ENEE3012IU; ENEE4017IU
	ENEE3111IU	Đồ án 2	Project 2	Bắt buộc	2	0	2	HT: ENEE3014IU; ENEE4017IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE2014IU	Truyền nhiệt và truyền khối	Heat and Mass Transfer	Bắt buộc	3	3	0	
	Nhóm môn học kỹ sư (chọn tối thiểu 07 tín chỉ)							
	ENEE4016IU	*Đo bóc khối lượng và ước tính chi phí xây dựng*	*Construction-Measurement-and-Cost-Estimating*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3105IU	*Vận hành nhà máy xử lý*	*Treatment Plant Operation*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4019IU	*Thiết kế thí nghiệm*	*Experimental Design*	*Tự chọn*	*2*	*2*	*0*	HT: ENEE1019IU
	ENEE4020IU	*Thực hành thiết kế thí nghiệm*	*Experimental Design Lab*	*Tự chọn*	*2*	*0*	*2*	SH: ENEE4019IU
	ENEE4021IU	*Thiết kế đường ống và thiết bị*	*Pipe and Instruments Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1011IU*
	ENEE4022U	*Thực hành thiết kế đường ống và thiết bị*	*Pipe and Instruments Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4021IU*
	ENEE3103IU	*Hệ thống cấp thoát nước*	*Water Supply and Drainage Systems*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3112IU	*Đồ án môn học 3*	*Project 3*	*Tự chọn*	*1*	*0*	*1*	*HT: ENEE3020IU; ENEE4017IU*
	ENEE3113IU	*Đồ án môn học 4*	*Project 4*	*Tự chọn*	*2*	*0*	*2*	*HT: ENEE3018IU; ENEE3019IU*
VIII (15)	CHE2081IU	Sức khỏe nghề nghiệp, An toàn và Môi trường	Occupational Health Safety and Environment	Bắt buộc	2	2	0	
	ENEE5007IU	Đề cương luận văn tốt nghiệp	Pre-thesis	Bắt buộc	2	0	2	HT: ENEE5006IU
	ENEE3018IU	Quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management	Bắt buộc	3	3	0	HT: ENEE2005IU; ENEE2011IU
	ENEE3019IU	Thực hành quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management Lab	Bắt buộc	1	0	1	HT: ENEE2005IU; ENEE2011IU SH: ENEE3018IU
	ENEE3020IU	Kiểm soát ô nhiễm không khí	Air pollution control	Bắt buộc	3	3	0	HT: ENEE2014IU; ENEE2011IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE3021IU	Thực hành kiểm soát ô nhiễm không khí	Air pollution control Lab	Bắt buộc	1	0	1	SH: ENEE3020IU
	Nhóm môn học tự chọn tự do (chọn tối thiểu 3 tín chỉ)							
	BA115IU	*Nhập môn quản trị kinh doanh*	*Introduction to Business Administration*	*Tự chọn*	*3*	*3*	*0*	
	BA154IU	*Khởi nghiệp và quản lý doanh nghiệp nhỏ*	*Entrepreneurship and Small Business Management*	*Tự chọn*	*3*	*3*	*0*	
	BT010IU	*Sinh lý học thực vật*	*Plant physiology*	*Tự chọn*	*3*	*3*	*0*	
	CHE3211IU	*Vật liệu nano*	*Nanomaterials*	*Tự chọn*	*3*	*3*	*0*	
	CHE3221IU	*Vật liệu sinh học*	*Biomaterials*	*Tự chọn*	*3*	*3*	*0*	
Hè (3)	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	HT: ENEE3110IU; ENEE3111IU; CHE2081IU
IX(10)	ENEE5003IU		Thesis		10	0	10	HT: ENEE5007IU
			Tổng	**150**				

10.4. Trình độ IE0

Bảng 9. Kế hoạch giảng dạy đối với người học đạt trình độ IE0

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
I (0)	ENTP00	Tiếng Anh tăng cường 0 – Chương trình liên kết	Intensive English 0 – Twinning Program	Bắt buộc	17	17	0	
	ENTP01	Tiếng Anh tăng cường 1 – Chương trình liên kết	Intensive English 1 – Twinning Program	Bắt buộc	17	17	0	
II (9)	ENTP02	Tiếng Anh tăng cường 2 - Chương trình liên kết	Intensive English 2 – Twinning Program	Bắt buộc	13	13	0	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	CH011IU	Hóa đại cương	Chemistry for Engineers	Bắt buộc	3	3	0	
	CH012IU	Thực hành hóa đại cương	Chemistry Lab	Bắt buộc	1	0	1	SH: CH011IU
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	SH: PE015IU
III (20)	ENEE2017IU	Nhập môn tính toán	Introduction to Computing	Bắt buộc	3	3	0	
	ENEE1017IU	Cơ sở hóa phân tích	Fundamental of Analytical Chemistry	Bắt buộc	2	2	0	HT: CH011IU
	ENEE1018IU	Thực hành cơ sở hóa phân tích	Fundamental of Analytical Chemistry Lab	Bắt buộc	1	0	1	HT: CH012IU SH: ENEE1017IU
	ENEE1015IU	Hóa sinh	Biochemistry	Bắt buộc	3	3	0	
	ENEE1016IU	Thực hành hóa sinh	Biochemistry Lab	Bắt buộc	1	0	1	SH: ENEE1015IU
	ENEE1013IU	Vẽ kỹ thuật	Engineering Drawing	Bắt buộc	2	2	0	
	ENEE1014IU	Thực hành vẽ kỹ thuật	Engineering Drawing Lab	Bắt buộc	1	0	1	SH: ENEE1013IU
	ENEE2024IU	Sức bền vật liệu	Mechanics of Materials	Bắt buộc	2	2	0	
	ENEE2008IU	Sinh thái môi trường	Environmental Ecology	Bắt buộc	3	3	0	
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	3	0	
IV (21)	ENEE2001IU	Nhập môn Kỹ thuật Môi trường	Introduction to Environmental Engineering	Bắt buộc	3	3	0	
	ENEE2013IU	Vi sinh vật môi trường	Environmental Microbiology	Bắt buộc	2	2	0	
	ENEE2016IU	Thực hành vi sinh vật môi trường	Environmental Microbiology Lab	Bắt buộc	2	0	2	SH: ENEE2013IU
	ENEE2002IU	Hóa môi trường 1	Environmental Chemistry 1	Bắt buộc	2	2	0	HT: ENEE1017IU
	ENEE2010IU	Thực hành hóa môi trường 1	Environmental Chemistry 1 Lab	Bắt buộc	2	0	2	HT: ENEE1018IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
								SH: ENEE2002IU
	ENEE2005IU	Hóa Môi trường 2	Environmental Chemistry 2	Bắt buộc	2	2	0	SH: ENEE2011IU
	ENEE2011IU	Thực hành hóa môi trường 2	Environmental Chemistry 2 Lab	Bắt buộc	2	0	2	
	ENEE1019IU	Thống kê ứng dụng trong môi trường	Applied Statistics	Bắt buộc	2	2	0	HT: ENEE2017IU
	ENEE1020IU	Thực hành thống kê ứng dụng trong môi trường	Applied Statistics Lab	Bắt buộc	1	0	1	SH: ENEE1019IU
	PE008IU	Tư duy phản biện	Critical Thinking	Bắt buộc	3	3	0	
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	3	0	
Hè (0)		Giáo dục quốc phòng	Military education	Bắt buộc	0			
V (20)	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
	ENEE1011IU	Thủy lực môi trường	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	
	ENEE1012IU	Thực hành thủy lực môi trường	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	SH: ENEE1011IU
	ENEE2020IU	Các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE2002IU
	ENEE2021IIU	Thực hành các quá trình hóa học và hóa lý trong kỹ thuật môi trường	Physical and Chemical Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE2010IU SH: ENEE2020IU
	ENEE2022IIU	Các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering	Bắt buộc	2	2	0	HT: ENEE1015IU; ENEE2013IU
	ENEE2023IU	Thực hành các quá trình sinh học trong kỹ thuật môi trường	Biological Processes for Environmental Engineering Lab	Bắt buộc	1	0	1	HT: ENEE1015IU; ENEE2013IU SH: ENEE2022IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	HT:PE015IU; PE016IU
	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	HT: ENEE2001IU
	Sinh viên tự chọn tối thiểu 3 tín chỉ				3	3	0	
	IS020IU	*Kinh tế kỹ thuật*	*Engineering Economy*	*Tự chọn*	*3*	*3*	*0*	
	IT120IU	*Khởi nghiệp*	*Entre-preneurship*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4011IU	*Quản lý dự án kỹ thuật*	*Engineering Project Management*	*Tự chọn*	*3*	*3*	*0*	
VI (21)	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	
	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	
	ENEE2025IU	Kết cấu công trình môi trường	Basic Theory of Environmental Structures	Bắt buộc	2	2	0	
	ENEE4017IU	Vẽ kỹ thuật nâng cao	Advanced Engineering Drawing	Bắt buộc	2	2	0	HT: ENEE1013IU
	ENEE4018IU	Thực hành vẽ kỹ thuật nâng cao	Advanced Engineering Drawing Lab	Bắt buộc	1	0	1	SH: ENEE4018IU
	ENEE3012IU	Xử lý nước cấp	Water Treatment	Bắt buộc	3	3	0	HT: ENEE2002IU; ENEE2020IU
	ENEE3013IU	Thực hành xử lý nước cấp	Water Treatment Lab	Bắt buộc	1	0	1	SH: ENEE3012IU
	ENEE3014IU	Xử lý nước thải sinh hoạt	Municipal Wastewater Treatment	Bắt buộc	3	3	0	HT: ENEE2022IU; ENEE2010IU
	ENEE3015IU	Thực hành xử lý nước thải sinh hoạt	Municipal Wastewater Treatment Lab	Bắt buộc	1	0	1	HT: ENEE2022IU; ENEE2010IU SH: ENEE3014IU
	ENEE3016IU	Xử lý nước thải công nghiệp	Industrial Wastewater Treatment	Bắt buộc	2	2	0	HT: ENEE2010IU

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE3017IU	Thực hành xử lý nước thải công nghiệp	Industrial Wastewater Treatment Lab	Bắt buộc	2	0	2	HT: ENEE2010IU SH: ENEE3016IU
Hè (3)	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	HT: ENEE5004IU
VII (21)	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	HT: EN007IU
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	HT: EN008IU
	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
	ENEE3110IU	Đồ án 1	Project 1	Bắt buộc	2	0	2	HT: ENEE3012IU; ENEE4017IU
	ENEE3111IU	Đồ án 2	Project 2	Bắt buộc	2	0	2	HT: ENEE3014IU; ENEE4017IU
	ENEE2014IU	Truyền nhiệt và truyền khối	Heat and Mass Transfer	Bắt buộc	3	3	0	
	Nhóm môn học kỹ sư (chọn tối thiểu 07 tín chỉ)							
	ENEE4016IU	*Đo bóc khối lượng và ước tính chi phí xây dựng*	*Construction-Measurement-and-Cost-Estimating*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3105IU	*Vận hành nhà máy xử lý*	*Treatment Plant Operation*	*Tự chọn*	*3*	*3*	*0*	
	ENEE4019IU	*Thiết kế thí nghiệm*	*Experimental Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1019IU*
	ENEE4020IU	*Thực hành thiết kế thí nghiệm*	*Experimental Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4019IU*
	ENEE4021IU	*Thiết kế đường ống và thiết bị*	*Pipe and Instruments Design*	*Tự chọn*	*2*	*2*	*0*	*HT: ENEE1011IU*
	ENEE4022U	*Thực hành thiết kế đường ống và thiết bị*	*Pipe and Instruments Design Lab*	*Tự chọn*	*2*	*0*	*2*	*SH: ENEE4021IU*
	ENEE3103IU	*Hệ thống cấp thoát nước*	*Water Supply and Drainage Systems*	*Tự chọn*	*3*	*3*	*0*	
	ENEE3112IU	*Đồ án môn học 3*	*Project 3*	*Tự chọn*	*1*	*0*	*1*	*HT: ENEE3020IU; ENEE4017IU*

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	ENEE3113IU	*Đồ án môn học 4*	*Project 4*	*Tự chọn*	*2*	*0*	*2*	*HT: ENEE3018IU; ENEE3019IU*
VIII (22)	PE020IU	Đạo đức và kỹ năng nghề nghiệp	Engineering Ethics and Professional Skills	Bắt buộc	3	3	0	
	PE018IU	Lịch sử Đảng cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	HT: PE017IU
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	HT: PE017IU
	CHE2081IU	Sức khỏe nghề nghiệp, An toàn và Môi trường	Occupational Health Safety and Environment	Bắt buộc	2	2	0	
	ENEE5007IU	Đề cương luận văn tốt nghiệp	Pre-thesis	Bắt buộc	2	0	2	HT: ENEE5006IU
	ENEE3018IU	Quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management	Bắt buộc	3	3	0	HT: ENEE2005IU; ENEE2011IU
	ENEE3019IU	Thực hành quản lý chất thải rắn và chất thải nguy hại	Solid waste and hazardous waste management Lab	Bắt buộc	1	0	1	HT: ENEE2005IU; ENEE2011IU SH: ENEE3018IU
	ENEE3020IU	Kiểm soát ô nhiễm không khí	Air pollution control	Bắt buộc	3	3	0	HT: ENEE2014IU; ENEE2011IU
	ENEE3021IU	Thực hành kiểm soát ô nhiễm không khí	Air pollution control Lab	Bắt buộc	1	0	1	SH: ENEE3020IU
	Nhóm môn học tự chọn tự do (chọn tối thiểu 3 tín chỉ)							
	BA115IU	*Nhập môn quản trị kinh doanh*	*Introduction to Business Administration*	*Tự chọn*	*3*	*3*	*0*	
	BA154IU	*Khởi nghiệp và quản lý doanh nghiệp nhỏ*	*Entrepreneurship and Small Business Management*	*Tự chọn*	*3*	*3*	*0*	
	BT010IU	*Sinh lý học thực vật*	*Plant physiology*	*Tự chọn*	*3*	*3*	*0*	
	CHE3211IU	*Vật liệu nano*	*Nanomaterials*	*Tự chọn*	*3*	*3*	*0*	

Học kỳ	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Số tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng Việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	
	CHE3221IU	*Vật liệu sinh học*	*Biomaterials*	*Tự chọn*	*3*	*3*	*0*	
Hè (3)	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	HT: ENEE3110IU; ENEE3111IU; CHE2081IU
IX(10)	ENEE5003IU		Thesis		10	0	10	
			Tổng	**150**				HT: ENEE5007IU

11. Ma trận các môn học và chuẩn đầu ra (kỹ năng)

Mức độ đóng góp của các môn học vào chuẩn đầu ra của CTĐT ngành Kỹ thuật Môi trường được trình bày như Bảng 10(*).

Bảng 10. Đóng góp của các môn học vào CĐR của CTĐT

Học kỳ	Mã MH	Tên môn học	Chuẩn đầu ra của CTĐT									
			Kiến thức		Kỹ năng						Mức tự chủ và trách nhiệm	
			1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
I (17)	EN007IU	Writing AE1		2.5					2.4		2	
	EN008IU	Listening AE1		3					2.4		2	
	MA001IU	Calculus 1	2.2			2.5		2			3	
	CH011IU	Chemistry for Engineers	2.8									
	CH012IU	Chemistry Lab	3			2	3	2		3	2	
	PE015IU	Philosophy of Marxism and Leninism		4	4					4		3
	PE016IU	Political Economics of Marxism and Leninism		3.8	4		3.8			4		3
II (17)	EN011IU	Writing AE2		3		3			3		3	
	EN012IU	Speaking AE2		3					3.3		3	
	PE017IU	Scientific socialism		3.4	4					4		3
	PH013IU	Physics 1	2.3		3				3			
	PE021IU	General Law		2.8	3				3		1.5	
	PE008IU	Critical Thinking	1						4	4		4

Học kỳ	Mã MH	Tên môn học	Chuẩn đầu ra của CTĐT									
			Kiến thức		Kỹ năng						Mức tự chủ và trách nhiệm	
			1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
	PE020IU	Engineering Ethics and Professional Skills		3	3						3	
III (18)	ENEE2017IU	Introduction to Computing	3	5	5	5.3	5	4.5	5	4	5	5
	ENEE1017IU	Fundamental of Analytical Chemistry	3	1	2	2					1	
	ENEE1018IU	Fundamental of Analytical Chemistry Lab	3			2.5			3		2	
	ENEE1015IU	Biochemistry	4	4	4	4.5	7		5		4	5
	ENEE1016IU	Biochemistry Lab	4					3.5		4	4	5
	ENEE1013IU	Engineering Drawing	2					4			5	
	ENEE1014IU	Engineering Drawing Lab	2					5			5	
	ENEE2024IU	Mechanics of Materials	2		4						5	
	ENEE2008IU	Environmental Ecology	2	4	6					6		5
IV (18)	ENEE2001IU	Introduction to Environmental Engineering	2.3			3	3	2.5	3	3	2.5	2.8
	ENEE2013IU	Environmental Microbiology		1.5	4		2	4	5			5
	ENEE2016IU	Environmental Microbiology Lab	4	5			4	3	3		5	
	ENEE2002IU	Environmental Chemistry 1	2		3				3			1
	ENEE2010IU	Environmental Chemistry 1 Lab	3			2			3		3	
	ENEE2005IU	Environmental Chemistry 2	3		2							2
	ENEE2011IU	Environmental Chemistry 2 Lab	2.7			3					3	
	ENEE1019IU	Applied Statistics in Environment	2.5		2	2					3	
	ENEE1020IU	Applied Statistics in Environment Lab	2.5		2	2					3	

Học kỳ	Mã MH	Tên môn học	Chuẩn đầu ra của CTĐT									
			Kiến thức		Kỹ năng						Mức tự chủ và trách nhiệm	
			1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
V (18)	ENEE1011IU	Hydraulics for Environmental Engineering	5		5						5	
	ENEE1012IU	Hydraulics for Environmental Engineering Lab	3			5			4		5	
	ENEE2020IU	Physical and Chemical Processes for Environmental Engineering	3		3							3
	ENEE2021IIU	Physical and Chemical Processes for Environmental Engineering Lab	3		3				3			3
	ENEE2022IIU	Biological Processes for Environmental Engineering	4		6	4	2	3	2.5			5
	ENEE2023IU	Biological Processes for Environmental Engineering Lab	3.5			3	2.5		2.5			3
	PE018IU	History of Vietnamese Communist Party		3	3					3		3
	PE019IU	Ho Chi Minh's Thoughts		3	3					3		3
	ENEE5004IU	Internship 1	3	3		2	4	2				
	Sinh viên tự chọn tối thiểu 3 tín chỉ											
	IS020IU	Engineering Economy		2.3			2.3				3	
	IT120IU	Entre-preneurship	2	3		4		3.5			3	
	ENEE4011IU	Engineering Project Management	3	3		3		3		3	4	
VI (17)	ENEE2025IU	Basic Theory of Environmental Structures	3					3				5
	ENEE4017IU	Advanced Engineering Drawing	2					4			5	
	ENEE4018IU	Advanced Engineering Drawing Lab	2					5			5	
	ENEE3012IU	Water Treatment	4		4		4				3	4

Học kỳ	Mã MH	Tên môn học	Chuẩn đầu ra của CTĐT									
			Kiến thức		Kỹ năng						Mức tự chủ và trách nhiệm	
			1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
	ENEE3013IU	Water Treatment Lab	4			4		4	4		3	
	ENEE3014IU	Municipal Wastewater Treatment	5	4		6	5	6				5
	ENEE3015IU	Municipal Wastewater Treatment Lab	5	4		6	5.5	4.5		5		3
	ENEE3016IU	Industrial Wastewater Treatment	3.5	4	6	3	4	6			5	
	ENEE3017IU	Industrial Wastewater Treatment Lab		4	5.5	4.5			4.5	5.5		3
Hè (3)	ENEE5005IU	Internship 2	3			4		3	2	6	4	
VII (14)	ENEE3110IU	Project 1	5		4.8	4	4.5	4.8	4			4
	ENEE3111IU	Project 2	5		4.8	4	4.5	4.8	4			4
	ENEE2014IU	Heat and Mass Transfer	2		3		3	3				
	Nhóm môn học kỹ sư (chọn tối thiểu 07 tín chỉ)											
	ENEE4016IU	*Construction-Measurement-and-Cost-Estimating*	4					4			4	
	ENEE3105IU	*Treatment Plant Operation*	2.5	3.5	3.7			4			3	
	ENEE4019IU	*Experimental Design*	3.7		4	3.3					4	
	ENEE4020IU	*Experimental Design Lab*	4		4	4		4			3	
	ENEE4021IU	*Pipe and Instruments Design*	3	3	6	3	2	4	5	4	5	1
	ENEE4022U	*Pipe and Instruments Design Lab*	3	3	6	3	2	4	5	4	5	1
	ENEE3103IU	*Water Supply and Drainage Systems*	5		5		7			5		
	ENEE3112IU	*Project 3*	5		4.8	4	4.5	4.8	4			4
	ENEE313IU	*Project 4*	3.5		2	3					4	4
VIII (15)	CHE2081IU	Occupational Health Safety and Environment		4				4			3	
	ENEE5007IU	Pre-thesis	4.3		4.3	4	5	4.3	6		4	

Học kỳ	Mã MH	Tên môn học	Chuẩn đầu ra của CTĐT									
			Kiến thức		Kỹ năng						Mức tự chủ và trách nhiệm	
			1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
	ENEE3018IU	Solid waste and hazardous waste management	3.5		2	2					4	4
	ENEE3019IU	Solid waste and hazardous waste management Lab	3.5		2	3					4	4
	ENEE3020IU	Air pollution control	4		4		4				3	4
	ENEE3021IU	Air pollution control Lab	4			4		4	4		3	
	Nhóm môn học tự chọn tự do (chọn tối thiểu 3 tín chỉ)											
	BA115IU	*Introduction to Business Administration*		2.5			2					2
	BA154IU	*Entrepreneurship and Small Business Management*		2.3	3				3		3	
	BT010IU	*Plant physiology*		3.3					3		2	
	CHE3211IU	*Nanomaterials*	2.7		6					1		
	CHE3221IU	*Biomaterials*	1.2						3			2
Hè (2)	ENEE5006IU	Internship 3	3	4	4			4	4		3.5	3.5
IX (10)	ENEE5003IU	Thesis	5		4.8	5	5.6	4.3	5		4.7	3

(*) Trình độ năng lực theo thang Bloom's Taxonomy

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

12. Mô tả vắn tắt nội dung và khối lượng các môn học

(1).Triết học Mác-Lênin (Philosophy of Marxism and Leninism):

- Mã môn học: PE015IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không

- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những nội dung cơ bản về thế giới quan, phương pháp luận chính trị Mác-Lênin. Giúp sinh viên vận dụng những tri thức về thế giới quan, phương pháp luận triết học Mác-Lênin một cách sáng tạo trong hoạt động khoa học và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

(2).Kinh tế chính trị Mác-Lênin (Political economics of Marxism and Leninism):

- Mã môn học: PE016IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: 1. PE015IU-Triết học Mác-Lênin
- Mô tả nội dung môn học: Nội dung chương trình gồm 6 chương, trong đó chương 1 bàn về đối tượng, phương pháp nghiên cứu và chức năng của Kinh tế chính trị Mác-Lênin. Từ chương 2 đến chương 6 trình bày nội dung cốt lõi của Kinh tế chính trị Mác-Lênin theo mục tiêu môn học. Cụ thể các vấn đề như: hàng hóa, thị trường và vai trò của các chủ thể trong nền kinh tế; Sản xuất giá trị thặng dư trong nền kinh tế thị trường. Cạnh tranh và độc quyền trong nền kinh tế thị trường; Kinh tế thị trường định hướng xã hội chủ nghĩa và các mối quan hệ lợi ích kinh tế ở Việt Nam; Công nghiệp hóa, hiện đại hóa và hội nhập kinh tế quốc tế ở Việt Nam.

(3).Chủ nghĩa xã hội khoa học (Scientific socialism):

- Mã môn học: PE017IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: 1. PE015IU-Triết học Triết học Mác-Lênin; 2. PE016IU-Kinh tế chính trị Mác - Lênin
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những nội dung cơ bản của chủ nghĩa Xã hội khoa học. Giúp sinh viên vận dụng những tri thức cơ bản của chủ nghĩa xã hội khoa học một cách sáng tạo trong hoạt động nhận thức và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

(4). Lịch sử Đảng Cộng Sản Việt Nam (Revolutionary Lines of Vietnamese Communist Party):

- Mã môn học: PE018IU

- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: 1. PE015IU-Triết học Triết học Mác-Lênin; 2. PE016IU-Kinh tế chính trị Mác – Lênin; 3. PE017IU-Chủ nghĩa xã hội khoa học.
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học cung cấp những tri thức có tính hệ thống, cơ bản về sự ra đời của Đảng Cộng sản Việt Nam (1920-1930), sự lãnh đạo của Đảng đối với cách mạng Việt Nam trong thời kỳ đấu tranh giành chính quyền (1930-1945), trong hai cuộc kháng chiến chống thực dân Pháp và đế quốc Mỹ xâm lược (1945-1975), trong sự nghiệp xây dựng, bảo vệ tổ quốc thời kỳ cả nước quá độ lên chủ nghĩa xã hội, tiến hành công cuộc đổi mới (1975-2018). Thông qua các sự kiện lịch sử và kinh nghiệm về sự lãnh đạo cảu Đảng để xây dựng ý thức tôn trọng sự thật khách quan, nâng cao long tự hào, niềm tin đối với sự nghiệp lãnh đạo của Đảng.

(5).Tư tưởng Hồ Chí Minh (Ho Chi Minh's Thoughts):

- Mã môn học: PE019IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: 1. PE015IU-Triết học Triết học Mác-Lênin; 2. PE016IU-Kinh tế chính trị Mác – Lênin; 3. PE017IU-Chủ nghĩa xã hội khoa học.
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những kiến thức cơ bản về : Đối tượng, phương pháp nghiên cứu và ý nghĩa học tập môn tư tưởng Hồ Chí Minh; về độc lập dân tộc và chủ nghĩa xã hội; về Đảng Cộng sản và Nhà nước Việt Nam; về đại đoàn kết dân tộc và đoàn kết quốc tế; về văn hóa, đạo đức, con người.

(6).Pháp luật đại cương (General Law):

- Mã môn học: PE021IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học sẽ giới thiệu cho sinh viên về hệ thống pháp luật Việt Nam. Đặc biệt, sinh viên sẽ hiểu được quyền và nghĩa vụ của mình trong Hiến pháp, luật hình sự, luật hành chính, luật dân sự, luật lao động và luật doanh nghiệp của Việt Nam. Từ đó, sinh viên sẽ nâng cao nhận thức về trách nhiệm đảm bảo công lý, trong đó có việc chấm dứt tham nhũng trong xã hội.

(7). Tư duy phản biện (Critical Thinking):

- Mã môn học: PE008IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học cung cấp sinh viên những kiến thức nền về tư duy phân tích, kỹ năng hữu ích đối với mọi đối tượng ngành nghề. Sinh viên thực hành với các dạng lý luận, phân tích, đánh giá các lý luận của mình và của người khác. Sinh viên được hỗ trợ các phương pháp tìm kiếm thông tin để lý luận và kiểm định lý luận.

(8). Đạo đức và kỹ năng nghề nghiệp (Đạo đức và kỹ năng nghề nghiệp (Professional Ethics and Skills for engineers):

- Mã môn học: PE020IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học được thiết kế nhằm cung cấp cho sinh viên các ngành kỹ thuật lý thuyết và thực hành đạo đức kỹ sư. Môn học giúp sinh viên khám phá mối quan hệ giữa đạo đức và kỹ thuật, áp dụng lý thuyết đạo đức cổ điển để giải quyết các vấn đề kỹ thuật gặp phải trong nghề nghiệp. Học tập và hiểu đạo đức nghề nghiệp cũng là một phần trong sự phát triển của kỹ sư. Người học phải có khả năng mở rộng tâm trí và cởi mở với xã hội, học cách chia sẻ ý tưởng và kiến thức. Do đó, người học sẽ làm việc theo nhóm trong phần lớn các bài tập trong khóa học này.

(9). Tiếng Anh chuyên ngành 1 - kỹ năng viết (Writing AE1):

- Mã môn học: EN007IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học nhằm nâng cao kỹ năng viết trình độ tiền nâng cao (pre-advanced). Chương trình tập trung vào việc xây dựng bài luận dựa trên các kỹ năng viết như: làm dàn bài, viết câu luận đề, kết nối và sắp xếp trình tự các đoạn, dung từ và cụm từ nối để tạo sự mạch lạc cho bài văn. Các thể loại bao

gồm: miêu tả người, đồ vật, qui trình, trình bày ý kiến, so sánh và đối chiếu, nguyên nhân – kết quả, vấn đề - giải pháp, nghị luận.

(10). Tiếng Anh chuyên ngành 1 - kỹ năng nghe (Listening AE1):

- Mã môn học: EN008IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Những kỹ năng nghe tiếng Anh học thuật, ghi chú, và thảo luận sẽ giúp sinh viên làm quen với những khó khăn trong việc học tiếng Anh ở đại học. Sinh viên sẽ học các kỹ năng cần thiết cho sinh viên đại học quốc tế, bao gồm: nghe bài giảng chủ động, ghi chú hiệu quả, tham gia thảo luận tự tin. Cùng với các kỹ năng nghe, sinh viên cũng sẽ trau giồi thêm vốn từ vựng học thuật.

(11). Tiếng Anh chuyên ngành 2 - kỹ năng viết (Writing AE2):

- Mã môn học: EN011IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: EN008IU-tiếng Anh chuyên ngành 1 (kỹ năng viết)
- Môn học song hành: Không
- Mô tả nội dung môn học: Khóa học nhằm cung cấp một cách tổng quát cấu trúc của một bài viết báo cáo nghiên cứu, từng bước giúp sinh viên hoàn tất một bài viết cụ thể trong lĩnh vực của mình. Nội dung của khóa học bao gồm: các thành phần của bài báo cáo, kỹ năng chọn và giới hạn đề tài, viết câu luận đề, làm dàn bài, tìm và dẫn chứng tài liệu, ghi chú, viết mở bài, nội dung chính và kết luận, viết và sửa chữa bản nháp. Sinh viên sẽ thực hành trên các đề tài liên quan đến môn học của mình.

(12). Tiếng Anh chuyên ngành 2 - kỹ năng nói (Speaking AE2):

- Mã môn học: EN012IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: tiếng Anh chuyên ngành 1 (kỹ năng nghe)
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học cung cấp cho sinh viên các chiến lược thiết thực sử dụng trong việc thuyết trình. Ngòai ra sinh viên được giúp đỡ hình thành kỹ năng lắng nghe, nhận xét và nêu ý kiến phản hồi đối với các bài thuyết trình khác trong lớp.

(13). Toán 1 (Calculus 1):

- Mã môn học: MA001IU
- Số tín chỉ: 4 (lý thuyết: 4, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Hàm số, Giới hạn, Tính liên tục, Đạo hàm, Đạo hàm cho các hàm cơ bản, Qui tắc tính đạo hàm, Ứng dụng của đạo hàm, Quy tắc L'hospitail, Tối ưu, Phương pháp Newton, Tích phân, Tích phân xác định, Các định lý cơ bản của giải tích, kỹ thuật tính tích phân.

(14). Hóa đại cương (Chemistry for Engineers):

- Mã môn học: CH011IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: CH012IU - Thực hành hóa đại cương
- Mô tả nội dung môn học: Môn học được thiết kế cho sinh viên kỹ thuật hoặc sinh viên đang đọc những ngành không phải chuyên ngành Hóa học như Công nghệ thông tin, Công nghệ sinh học, Kỹ thuật xây dựng, Kỹ thuật y sinh, Kỹ thuật điện tử và truyền thông, Kỹ thuật môi trường. Môn học sẽ giới thiệu những nguyên lý cơ bản của Hóa học và kết nối những nguyên lý đó với những vấn đề của ngành kỹ thuật. Phần thực hành không bao gồm trong môn học này.

(15). Thực hành hóa đại cương (Chemistry lab):

- Mã môn học: CH012IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: CH011IU-Hóa đại cương
- Mô tả nội dung môn học: Môn học này giới thiệu cho sinh viên kiến thức cơ bản về an toàn phòng thí nghiệm cơ bản, kỹ thuật và thiết bị, đồng thời bổ sung kiến thức trong bài giảng. Trước mỗi thí nghiệm, sinh viên phải đọc hướng dẫn thí và hoàn thành báo cáo trước thí nghiệm. Tất cả sinh viên phải hoàn thành khóa huấn luyện an toàn bắt buộc để tham gia khóa học, sẽ được cung cấp vào ngày đầu tiên của lớp học. Sinh viên phải đến từng ngày thí nghiệm đúng giờ và sẵn sàng thực hiện các nhiệm vụ trong ngày.

(16). Hóa sinh (Biochemistry):

- Mã môn học: ENEE1015IU

- Số tín chỉ: 3 (lý thuyết: 3, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1016IU- Thực hành hóa sinh
- Mô tả nội dung môn học: Môn học được thiết kế để cung cấp cho sinh viên các khái niệm cơ bản trong hóa sinh và giới thiệu về các chất chuyển hóa xảy ra trong các sinh vật sống để hiểu cơ bản phân tử của sự sống. Các chủ đề của môn học sẽ bao gồm động học enzyme và cơ chế và chuyển hóa của các phân tử sinh học quan trọng như carbohydrate, axit béo, axit amin, tập trung vào con đường thoái hóa của chúng.

(17). Thực hành hóa sinh (Biochemistry Lab):

- Mã môn học: ENEE1016IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1015IU - Hóa sinh
- Mô tả nội dung môn học: Môn học được thiết kế để cung cấp cho sinh viên các khái niệm cơ bản trong hóa sinh và giới thiệu về các chất chuyển hóa xảy ra trong các sinh vật sống để hiểu cơ bản phân tử của sự sống. Các kỹ thuật và phương pháp tiếp cận được sử dụng trong nghiên cứu sinh hóa sẽ được trình bày trong môn học này.

(18). Vi sinh vật môi trường (Environmental Microbiology):

- Mã môn học: ENEE2013IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE2016IU-Thí nghiệm Vi sinh vật môi trường
- Mô tả nội dung môn học: Môn học cung cấp kiến thức cơ bản về vi sinh trong môi trường tự nhiên và môi trường bị ảnh hưởng của con người. Đặc biệt, khóa học sẽ trang bi kiến thức vi sinh cơ bản ứng dụng trong kỹ thuật xử lý nước và nước thải, phương pháp phát hiện vi sinh vật gây bệnh trong nước, và chu trình vi khuẩn của vật liệu hữu cơ (ví dụ như chất ô nhiễm) trong nhiều hệ thống tự nhiên và kỹ thuật. Trong chương trình đào tạo ngành Kỹ thuật Môi trường, đây là môn học cần thiết cho những môn học tiếp theo như Quá trình sinh học, và Xử lý nước thải.

(19). Thực hành Vi sinh vật môi trường (Environmental Microbiology):

- Mã môn học: ENEE2016IU

- Số tín chỉ: 2 (lý thuyết: 0, thực hành:2)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE2013IU-Vi sinh vật môi trường
- Mô tả nội dung môn học: Môn học cung cấp các kỹ năng phòng thí nghiệm vi sinh cơ bản để nghiên cứu các mẫu môi trường. Học sinh được học các phương pháp phân lập, nuôi cấy, lưu trữ và xác định một số chủng vi khuẩn từ một số mẫu môi trường (ví dụ: đất, nước thải, nước mặt). Khóa học này yêu cầu sinh viên có nền tảng kiến thức về vi sinh vật môi trường và cung cấp những kỹ năng thao tác trên vi sinh vật cần thiết dể phân tích các chỉ tiêu vi sinh trong nước cho các môn học tiếp theo như quá trình sinh học và xử lý nước thải.

(20). Vật lý 1 (Physics 1):

- Mã môn học: PH013IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Khảo sát động học, động lực học, năng lượng học của chuyển động của chất điểm và của vật rắn.

(21). Nhập môn tính toán (Introduction to Computing):

- Mã môn học: ENEE2017IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học bao gồm một số chủ đề và ứng dụng cơ bản của Matlab về các biến, kiểu dữ liệu, câu lệnh, cấu trúc điều khiển, mảng, chuỗi, hàm và giao diện đồ họa người dùng (GUIs).

(22). Vẽ kỹ thuật (Engineering Drawing):

- Mã môn học: ENEE1013IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1014IU-Thực hành vẽ kỹ thuật
- Mô tả nội dung môn học: Môn học này cung cấp kiến thức về sơ đồ kỹ thuật, kỹ năng xây dựng bản vẽ kỹ thuật được bổ sung bằng tay và bằng phần mềm

AutoCAD. Môn học cung cấp kiến thức cho việc sử dụng và xây dựng hình học với các công cụ vẽ và phần mềm AutoCAD, tiêu chuẩn trình bày bản vẽ kỹ thuật; cơ sở, tiêu chuẩn, xây dựng và kỹ năng phân tích, hiểu bản vẽ kỹ thuật.

(23). Thực hành vẽ kỹ thuật (Engineering Drawing Lab):

- Mã môn học: ENEE1014IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành:1)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1013IU-Vẽ kỹ thuật
- Mô tả nội dung môn học: Môn học này cung cấp kỹ năng thực hiện các ý tưởng kỹ thuật về sơ đồ kỹ thuật, kỹ năng xây dựng bản vẽ kỹ thuật được bổ sung bằng tay và bằng phần mềm AutoCAD.

(24). Nhập môn Kỹ thuật môi trường (Introduction to Environmental Engineering):

- Mã môn học: ENEE2001IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường với những kiến thức cơ bản về kỹ thuật và kỹ thuật môi trường, giúp sinh viên được tiếp cận đầu tiên về nội dung chương trình kỹ thuật môi trường và nghề nghiệp trong tương lai. Sinh viên được học những kiến thức cơ bản về vấn đề môi trường, đạo đức nghề nghiệp và kỹ năng mềm. Môn học này cung cấp những kiến thức cơ bản về kỹ sư nói chung và kỹ thuật môi trường nói riêng.

(25). Sinh thái môi trường (Environmental Ecology):

- Mã môn học: ENEE2008IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Khóa học này cung cấp các khái niệm và lý thuyết chính về sinh thái học, các hệ sinh thái và các quy luật vận hành trong tự nhiên, mối quan hệ tương tác giữa sinh vật với môi trường. Qua đó, cung cấp kiến thức khoa học về hệ sinh thái ứng dụng trong cải tạo, xử lý ô nhiễm môi trường cũng như các giải pháp cơ bản trong bảo vệ hệ sinh thái. Khóa học cũng giới

thiệu phương pháp nghiên cứu bao gồm tìm kiếm tài liệu, nghiên cứu thực địa và phương pháp mô phỏng.

(26). Kinh tế kỹ thuật (Engineering Economy):

- Mã môn học: IS020IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Các quyết định kinh tế liên quan đến giải pháp kỹ thuật; chi phí thường niên, giá trị hiện tại và tương lai; tỷ suất lợi nhuận và chi phí; kinh tế thay thế trước và sau thuế; tài chính tổ chức; biểu đồ hòa vốn; nghiên cứu đơn vị và chi phí tối thiểu khu vực công

(27). Khởi nghiệp (Entre- preneurship)

- Mã môn học: IT120IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Giới thiệu về các hoạt động quản lý sáng tạo và đổi mới của tinh thần kinh doanh thành công.

(28). Quản lý dự án kỹ thuật (Engineering Project Management)

- Mã môn học: ENEE4011IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học được phát triển để cung cấp khái niệm chính về quản lý dự án, được đặc trưng bởi phần hướng dẫn kiến thức về quản lý dự án (Hướng dẫn về những kiến thức cốt lõi trong Quản lý dự án). Hướng dẫn này nhấn mạnh năm nhóm quy trình dự án gồm khởi tạo, lập kế hoạch, thực hiện, kiểm soát và kết thúc, và chín lĩnh vực kiến thức về tích hợp dự án, phạm vi, thời gian, chi phí, chất lượng, nguồn nhân lực, truyền thông, rủi ro và quản lý mua sắm.

(29). Nhập môn quản trị kinh doanh (Introduction to Business Administration):

- Mã môn học: BA115IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)

- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Khóa học giới thiệu các lĩnh vực chức năng của kinh doanh và sự tích hợp giữa chúng. Giúp sinh viên hiểu biết về các vấn đề toàn cầu, bao gồm sự hiểu biết về cách tiếp cận đạo đức kinh doanh và các vấn đề quốc gia. Phát triển kỹ năng nghiên cứu, phân tích, viết, tin học, đội nhóm và kỹ năng thuyết trình cơ bản của sinh viên. Phát triển kỹ năng tư duy phản biện và giao tiếp của sinh viên.

(30). Khởi nghiệp và quản lý doanh nghiệp nhỏ (Entrepreneurship and Small Business Management):

- Mã môn học: BA154IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học cung cấp cho sinh viên các kiến thức về hồ sơ doanh nhân và đánh giá tiềm năng của người học như một doanh nhân. Các bước doanh nhân phải hoàn thành khi bắt đầu một dự án kinh doanh mới. Các yếu tố của một kế hoạch kinh doanh vững chắc. Các thuật ngữ kinh doanh thể hiện kiến thức kinh doanh tổng thể. Các lựa chọn kinh doanh mới. Hoàn thành kế hoạch kinh doanh bằng văn bản. Làm sáng tỏ các yếu tố cốt lõi để trình bày kế hoạch kinh doanh hiệu quả.

(31). Sinh lý học thực vật (Plant physiology):

- Mã môn học: BT010IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Sinh lý học thực vật là một khóa học nền tảng cho Công nghệ sinh học thực vật. Khóa học này bao gồm kiến thức liên quan đến sinh lý thực vật như chuyển hóa thực vật, phát triển và các điều kiện thiết yếu để phát triển, ứng suất môi trường, các chất chuyển hóa thứ cấp và thực vật được thiết kế trong công nghệ sinh học thực vật.

(32). Vật liệu Nano (Nanomaterials):

- Mã môn học: CHE3211IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)

- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Khóa học sẽ trình bày về đặc tính và ứng dụng của các vật liệu có cấu trúc nano. Khóa học cũng sẽ thảo luận về các phương pháp chế tạo bao gồm: epitaxy chum phân tử, quang khắc và tự lắp ráp. Các đặc tính quang học và điện tử của vật liệu nano (bao gồm vật liệu nano một chiều và hai chiều) sẽ được trình bày. Đặc biệt chú ý đến vật liệu nano dựa trên vật liệu carbon, bao gồm ống nano carbon và graphene. Các vật liệu nano khác được thảo luận bao gồm: chấm lượng tử, dây nano và hạt nano. Phần đề cập đến các ứng dụng của vật liệu nano có tính tương tác: mỗi sinh viên sẽ được chỉ định một loại hoặc ứng dụng cụ thể của vật liệu nano, sinh viên tự nghiên và trình bài thuyết trình ngắn bày trước lớp.

(33). Vật liệu sinh học (Biomaterials):

- Mã môn học: CHE3221IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nội dung môn học: Một kỹ sư chuyên ngành công nghệ mô nên hiểu về các vật liệu sinh học và phương sửa đổi bề mặc của nó cho các ứng dụng cụ thể. Ngoài ra, một kỹ sư phải hiểu làm thế nào để chọn vật liệu và cách thiết kế một khung cho vùng cấy ghép cụ thể.

(34). Thống kê ứng dụng (Applied Statistics):

- Mã môn học: ENEE1019IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2017IU- Nhập môn tính toán
- Môn học song hành: ENE1020IU-Thực hành thống kê ứng dụng trong môi trường
- Mô tả nội dung môn học: Môn học này được thiết kế cho sinh viên theo đuổi bằng cấp về kỹ thuật hóa học/môi trường và cung cấp kiến thức về dữ liệu thống kê, dữ liệu đồ thị, thống kê mô tả, xác suất và phân phối, kiểm tra giả thuyết, phân tích phương sai (ANOVA), phân tích và dự báo chuỗi thời gian.

(35). Thực hành thống kê ứng dụng (Applied Statistics Lab):

- Mã môn học: ENEE1020IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)

- Môn học tiên quyết: Không
- Môn học trước: ENEE2017IU- Nhập môn tính toán
- Môn học song hành: ENEE1019IU- Thống kê ứng dụng trong môi trường
- Mô tả nội dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật hóa học/môi trường và cung cấp kiến thức cũng như kỹ năng sử dụng phần mềm Python/R để vẽ dữ liệu, thống kê mô tả, kiểm tra giả thuyết, phân tích phương sai (ANOVA), phân tích chuỗi thời gian và dự báo.

(36). Cơ sở hóa phân tích (Fundamental of Analytical Chemistry):

- Mã môn học: ENEE1017IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành:0)
- Môn học tiên quyết: Không
- Môn học trước: CH011IU- Chemistry for Engineers
- Môn học song hành: ENE1018IU - Thực hành cơ sở hóa phân tích
- Mô tả nội dung môn học: Môn học sẽ cung cấp các nguyên lý cơ bản của hóa phân tích,bao gồm quy trình phân tích,sai số trong đo lường. Môn học còn cung cấp các phương pháp phân tích thể tích đến dụng cụ, đặc biệt nhấn mạnh vào phân tích các chỉ tiêu môi trường.

(37). Thực hành cơ sở hóa phân tích (Fundamental of Analytical Chemistry Lab):

- Mã môn học: ENEE1018IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành:1)
- Môn học tiên quyết: Không
- Môn học trước: CH012IU – Chemistry Laboratory
- Môn học song hành: ENEE1017IU - Cơ sở hóa phân tích
- Mô tả nội dung môn học: Môn học nhằm cung cấp cho sinh viên các kỹ năng hóa phân tích trong PTN bao gồm an toàn lao động, cách sử dụng các dụng cụ phân tích, chuẩn bị hóa chất phân tích, kỹ năng phân tích thể tích, quang phổ và sắc ký, đặc biệt nhấn mạnh vào phân tích môi trường.

(38). Hóa môi trường 1 (Environmental Chemistry 1):

- Mã môn học: ENEE2002IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1017IU-Cơ sở hóa phân tích
- Môn học song hành: ENEE2010IU-Thực hành hóa môi trường 1
- Mô tả nôi dung môn học: Môn học cung cấp các kiến thức nền tảng của hóa nước,bao gồm các quá trình hóa học diễn ra trong nước và ô nhiễm nguồn nước.

(39). Thực hành Hóa môi trường 1 (Environmental Chemistry 1 Lab):

- Mã môn học: ENEE2010IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1018IU-Thực hành Cơ sở hóa phân tích
- Môn học song hành: ENEE2002IU - Hóa môi trường 1
- Mô tả nôi dung môn học: Môn học sẽ cung cấp các kỹ năng nghề nghiệp để phân tích chất lượng nước như phá mẫu, chưng cất mẫu , UV-VIS,chuẩn độ và phát triển kỹ năng viết báo cáo khoa học.

(40). Hóa môi trường 2 (Environmental Chemistry 2):

- Mã môn học: ENEE2005IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE2011IU- Thực hành Hóa môi Trường 2
- Mô tả nôi dung môn học: Môn học sẽ cung cấp kiến thức về hóa khí quyển và ô nhiễm không khí, chất thải rắn và thành phần chất thải rắn và các phương pháp xử lý các chất ô nhiễm trong không khí và chất thải rắn. Sinh viên sẽ biết làm thế nào sử dụng phản ứng hóa học để xác định nguồn gốc của các chất trong chất thải rắn và không khí

(41). Thực hành Hóa môi trường 2 (Environmental Chemistry 2):

- Mã môn học: ENEE2011IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE2005IU-Hóa môi Trường 2
- Mô tả nôi dung môn học: Sinh viên sẽ được cung cấp các kỹ năng về lấy mẫu và phân tích các hợp chất trong chất thải rắn và không khí. Qua đó, sinh viên sẽ biết ứng dụng các kỹ thuật phân tích để xác định thành phần của chất thải rắn và không khí.

(42). Sức bền vật liệu (Mechanics of Materials):

- Mã môn học: ENEE2024IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không

- Mô tả nôi dung môn học: Môn học này nhằm cung cấp cho sinh viên những kiến thức cần thiết về nội lực và ngoại lực xuất hiện trong một phần cấu trúc chịu nhiều loại tải khác nhau. Mục đích của việc phân tích là nhằm xác định được điểm bị oằn, kéo giãn và lệch gây ra bởi tải. Môn học này còn cung cấp cho sinh viên khả năng phân tích câu trúc đơn giản chịu tải hỗn hợp. Ngoài ra, môn học giúp sinh viên nghiên cứu hiện tượng cân bằng của dầm chịu lực. Ngoài ra, môn học này còn cung cấp kiến thức về phản ứng cơ học của vật liệu, quan trọng cho việc thiết kế một cách an toàn tất cả các cấu trúc trong xây dựng dân dụng và xây dựng kỹ thuật.

(43). Kết cấu công trình môi trường (Basic Theory of Environmental Structures):

- Mã môn học: ENEE2025IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước:
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học này nhằm giới thiệu cho sinh viên về việc phân tích, thiết kế một số kết cấu thông dụng trong lĩnh vực kỹ thuật môi trường. Sau khi học môn này, sinh viên sẽ làm quen với phân tích lực, nắm được kỹ năng thiết kế và ứng dụng vào các cấu trúc thực tế

(44). Truyền nhiệt và truyền khối (Heat and Mass Transfer):

- Mã môn học: ENEE2014IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học được thiết kế nhằm cung cấp kiến thức nền tảng cho quá trình vật lý trong kỹ thuật môi trường. Môn học sẽ cung cấp kiến thức về hiện tượng khuếch tán và các quá trình truyền khối ảnh hưởng đến các hệ thống môi trường tự nhiên và công nghệ. Sinh viên có thể đánh giá quá trình vận chuyển và chuyển hóa các chất trong hệ thống bằng truyền khối, động học hóa học, cân bằng hóa học và kỹ thuật phản ứng cho hệ hấp phụ, trao đổi ion, phân tách màng, oxi hóa khử, trung hòa và khử trùng. Ngoài ra, sinh viên áp dụng các nguyên lý cơ bản về nhiệt động lực học và truyền nhiệt trong tính toán và giải thích các ứng dụng công nghệ nhiệt như nhà máy nhiệt điện, tủ lạnh và điều hòa nhiệt độ, động cơ đốt trong, hệ thống sấy và hệ thống trao đổi nhiệt trong xử lý môi trường.

(45). Thủy lực môi trường (Hydraulics for Environmental Engineering):

- Mã môn học: ENEE1011IU

- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1012IU-Thực hành thủy lực môi trường
- Mô tả nôi dung môn học: Thủy lực môi trường là môn học cơ bản cho các ngành kỹ thuật xây dựng, kỹ thuật cơ khí và kỹ thuật môi trường. Môn học này sẽ giới thiệu các nguyên lý của lưu chất ở thể tĩnh cũng như thể động, cung cấp những khái niệm và úng dụng của cơ lưu chất trong phản ứng của chất lưu, dòng chảy trong và dòng chảy ngoài, phân tích các ứng dụng kỹ thuật của hệ thống ống không nén, khí động lực học ngoài và dòng chất lưu lý tưởng, bao gồm các thuyết về thế dòng chảy, lực nâng và ma sát.

(46). Thực hành thủy lực môi trường (Hydraulics for Environmental Engineering Lab):

- Mã môn học: ENEE1012IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: ENEE1011IU-Thủy lực môi trường
- Mô tả nôi dung môn học: Sinh viên sẽ thực hiện thí nghiêm để hiệu hơn về nhũng nguyên lý và hiện tượng cơ bản của cơ lưu chất và hiểu thêm cách sử dụng thiết bị để đo dòng chảy.

(47). Các quá trình hóa lý trong Kỹ thuật Môi trường (Physical and chemical processes in Environmental engineering):

- Mã môn học: ENEE2020IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2002IU – Environmental Chemistry 1
- Môn học song hành: ENEE2021IU- Thực hành các quá trình hóa lý trong kỹ thuật môi trường
- Mô tả nôi dung môn học: Môn học sẽ cung cấp các kiến thức về cân bằng vật chất, động học phản ứng để ứng dụng cho các quá trình hóa lý trong kỹ thuật môi trường. Hơn nữa, các nguyên lý và tính toán của quá trình loại bỏ chất rắn lơ lửng và các chất tan trong nước cũng sẽ được thảo luận chi tiết trong khóa học.

(48). Thực hành các quá trình hóa lý trong Kỹ thuật Môi trường (Physical and chemical processes in Environmental engineering Lab):

- Mã môn học: ENEE2021IU

- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2010IU- Environmental Chemistry 1 Lab
- Môn học song hành: Các quá trình hóa lý trong kỹ thuật môi trường
- Mô tả nôi dung môn học: Sinh viên sẽ được trải nghiệm các thí nghiệm về keo tụ/tạo bông, hấp phụ, trao đổi ion và oxi hóa khử trong PTN nhằm giúp sinh viên hiểu rõ về các nguyên lý của các quá trình diễn ra trong xử lý nước.

(49). Các quá trình sinh học trong Kỹ thuật Môi trường (Biological Processes for Environmental Engineering):

- Mã môn học: ENEE2022IIU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2013IU- Vi sinh vật môi trường; ENEE1015IU-Hóa sinh
- Môn học song hành: ENEE2023IU- Thực hành các quá trình sinh học trong kỹ thuật môi trường
- Mô tả nôi dung môn học: Môn học sẽ giới thiệu những nguyên lý cơ bản và động lực của sự phát triển của vi sinh vật sử dụng trong xử lý vi sinh, bao gồm quá trình phát triển lơ lửng, bám dính và kết hợp. Môn học cũng cung cấp cho sinh viên kiến thức cơ bản về các quá trình sinh học trong ứng dụng của kỹ thuật môi trường.

(50). Thực hành các quá trình sinh học trong Kỹ thuật Môi trường (Biological Processes for Environmental Engineering Lab):

- Mã môn học: ENEE2023IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2013IU- Vi sinh vật môi trường; ENEE1016IU-Hóa sinh
- Môn học song hành: ENEE2022IU- Các quá trình sinh học trong kỹ thuật môi trường
- Mô tả nôi dung môn học: Ở môn học này, sinh viên sẽ được thực hành các thí nghiệm về các quá trình sinh học trong ngành kỹ thuật môi trường.

(51). Sức khỏe nghề nghiệp, an toàn và môi trường (Occupational Health Safety and Environment (HSE)

- Mã môn học: CHE2081IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không

- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học này giới thiệu cho sinh viên về việc áp dụng các khái niệm về an toàn sức khỏe và môi trường (HSE) trong kỹ thuật. Nó nhấn mạnh chủ yếu vào việc quản lý rủi ro liên quan đến bất kỳ sản phẩm và quy trình nguy hiểm nào trong suốt vòng đời của nó. Nói chung, việc thực hiện chương trình HSE là để giảm thiểu và kiểm soát rủi ro đến từ bất kỳ mối nguy nào của sản phẩm và quy trình. Điều này làm cho HSE trở thành một phần không thể thiếu của bất kỳ ngành kỹ thuật nào.

(52). Xử lý nước cấp (Water Treatment):

- Mã môn học: ENEE3012IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENE2010IU-Thực hành Hóa môi trường 1; ENEE2020IU-Quá trình hóa học và hóa lý trong kỹ thuật môi trường
- Môn học song hành: ENE3013IU-Thực hành xử lý nước cấp
- Mô tả nôi dung môn học: Môn học này là một trong những môn học chuyên ngành trọng tâm của chương trình đào tạo kỹ sư kỹ thuật môi trường với những kiến thức cốt lõi về xử lý nước mà kỹ sư kỹ thuật môi trường phải đạt được. Môn học cung cấp các kỹ năng và kiến thức liên quan đến kỹ thuật xử lý nước như xác định chất lượng nước, mô tả và thiết kế các quá trình/ thiết bị xử lý nước như keo tụ – tạo bông, lắng, lọc và khử trùng, loại bỏ sắt...

(53). Thực hành xử lý nước cấp (Water Treatment Lab):

- Mã môn học: ENEE3013IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2010IU-Thực hành hóa môi trường 1; ENEE2020IU-Quá trình hóa học và hóa lý trong kỹ thuật môi trường
- Môn học song hành: ENEE3012IU - Xử lý nước cấp
- Mô tả nôi dung môn học: Môn học này là một trong những môn học chuyên ngành chính của chương trình đào tạo kỹ sư môi trường, truyền đạt những kỹ năng cốt lõi về vận hành, đo lường hệ thống xử lý nước mà kỹ sư môi trường phải đạt được. Các quá trình/ thiết bị bao gồm: keo tụ – tạo bông, lắng, lọc, hấp phụ,…

(54). Xử lý nước nước thải sinh hoạt (Municipal Wastewater Treatment):

- Mã môn học: ENEE3014IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không

- Môn học trước: ENE2010IU-Thực hành Hóa môi trường 1; ENEE2022IU-Quá trình sinh học trong kỹ thuật môi trường
- Môn học song hành: ENEE3015IU-Thực hành xử lý nước thải sinh hoạt
- Mô tả nôi dung môn học: Đây là một trong những môn học chuyên ngành chính trong chương trình đào tạo ngành kỹ thuật môi trường. Nó chuyển tải các kiến thức cốt lõi mà kỹ sư môi trường cần phải đạt được. Môn học này cung cấp kiến thức nền tảng để lựa chọn và thiết kế các hệ thống xử lý nước thải sinh hoạt dựa trên các tiêu chí hiệu quả kinh tế kỹ thuật, bền vững và phù hợp điều kiện địa phương. Môn học sẽ chú trọng vào các quá trình hiếu khí, nitrat hóa, khử nitrat, ổn định bùn và các thiết kế cụ thể của bể tự hoại, bể sinh học hiếu khí liên tục, bể sinh học hiếu khí dạng mẻ, lọc sinh học, bể màng sinh học hiếu khí, bể ổn định bùn.

(55). Thực hành xử lý nước thải sinh hoạt (Municipal Wastewater Treatment Lab)

- Mã môn học: ENEE3015IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2010IU-Thực hành hóa môi trường 1; ENEE2022IU-Quá trình sinh học trong kỹ thuật môi trường
- Môn học song hành: ENEE3014IU-Xử lý nước thải sinh hoạt
- Mô tả nôi dung môn học: Đây là một trong những môn học chuyên ngành chính trong chương trình đào tạo ngành kỹ thuật môi trường. Nó chuyển tải các kiến thức cốt lõi mà kỹ sư môi trường cần phải đạt được. Môn học này cũng huấn luyện các kỹ năng như tổ chức và thực hiện các thực nghiệm các quá trình thường sử dụng trong các nhà máy xử lý nước thải sinh hoạt.

(56). Xử lý nước thải công nghiệp (Industrial Wastewater Treatment):

- Mã môn học: ENEE3016IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENE2010IU-Thực hành Hóa môi trường 1
- Môn học song hành: ENEE3017IU-Thực hành xử lý nước thải công nghiệp
- Mô tả nôi dung môn học: Đây là một trong những môn học chuyên ngành chính trong chương trình đào tạo ngành kỹ thuật môi trường. Nó chuyển tải các kiến thức cốt lõi mà kỹ sư môi trường cần phải đạt được. Môn học này cung cấp kiến thức nền tảng để lựa chọn và thiết kế các hệ thống xử lý nước thải công nghiệp dựa trên các tiêu chí hiệu quả kinh tế kỹ thuật, bền vững và phù hợp điều kiện địa phương. Môn học sẽ chú trọng vào các quá trình kỵ khí, tuyển nổi, và oxi hóa bậc cao và các ứng dụng vào mục đích khử màu, khử nước ô nhiễm cao.

(57). Thực hành xử lý nước thải công nghiệp (Industrial Wastewater Treatment Lab):

- Mã môn học: ENEE3017IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2010IU-Thực hành hóa môi trường 1
- Môn học song hành:ENEE3016IU- Xử lý nước thải công nghiệp.
- Mô tả nôi dung môn học: Đây là một trong những môn học chuyên ngành chính trong chương trình đào tạo ngành kỹ thuật môi trường. Nó chuyển tải các kiến thức cốt lõi mà kỹ sư môi trường cần phải đạt được. Môn học này huấn luyện các kỹ năng như tổ chức và thực hiện các thực nghiệm các quá trình thường sử dụng trong các nhà máy xử lý nước thải công nghiệp.

(58). Quản lý chất thải rắn và chất thải nguy hại (Solid waste & hazardous waste management):

- Mã môn học: ENEE3018IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2005IU- Hóa môi trường 2; ENEE2011IU-Thực hành hóa môi trường 2.
- Môn học song hành: ENEE3019IU- Thực hành quản lý chất thải rắn và chất thải nguy hại
- Mô tả nôi dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường và cung cấp kiến thức về quản lý chất thải rắn và chất thải nguy hại (SWM), loại và lượng chất thải, hệ thống lưu trữ, thu gom và vận chuyển, công nghệ xử lý chất thải và các công cụ chính trị; tính chất của chất thải và vật liệu nguy hại, chuyển đổi và hành vi của các hóa chất nguy hiểm trong đất, nước ngầm và hệ thống xử lý, đánh giá độc tính và rủi ro liên quan đến việc tiếp xúc với hóa chất nguy hiểm, áp dụng các nguyên tắc khoa học về chất thải nguy hại để quản lý, khắc phục và xử lý chúng.

(59). Thực hành quản lý chất thải rắn và chất thải nguy hại (Solid waste & hazardous waste management Lab):

- Mã môn học: ENEE3019IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2005IU- Hóa môi trường 2; ENEE2011IU-Thực hành hóa môi trường 2.
- Môn học song hành: ENEE3018IU-Quản lý chất thải rắn và chất thải nguy hại

- Mô tả nôi dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường và cung cấp kiến thức về quản lý chất thải rắn và chất thải nguy hại (SWM), tập trung vào các phương pháp xử lý sinh học đối với chất thải rắn hữu cơ.

(60). Kiểm soát ô nhiễm không khí (Air pollution control):

- Mã môn học: ENEE3020IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2011IU-Thực hành hóa môi trường 2; ENEE2014IU Truyền nhiệt và truyền khối.
- Môn học song hành: Thực hành kiểm soát ô nhiễm không khí
- Mô tả nôi dung môn học: Môn học này là một trong những môn học chuyên ngành trọng tâm của chương trình đào tạo kỹ sư kỹ thuật môi trường, chuyển tải các kiến thức cốt lõi về kỹ thuật xử lý khí thải mà kỹ sư môi trường cần phải đạt được. Môn học này cung cấp cho sinh viên kiến thức nguyên lý các phương pháp xử lý bụi và khí thải; đồng thời huấn luyện sinh viên kỹ năng tính toán thiết kế các công trình kiểm soát ô nhiễm không khí, như thiết bị lắng, cyclon, lọc, rửa khí, hấp thụ, hấp phụ...

(61). Thực hành kiểm soát ô nhiễm không khí (Air pollution control Lab):

- Mã môn học: ENEE3021IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2011IU-Thực hành hóa môi trường 2; ENEE2014IU Truyền nhiệt và truyền khối.
- Môn học song hành: Kiểm soát ô nhiễm không khí
- Mô tả nôi dung môn học: Môn học này là một trong những môn học chuyên ngành cốt lõi của chương trình đào tạo kỹ sư môi trường, với các kỹ năng về kiểm soát ô nhiễm không khí. Môn học cung cấp cho sinh viên các kỹ năng vận hành các thiết bị kiểm soát ô nhiễm không khí, ví dụ: cyclone, nhà túi, máy lọc khí, hấp thụ, hấp phụ, …

(62). Đồ án 1 (Project 1):

- Mã môn học: ENEE3110IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE3012IU- Xử lý nước cấp; ENEE4017IU- Vẽ kỹ thuật nâng cao
- Môn học song hành: Không

- Mô tả nôi dung môn học: Môn học được thiết kế nhằm cung cấp cho sinh viên kỹ năng nghề nghiệp trong kỹ thuật xử lý nước cấp. Môn học sẽ áp dụng kiến thức của môn bắt buộc trước đó (xử lý nước cấp) để giải quyết các nhiệm vụ khác nhau của đồ án. Sinh viên sẽ xác định đặc điểm của nước đầu vào; thông số cần xử lý; tổng quan các phương pháp xử lý nước; đề xuất công nghệ; thực hiện các tính toán và thiết kế các thiết bị cơ bản trong hệ thống.

(63). Đồ án 2 (Project 2):

- Mã môn học: ENEE3111IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE3014IU- Xử lý nước thải sinh hoạt; ENEE4017IU- Vẽ kỹ thuật nâng cao
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học được thiết kế nhằm cung cấp cho sinh viên kỹ năng nghề nghiệp trong kỹ thuật xử lý nước thải. Môn học sẽ áp dụng kiến thức của môn bắt buộc trước đó (xử lý nước thải) để giải quyết các nhiệm vụ khác nhau của đồ án. Sinh viên sẽ xác định đặc điểm của nước thải đầu vào; thông số cần xử lý; tổng quan các phương pháp xử lý nước thải; đề xuất công nghệ; thực hiện các tính toán và thiết kế các thiết bị cơ bản trong hệ thống.

(64). Đo bóc khối lượng và ước tính chi phí xây dựng:

- Mã môn học: ENEE4016IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học này được thiết kế để cung cấp cho sinh viên kiến thức về đo bóc khối lượng và dự đoán chi phí. Khối lượng bóc tách được sử dụng để ước tính chi phí xây dựng và phát triển các tài liệu hợp đồng.

(65). Vận hành nhà máy xử lý (Treatment Plant Operation):

- Mã môn học: ENEE3105IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Khóa học này được thiết kế cho sinh viên ngành Kỹ thuật Môi trường nhằm cung cấp các nguyên tắc cơ bản để vận hành hiệu quả, an toàn và hợp pháp các hệ thống xử lý nước thải hoặc vệ sinh. Khóa học này

hướng dẫn cho sinh viên kỹ năng bố trí thí nghiệm được sử dụng cho việc vận hành các nhà máy xử lý nước thải. Nó cũng cung cấp những điều luật cơ bản và các quy định môi trường, quản lý rủi ro và HSE.

(66). Thiết kế thí nghiệm (Experimental Design)

- Mã môn học: ENEE4019IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1019IU-Thống kê ứng dụng
- Môn học song hành: ENEE4020IU-Thực hành thiết kế thí nghiệm
- Mô tả nôi dung môn học: Môn học được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường nhằm cung cấp kiến thức nâng cao trong thiết kế thí nghiệm và phân tích số liệu cho lĩnh vực kỹ thuật môi trường. Môn học sẽ bao gồm các kiểu thiết kế thí nghiệm, thu nhận và phân tích dữ liệu sau các thí nghiệm được thiết kế. Môn học còn cung cấp cho sinh viên các kiến thức và kỹ năng để thiết kế thí nghiệm, phân tích dữ liệu, tạo các đồ thị trực quan cho các thí nghiệm môi trường.

(67). Thực hành thiết kế thí nghiệm (Experimental Design Lab)

- Mã môn học: ENEE4020IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1019IU-Thống kê ứng dụng
- Môn học song hành: ENEE4020IU-Thiết kế thí nghiệm
- Mô tả nôi dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường, với các kỹ năng nâng cao về thiết kế thí nghiệm và phân tích dữ liệu, chú trọng vào các ứng dụng trong kỹ thuật môi trường. Môn học cung cấp cho sinh viên các kỹ năng thông qua thực hành các phần mềm như Excel, SPSS, Design Expert, và Python, cho phép họ thiết kế, thực hiện, phân tích và diễn giải dữ liệu của các thí nghiệm kỹ thuật môi trường.

(68). Thiết kế đường ống và thiết bị (Pipe and Instruments Design):

- Mã môn học: ENEE4021IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENE1011IU-Thủy lực môi trường
- Môn học song hành: ENEE4022U -Thực hành thiết kế đường ống và thiết bị
- Mô tả nôi dung môn học: Môn học cung cấp kiến thức về đường ống và phụ kiện, bơm máy thổi khí và hệ thống điều khiển điện cho nhà máy xử lý nước / nước thải.

(69). Thực hành thiết kế đường ống và thiết bị (Pipe and Instruments Design Lab):

- Mã môn học: ENEE4022U
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENE1011IU-Thủy lực môi trường
- Môn học song hành: ENEE4021IU - Thiết kế đường ống và thiết bị
- Mô tả nôi dung môn học: Môn học này nhằm mục đích cung cấp các khả năng thiết kế Hệ thống đường ống và điều khiển cho nhà máy xử lý nước / nước thải.

(70). Hệ thống cấp thoát nước (Water Supply and Drainage Systems):

- Mã môn học: ENEE3103IU
- Số tín chỉ: 3 (lý thuyết: 3, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: Không
- Môn học song hành: Không
- Mô tả nôi dung môn học: Khóa học này giới thiệu các khái niệm cơ bản về quản lý dự án của mạng lưới phân phối nước, hệ thống thoát nước và nước mưa. Cụ thể, các vấn đề chính được đề cập trong khóa học như là quy hoạch, thiết kế, xây dựng và lắp đặt mạng lưới phân phối cấp nước, hệ thống thoát nước và nước mưa. Ngoài ra, khóa học cũng giới thiệu các vấn đề quản lý như là các bước lập kế hoạch quản lý và vận hành, bảo trì, xây dựng và bảo trì hệ thống cấp thoát nước.

(71). Đồ án 3 (Project 3):

- Mã môn học: ENEE3112IU
- Số tín chỉ: 1 (lý thuyết: 0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE3020IU- Kiểm soát ô nhiễm không khí; ENEE4017IU-Vẽ kỹ thuật nâng cao
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường, với các kiến thức/kỹ năng về kiểm soát ô nhiễm không khí. Sinh viên thực hành dự án kiểm soát ô nhiễm không khí, bao gồm xác định đặc điểm dòng khí thải, xác định yêu cầu xử lý, đề xuất công nghệ và thực hiện tính toán, thiết kế cần thiết cho các bộ phận chính trong hệ thống.

(72). Đồ án 4 (Project 4):

- Mã môn học: ENEE3113IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)

- Môn học tiên quyết: Không
- Môn học trước:ENEE3108IU- Quản lý chất thải rắn và chất thải nguy hại; ENEE3109IU- Thực hành quản lý chất thải rắn và chất thải nguy hại.
- Môn học song hành: Không
- Mô tả nôi dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường và cung cấp kiến thức về quản lý chất thải rắn và chất thải nguy hại (SWM), tập trung vào các phương pháp xử lý sinh học đối với chất thải rắn hữu cơ.

(73). Vẽ kỹ thuật nâng cao (Advanced Engineering Drawing):

- Mã môn học: ENEE4017IU
- Số tín chỉ: 2 (lý thuyết: 2, thực hành: 0)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1013IU-Vẽ kỹ thuật
- Môn học song hành: ENEE4018-Thực hành vẽ kỹ thuật nâng cao
- Mô tả nội dung môn học: Đây là một trong những môn học chuyên huấn luyện kỹ năng trong chương trình đào tạo. Nó chuyển tải kiến thức nâng cao về sử dụng phần mềm AutoCAD mà kỹ sư môi trường cần phải nắm được. Môn này yêu cầu sinh viên phải có kiến thức vẽ kỹ thuật cơ bản từ môn học "Vẽ kỹ thuật" về hình chiếu và các lệnh AutoCAD.

(74). Thực hành vẽ kỹ thuật nâng cao (Advanced Engineering Drawing Lab):

- Mã môn học: ENEE4018IU
- Số tín chỉ: 1 (lý thuyết:0, thực hành: 1)
- Môn học tiên quyết: Không
- Môn học trước: ENEE1014IU-Thực hành Vẽ kỹ thuật
- Môn học song hành: ENEE4017IU- Vẽ kỹ thuật nâng cao
- Mô tả nội dung môn học: Đây là một trong những môn học chuyên huấn luyện kỹ năng trong chương trình đào tạo. Môn học này nhằm cung cấp cho sinh viên khả năng tạo dựng và quản lý các bản vẽ kỹ thuật thoả mãn các tiêu chí trong tiêu chuẩn Việt nam và quốc tế sử dụng phần mềm AutoCAD. Môn học này cung cấp kiến thức nâng cao về sử dụng phần mềm AutoCAD và kỹ năng ứng dụng vào thể hiện các bản vẽ kỹ thuật chuyên ngành.

(75). Thực tập 1 (Internship 1):

- Mã môn học: ENEE5004IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE2001IU- Nhập môn Kỹ thuật Môi trường
- Môn học song hành: Không

- Mô tả nội dung môn học: Môn học này tổ chức các chuyến đi thực tế do Khoa Kỹ thuật Hóa học và Môi trường tổ chức để tìm hiểu các mô hình thực tế trong lĩnh vực kỹ thuật môi trường. Thông qua quan sát, trao đổi thông tin với các cán bộ, chuyên gia tại viện, doanh nghiệp, sinh viên sẽ hiểu rõ hơn về các vấn đề liên quan kỹ thuật môi trường. Môn học nhằm giúp sinh viên có nhận thức và định hướng nghề nghiệp trong quá trình học tập, nghiên cứu ở những năm học tiếp theo và sau khi tốt nghiệp. Thông qua môn học, sinh viên sẽ phát huy được khả năng chủ động trong việc tiếp xúc doanh nghiệp, đi sâu tìm hiểu hoạt động của doanh nghiệp trong lĩnh vực kỹ thuật môi trường.

(76). Thực tập 2 (Internship 2):

- Mã môn học: ENEE5005IU
- Số tín chỉ: 3 (lý thuyết: 0, thực hành: 3)
- Môn học tiên quyết: Không
- Môn học trước: ENEE5004IU-Thực tập 1
- Môn học song hành: Không
- Mô tả nội dung môn học: Thực tập là cơ hội cho sinh viên được tìm hiểu và áp dụng các nguyên tắc kỹ thuật môi trường trong phòng thí nghiệm, nơi làm việc và/hoặc nhà máy. Trước khi thực tập, người hướng dẫn của khoa sẽ giao cho sinh viên các nhiệm vụ đã được thỏa thuận trước đó và được chấp thuận bởi trưởng bộ môn/trường. Các nhiệm vụ này sẽ thay đổi tùy thuộc vào lĩnh vực cụ thể. Sinh viên sẽ làm việc dưới sự hướng dẫn và chỉ đạo của người hướng dẫn thực tập, người này là một nhân viên của địa điểm thực tập. Cuối cùng, sinh viên sẽ nộp một báo cáo bằng văn bản và thuyết trình trước hội đồng về những công việc đã làm, và một phiếu báo cáo bao gồm nhận xét và đề xuất từ người hướng dẫn thực tập.

(77). Thực tập 3 (Internship 3):

- Mã môn học: ENEE5006IU
- Số tín chỉ: 3 (lý thuyết: 0, thực hành: 3)
- Môn học tiên quyết: Không
- Môn học trước: ENEE3110IU-Đồ án 1; ENEE3111IU-Đồ án 2; CHE2081IU-Sức khỏe nghề nghiệp, an toàn và môi trường.
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành kỹ thuật môi trường trong đó sinh viên cơ hội nghiên cứu, quan sát và vận hành một hệ thống xử khí/nước/nước thải hoặc chất thải rắn hoàn chỉnh, cũng như thu thập dữ liệu cho luận văn tốt nghiệp, đồng thời định hướng và tìm kiếm cơ hội nghề nghiệp của SV trong tương lai. Môn học cung cấp cho sinh viên những kỹ năng và kinh nghiệm cần thiết của một kỹ sư, bao gồm khả năng

phân tích kỹ thuật và giải quyết vấn đề, khả năng tư duy sáng tạo, khả năng đánh giá vấn đề môi trường trong "thế giới thực". Ngoài ra, sinh viên có cơ hội hiểu biết về bối cảnh xã hội và môi trường kinh doanh, để hình thành ý tưởng và xây dựng hệ thống, thiết kế các quy trình xử lý môi trường trong điều kiện cụ thể của doanh nghiệp.

(78). Đề cương luận văn tốt nghiệp (Pre-thesis):

- Mã môn học: ENEE5000IU
- Số tín chỉ: 2 (lý thuyết: 0, thực hành: 2)
- Môn học tiên quyết: Không
- Môn học trước: ENEE5006IU-Thực tập 3
- Môn học song hành: Không
- Mô tả nội dung môn học: Môn học này được thiết kế cho sinh viên theo học ngành Kỹ thuật môi trường, nhằm phát triển kỹ năng viết đề xuất (proposal). Sinh viên học cách xác định các vấn đề và phạm vi của các vấn đề kỹ thuật; kết luận về các vấn đề môi trường cần xử lý; xem xét và đề xuất các giải pháp xử lý phù hợp. Đồng thời, sinh viên rèn luyện các kỹ năng tự đọc, đánh giá, viết và bảo vệ đề xuất của mình.

(79). Luận văn tốt nghiệp (Thesis):

- Mã môn học: ENEE5003IU
- Số tín chỉ: 10 (lý thuyết: 0, thực hành: 10)
- Môn học tiên quyết: Không
- Môn học trước: ENEE5000IU-Đề cương luận văn tốt nghiệp
- Môn học song hành: Không
- Mô tả nội dung môn học: Luận văn tốt nghiệp được thực hiện dưới sự hướng dẫn của một hoặc nhiều giảng viên hướng dẫn. Đề tài của luận văn bao gồm các định hướng thiết kế, nghiên cứu hay ứng dụng thực tế sẽ do giảng viên hoặc sinh viên đề xuất và phải được sự đồng ý của Trưởng Bộ môn. Sinh viên vận dụng kiến thức thu được một cách có hệ thống để giải quyết các vấn đề về môi trường. Giải quyết các vấn đề môi trường bằng cách áp dụng kiến thức có hệ thống.

TRƯỞNG KHOA	**KT. HIỆU TRƯỞNG** **PHÓ HIỆU TRƯỞNG**
Huỳnh Kim Lâm	**Đinh Đức Anh Vũ**

ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

Phụ lục 1
NỘI DUNG ĐIỀU CHỈNH CHƯƠNG TRÌNH ĐÀO TẠO NGÀNH KỸ THUẬT MÔI TRƯỜNG KHÓA 2023 SO VỚI KHÓA 2022
(Kèm theo Quyết định số 1001/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

1. Các môn học loại bỏ khỏi chương trình đào tạo

TT	Mã môn học	Tên môn học	Loại MH	Số TC			Lý do
				Tổng	LT	TH	
1.	BA167IU	Introduction to Vietnamese Legal systems	Bắt buộc	3	3	0	Bỏ môn để thay thế bằng môn Pháp luật đại cương Việt Nam
2.	ENEE2003IU	Mechanics of Materials	Bắt buộc	3	3	0	Bỏ môn để thay thế bằng môn mới có điều chỉnh số tín chỉ để đảm bảo số TC thực tập theo TT 17
3.	ENEE2015IU	Basic Theory of Environmental Structures	Bắt buộc	3	3	0	Bỏ môn để thay thế bằng môn mới có điều chỉnh số tín chỉ để đảm bảo số TC thực tập theo TT 17
4.	IS026IU	Project Management	Bắt buộc	3	3	0	Bỏ môn học này trong nhóm môn tự chọn tự do vướng môn học trước/tiên quyết SV không đăng ký học được; Môn tự chọn nên hủy môn không làm thay đổi số tín chỉ của CTĐT
5.	ENEE5001IU	Internship	Bắt buộc	2	0	2	Bỏ môn để thêm số TC thực tập theo TT 17
6.	ENEE5000IU	Pre-thesis	Bắt buộc	1	0	1	Bỏ môn để thay thế bằng môn mới có điều chỉnh số tín chỉ để đảm bảo khối lượng thực hiện thực tế của sinh viên
7.	BT155IU	Biology	Bắt buộc	4	3	1	Bỏ môn để thêm số TC thực tập theo TT 17
8.	ENEE1002IU	Hydraulics for Environmental	Bắt buộc	4	3	1	Bỏ môn để thay thế bằng môn mới có tách riêng thành

TT	Mã môn học	Tên môn học	Loại MH	Số TC			Lý do
				Tổng	LT	TH	
		Engineering					2 môn mới (lý thuyết 2tc và thực hành 1tc), giảm bớt 1 tín chỉ thực hành để cân đối lại số tín chỉ thực tập của CTĐT

2. Các môn học bổ sung vào chương trình đào tạo

TT	Mã môn học	Tên môn học	Loại MH	Số TC			Lý do
				Tổng	LT	TH	
1.	CHE2082IU	Occupational Health Safety and Environment (HSE)	Bắt buộc	2	2	0	Bổ sung môn học theo kết quả khảo sát các bên liên quan/ tăng cơ hội về nghề nghiệp cho người học/ đảm bảo yêu cầu khi đi thực tập tại một số đơn vị
2.	CH012IU	Chemistry Lab	Bắt buộc	1	0	1	Bổ sung kiến thức/kỹ năng nền tảng cần thiết cho các môn học sau
3.	ENEE5004IU	Internship 1	Bắt buộc	2	0	2	Thêm số TC thực tập theo TT17
4.	ENEE5005IU	Internship 2	Bắt buộc	3	0	3	Thêm số TC thực tập theo TT17
5.	PE021IU	General Law	Bắt buộc	3	3	0	Thay thế BA167IU (cùng khối kiến thức pháp luật Việt Nam)
6.	ENEE2024	Mechanics of Materials	Bắt buộc	2	2	0	Thay thế ENEE2003IU
7.	ENEE2025	Basic Theory of Environmental Structure	Bắt buộc	2	2	0	Thay thế 2015IU
8.	ENEE5006IU	Internship 3	Bắt buộc	3	0	3	Thêm số TC thực tập theo TT17
9.	ENEE5007IU	Pre-thesis	Bắt buộc	2	0	2	Thêm số TC để đáp ứng khối lượng thực hiện của SV
10.	ENEE3112IU	Project 3	Tự chọn	1	0	1	Thêm môn học vào nhóm môn Tự chọn kỹ sư để tăng

TT	Mã môn học	Tên môn học	Loại MH	Số TC			Lý do
				Tổng	LT	TH	
11.	ENEE3113IU	Project 4	Tự chọn	2	0	2	sự linh hoạt khi vận hành giữa các CTĐT khóa cũ và khóa mới. Đây là môn tự chọn nên thêm môn không làm thay đổi số tín chỉ của CTĐT
12.	ENEE1011IU	Hydraulics for Environmental Engineering	Bắt buộc	2	2	0	Giảm TC lý thuyết; Tách riêng phần lý thuyết và thực hành
13.	ENEE1012IU	Hydraulics for Environmental Engineering Lab	Bắt buộc	1	0	1	

3. Các điều chỉnh khác

3.1. Tách riêng phần lý thuyết và phần thực hành cho những môn học có cả lý thuyết và thực hành để tổ chức lớp học được thuận tiện hơn

TT	Môn học cũ				Môn học thay thế		
	Mã môn học	Tên môn	Loại MH	TC (LT, TH)	Mã môn học	Tên môn	TC (LT, TH)
1.	ENEE2007IU	Physical and Chemical Processes for Environmental Engineering	Bắt buộc	3 (2,1)	ENEE2020IU	Physical and Chemical Processes for Environmental Engineering	2 (2,0)
					ENEE2021IIU	Physical and Chemical Processes for Environmental Engineering Lab	1 (0,1)
2.	ENEE2009IU	Biological Processes for Environmental Engineering	Bắt buộc	3 (2,1)	ENEE2022IIU	Biological Processes for Environmental Engineering	2 (2,0)
					ENEE2023IU	Biological Processes for Environmental Engineering Lab	1 (0,1)
3.	ENEE3101IU	Water Treatment	Bắt buộc	4 (3,1)	ENEE3012IU	Water Treatment	3 (3,0)
					ENEE3013IU	Water Treatment Lab	1 (0,1)

TT	Môn học cũ				Môn học thay thế		
	Mã môn học	**Tên môn**	**Loại MH**	**TC (LT, TH)**	**Mã môn học**	**Tên môn**	**TC (LT, TH)**
4.	ENEE3102IU	Municipal Wastewater Treatment	Bắt buộc	4 (3,1)	ENEE3014IU	Municipal Wastewater Treatment	3 (3,0)
					ENEE3015IU	Municipal Wastewater Treatment Lab	1 (0,1)
5.	ENEE3104IU	Industrial Wastewater Treatment	Bắt buộc	4 (2,2)	ENEE3016IU	Industrial Wastewater Treatment	2 (2,0)
					ENEE3017IU	Industrial Wastewater Treatment Lab	2 (0,2)
6.	ENEE3301IU	Solid waste and hazardous waste management	Bắt buộc	4 (3,1)	ENEE3018IU	Solid waste and hazardous waste management	3 (3,0)
					ENEE3019IU	Solid waste and hazardous waste management Lab	1 (0,1)
7.	ENEE3202IU	Air pollution control	Bắt buộc	4 (3,1)	ENEE3020IU	Air pollution control	3 (3,0)
					ENEE3021IU	Air pollution control Lab	1 (0,1)
8.	ENEE1001IU	Engineering Drawing	Bắt buộc	3 (2,1)	ENEE1013IU	Engineering Drawing	2 (2,0)
					ENEE1014IU	Engineering Drawing Lab	1 (0,1)
9.	ENEE1010IU	Biochemistry	Bắt buộc	4 (3,1)	ENEE1015IU	Biochemistry	3 (3,0)
					ENEE1016IU	Biochemistry Lab	1 (0,1)
10.	ENEE1003IU	Fundamental of Analytical Chemistry	Bắt buộc	3 (2,1)	ENEE1017IU	Fundamental of Analytical Chemistry	2 (2,0)
					ENEE1018IU	Fundamental of Analytical Chemistry Lab	1 (0,1)
11.	ENEE1006IU	Applied Statistics in Environment	Bắt buộc	3 (2,1)	ENEE1019IU	Applied Statistics in Environment	2 (2,0)
					ENEE1020IU	Applied Statistics in Environment Lab	1 (0,1)

TT	Môn học cũ				Môn học thay thế		
	Mã môn học	**Tên môn**	**Loại MH**	**TC (LT, TH)**	**Mã môn học**	**Tên môn**	**TC (LT, TH)**
12.	ENEE4002IU	Advanced Engineering Drawing	Bắt buộc	3 (2,1)	ENEE4017IU	Advanced Engineering Drawing	2 (2,0)
					ENEE4018IU	Advanced Engineering Drawing Lab	1 (0,1)
13.	ENEE4015IU	Experimental Design	Tự chọn	4 (2,2)	ENEE4019IU	Experimental Design	2 (2,0)
					ENEE4020IU	Experimental Design Lab	2 (0,2)
14.	ENEE3106IU	Pipe and Instruments Design	Tự chọn	4 (2,2)	ENEE4021IU	Pipe and Instruments Design	2 (2,0)
					ENEE4022U	Pipe and Instruments Design Lab	2 (0,2)

3.2. Điều chỉnh nhóm môn học tự chọn

Điều chỉnh nhóm môn 6 tín chỉ tự chọn tự do thành 02 nhóm môn tự chọn như sau:

(01)Sinh viên chọn 03 tín chỉ trong nhóm môn tự chọn sau đây

TT	CTĐT hiện hành				Điều chỉnh				
	Mã môn học	**Tên môn học**	**Số TC (LT, TH)**	**Nhóm môn**	**Mã môn học**	**Tên môn học**	**Số TC (LT, TH)**	**Nhóm môn**	**Ghi chú**
	Khối kiến thức kinh tế - quản lý				**Khối kiến thức kinh tế - quản lý (SV chọn tối thiểu 1 môn 3 TC)**				
1	IS020IU	Engineering Economy	3 (3,0)	Bắt buộc	IS020IU	Engineering Economy	3 (3,0)	Tự chọn	Đổi thành môn tự chọn
2					IT120IU	Entre-preneurship	3 (3,0)	Tự chọn	Thêm môn tự chọn mới
3					ENEE4011 IU	Engineering Project Management	3 (3,0)	Tự chọn	Thêm môn tự chọn mới

(02) Sinh viên chọn 03 tín chỉ trong nhóm môn tự chọn sau đây

TT	CTĐT hiện hành (SV chọn tối thiểu 6 tín chỉ trong danh sách các môn tự chọn sau)			Điều chỉnh (SV chọn tối thiểu 3 tín chỉ trong danh sách các môn tự chọn sau)			
	Mã môn học	**Tên môn học**	**Số TC (LT, TH)**	**Mã môn học**	**Tên môn học**	**Số TC (LT, TH)**	**Ghi chú**
1	IS026IU	Project Management	3 (3,0)	*Bỏ môn này*			
2	BA115IU	Introduction to Business Administration	3 (3,0)	BA115IU	Introduction to Business Administration	3 (3,0)	*Như cũ*
3	BA151IU	Entrepreneurship and Small Business Management	3 (3,0)	BA151IU	Entrepreneurship and Small Business Management	3 (3,0)	*Như cũ*
4	BT010IU	Plant physiology	3 (3,0)	BT010IU	Plant physiology	3 (3,0)	*Như cũ*
5	CHE3211IU	Nanomaterials	3 (3,0)	CHE3211IU	Nanomaterials	3 (3,0)	*Như cũ*
6	CHE3221IU	Biomaterials	3 (3,0)	CHE3221IU	Biomaterials	3 (3,0)	*Như cũ*

Bổ sung 02 môn tự chọn vào nhóm Tự chọn kỹ sư (*chỉ thêm môn học, không làm thay đổi số tín chỉ)*

CTĐT hiện hành			Điều chỉnh			
Mã MH	**Tên MH**	**Số TC (LT, TH)**	**Mã MH**	**Tên MH**	**Số TC (LT, TH)**	**Ghi chú**
ENEE4016IU	Construction-Measurement-and-Cost-Estimating	3(3,0)	ENEE4016IU	Construction-Measurement-and-Cost-Estimating	3(3,0)	Như cũ
ENEE3105IU	Treatment Plant Operation	3(3,0)	ENEE3105IU	Treatment Plant Operation	3(3,0)	Như cũ
ENEE4019IU	Experimental Design	2 (2,0)	ENEE4019IU	Experimental Design	2 (2,0)	Như cũ
ENEE4020IU	Experimental Design Lab	2(0,2)	ENEE4020IU	Experimental Design Lab	2(0,2)	Như cũ

CTĐT hiện hành			Điều chỉnh			
Mã MH	**Tên MH**	**Số TC (LT, TH)**	**Mã MH**	**Tên MH**	**Số TC (LT, TH)**	**Ghi chú**
ENEE4021IU	Pipe and Instruments Design	2(2,0)	ENEE4021IU	Pipe and Instruments Design	2(2,0)	Như cũ
ENEE4022U	Pipe and Instruments Design Lab	2(0,2)	ENEE4022U	Pipe and Instruments Design Lab	2(0,2)	Như cũ
ENEE3103IU	Water Supply and Drainage Systems	3(3,0)	ENEE3103IU	Water Supply and Drainage Systems	3(3,0)	Như cũ
			ENEE3112IU	Project 3	1(0,1)	Thêm mới
			ENEE313IU	Project 4	2(02)	Thêm mới

3.3. Môn học tương đương, thay thế

Môn học					Môn học tương đương, thay thế			
TT	**Mã MH**	**Tên MH**	**Loại MH**	**TC (LT, TH)**	**Mã MH**	**Tên MH**	**Loại MH**	**TC (LT, TH)**
1	ENEE1002IU	Hydraulics for Environmental Engineering	Bắt buộc	4 (3,1)	1.ENEE1011 IU	Hydraulics for Environmental Engineering	Bắt buộc	2 (2,0)
					2.ENEE1012 IU	Hydraulics for Environmental Engineering Lab	Bắt buộc	1 (0,1)
					3.ENEE3112I U	Project 3	Tự chọn	1 (0,1)
2	ENEE2003IU	Mechanics of Materials	Bắt buộc	3 (3,0)	1.ENEE2024	Mechanics of Materials	Bắt buộc	2 (2,0)
					2.ENEE3112I U	Project 3	Tự chọn	1 (0,1)
3	ENEE2015IU	Basic Theory of Environmental Structures	Bắt buộc	3 (3,0)	1.ENEE2025	Basic Theory of Environmental Structure	Bắt buộc	2 (2,0)
					2.ENEE3112I U	Project 3	Tự chọn	1 (0,1)
4	BA167IU	Introduction to Vietnamese Legal systems	Bắt buộc	3 (3,0)	PE021IU	General Law	Bắt buộc	3 (3,0)

Môn học					Môn học tương đương, thay thế			
TT	**Mã MH**	**Tên MH**	**Loại MH**	**TC (LT, TH)**	**Mã MH**	**Tên MH**	**Loại MH**	**TC (LT, TH)**
5	ENEE3105IU	ENEE3105IU Treatment Plant Operation	Tự chọn	3 (3,0)	CHE3431IU	Treatment Plant Operation	Tự chọn	3 (3,0)
6	ENEE1010IU	Biochemistry	Bắt buộc	4 (3,1)	1.CHE1104IU	Biochemistry	Bắt buộc	3 (3,0)
					2.CHE1105IU	Biochemistry Lab	Bắt buộc	1 (0,1)
					Hoặc			
					1.BT319IU	Biochemistry	Bắt buộc	3 (3,0)
					2.BT320IU	Practice in Biochemistry	Bắt buộc	1 (0,1)
7	ENEE4002IU	Advanced Engineering Drawing	Bắt buộc	3 (2,1)	CHE3414IU	Advanced Engineering Drawing	Bắt buộc	2 (2,0)
					CHE3415IU	Advanced Engineering Drawing Lab	Bắt buộc	1 (0,1)
8	IS026IU	Project Management	Tự chọn	3 (3,0)	IS050IU	Project Management	Tự chọn	3 (3,0)
					Hoặc			
					ENEE4011IU	Engineering Project Management	Tự chọn	3 (3,0)

4. Hướng xử lý cho các sinh viên khóa cũ khi chưa học các môn học bị loại bỏ khỏi chương trình đào tạo

TT	Mã môn học	Tên môn học	Số TC (LT, TH)	Hướng xử lý
1.	BA167IU	Introduction to Vietnamese Legal systems	3(3,0)	Môn học thay thế: PE021IU General Law (3,0)
2.	ENEE2003IU	Mechanics of Materials	3(3,0)	Môn học thay thế: 1. ENEE2024 Mechanics of Materials (2,0) 2. ENEE3112IU Project 3 (0,1)

TT	Mã môn học	Tên môn học	Số TC (LT, TH)	Hướng xử lý
3.	ENEE2015IU	Basic Theory of Environmental Structures	3(3,0)	Môn học thay thế: 1. ENEE2025 Basic Theory of Environmental Structures (2,0) 2. ENEE3112IU Project 3 (0,1)
4.	IS026IU	Project Management	3(3,0)	Đăng ký môn thay thế: IS050IU Project Management (3,0) hoặc ENEE4011IU Engineering Project Management (3,0)
5.	ENEE5001IU	Internship	2(2,0)	Môn học không xếp thời khóa biểu (tính khối lượng giảng dạy theo từng sinh viên) nên Khoa sẽ mở môn cho đến khi hết sinh viên cũ học.
6.	ENEE5000IU	Pre-thesis	1(0,1)	Môn học không xếp thời khóa biểu (tính khối lượng giảng dạy theo từng sinh viên) nên Khoa sẽ mở môn cho đến khi hết sinh viên cũ học.
7.	BT155IU	Biology	4(3,1)	Sinh viên tiếp tục đăng ký 02 môn học thay thế của môn này thuộc Khoa BT BT311IU Biology (3,0) BT312IU Practice in Biology (0,1)
8.	ENEE1002IU	Hydraulics for Environmental Engineering	4(3,1)	Môn học thay thế: 1. ENEE1011IU Hydraulics for Environmental Engineering (2,0) 2. ENEE1012IU Hydraulics for Environmental Engineering Lab (0,1) 3. ENEE3112IU Project 3 (0,1)

ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

Phụ lục 2

ĐỀ CƯƠNG CHI TIẾT CÁC MÔN HỌC

(Kèm theo Quyết định số 1001/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

1. PE015IU-Philosophy of Marxism and Leninism
2. PE016IU-Political economics of Marxism and Leninism
3. PE017IU-Scientific socialism
4. PE018IU-History of Vietnamese Communist Party
5. PE019IU-Ho Chi Minh's Thoughts
6. PE021IU-General Law
7. PE008IU-Critical Thinking
8. PE020IU-Engineering Ethics and Professional Skills
9. EN007IU-Writing AE1
10. EN008IU-Listening AE1
11. EN011IU-Writing AE2
12. EN012IU-Speaking AE2
13. MA001IU-Calculus 1
14. CH011IU-Chemistry for Engineers
15. CH012IU-Chemistry lab
16. ENEE1015IU-Biochemistry
17. ENEE1016IU-Biochemistry Lab
18. ENEE2013IU-Environmental Microbiology
19. ENEE2016IU-Environmental Microbiology Lab
20. PH013IU-Physics 1
21. ENEE2017IU-Introduction to Computing
22. ENEE1013IU-Engineering Drawing

23. ENEE1014IU-Engineering Drawing Lab
24. ENEE2001IU-Introduction to Environmental Engineering
25. ENEE2008IU-Environmental Ecology
26. IS020IU-Engineering Economy
27. IT120IU-Entre- preneurship
28. ENEE4011IU-Engineering Project Management
29. BA115IU-Introduction to Business Administration
30. BA154IU-Entrepreneurship and Small Business Management
31. BT010IU-Plant physiology
32. CHE3211IU-Nanomaterials
33. CHE3221IU-Biomaterials
34. ENEE1019IU-Applied Statistics
35. ENEE1020IU-Applied Statistics Lab
36. ENEE1017IU-Fundamental of Analytical Chemistry
37. ENEE1018IU-Fundamental of Analytical Chemistry Lab
38. ENEE2002IU-Environmental Chemistry 1
39. ENEE2010IU-Environmental Chemistry 1 Lab
40. ENEE2005IU-Environmental Chemistry 2
41. ENEE2011IU-Environmental Chemistry 2 Lab
42. ENEE2024IU-Mechanics of Materials
43. ENEE2025IU-Basic Theory of Environmental Structures
44. ENEE2014IU-Heat and Mass transfer
45. ENEE1011IU-Hydraulics for Environmental Engineering
46. ENEE1012IU-Hydraulics for Environmental Engineering Lab
47. ENEE2020IU-Physical and Chemical Processes for Environmental Engineering
48. ENEE2021IIU-Physical and Chemical Processes for Environmental Engineering Lab
49. ENEE2022IIU-Biological Processes for Environmental Engineering
50. ENEE2023IU-Biological Processes for Environmental Engineering Lab
51. CHE2082IU-Occupational Health Safety and Environment (HSE)
52. ENEE3012IU-Water Treatment
53. ENEE3013IU-Water Treatment Lab
54. ENEE3014IU-Municipal Wastewater Treatment
55. ENEE3015IU-Municipal Wastewater Treatment Lab
56. ENEE3016IU-Industrial Wastewater Treatment

57. ENEE3017IU-Industrial Wastewater Treatment Lab
58. ENEE3018IU-Solid waste and hazardous waste management
59. ENEE3019IU-Solid waste and hazardous waste management Lab
60. ENEE3020IU-Air pollution control
61. ENEE3021IU-Air pollution control Lab
62. ENEE3110IU-Project 1
63. ENEE3111IU-Project 2
64. ENEE4016IU-Construction Measurement and Cost Estimating
65. ENEE3105IU-Treatment Plant Operation
66. ENEE4019IU-Experimental Design
67. ENEE4020IU-Experimental Design Lab
68. ENEE4021IU-Pipe and Instruments Design
69. ENEE4022U-Pipe and Instruments Design Lab
70. ENEE3103IU-Water Supply and Drainage Systems
71. ENEE3112IU-Project 3
72. ENEE3113IU-Project 4
73. ENEE4017IU-Advanced Engineering Drawing
74. ENEE4018IU-Advanced Engineering Drawing Lab
75. ENEE5004IU-Internship 1
76. ENEE5005IU-Internship 2
77. ENEE5006IU-Internship 3
78. ENEE5000IU-Pre-thesis
79. ENEE5003IU-Thesis

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
KHOA CHÍNH TRỊ - HÀNH CHÍNH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

ĐỀ CƯƠNG CHI TIẾT MÔN HỌC

Triết học Mác-Lênin

(Philosophy Marx - Lenin)

1. Thông tin chung

Tên môn học (tiếng Việt):	Triết học Mác-Lênin
Tên môn học (tiếng Anh):	Philosophy Marx – Lenin
Mã số môn học:	PE015IU
Thuộc khối kiến thức:	Cơ sở
Số tín chỉ/ECTS	3 tín chỉ/ 4.64 ECTS
Số tiết lý thuyết:	*30 (trên lớp)*
Số tiết thực hành:	*15 (trên lớp)*
Số tiết tự học:	*90 (về nhà)*
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Môn học trang bị cho sinh viên những nội dung cơ bản về thế giới quan, phương pháp luận triết học Mác - Lênin.

2.2. Giúp cho sinh viên vận dụng những tri thức về thế giới quan, phương pháp luận triết học triết học Mác - Lênin một cách sáng tạo trong hoạt động nhận thức và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về triết học Mác-Lênin

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Giáo trình Triết học Mác - Lênin,* Nxb. Chính trị quốc gia, Hà Nội.

- Bộ Giáo dục và Đào tạo (2012), *Giáo trình Những Nguyên lý cơ bản của chủ nghĩa Mác - Lênin,* Nxb. Chính trị quốc gia, Hà Nội.

- Hội đồng Trung ương (2008), *Giáo trình Triết học Mác-Lênin,* Nxb. Chính trị quốc gia, Hà Nội.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIO CTĐT**	**Mức độ giảng dạy (I/T/U)**
5.1. Kiến thức					
LO.l	TRIẾT HỌC VÀ VAI TRÒ CỦA TRIẾT HỌC TRONG ĐỜI SỐNG XÃ HỘI	LO. 1.1 - Khái lược được triết học, một số khái niệm cơ bản trong triết học	2.1	1.1.3	I3
		LO. 1.2 - Nhận biết được sự đối lập giữa chủ nghĩa duy vật và chủ nghĩa duy tâm trong việc giải quyết vấn đề cơ bản của triết học			
		LO. 1.3 - Nắm được chủ nghĩa duy vật biện chứng - hình thức phát triển cao nhất của chủ nghĩa duy vật biện chứng			
		LO. 1.4 - Nắm rõ được sự ra đời, đối tượng, chức năng và vai trò của triết học Mác - Lênin			
LO.2	CHỦ NGHĨA DUY VẬT BIỆN CHÚNG	LO.2.1- Hiểu rõ vật chất theo quan điểm của chủ nghĩa duy vật biện chứng	2.1	1.1.3	T4
		LO.2.2 - Hiểu rõ ý thức theo quan điểm của chủ nghĩa duy vật biện chứng	2.1		
		LO.2.3 - Giải quyết được mối quan hệ giữa vật chất và ý thức theo quan điểm của chủ nghĩa duy vật biện chứng	2.1		
		LO.2.4 - Hiểu được phép biện chứng và phép biện chứng duy vật	2.1		
LO.3	CHỦ NGHĨA DUY VẬT LỊCH SỬ	LO.3.1 - Nắm được vai trò của sản xuất vật chất và phương thức sản xuất đối với sự tồn tại và phát triển xã hội	2.1 2.2	1.1.3	T4

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
		LO.3.2 - Hiểu rõ được mối quan hệ biện chứng giữa lực lượng sản xuất và quan hệ sản xuất			
		LO.3.3 - Hiểu rõ được mối quan liệ biện chứng giữa CSHT và KTTT; sự phát triển tự nhiên của các hình thái KT-XH			
		LO.3.4 - Hiểu rõ được giai cấp, đấu tranh giai cấp; dân tộc và mối quan hệ giữa giai cấp, dân tộc và nhân loại			
		LO.3.5 - Hiểu rõ được nhà nước và mạng xã hội			
		LO.3.6 - Hiểu rõ dược mối quan lệ biện chứng giữa tồn tại xã hội và ý thức xã hội			
		LO.3.7 - Hiểu rõ được con người bản chất con người; hiện tượng tha hóa và giải phóng con người mối quan hệ giữa cá nhân và xã hội, vai trò của quần chúng nhân dân			
5.2. Kỹ năng					
LO.4	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.4.1. Có kỹ năng khái quát hóa để rút ra *Từ khóa tri thức* đối với mỗi nội dung và tư duy có hệ thống LO.4.2. Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn LO.4.3. Có kỹ năng giao tiếp xã bội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều hành nhóm làm việc	2.1 2.2	2.1.1 2.3.1 2.4.4 2.5 3.1.5	U4
5.3. Thái độ					

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
LO.5	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.5.1. Có ý thức trách nhiệm bảo vệ tính khoa học, cách mạng, nhân văn của CN Mác - Lênin LO.5.2. Có ý thức, trách nhiệm cá nhân đối vối tập thế, cộng đồng LO.5.3. Có nhận thức về sự cần thiết học tập, nghiên cứu suốt đời và vận dụng nó trong cuộc sống.	2.1 2.2	3.1	U3

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (Tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (1 tiết)	**Giới thiệu về môn học**	LO.l, LO.4;	**Dạy:** - Giới thiệu đề cương môn học - Giới thiệu nội dung đề tài thuyết trình nhóm GHW) **Học ở lớp:** - Chia nhóm (5 sv/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** -Chọn đề tài thuyết trình của nhóm (GHW) Đọc trước tài liệu chương 1.	
2 (15 tiết)	**Chương 1** TRIẾT HỌC VÀ VAI TRÒ CỦA TRIẾT HỌC TRONG ĐỜI SỐNG XÃ HỘI	LO.l; LO.4 LO.5	**Dạy:** **1.** TRIẾT HỌC VÀ VẤN ĐỀ CƠ BẢN CỦA TRIẾT HỌC 1. Khái lược về triết học 2. Vấn đề cơ bản của triết học 3. Biện chứng và siêu hình II. TRIẾT HỌC MÁC - LÊNIN VÀ VAI TRÒ CÙA TRIẾT HỌC MÁC - LÊNIN TRONG ĐỜI SỐNG XÃ HỘI 1. Sự ra đời và phát triển của triết học Mác - Lênin 2. Đối tượng và chức năng của triết học Mác - Lênin 3. Vai trò cùa triết học Mác - Lênin trong đời sống xã hội và trong sự nghiệp đổi mới ở Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** - Phác thảo nội dung thuyết trình nhóm GHW	Thi giữa kỳ (Quiz)

			Đọc trước tài liệu chương 2.	
3 (15 tiết)	**Chương 2** CHỦ NGHĨA DUY VẬT BIỆN CHỨNG	LO.2 LO.4 LO.5	**Dạy:** I. VẬT CHẤT VÀ Ý THỨC 1. Vật chất và các hình thức tồn tại của vật chất 2. Nguồn gốc, bản chất và kết cấu của ý thức 3. Mối quan hệ giữa vật chất và ý thức II. PHÉP BIỆN CHỨNG DUY VẬT 1. Hai loại hình biện chứng và phép biện chứng duy vật Nội dung của phép biện chứng duy vật III. LÝ LUẬN NHẬN THỨC 1. Các nguyên tắc của lý luận nhận thức duy vật biện chứng 2. Nguồn gốc, bản chất của nhận thức 3. Thực tiễn và vai trò của thực tiễn đối với nhận thức 4. Các giai đoạn cơ bản của quá trình nhận thức Chân lý **Học ở Lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 3	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)
4 (14 tiết)	**Chương 3** CHỦ NGHĨA DUY VẬT LỊCH SỬ	L0.3 L0.4 L0.5	**Dạy:** I. HỌC THUYẾT HÌNH THÁI KINH TẾ - XÃ HỘI 1. Sản xuất vật chất là cơ sở của sự tồn tại và phát triển xã hội 2. Biện chứng giữa lực lượng sản xuất và quan hệ sản xuất 3. Biện chứng giữa cơ sở hạ tầng và kiến trúc thượng tầng của xã hội 4. Sự phát triển các hình thái kinh tế - xã hội là một quá trình lịch sử - tự nhiên II. GIAI CẤP VÀ DÂN TỘC 160 1. Vấn đề giai cấp và đấu tranh giai cấp 2. Dân tộc 3. Mối quan hệ giai cấp - dân tộc - nhân loại III. NHÀ NƯỚC VÀ CÁCH MẠNG XÃ HỘI 1. Nhà nước 2. Cách mạng xã hội IV. Ý THỨC XÃ HỘI 1. Khái niệm tồn tại xã hội và các yếu tố cơ bản của tồn tại xã hội 2. Ý thức xã hội và kết cấu của ý thức xã hội V. TRIẾT HỌC VỀ CON NGƯỜI 1. Khái niệm con người và bản chất con người 2. Hiện tượng tha hóa con người và vấn đề giải phóng con người 3. Quan hệ cá nhân và xã hội; vai trò của quần chúng nhân dân và lãnh tụ trong lịch sử Vấn đề con người trong sự nghiệp cách mạng ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Hoàn thiện bài thuyết trình	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	15%	Thuyết trình và bản báo cáo nhóm	LO.2 LO.3 LO.4 LO.5
2	Quiz	Bài thi giữa kỳ	Thi theo đề thi chung	20%	Tự luận đề mở	LO.l LO.2;
3	Die	Thảo luận, chuyên cần tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. sv có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	LO.4 LO.5
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận đề đóng	LO.2; LO.3; LO.4;
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	Nhận biết được sự đối lập giữa chủ nghĩa duy vật và chủ nghĩa duy tâm trong việc giải quyết vấn đề cơ bản của triết học; vai trò của triết học Mác – Lênin	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.4	Nắm rõ nội dung: Vật chất, ý thức và mối quan hệ giữa chúng; các nguyên lý, các quy luật và các phạm trù cơ bản của phép biện chứng duy vật	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được nội dung của chủ nghĩa duy vật lịch sử	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thế liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn
- Quy định về Bài thuyết trình nhóm GHW

Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đãng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp nộp cho GV buổi 1.

Tuần 4 (buổi thứ 4) thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
KHOA CHÍNH TRỊ - CHÍNH CHÍNH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

ĐỀ CƯƠNG CHI TIẾT MÔN HỌC

Kinh tế chính trị Mác-Lênin

(Marxist-Leninist Political Economy)

1. Thông tin chung

Tên môn học (tiếng Việt):	Kinh tế chính trị Mác-Lênin
Tên môn học (tiếng Anh):	Marxist – Leninist Political Economy
Mã số môn học:	PE016IU
Thuộc tính khối kiến thức:	Cơ sở
Số tín chỉ/ECTS	2 tín chỉ/3.09 ECTS
Số tiết lí thuyết:	*20 (trên lớp)*
Số tiết thực hành:	*10 (trên lớp)*
Số tiết tự học:	*60 (về nhà)*
Môn học song hành:	1. Triết học Mác - Lênin
Giảng viên phụ trách:	Khoa Chính trị - Hành chính. ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Một là, trang bị cho sinh viên những kiến thức cơ bản, cốt lõi của Kinh tế chính trị Mác – Lênin trong bối cảnh phát triển kinh tế của đất nước và thế giới ngày nay. Bảo đảm tính cơ bản, hệ thống, khoa học, cập nhật tri thức mới, gần với thực tiễn. tính sáng tạo, kỹ năng, tư duy, sản phẩm chất người học, tính liên thông khắc phục trùng lắp, tăng cường tích hợp và giảm tái sinh, lược bớt những nội dung không còn phù hợp hoặc những nội dung mang tỉnh kinh viện đối kháng sinh viên các trường Cao đẳng, Đại học không chuyên luận.

2.2. Hai là, trên cơ sở đó hình thành tư duy, kỹ năng phân tích, đánh giá và nhận diện bản chất của các quan hệ có lợi cho kinh tế trong phát triển kinh tế - xã hội của đất nước góp phần giúp sinh viên xây dựng trách nhiệm xã hội phù hợp với vị trí công việc và cuộc sống sau khi ra trường.

2.3. Ba là, góp phần xây dựng trường, thức hệ tư tưởng Mác – Lê nin đối với sinh viên.

3. Mô tả môn học (Đề cương khóa học)

Nội dung chương trình gồm 6 chương: Trong đó chương 1 bàn về đối tượng, phương pháp nghiên cứu và chức năng của Kinh tế chính trị Mác – Lênin. Từ chương 2 đến chương 6 trình bày nội dung cốt lõi của Kinh tế chính trị Mác – Lê nin theo mục tiêu của môn học. Cụ thể các vấn đề như: Hàng hóa, thị trường và vai trò của các chủ sở hữu nền kinh tế thị trường; Sản xuất giá trị thặng dư trong nền kinh tế thị trường; trong Cạnh tranh và độc quyền trong nền kinh tế thị trường; Kinh tế thị trường định hướng xã hội chủ nghĩa và các quan hệ có lợi cho kinh tế ở Việt Nam; Công nghiệp hóa, hiện đại hóa và hội nhập kinh tế quốc tế tại Việt Nam.

4. Tài liệu phục vụ học tập:

- Tài liệu bắt buộc: Giáo trình kinh tế chính trị Mác – Lê nin dành cho bậc đại học không chuyên kinh tế chính trị.
- Tài liệu đọc thêm:

+ Robert, JR và Robert F. Hebert (2003), Lịch sử các học thuyết kinh tế, Bản tiếng Việt, Nxb Thống kê.

+ Viện Kinh tế chính trị, Học viện Chính trị quốc gia Hồ Chí Minh (2018), Giáo trình Kinh tế chính trị Mác – Lê nin, NXB Lý luận Chính trị.

+ Các. Mác – Ph. Ăngghen: Toàn tập, tập 20, tập 23, tập 25, Nxb Chính trị quốc gia, 1994.

+ V.I.Lê nin toàn cập, tập 3, tập 27. NXB Tiến bộ Maxcơva, 1976.

+ Davig Begg, Stanley Fisher, Rudiger Dornbusch, Kinh tế học, Nhà xuất dục Hà Nội 1992.

+ Đảng Cộng sản Việt Nam (2016), Văn kiện Đại hội Đại biểu toàn quốc lần thứ XII, Nxb Chính trị quốc gia, Hà Nội.

+ Đảng Cộng sản Việt Nam (2016), Báo cáo tổng kết một số vấn đề lý luận – thực tiễn qua ba mươi năm đổi mới (1986 – 2016), NXB Chính trị quốc gia, Hà Nội.

+ Đảng Cộng sản Việt Nam (2017), Nghị quyết số 11-NQ/TW ngày 03/6/2017 về: "Hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa"

+ Chỉ thị số 16/CT-TTg (2017) "Về việc tăng cường năng lực cận kề cuộc cách mạng công nghiệp lần thứ 4".

+ Jeremy Rifkin (2014), Cuộc cách mạng công nghiệp lần thứ ba, bản dịch tiếng Việt, NXB Lao động xã hội.

+ Manfred B. Steger (2011), Toàn cầu hóa, Nxb Tri thức.

+ Klaus Schwab (2015): Caahcs mạng công nghiệp lần thứ 4, Nxb Chính trị quốc gia.

+Sự thật, 2018.

5.Chuẩn đầu ra môn học (Course Learnig Outcomes).

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIP CTDT**	**Mức độ giảng dạy (I/T/U)**
5.1.Kiến thức					
LO.1	ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU VÀ CHỨC NĂNG CỦA KINH TẾ CHÍNH TRỊ	LO.1.1-Nắm được sự hình thành và phát triển của Kin tế chính trị Mác-Lênin.	2.1		I3
		LO.1.2- Xác định được đối tượng nghiên của kinh tế chính trị Mác-Lênin.			

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIP CTDT	Mức độ giảng dạy (I/T/U)
	MÁC-LÊNIN	LO.1.3- Hiểu rõ được phương pháp nghiên cứu của kinh tế chính trị Mác-Lênin			
		LO.1.4- Hiểu rõ các chức nawg của môn học kinh tế chính trị Mác-Leenin.			
LO.2	HÀNG HÓA, THỊ TRƯỜNG VÀ VAI TRÒ CỦA CÁC CHỦ THỂ THAM GIA THỊ TRƯỜNG	LO.2.1- Hiểu rõ sản xuất hàng hóa và điều kiện ra đời của sản xuất hàng hóa.	2.1		T4
		LO.2.2- Hiểu rõ hàng hóa, hai thuộc tính của hàng hóa và mối quan hệ giữa hai thuộc tính .			
		LO.2.3- Hiểu rõ mối quan hệ giữa tính hai mặt của lao động sản xuất hàng hóa với hai thuộc tính của hàng hóa			
		LO.2.4- Hiểu rõ mặt chất và lương của giá trị hàng hóa và các nhân tố ảnh hưởng đến giá trị hàng hóa .			
		LO.2.5- Hiểu rõ được nguồn gốc, bản chất và chức năng của tiền tệ.			
		LO.2.6- Hiểu rõ về thị trường , vai trò của thị trường, cơ chế thị trường và nền kinh tê thị trường.			
		LO.2.7- Hiểu rõ được một số quy luật kinh tế chủ yếu của kinh tế thị trường.			
		LO.2.8- Hiểu rõ vai trò của các chủ thể tham gia thị trường.			
LO.3	GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.3.1- Hiểu rõ được tư bản là gì, công thức chung của tư bản và mâu thuẫn công thức chung của tư bản.	2.1		T4
		LO.3.2-Hiểu rõ được hàng hóa sức lao động là gì, tại sao nghiên cứu hàng hóa sức lao động giải quyết mâu thuẫn công thức chung của tư bản.	2.1		
		LO.3.3-Hiểu rõ được giá trih thặng dư là gì. Xác định được có mấy phương pháp sản xuất giá trị thặng dư.	2.1 2.3		

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIP CTDT	Mức độ giảng dạy (I/T/U)
		LO.3.4-Hiểu rõ được bản chất của tích lũy tư bản, nhưng nhân tố làm tăng quy mô quy mô tích lũy tư bản và hệ quả của tích lũy tư bản.	2.3		
		LO.3.5-Hiểu rõ được các khái niệm: chi phí sản xuất, lợi nhuận, tỷ xuất lợi nhuận, lợi nhuận bình quân, lợi nhuận thương nghiệp, các nhân tố ảnh hưởng đến tỷ xuất lợi nhuận.	2.1		
		LO.3.6-Hiểu rõ được lợi tức là gì	2.1		
		LO.3.7-Hiểu rõ được địa tô tư bản chủ nghĩa. Có mấy loại địa tô tư bản chủ nghĩa và giá cả ruộng đất.	2.1 2.3		
LO.4	CẠNH TRANH VÀI ĐỘC QUYỀN TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.4.1- Hiểu rõ được quan hệ cạnh tranh và độc quyền trong nền kinh tế thị trường.	2.1		
		LO.4.2 - Hiểu rõ được nguyên nhân hình thành độc quyền trong nền kinh tế thị trường.	2.1		
		LO.4.3 - Hiểu rõ được những đặc điểm kinh tế cơ bản của độc quyền trong chủ nghĩa tư bản theo quan điểm của V.I. Lênin	2.1		
		LO.4.4 - Hiểu rõ được nguyên nhân hình thành và phát triển của chủ nghĩa tư bản độc quyền nhà nước.	2.1		
		LO.4.5 - Hiểu rõ được bản chất của chủ nghĩa tư bản độc quyền nhà nước và những biểu hiện chủ yếu của độc quyền nhà nước trong chủ nghĩa tư bản.	2.3		
		LO 4.6 – Nắm được vai trò lịch sử của chủ nghĩa tư bản.	2.1		
LO.5	KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA VÀ CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM	LO.5.1 - Hiểu tổ được khái niệm kinh tế thị trường dinh hưởng xã hội chủ nghĩa.	2.1		
		LO.5.2 – Hiểu rõ được tính tất yếu khách quan của việc phát triển kinh tế thị trưởng định hưởng xã hội chủ nghĩa ở Việt Nam	2.1		
		LO.5.3 – Nắm được những đặc trưng của kinh tế thị trường định	2.1		

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIP CTDT	Mức độ giảng dạy (I/T/U)
		hướng xã hội chủ nghĩa ở Việt Nam.	2.1		
		LO.5.4 – Hiểu rõ thể chế kinh tế thị trường định hướng xã hội chủ nghĩa là gì và sự cần thiết phải hoàn thiện nó.	2.1		
		LO.5 5 – Nắm được những nội dung cơ bản của hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa là gì và sự cần thiết phải hoàn thiện nó.	2.2		
		LO.5.6 – Hiểu rõ được khái niệm lợi ích kinh tế và quan hệ lợi ích kinh tế.	2.1		
		LO.5.7 - Hiểu rõ được khái niệm lợi ích kinh tế và quan hệ lợi ích kinh tế			
LO.6	CÔNG NGHIỆP HÓA, HIỆN ĐẠI HÓA VÀ HỘI NHẬP KINH TẾ QUỐC TẾ CỦA VIỆT NAM	LO.6.1 - Hiểu rõ được cách mạng công nghiệp là gì, khái quát được các cuộc cách mạng đã diễn ra trong lịch sử.	2.1		
		LO.6.2 - Hiểu rõ vai trò của cách mạng công nghiệp đối với sự phát triển.	2.1		
		LO.6.3 – Hiểu được công nghiệp Hoa là gì và các mô hình công hóa ở Việt Nam	2.1		
		LO.6.4 – Hiểu rõ tính tất yếu khách quan của công nghiệp hóa, hiện đại hóa ở Việt Nam	2.1		
		L0.6.5 – Năm được những nội dung của công nghiệp hóa, hiện đại hóa ở Việt Nam.	2.1		
		LO.6.6 - Năm được công nghiệp hóa, hiện đại hóa ở Việt Nam trong bối cảnh của cuộc cách mạng công nghiệp lần thứ 4	2.3		
		LO.6.7 – Hiểu rõ được hội nhập kinh tế quốc tế là gì. Vì sao hội nhập kinh tế quốc tế là sự cần thiết khách quan.	2.1		
		LO.6.8 - Năm được những nội dung và tác động tích cực và tiêu cực của hội nhập kinh tế quốc tế.	2.3		

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIP CTDT	Mức độ giảng dạy (I/T/U)
		LO.6.9 – Nắm được phương hướng nâng cao hiệu quả hội nhập kinh tế quốc tế trong phát triển của Việt Nam			
5.2. Kỹ năng					
LO.7	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO7.1. Có kỹ năng khái quát hóa để rút ra Từ khóa tri thức đối với mỗi nội dung và tư duy có hệ thống LO7.2. Có kỹ năng trình bày thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn LO7.3. Có kỹ năng giao tiếp xã hội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều hành nhóm làm việc	2.1 2.2 2.4		U4
5.3.Thái độ					
LO.8	THỂ HIỆN Ý THỨC NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	L.0.8.1. Có ý thức trách nhiệm bảo Vệ tính khoa học, cách mạng, nhân - văn của CN Mác Lênin L.O.8.2. Có ý thức, trách nhiệm các nhản đối với tập thể, cộng đồng L.0.8.3. Có nhận thức về sự cần thiết học tập, nghiên cứu suốt đời và vẫn đụng nó trong cuộc sống.	2.1 2.2 2.3		U3

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (1 tiết)	Giới thiệu về môn học	LO.1, LO.7;	Day: - Tự giới thiệu về giảng viên. - Giới thiệu để cương và tài liệu môn học. - Hướng dẫn cách thức dạy và học vũ cách đánh giá. - Giới thiệu nội dung đề tài thuyết trình thiệu về môn học nhóm GIIW . Học ở lớp: - Chia nhóm (5 SV/nham) - Giới thiệu nhóm học tập Học ngoài lớp:	

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			-Chọn đề tài thuyết trình của nhóm (GHW) - Đọc trước tài liệu chương 1.	
2 (2 tiết)	**Chương 1** ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU VÀ CHỨC NĂNG CỦA KINH TẾ CHÍNH TRỊ MÁC - LÊNIN	LO.1; LO.7 LO.8	Dạy: 1. SỰ HÌNH THÀNH VÀ PHÁT TRIỂN CỦA KÍCH MẶC – LÊNIN 1. 1. Giai đoạn từ cổ đại đến thế kỷ 18 2. Giai đoạn từ sau thế kỷ 18 đến nay II. ĐỐI TƯỢNG. PHƯƠNG PHÁP NGHIÊN CỨU CỦA KINH TẾ CHÍNH TRỊ MAC-LENIN. 1. Đối tượng nghiên cứu 2. Phương pháp nghiên cứu 3, Mục dịch nghiên cứu III. CHỨC NĂNG CỦA TRI MAC-LENIN. 1. Chức năng nhận thức 2. Chức năng thực tiễn 3. Chức năng tư tưởng 4 Chức năng phương pháp luận Học ở lớp: Thảo luận và phát biểu trên lớp. Học ngoài lớp: Phác thảo nội dung thuyết trình nhóm GHW - Đọc trước tài liệu chương 2	Thi giữa kỳ (Quiz)
3 (6 tiết)	**Chương 2** HÀNG HÓA, THỊ TRƯỜNG VÀ VAI TRÒ CỦA CÁC		Dạy: I. LÝ LUẬN CỦA CÁC MẮC VỀ SẢN XUẤT HÀNG HOA VÀ HÀNG HÓA 1. Sản xuất hàng hỏi: - Khái niệm sản xuất hàng - Điều kiện ra đời của sản 2. Hàng hóa - Khái niệm hàng hóa - Hai thuộc tỉnh của hàng hóa - Lượng giá trị và các nhân tố ảnh hưởng đến lượng giá trị của hàng hóa	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
	CHỦ THỂ THAM GIA THỊ TRƯỜNG	LO.2 LO.7 LO.8	- Tỉnh lại mặt của lao động sản xuất hàng hòa. 3. Tiền - Nguồn gốc và bản chất của tiền - Chức năng của tiền 4. Dịch vụ và một số hàng hóa đặc biệt. II. THỊ TRƯỜNG VÀ VAI TRÒ CỦA HÀNG HÓA, THỊ RƯỞNG VÀ VAI TRÒ CÁC CHỦ THỂ THAM GIA THỊ TRƯỜNG. 1. Thị trường - Khái niệm về thị trưởng - Vai trò của thị trường. - Cơ chế thị trưởng - Nền kinh tế thị trường. 2, Vai trò của các chủ thể tham gia thị trường. - Người sản xuất. - Người tiêu dùng. - Các chủ thể trung gian trong thị trường - Nhà nước. Học ở lớp: Thảo luận và phát biểu trên lớp. Học ngoài lớp: Đọc trước tài liệu chương 3	
4 (6 tiết)	**Chương 3** GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.3 LO.7 LO.8	Day: I. LÝ LUẬN CỦA CÁC MÁC VỀ GIÁ TRỊ THẶNG DƯ 1. Nguồn gốc của giá trị thặng dư 2. Bản chất của giá trị thặng dư 3. Các phương pháp sản xuất giá trị thống dư trong nền kinh tế thị trường tư bản chủ nghĩa. II. TÍCH LŨY TƯ BẢN. - Bản chất của tích lũy tư bản - Những nhân tố góp phần làm tăng quy mô tích lũy dụng nó trong cuộc sống. -Một số hệ quả của tích lũy tư bản. III. CÁC HÌNH THỨC BIỂU HIỆN GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG 1. Lợi nhuận 2. Lợi tức 3. Địa tô tư bản chủ nghia	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			Học ở lớp: Thảo luận và phát triển ở lớp Học ngoại lớp: Hoàn thiện bài thuyết trình Đọc trước tài liệu chương 4	
5 (5 tiết)	**Chương 4** CẠNH TRANH VÀ ĐỘC QUYỀN TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.4 LO.7 LO.8	**Dạy:** I. QUAN HỆ GIỮA CẠNH TRANH VÀ ĐỘC QUYỀN TRONG NỀN KINH TẾ THỊ TRƯỜNG. II. ĐỘC QUYỀN VÀ ĐỘC QUYỀN NHÀ NƯỚC TRONG NỀN KINH TẾ THỊ 1. Lý luận của V.I.Lênin về độc quyền trong nền kinh tế thị trường. - Nguyên nhân hình thành và tốc động của độc quyền trong chủ nghĩa tư bản. - Những đặc điểm kinh tế cơ bản của độc quyền trong chủ nghĩa tư bản 2. Lý luận của VII. Lê nin về độc quyền nhân nước trong chủ nghĩa tư bản, - Nguyên nhân ra đời và phát triển của độc quyền nhà nước trong chủ nghĩa tư bản. - Bản chất của độc quyền nhà nước trong chủ nghĩa từ bản - Những biểu hiện chủ yếu của độc quyền nhà nước trong chủ nghĩa tư bản. - Vai trò lịch sử của chủ nghĩa tư bản. **Học ở lớp:** Thảo luận và phát biểu trên **Học ngoài lớp:** Đọc trước tài liệu chương 5	Thuyết trình nhóm (GHW) Thi cuối ky (FEX)
			Dạy: I. KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM	Thuyết trình nhóm (GHW) Thi cuối ky (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
6 (5 tiết)	**Chương 5** KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HOOIJU CHỦ NGHĨA VÀ CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM	LO.5 LO.7 LO.8	1. Khái niệm kinh tế thị trường định hưởng xã hội chủ nghĩa ở Việt Nam. 2. Tính tất yếu khách quan của việc phát triển kinh tế thị trường định hướng xã hội. chủ nghĩa ở Việt Nam. 3. Đặc trưng của kinh tế thị trường định hưởng xã hội chủ nghĩa ở Việt Nam. II. HOÀN THIỆN THỂ CHẾ KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM. 1. Sự cần thiết phải hoàn thiện thể chế kinh Việt Nam. te thị trường định hướng xã hội chủ nghĩa ở Việt Nam. 2. Hoàn thiện thể chế kinh tế thị trường định hưởng xã hội chủ nghĩa ở Việt Nam một số khía cạnh chủ yếu. **III.** CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM. 1. Lợi ích kinh tế và quan hệ lợi ích kinh tế. 2. 2 Vai trò của nhà nước trong đảm bảo hài hòa các quan hệ lợi ích **Học ở lớp**: Thảo luận và phát biểu trên **Học ngoài lớp** Hoàn thiện bài thuyết trình Đọc trước tài liệu chương 6	
7 (5 tiết)	**Chương 6** CÔNG NGHIỆP HÓA, HIỆN ĐẠI HÓA VÀ HỘI NHẬP	LO.6	**Dạy:** I. CÔNG NGHIỆP HÓA, HIỆN ĐẠI HÓA Ở VIỆT NAM. 1. Khái quát cách mạng công nghiệp và công nghiệp hóa - Khái quát về cách mạng công nghiệp - Công nghiệp hóa và các mô hình công nghiệp hóa trên thế giới	Thuyết trình nhóm (GHW) Thi cuối ky (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
	KINH TẾ QUỐC TẾ CỦA VIỆT NAM	LO.7 LO.8	2. Tính tất yếu khách quan và nội dung của công nghiệp hóa, hiện đại hóa ở Việt Nam. - Tính tất yếu của công nghiệp hóa, hiện đại hoa ở Việt Nam. - Nội dung công nghiệp hóa, hiện đại hóa ở Việt Nam. 3. Công nghiệp hóa, hiện đại hóa của Việt Nam trong bối cảnh cách mạng ông nghiệp lần thứ 4. II.HỘI NHẬP KINH TẾ QUỐC TẾ CỦA VIỆT NAM. 1. Khái niệm và các hình thức hội nhập kinh tế quốc tế. - Khái niệm và sự cần thiết khách quan của hội nhập kinh tế quốc tế. - Những nội dung của hôi nhập kinh tế quốc tê. 2. Tác động của hội nhập kinh tế quốc tế đến phát triển của Việt Nam. - Tác động tích cực. - Tác động tiêu cực. 3. Phương hướng nâng cao hiệu quả hội nhập kinh tế quốc tế tronh phát triển của Việt Nam. Học ở lớp: Thảo luận và phát biểu trên lớp Học ngoài lớp: Hoàn thiện bài thuyết trình.	

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm về đề tài phân công	Thuyết trình nhóm về đề tài đã phân công.	15%	Thuyết trình và bản báo cáo nhóm.	LO.4 LO.5 LO.6 LO.7 LO.8
2	Quiz	Bài thi giữa kì	Thi theo đề thi chung.	20%	Tự luận đề mở.	LO.2 LO.3
3	DIC	Thảo luận, chuyên cần	Điểm thảo luận được tính theo phương pháp	15%	Phát biểu/đặt câu hỏi trên lớp hoặc	LO.7 LO.8

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
		tại lớp (Discission in Class)	tương đối. SV có số lần thảo luận nhiều nhất tại lớp sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.		phiếu trả lời trong các nghiên cứu tình huống tại lớp.	
4	FEX	Thi cuối kì	Đề thi bao quát toàn bộ nội dung môn học.	50%	Tự luận đề đóng.	LO.2 LO.3 LO.4 LO.5 LO.6 LO.7 LO.8
			100%	100%		

8.Tiêu chí đánh giá chuẩn đầu ra môn học.

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.1	Nhận biết được vị trí của Kinh tế chính trị Mác – Lênin trong hệ thống lịch sử tư tưởng kinh tế và nắm được đối tượng, phương pháp và chức năng của kinh tế chính trị Mác – Lênin	Chương 1	Thi giữ kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.7	Nắm rõ nội dung: sản xuất hàng hóa, điều kiện ra đời của sản xuất hàng hóa, khái niệm hàng hóa và hai thuộc tính của hàng hóa, chất và lượng của giá trị hàng hóa, mối quan hệ giữa tính hai mặt của lao động sản xuất hàng hóa với hai thuộc tính của hàng hóa, các nhân tố ảnh hưởng đến lượng giá trị của hàng hóa, nguồn gốc ra đời, bản chất và chức năng của tiền. Thị trường, cơ chế thị trường, nền kinh tế thị trường và vai trò các chủ đề tham gia thị trường	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của GV
LO.3 LO.7	Hiểu rõ và nắm được những nội dung: tư bản là gì? Công thức chung và mâu thuẫn công thứ chung của tư bản. Hàng hóa sức lao động và tính chất đặc biệt của giá trị sử dụng hàng hóa sức lao động. Giá trị thặng dư và hai phương pháp sản xuất giá trị thặng dư. Tích lũy tư bản và những nhân tố làm tang quy mô tích lũy. Các khái niệm về	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá tuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
	chi phí sản xuất, lợi nhuận, lợi tức và địa tô tư bản chủ nghĩa			
LO.4 LO.7	Hiểu rõ và nắm được những nội dung: quan hệ giữ cạnh tranh và độc quyền trong nền kinh tế thị trường. Tổ chức độc quyền là gì? ,nguyên nhân hình thành các tổ chức độc quyền. Những đặc điểm kinh tế cơ bản của độc quyền theo quan điểm của V.I. Lênin. Lý luận về độc quyền nhà nước trong chủ nghĩa tư bản. Vai trò lịch sử của chủ nghĩa tử bản	Chương 4	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá tuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.5 LO.7	Hiểu rõ và nắm được những nội dung: kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam, những đặc chưng của kinh tế thị trường định hướng xã hội chủ nghĩa. Thể chế kinh tế thị trường định hướng xã hội chủ nghĩa và sự cần thiết phải hoàn thiện thể chế kinh tế thị trường định hướng xã họi chủ nghĩa. Lợi ích kinh tế và quan hệ lợi ích kinh tế. Vai trò của nhà nước trong đảm mảo hài hòa các quan hệ lợi ích.	Chương 5	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá tuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.6 LO.7	Hiểu rõ và nắm được những nội dung: cách mạng công nghiệp là gì? Vai trò của cách mạng công nghiệp đối với sự phát triển. Công nghiệp hóa là gì? Các mô hình công nghiệp hóa tiêu biểu trên thế giới. Công nghiệp hóa, hiện đại hóa ở Việt Nam là gì? Tính tất yếu khách quan phải công nghiệp hóa, hiện đại hóa ở Việt Nam. Công nghiệp hóa, hiện đại hóa ở Việt Nam trong bối cảnh cuộc cách mạng công nghiệp lần thứ 4. Hội nhập kinh tế quốc tế là gì, Sự cần thiết khách quan phải hội nhập kinh tế quốc tế. Tác động của hội nhập kinh tế quốc tế của Việt Nam. Phương hướng nâng cao hiệu quả hội nhập kinh tế quốc tế	Chương 6	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá tuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

9. Một số lưu ý khác:

- Khi có các thắc mắc liệ quan môn học, sinh viên có thể liên lạc với giảng viên qua email: lethong0804@gmail.com
- Quy định về Bài thuyết trình nhóm GHW

Thành lập nhóm: 5 sinh viên/ nhóm. Hạn chót đắng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp cập nhật cho GV buổi 1.

Tuần 4 (buổi thứ 4) thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt dù và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

Hình thức nộp bài: Nộp file và biên bản làm việc theo nhóm qua mail cho GV

- Quy định về giờ ngủ, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự kiến thiếu 80% thời gian học trên lớp (chỉ được phép bỏ qua mặt tối đa 20% số liệu học). Nếu bỏ qua số lượng quy định quy định sẽ bị cấm thi theo quy định. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt thảo luận, phát biểu xây dựng bài, nghiêm trọng trong giờ học.

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
KHOA CHÍNH TRỊ - HÀNH CHÍNH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

ĐỀ CƯƠNG CHI TIẾT MÔN HỌC

Chủ nghĩa xã hội khoa học (Scientific socialism)

1. Thông tin chung

Tên môn học (tiếng Việt):	Chủ nghĩa xã hội khoa học
Tên môn học (tiếng Anh):	Scientific socialism
Mã số môn học:	PE017IU
Thuộc khối kiến thức:	Cơ sở
Số tín chỉ/ECTS:	2 tín chỉ/3.09 ECTS
Số tiết lý thuyết:	*30 (trên lớp)*
Số tiết thực hành:	
Số tiết tự học:	*60 (về nhà)*
Môn học trước:	l. Kinh tế chính trị Mác - Lênin, 2. Triết học Mác - Lênin
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Môn học trang bị cho sinh viên những nội dung cơ bản của chủ nghĩa xã hội khoa học (một trong ba bộ phận cấu thành chủ nghĩa Mác - Lênin).

2.2. Giúp cho sinh viên vận dụng những tri thức cơ bản của chủ nghĩa xã hội khoa học một cách sáng tạo trong hoạt động nhận thức và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về chủ nghĩa xã hội khoa học

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Giáo trình Chủ nghĩa xã hội khoa học,* Nxb. Chính trị quốc gia, Hà Nội.
- Bộ Giáo dục và Đào tạo (2012), *Giáo trình Những Nguyên lý cơ bản của chủ nghãi Mác-Leenin,* Nxb. Chính trị quốc gia, Hà Nội.
- Hội đồng Trung ương (2008), *Giáo trình Chủ nghĩa xã hội khoa học,* Nxb. Chính trị quốc gia, Hà Nội.

5.Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
5.1. Kiến thức					
LO.1	NHẬP MÔN CHỦ NGHĨA XÃ HỘI KHOA HỌC	LO.1.1 – Khái lược sự ra đời CHủ nghĩa xã hội khoa học, hoàn cảnh lịch sử và vai trò của Các Mác và PH.Ăngghen	2.1	1.1.3	**13**
		LO.1.2 – Nhận biết được các giai đoạn phát triển cơ bản của Chủ nghĩa xã hội khoa học thể hiện qua các tác phẩm			
		LO.1.3 – Nắm rõ được đối tượng, phương pháp và ý nghĩa của việc nghiện cứu Chủ nghĩa xã hội khoa học			
LO.2	SỨ MỆNH LỊCH SỬ CỦA GIAI CẤP CÔNG NHÂN	LO.2.1- Hiểu rõ khái niệm giai cấp coongn hân và đặc điểm của giai cấp công nhan	2.1	1.1.3	T4
		LO.2.2 – Nắm rõ nội dung, đặc điểm sứ mệnh lịch sử của giai cấp công nhân	2.1		
		LO.2.3 – Giải thích được những điều kiện quy định sứ mệnh lịch sử của giai cấp công nhân	2.1		
		LO.2.4 – Phân tích được những điểm tương đồng và khác biệt của giai cấp công nhân hiện nay và việc thực hiện sứ mệnh của giai cấp công nhân trên thế giới hiện nay	2.1		
		LO.2.5 – Nắm rõ những đặc điểm cơ bản của giai cấp công nhân Việt Nam và nội dung sứ mệnh lịch sử của giai cấp công nhân Việt Nam hiện nay	2.1 2.2		
		LO.2.6 – Trình bày được phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp công nhân Việt Nam hiện nay	2.1 2.2		
LO.3		LO.3.1 – Hiểu rõ Chủ nghĩa xã hội là giai đoạn đầu của hình thái kinh tế - xã hội công sản chủ nghĩa	2.1	1.1.3	I3
		LO.3.2 – Trình bày được những đặc trưng cơ bản của chủ nghĩa xã hội			

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
	CHỦ NGHĨA XÃ HỘI VÀ THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3.3 – Giải thích được tính tất yếu khách quan của thời kỳ quá độ lên chủ nghĩa xã hội và những đặc điểm cơ bản của thời kỳ quá độ lên chủ nghĩa xã hội			
		LO.3.4 – Hiểu rõ đặc trưng của thời kỳ quá độ và chủ nghĩa xã hội ở Việt Nam, trình bày được những phương hướng xây dựng chủ nghĩa xã hội ở Việt Nam hiện nay			
LO.4	DÂN CHỦ XÃ HỘI CHỦ NGHĨA VFA NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA	LO.4.1 – Giải thích được quan niệm về dân chủ và sự ra đời và phát triển dân chủ trong lịch sử xã hội loài người	2.1	1.1.3	T4
		LO.4.2 – Nắm rõ quá trình ra đời và bản chất của nền dân chủ xã hội chủ nghĩa	2.1		
		LO.4.3 – Hiểu được sự ra đời, bản chất và chức năng của nhà nước xã hội chủ nghĩa cũng như mối quan hệ giữa dân chủ và nhà nước	2.1		
		LO.4.4 - hiểu được sự ra đời phát triển và bản chất của nền dân chủ xã hội chủ nghĩa ở Việt Nam	2.1		
		LO.4.5 - trình bày được đặc điểm và các giải pháp cơ bản nhằm xây dựng nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam hiện nay	2.1 2.2		
LO.5	CƠ CẤU XÃ HỘI GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.5.1 – Trình bày được khái niệm cơ cấu xã hội – khái quát và sự biến đổi của cơ cấu xã hội giai cấp trong thời kì quá độ lên chủ nghĩa xã hội	2.1	1.1.3	I3
		LO.5.2 – giải thích được tính tất yếu của liên minh giai cấp, tầng trong thời kỳ quá độ lên chủ nghĩa xã hội			
		LO.5.3 – Hiểu rõ cơ cấu xã hội – giai cấp ở Việt Nam trong thời kì quá độ và trình bày những giải pháp cơ bản nhằm xây dựng, phát triển lối liên minh giai cấp, tầng lớp xã hội ở Việt Nam			
		LO.6.1 – Hiểu rõ khái niệm, đặc	2.1		

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
LO.6	VẤN ĐỀ DÂN TỘC VÀ TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	trưng cơ bản của dân tộc và quan điểm của chú nghĩa Mác – Leenin về vấn đề dân tộc			
		LO.6.2 – Trình bày được những đặc điểm cơ bản của dân tộc ở Việt Nam và quan điểm chính sách dân tộc của Đảng và Nhà nước Việt Nam	2.1		
		LO.6.3 – Hiểu được bản chất, nguồn gốc, tính chất của tôn giáo và nguyên tắc cơ bản giải quyết vấn đề tôn giáo trong thời kỳ quá độ lên chủ nghĩa xã hội	2.1	1.1.3	T4
		LO.6.4 – Giải thích được những đặc điểm tôn giáo ở Việt Nam và chính sách của Đảng và Nhà nước Việt Nam đối với tín ngưỡng tôn giáo hiện nay	2.1 2.2		
		LO.6.5 – Hiểu rõ được đặc điểm quan hệ dân tộc và tôn giáo ở Việt Nam và trình bày được các định hướng cơ bản nhằm giải quyết mối quan hệ giữa dân tộc và tôn giáo ở Việt Nam hiện nay	2.1 2.2		
LO.7	VẤN ĐỀ GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.7.1 – Khái lược được vị trí, chức năng và vai trò của gia đình trong xã hội			
		LO.7.2 – Nhận biết được các cơ sở xây dựng gia đình trong thời kỳ quá độ lên chủ nghĩa xã hội	2.1	1.1.3	I3
		LO.7.3 – Giải thích được sự biến đổi của gia đình Việt Nam trong thời kỳ quá đội và trình bày được những phương hướng cơ bản xây dựng và phát triển gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội			
5.2. Kỹ năng					
LO.8	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANG LUẬN, PHẢN	LO.8.1 – Có kỹ năng khái quát hóa để rút ra *Từ khóa trí thức* đối với mỗi nội dung và tư duy vó hệ thống		2.1.1 2.3.1	
		LO.8.2 – Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu	2.1 2.2	2.4.4 2.5 3.1.5	U4

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
	BIỆN, LÀM VIỆC NHÓM	dựa trên thực tiễn LO.8.3 – Có kỹ năng giao tiếp xã hội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều hành nhóm làm việc			
LO.9	THỂ HIỆN Ý THỨC NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.9.1 – Có ý thức trách nhiệm bảo vệ tính khoa học, cách mạng trong lý luận của chủ nghĩa Mác – Leenin về CNXH và con đường đi lên CNXH ở Việt Nam LO.9.2 – Có ý thức, trách nhiệm cá nhân đối với tập thể, cộng đồng LO.9.3 – Có nhận thức về sự cần thiết học tập, nghiên cứu suốt đời và vận dụng nó trong cuộc sống	2.1 2.2	3.1	U3

6.Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (tiết 1)	Giới thiệu về môn học	LO.1 LO.4	**Dạy:** -Giới thiệu đề cương môn học -Giới thiệu nội dung đề tài thuyết trình nhóm (GHW) **Học ở lớp:** -Chia nhóm (5 SV/nhóm) -Giới thiệu nhóm học tập **Học ngoài lớp:** -Chọn đề tài thuyết trình của nhóm (GHW) -Đọc trước tài liệu chương 1.	
	Chương 1 NHẬP MÔN		Dạy: 1.SỰ RA ĐỜI CỦA CHỦ NGHĨA XÃ HỘI KHOA HỌC 1.1. Hoàn cảnh lịch sử sự ra đời của chủ nghĩa xã hội khoa học 1.2. Vai trò của C. Mác và Ăngghen 2.CÁC GIAI ĐOẠN PHÁT TRIỂN CƠ BẢN CỦA CHỦ NGHĨA XÃ HỘI KHOA HỌC 2.1. C. Mác và Ph.Ăngghen phát triển chủ nghĩa xã hội khoa học 2.2. V.I.Lênin vận dụng và phát triển	Thi giữa kì (Quiz)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
2	CHỦ NGHĨA XÃ HỘI KHOA HỌC		sáng tạo chủ nghĩa xã hội khoa học trong điều kiện mới 2.3. Sự vận dụng và phát triển sáng tạo chủ nghĩa xã hội khoa học từ sau khi lênin qua đời đến nay 3.ĐỐI TƯỢNG, PHƯƠNG PHÁP VÀ Ý NGHĨA CỦA VIỆC NGHIÊN CỨU CHỦ NGHĨA XÃ HỘI KHOA HỌC 3.1. Đối tượng nghiên cứu của chủ nghĩa xã hội khoa học 3.2. Phương pháp nghiên cứu của chủ nghĩa xã hội khoa học Ý nghĩa của viêc nghiên cứu chủ nghĩa xã hội khoa học **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** -Phác thảo nội dung thuyết trình nhóm GHW -Đọc trước tài liệu chương 2.	
3	**Chương 2** SỨ MỆNH LỊCH SỬ CỦA GIAI CẤP CÔNG NHÂN	LO.2 LO.4 LO.5	**Dạy**: 1.QUAN ĐIỂM CƠ BẢN CỦA CHỦ NGHĨA MÁC - LEENIN VỀ GIAI CÁP CÔNG NHÂN VÀ SỨ MỆNH LỊCH SỬ THẾ GIỚI CỦA GIAI CẮP CÔNG NHÂN 1.1. Khái niệm và đặc điểm của giai cấp công nhân 1.2. Nội dung và đặc điểm sứ mệnh lịch sử của giai cấp công nhân 1.3. Những điều kiện quy định sứ mệnh lịch sử của giai cấp công nhân 2.GIAI CẤP CÔNG NHÂN VÀ VIỆC THỰC HIỆN SỨ MỆNH LỊCH SỬ CỦA GIA1 CẤP CÔNG NHÂN HIỆN NAY 2.1. Giai cấp công nhân hiện nay 2.2. Thực hiện sứ mệnh lịch sử của giai cấp công nhân trên thế giới hiện nay 3.SỨ MỆNH LỊCH SỬ CÙA GIAI CẤP CÔNG NHÂN VIỆT NAM 3.1. Đặc điểm của giai cấp công nhân Việt Nam 3.2. Nội dung sứ mệnh lịch sử của giai cấp công nhân Việt Nam hiện nay 3.3. Phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp	Thi giữa kỳ (Quiz)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			công nhân Việt Nam hiện nay **Học ở lớp**: Thảo luận và phát biểu trên lớp **Học ngoài lớp**: Đọc trước tài liệu chương 3	
4	**Chương 3** CHỦ NGHĨA XÃ HỘI VÀ THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3 LO.4 LO.5	**Dạy:** 1.CHỦ NGHĨA XÃ HỘI 1.1. Chủ nghĩa xã hội, giai đoạn đầu của hình thái kinh tế - xã hội công sản chủ nghĩa 1.2. Điều kiện ra dời chủ nghĩa xã hội 1.3. Những đặt trưng cơ bản của chủ nghĩa xã hội 2.THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Tính tất yếu khách quan của thời kỳ quá độ lên chủ nghĩa xã hội 2.2. Đặc điểm của thời kỳ quá độ lên chủ nghĩa xã hội 3.QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI Ở VIỆT NAM 3.1. Quá độ lên chủ nghĩa xã hội bỏ qua chế độ tư bản chủ nghĩa 3.2. Những đặc trưng cơ bản của chủ nghĩa xã hội và phương hướng xây dựng chủ nghĩa xã hội ở Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 4	Thuyết trình nhóm (GHW) Thi giữa kỳ (Quiz)
5	**Chương 4** DÂN CHỦ XÃ HỘI CHỦ NGHĨA VÀ NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA	LO.2 LO.4 LO.5	**Dạy:** 1.DÂN CHỦ VÀ DÂN CHỦ XÃ HỘI CHỦ NGHĨA 1.1. Dân chủ và sự ra đời, phát triển của dân chủ 1.2. Dân chủ xã hội chủ nghĩa 2.NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA 2.1. Sự ra đời, bản chất, chức năng của nhà nước xã hội chủ nghĩa 2.2. Mối quan hệ giữa dân chủ xã hội chủ nghĩa và nhà nước xã hội chủ nghĩa 3.DÂN CHỦ XÃ HỘI CHỦ NGHĨA VÀ NHÀ NƯỚC PHÁP QUYỀN XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM 3.1. Dân chủ xã hội chủ nghĩa ở Việt	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			Nam 3.2. Nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam hiện nay 3.3. Phát huy dân chủ xã hội chủ nghĩa, xây dựng nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu **Học ngoài lớp:** Đọc trước tài liệu chương 5 trên lớp	
6	Chương 5 CƠ CẤU XÃ HỘI – GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3 LO.4 LO.5	**Dạy:** 1.CƠ CẤU XÃ HỘI GIAI CẤP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 1.1. Khái niệm và vị trí của cơ cấu xã hội - giai cấp trong cơ cấu xã hội 1.2. Sự biến đổi có tính quy luật của cơ cấu xã hội - giai cấp trong thời kỳ quá độ lên chủ nghĩa xã hội 2.LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 3.CƠ CẤU XÃ HỘI - GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI Ở VIỆT NAM 3.1. Cơ cấu xã hội - giai cấp trong thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam 3.2. Liên minh giai cấp, tầng lớp trong thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 6	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)
7	**Chương 6** VẤN ĐỀ DÂN TỘC VÀ TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.2 LO.4 LO.5	**Dạy:** 1.DÂN TỘC TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 1.1. Chủ nghĩa Mác - Lênin về dân tộc 1.2. Dân tộc và quan hệ dân tộc ở Việt Nam 2.TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Chủ nghĩa Mác - Lênin về tôn giáo 2.2. Tôn giáo ở Việt Nam và chính	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			sách tôn giáo của Đảng, Nhà nước ta hiện nay 3.QUAN HỆ DÂN TỘC VÀ TÔN GIÁO Ở VIỆT NAM 3.1. Đặc điểm quan hệ dân tộc và tôn giáo ở Việt Nam 3.2. Định hướng giải quyết mối quan hệ dân tộc và tôn giáo ở Việt Nam hiện nay 3.3. Phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp công nhân Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 7	
8	**Chương 7** VẤN ĐỀ GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI		**Dạy:** 1.KHÁI NIỆM, VỊ TRÍ VÀ CHỨC NĂNG CỦA GIA ĐÌNH 1.1. Khái niệm gia đình 1.2. Vị trí của gia đình trong xã hội 1.3. Chức năng cơ bản của gia đình 2.CƠ SỞ XÂY DỰNG GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Cơ sở kinh tế - xã hội 2.2. Cơ sở chính trị - xã hội 2.3. Cơ sở văn hóa 3.XÂY DỰNG GIA ĐÌNH VIỆT NAM TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 3.1. Sự biến đổi gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội 3.2. Phương hướng cơ bản xây dựng và phát triển gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Hoàn thiện bài thuyết trình	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	15%	Thuyết trình và bản báo cáo nhóm	LO.3 LO.4 LO.5 LO.6 LO.7
2	Quiz	Bài thi giữa kì	Thi theo đề thi của GV	20%	Tự luận đề mở	LO.l LO.2 LO.3
3	DIC	Thảo luận, chuyên cần tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. SV có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	LO.3 LO.4 LO.5 LO.6 LO.7
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận đề đóng	LO.3 LO.4 LO.5 LO.6 LO.7
			Tổng cộng	100%		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	Nhận biết quá trình ra đời của Chủ nghĩa xã hội khoa học và các giai đoạn phát triển cơ bản	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.4	Nắm rõ nội dung: quan điểm cơ bản của chủ nghĩa Mác - Lênin về giai cấp công nhân, nội dung, biểu hiện và ý nghĩa của sứ mệnh đó trong bối cảnh hiện nay	Chương 2	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - lênin về chủ nghĩa xã hội, thời kỳ quá độ lên chủ nghĩa xã hội và sự vận dụng sáng tạo của Đảng Cộng sản Việt Nam vào điều kiện cụ thể của Việt Nam	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi giữa kỳ (Quiz)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được bản chất của nền dân chủ xã hội chủ nghĩa và nhà nước xã hội chủ nghĩa nói chung và ở Việt Nam nói riêng	Chương 4	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp
LO.3 LO.4	Nhận biết và nắm được những kiến thức nền tảng về cơ cấu xã hội - giai cấp và liên minh giai cấp, tầng lớp trong thời kỳ quá độ lên chủ nghĩa xã hội	Chương 5	Thảo luận tại lớp (Discussion in Class), Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của Khoa
LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - Lênin về dân tộc, tôn giáo, mối quan hệ giữa dân tộc và tôn giáo, tầm quan trọng của vấn đề	Chương 6	Thảo luận tại lớp (Discussion in Class), Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp
LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - Lênin, tư tưởng Hồ Chí Minh và Đảng Cộng sản Việt Nam về gia đình, xây dựng gia	Chương 7	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn

- Quy định về Bài thuyết trình nhóm GHW

Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp nộp cho GV buổi 1.

Giảng dạy kết thúc chương 3, các nhóm thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình

Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần và nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
KHOA CHÍNH TRỊ- HÀNH CHÍNH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

ĐỀ CƯƠNG CHI TIẾT MÔN HỌC

Lịch sử Đảng Cộng sản Việt Nam

(History of Vietnamese communist party)

1. **Thông tin chung**:

Tên môn học (tiếng Việt); Tên môn học (tiếng Anh):	Lịch sử Đảng Cộng sản Việt Nam History of Vietnamese communist party
Mã số môn học:	PE018IU
Thuộc khối kiến thức: Số tín chỉ/ ECTS	CƠ SỞ 2 tín chỉ/ 3.09 ECTS
Số tiết lý thuyết:	*20 (trên lớp)*
Số tiết thực hành: *Số tiết tự học:*	*10 (trên lớp)* *90 (về nhà)*
Môn học trước:	1. Triết học Mác - Lênin, 2. Kinh tế chính trị Mác - Lênin, 3. Chủ nghĩa xã hội khoa học
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1 Về nội dung: cung cấp những tri thức có tính hệ thống, cơ bản về sự ra đời của Đảng Cộng sản Việt Nam (1920-1930), sự lãnh đạo của Đảng đối với cách mạng Việt Nam trong thời kỳ đấu tranh giành chính quyền (1930-1945), trong hai cuộc kháng chiến chống thực dân Pháp và đế quốc Mỹ xâm lược (1945-1975), trong sự nghiệp xây dựng, bảo vệ tổ quốc thời kỳ cả nước quá độ lên chủ nghĩa xã hội, tiến hành công cuộc đổi mới (1975-2018).

2.2 Về tư tưởng: Thông qua các sự kiện lịch sừ và các kinh nghiệm về sự lãnh đạo của Đảng để xây dựng ý thức tôn trọng sự thật khách quan, nâng cao lòng tự hào, niềm tin đốivới sự nghiệp lãnh đạo của Đảng.

2.3 Về kỹ năng: Trang bị phương pháp tư duy khoa học về lịch sử, kỹ năng lựa chọn tài liệu nghiên cứu, học tập môn học và khả năng vận dụng nhận thức lịch sử vào công tác thực tiễn, phê phán quan niệm sai trái về lịch sử của Đảng.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về Lịch sử Đảng Cộng sản Việt Nam

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Chương trình môn học Lịch sử Đảng Cộng sản Việt Nam,* ban hành 2019.

- Hội đồng Trung ương chỉ đạo biên soạn giáo trình quốc gia các môn khoa học Mác — Lênin, Tư tưởng Hồ Chí Minh (2018), *Giáo trình Lịch sử Đảng Cộng sản Việt Nam (tái bản có sửa chữa, bổ sung),* Nxb. Chính trị quốc gia, Hà Nội.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIO CTĐT**	**Mức độ giảng dạy (I/T/U)**
5.1. Kiến thức					
LO.1	NHẬP MÔN ĐỐI TƯỢNG, CHỨC NĂNG, NHIỆM VỤ, NỘI DUNG VÀPHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM	LO. 1.1 - Nắm rõ được đối tượng, mục đích học tập, nghiên cứu và một số yêu cầu cơ bản về phương pháp học tập, nghiên cứu Lịch sử Đảng Cộng sản Việt Nam	2.1	1.1.3	13
LO.2	ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945)	LO.2.1 - Nắm được bối cảnh lịch sử tác động đến sự ra đời của Đảng Cộng sản Việt Nam	2.1	1.1.3	T4
		LO.2.2 - Nắm được quá trình chuẩn bị các điều kiện để thành lập Đảng của Nguyễn Ái Quốc	2.1		
		LO.2.3- Nắm được nội dung hội nghị thành lập Đảng và Cương lĩnh chính trị đầu tiên của Đảng	2.1		
		LO.2.4 - Hiểu được ý nghĩa lịch sử của việc thành lập Đảng Cộng sàn Việt Nam	2.1		
		LO.2.5 - Nắm rõ các phong trào cách mạng 1930-1935 và các chủ trương khôi phục phong trào năm 1932-1935	2.1		

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
		LO.2.6 - Nắm rõ phong trào dân chủ năm 1936-1939	2.1		
		LO.2.7 - Nắm rõ phong trào giải phóng dân tộc 1939-1945			
		LO.2.8 - Hiểu rõ tính chất, ý nghĩa và kinh nghiệm của Cách mạng Tháng Tám năm 1945	2.1		
LO.3	ĐẢNG LÃNH ĐẠO HAI CUỘC KHÁNG CHIẾN, HOÀN THÀNH GIẢI PHÓNG DÂN TỘC, THỐNG NHẤT ĐẤT NƯỚC (1945-1975)	LO.3.1 - Hiểu được chủ trương xây dựng và bảo vệ chính quyền cách mạng 1945-1946	2.1	1.1.3	T4
		LO.3.2 - Hiểu rõ Đường lối kháng chiến toàn quốc chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm			
		LO.3.3 - Hiểu rõ chủ trương Đẩy mạnh cuộc kháng chiến chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm 1946 đến năm 1950			
		LO.3.4 - Hiểu rõ được Ý nghĩa lịch sử và kinh nghiệm của Đảng trong lãnh đạo kháng chiến chống thực dân Pháp và can thiệp Mỹ			
		LO.3.5 - Nắm được quá trình lãnh đạo cách mạng hai miền giai đoạn 1954-1965 của Đảng			
		LO.3.6 - Nắm vững sự lãnh đạo cách mạng cả nước giai đoạn 1965-1975 của Đảng			
		LO.3.7 - Hiểu rõ Ý nghĩa và kinh nghiệm lãnh đạo của Đảng trong cuộc kháng chiến chống Mỹ, cứu nước 1954-1975			
LO.4	ĐẢNG LÃNH ĐẠO CẢ NƯỚC QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI VÀ TIẾN HÀNH CÔNG CUỘC ĐỔI MỚI (1975-2018)	LO.4.1 - Hiểu rõ chủ trương xây dựng chủ nghĩa xã hội và bảo vệ Tổ quốc 1975-1981	2.1 2.2	1.1.3	T4
		LO.4.2 - Nắm rõ nội dung Đại hội đại biểu toàn quốc lần thứ V của Đảng và các bước đột phá tiếp tục đổi mới kinh tế 1982-1986			
		LO.4.3 – Nắm rõ quan điểm Đổi mới toàn diện, đưa đất nước ra khỏi khủng hoảng kinh tế - xã hội 1986-1996 của Đảng			
		LO.4.4 - Nắm rõ thành tựu, kinh nghiệm của công cuộc đổi mới			

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
		LO.4.5 - Hiểu rõ những thắng lợi vĩ đại của cách mạng Việt Nam dưới sự lãnh đạo của Đảng từ năm 1930 đến 2018			
		LO.4.6 - Hiểu rõ những bài học lớn về sự lãnh đạo của Đảng từ năm 1930 đến 2018			
5.2. Kỹ năng					
LO.5	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.5.1. Rèn luyện năng lực tư duy độc lập trong nghiên cứu đường lối, chiến lược, sách lược cách mạng của Đảng. LO.5.2. Có tư duy phê phán, kỹ năng phân tích, tổng hợp và đánh giá những vấn đề liên quan đến môn học. Từ đó, vận dụng kiến thức đã học để chủ động, tích cực nhận thức những vấn đề chính trị, kinh tế, văn hoá, xã hội theo đường lối, chính sách, pháp luật của Đảng và Nhà nước. LO.5.3 Có kỹ năng viết, kỹ năng làm việc cá nhân, làm việc nhóm và trình bày kết quả nghiên cứu.	2.1 2.2 2.3	2.1.1 2.3.1 2.4.4 2.5 3.1.5	U4
5.3. Thái độ					
LO.6	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.6.1. Tin tưởng vào sự lãnh đạo của Đảng đối với cách mạng Việt Nam. LO.6.2. Quyết tâm phấn đấu thực hiện đường lối cách mạng của Đảng. LO.6.3. Có thái độ nghiêm túc trong học tập, nghiên cứu khoa học, trong nhận thức về cuộc sống, xã hội, tự rèn luyện bản thân trở thành người có phẩm chất, bản lĩnh chính trị vững vàng, có đạo đức, trình độ chuyên môn tốt; hình thành tình cảm, niềm tin vào con đường cách mạng mà dân tộc ta đã lựa chọn.	2.1 2.2 2.3	3.1	U3

6.Kế hoạch giảng dạy môn học (Course Plan):

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1	**Giới thiệu về môn học**	LO.l, LO.5;	**Dạy:** - Giới thiệu đề cương môn học - Giới thiệu nội dung đề tài thuyết trình nhóm GHW) **Học ở lớp:** - Chia nhóm (5 SV/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** -Chọn đề tài thuyết trình của nhóm **(GHW)**	
2	**Chương nhập môn** ĐỐI TƯỢNG, CHỨC NĂNG, NHIỆM VỤ, NỘI DUNG VÀ PHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM	LO.l;	**Dạy:** I. ĐỐI TƯỢNG NGHIÊN CỨU CỦA MÔN HỌC LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM 1.Đối tượng nghiên cứu 2.Phạm vi nghiên cứu II.CHỨC NĂNG, NHIỆM VỤ CỦA MÔN HỌC LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM 1.Chức năng của khoa học Lịch sử Đảng 2.Nhiệm vụ của môn học II.PHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP MÔN LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM 1.Phương pháp luận 2.Các phương pháp cụ thể **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** - Phác thảo nội dung thuyết trình nhóm GHW - Đọc trước tài liệu chương 1.	Thi giữa kỳ (Quiz)

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
3	**Chương 1** ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945)	LO.2	**Dạy:** I. ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ CƯƠNG LĨNH CHÍNH TRỊ ĐẦU TIÊN CỦA ĐẢNG (THÁNG 2-1930) 1. Bối cảnh lịch sử 2. Nguyễn Ái Quốc chuẩn bị các điều kiện để thành lập Đảng 3. Thành lập Đảng Cộng sản Việt Nam và Cương lĩnh chính trị đầu tiên của Đảng 4. Ý nghĩa lịch sử của việc thành lập Đảng Cộng sản Việt Nam II. ĐẢNG LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945) 1.Phong trào cách mạng 1930- 1935 và khôi phục phong trào 1932-1935 2.Phong trào dân chủ 1936-1939 3.Phong trào giải phóng dân tộc 1939-1945 4.Tính chất, ý nghĩa và kinh nghiệm của Cách mạng Tháng Tám năm 1945 **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 2	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
4	**Chương 2** ĐẢNG LÃNH ĐẠO HAI CUỘC KHÁNG CHIẾN, HOÀN THÀNH GIẢI PHÓNG DÂN TỘC, THỐNG NHẤT ĐẤT NƯỚC (1945-1975)	LO.3 LO.5	**Dạy:** I.ĐẢNG LÃNH ĐẠO XÂY DỰNG, BẢO VỆ CHÍNH QUYỀN CÁCH MẠNG VÀ KHÁNG CHIẾN CHỐNG THỰC DÂN PHÁP XÂM LƯỢC (1945-1954) 1.Xây dựng và bảo vệ chính quyền cách mạng 1945-1946 2.Đường lối kháng chiến toàn quốc chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm 1946-1950 3.Đẩy mạnh cuộc kháng chiến chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm 1946 đến năm 1950 4.Ý nghĩa lịch sử và kinh nghiệm của Đảng trong lãnh đạo kháng chiến chống thực dân Pháp và can thiệp Mỹ **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Các nhóm thuyết trình tại lớp II. LÃNH ĐẠO XÂY DỰNG CHỦ NGHĨA XÃ HỘI Ở MIỀN BẮC VÀ KHÁNG CHIẾN CHỐNG ĐẾ QUỐC MỸ XÂM LƯỢC GIẢI PHÓNG MIỀN NAM, THỐNG NHẤT ĐẤT NƯỚC (1954-1975) 1. Lãnh đạo cách mạng hai miền giai đoạn 1954-1965 2. Lãnh đạo cách mạng cả nước giai đoạn 1965-1975 3. Ý nghĩa và kinh nghiệm lãnh đạo của Đảng trong cuộc kháng chiến chống Mỹ, cứu nước 1954-1975 **Học ngoài lớp:** Đọc trước tài liệu chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
5	**Chương 3** ĐẢNG LÃNH ĐẠO CẢ NƯỚC QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI VÀ TIẾN HÀNH CÔNG CUỘC ĐỔI MỚI (1975-2018)	LO.4 LO.5	**Dạy** I.ĐẢNG LÃNH ĐẠO CẢ NƯỚC XÂY DỰNG CHỦ NGHĨA XÃ HỘI VÀ BẢO VỆ TỔ QUỐC (1975-1986) 1.Xây dựng chủ nghĩa xã hội và bảo vệ Tổ quốc 1975-1981 2.Đại hội đại biểu toàn quốc lần thứ V của Đảng và các bước đột phá tiếp tục đổi mới kinh tế 1982-1986 **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Thảo luận tại lớp II.LÃNH ĐẠO CÔNG CUỘC ĐỔI MỚI, ĐẨY MẠNH CÔNG NGHIỆP HÓA, HIỆN ĐẠI HÓA VÀ HỘI NHẬP QUỐC TẾ (1986-2018) 1. Đổi mới toàn diện, đưa đất nước ra khỏi khủng hoảng kinh tế - xã hội 1986-1996 2. Tiếp tục công cuộc đổi mới, đẩy mạnh công nghiệp hóa, hiện đại hóa và hội nhập quốc tế 1996-2018 3. Thành tựu, kinh nghiệm của công cuộc đổi mới TỔNG LUẬN 1.Những thắng lợi vĩ đại của cách mạng Việt Nam 2.Những bài học lớn về sự lãnh đạo của Đảng **Học ngoài lớp:** Hoàn thiện bài thuyết trình	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	20%	Thuyết trình và bản báo cáo nhóm	LO.3 LO.4 LO.5
2	Quiz	Bài thi giữa kỳ	Thi theo đề thi chung	30%	Tự luận	LO.l LO.2;
3	DIC	Thảo luận tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. SV có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.	Cộng tối đa 1 điểm vào bài thi cuối kỳ	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Trắc nghiệm	LO.2; LO.3, LO.4;
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	- Nắm được đối tượng, mục đích học tập, nghiên cứu và một số yêu cầu cơ bản về phương pháp học tập, nghiên cứu	Chương nhập môn	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2	Hiểu rõ quá trình ra đời của Đảng Cộng sản Việt Nam (1920-1930), nội dung cơ bản, giá trị lịch sử của Cương lĩnh chính trị đầu tiên của Đảng và quá trình Đảng lãnh đạo cuộc đấu tranh giành độc lập, giành chính quyền (1930-1945)	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.3 LO.5	Nắm rõ quá trình lãnh đạo của Đảng đối với hai cuộc kháng chiến chống thực dân Pháp và đế quốc Mỹ xâm lược, hoàn thành giải phóng dân tộc, thống nhất đất nước thời kỳ 1945-1975	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đanh giá thuyết trình nhóm Ngân hàng đề thi của GV
LO.4 LO.5	Hiểu được quá trình phát triển đường lối và sự lãnh đạo của Đảng đưa cả nước quá độ lên chủ nghĩa xã hội và tiến hành công cuộc đổi mới từ sau ngày thống nhất đất nước năm 1975 đến nay. Từ đó rút ra được những thắng lợi và những bài học kinh nghiệm trong quá trình lãnh đạo cách mạng của Đảng.	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Ngân hàng đề của GV .

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn
- Quy định về Bài thuyết trình nhóm GH
- Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2. Tuần 4 thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
KHOA CHÍNH TRỊ - HÀNH CHÍNH **Độc lập - Tự do - Hạnh phúc**

ĐỀ CƯƠNG CHI TIẾT MÔN HỌC

Tư tưởng Hồ Chí Minh
(Ho Chi Minh's Thoughts)

1. Thông tin chung	
Tên môn học (tiếng Việt):	Tư tưởng Hồ Chí Minh
Tên môn học (tiếng Anh):	Ho Chi Minh's Thoughts
Mã số môn học:	PE019IU
Thuộc khối kiến thức:	Cơ sở
Số tín chỉ/ECTS	2 tín chỉ/ 3.09 ECTS
Số tiết lý thuyết:	*20 (trên lớp)*
Số tiết thực hành:	*10 (trên lớp)*
Số tiết tự học:	*90 (về nhà)*
Môn học trước:	1. Triết học Mác - Lênin, 2. Kinh tế chính trị Mác - Lênin, 3. Chủ nghĩa xã hội khoa học

Giảng viên phụ trách Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Về kiến thức: Trang bị cho sinh viên những kiến thức cơ bản vê khái niệm, nguồn gốc, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh; những nội dung cơ bản của tư tưởng Hồ Chí Minh; sự vận dụng của Đảng Cộng sản Việt Nam trong cách mạng dân tộc dân chủ và cách mạng xã hội chủ nghĩa, trong công cuộc đổi mới đất nước hiện nay.

2.2. Về kỹ năng: Giúp cho sinh viên khả năng tư duy, phân tích, đánh giá, vận dụng sáng tạo tư tưởng Hồ Chí Minh vào giải quyết các vấn đề trong thực tiễn đời sống, học tập và công tác.

2.3. Về thái độ: Giúp sinh viên nâng cao về bản lĩnh chính trị, yêu nước, trung thành với mục tiêu, lý tưởng độc lập dân tộc gắn liền với chủ nghĩa xã hội; nhận thức được vai trò, giá trị của tư tưởng Hồ Chí Minh đối với Đảng và dân tộc Việt Nam; thấy được trách nhiệm của bản thân trong việc học tập, rèn luyện để góp phần vào xây dựng và bảo vệ Tổ quốc.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về: Đối tượng, phương pháp nghiên cứu và ý nghĩa học tập môn tư tưởng Hồ Chí Minh; về cơ sở, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh; về độc lập dân tộc và chủ nghĩa xã hội; về Đảng Cộng sản và Nhà nước Việt Nam; về đại đoàn kết dân tộc và đoàn kết quốc tế; về văn hóa, đạo đức, con người.

4.Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Giáo trình Tư tưởng Hồ Chí Minh,* Nxb. Chính trị quốc gia, Hà Nội.
- Khoa Chính trị - Hành chính, ĐHQG-HCM, *Tài liệu hướng dẫn học tập Tư tưởng Hồ*

Chí Minh

- Hồ Chí Minh (2011), *Toàn tập,* Nxb. Chính trị quốc gia Sự thật, Hà Nội.
- Hồ Chí Minh (2016), *Biên niên tiểu sử,* Nxb. Chính trị quốc gia Sự thật, Hà Nội.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIO CTĐT**	**Mức độ giảng dạy (I/T/U)**
5.1. Kiến thức					
LO.1	KHÁI NIỆM ĐỐI TƯỢNG PHƯƠNG PHÁP NGHIÊN CỨU VÀ Ý NGHĨA HỌC TẬP MÔN TƯ TƯỞNG HỒ CHÍ MINH	LO.1.1 - Nắm được khái niệm tư tưởng Hồ Chí Minh	2.1	1.1.3	I3
		LO.1.2 - Nắm rõ được đối tượng nghiên cứu	2.1		
		LO.1.3 - Nắm được một số yêu cầu cơ bản về phương pháp học tập, nghiên cứu môn học tư tưởng Hồ Chí Minh	2.1		
		LO.1.4 - Nắm được ý nghĩa học tập, nghiên cứu môn học tư tưởng đối với sinh viên	2.1		
LO.2	CƠ SỞ QUÁ TRÌNH HÌNH THÀNH VÀ PHÁT TRIỂN TƯ TƯỞNG HỒ CHÍ MINH	LO.2.1 - Hiểu rõ được cơ sở thực tiễn, tiền đề lý luận và nhân tố chủ quan hình thành tư tưởng Hồ Chí Minh	2.1	1.1.3	I4
		LO.2.2 - Hiểu rõ được quá trình hình thành và phát triển tư tưởng Hồ Chí Minh	2.1		
		LO.2.3 - Nắm được giá trị tư tưởng Hồ Chí Minh đối với cách mạng Việt Nam và sự phát triển tiến bộ của nhân loại	2.1		
LO.3	TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐỘC LẬP DÂN TỘC VÀ CHỦ NGHĨA XÃ HỘI	LO.3.1 - Nhận thức được bản chất khoa học, cách mạng và những sáng tạo tư tưởng Hồ Chí Minh về độc lập dân tộc và cách	2.1		13

		LO.3.2 - Nắm được quan điểm của Hồ Chí Minh về tính tất yếu di lên chủ nghĩa xã hội, xây dựng chủ nghĩa xã hội và thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam.			
		LO.3.3 - Nắm được quan điểm Hồ Chí Minh về mối quan hệ giữa độc lập dân tộc và chủ nghĩa xã hội.		1.1.3	T4
		LO.3.4 - Vận dụng tư tưởng Hồ Chí Minh về độc lập dân tộc gắn liền với chủ nghĩa xã hội trong sự nghiệp cách mạng hiện nay.			
LO.4	TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẢNG CỘNG SẢN VIỆT NAM VÀ NHÀ NƯỚC CỦA NHÂN DÂN, DO NHÂN DÂN, VÌ NHÂN DÂN	LO.4.1 - Nắm được nội dung cơ bản tư tưởng Hồ Chí Minh về Đảng Cộng sản Việt Nam.	2.1	1.1.3	I4
		LO.4.2 - Nắm được nội dung cơ bản tư tưởng Hồ Chí Minh về nhà nước của nhân dân, do nhân dân, vì nhân dân.	2.1		I4
		LO.4.3 - Vận dụng tư tưởng Hồ Chí Minh vào công tác xây dựng Đảng và xây dựng Nhà nước.	2.1		T4
LO.5	TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẠI ĐOÀN KẾT TOÀN DÂN TỘC VÀ ĐOÀN KẾT QUỐC TẾ	LO.5.1 - Hiêu được những quan điểm cơ bản của tư tưởng Hồ Chí Minh về đại đoàn kết toàn dân tộc.	2.1	1.1.3	I4
		LO.5.2 -Hiểu được những quan điểm cơ bản của tư tưởng Hồ Chí Minh về đoàn kết quốc tế	2.1		
		LO.5.3 - Vận dụng tư tưởng Hồ Chí Minh về đại đoàn kết dân tộc và đoàn kết quốc tế trong giai đoạn hiện nay	2.1		T4
LO.6	TƯ TƯỞNG HỒ CHÍ MINH VỀ VĂN HÓA, ĐẠO ĐỨC, CON NGƯỜI	LO.6.1 - Nắm được kiến thức cơ bản tư tưởng Hồ Chi Minh về văn hóa.	2.1	1.1.3	I4
		LO.6.2 - Nắm được kiến thức cơ bản tư tưởng Hồ Chí Minh về đạo đức mới (đạo đức cách mạng).	2.1		
		LO.6.3 - Nắm được kiến thức	2.1		I4

		cơ bản tư tưởng Hồ Chí Minh về văn hóa.			
		LO.6.4 - Vận dụng tư tưởng Hồ Chí Minh về văn hóa, đạo đức, con người trong việc xây dựng văn hóa, đạo đức, con người Việt Nam hiện nay.	2.1		T4
5.2. Kỹ năng					
LO.7	THỂ HIỆN KHẢ NĂNG TƯ DUY, PHÂN TÍCH, ĐÁNH GIÁ, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.7.1 Có kỹ năng tư duy, phân tích, đánh giá tư tưởng Hồ Chí Minh.	2.2	2.1.1 2.3.1	U4
		LO.7.2. Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn	2.2	2.4.4	
		LO.7.3. Có kỹ năng vận dụng sáng tạo tư tưởng Hồ Chí Minh vào giải quyết các vấn đề trong thực tiễn đời sống, học tập và công tác.	2.2	2.5 3.1.5	
5.3. Thái Độ					
LO.7	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.6.1. Nhận thức được vai trò, giá trị của tư tưởng Hồ Chí Minh đối với Đảng và dân tộc Việt Nam.	2.3	3.1	U3
		LO.6.2. Có bản lĩnh chính trị, yêu nước, trung thành với mục tiêu, lý tưởng độc lập dân tộc gắn liền với chủ nghĩa xã hội	2.3		
		LO.6.3. Thấy được trách nhiệm của bản thân trong việc học tập, nghiên cứu, vận dụng trong cuộc sống, góp phần vào sự nghiệp xây dựng và bảo vệ Tổ quốc	2.3		

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

Buổi (3 tiết)	**Nội dung giảng dạy**	**LO**	**Hoạt động dạy và học**	**Đánh giá**
1		LO.1,	**Dạy:**	
1 (tiết)	Giới thiệu về môn học	LO.5,	- Giới thiệu đề cương môn - Giới thiệu nội dung đề tài thuyết trình nhóm GHW).	

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			Học ở lớp: - Chia nhóm (5 sv/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** - Chọn đề tài thuyết trình của nhóm (GHW), - Đọc trước tài liệu chương 1.	
2	**Chương 1** KHÁI NIỆM, ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU VÀ Ý NGHĨA HỌC TẬP MÔN TƯ TƯỞNG HỒ CHÍ MINH	LO.1;	**Dạy:** I. KHÁI NIỆM TƯ TƯỞNG HỒ CHÍ MINH II. ĐỐI TƯỢNG NGHIÊN CỨU MÔN HỌC TƯ TƯỞNG HỒ CHÍ MINH III. PHƯƠNG PHÁP NGHIÊN CỨU 3. Phương pháp luận của việc nghiên cứu tư tưởng Hồ Chí Minh 4. Một số phương pháp cụ thể IV. Ý NGHĨA CỦA VIỆC HỌC TẬP MÔN HỌC TƯ TƯỞNG HỒ CHÍ MINH 1. Góp phần nâng cao năng lực tư duy lý luận 2. Giáo dục và thực hành đạo đức cách mạng, củng cố niềm tin khoa học gắn liền với trau dồi tình cảm cách mạng, bồi dưỡng lòng yêu nước 3.Xây dựng, rèn luyện phương pháp và phong cách công tác. **Học ở lớp**: Trao đổi, phát biểu trên lớp **Học ngoài lớp:** - Phác thảo nội dung thuyết trình nhóm GHW - Đọc trước tài liệu chương 2	

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
3	**Chương 2** CƠ SỞ, QUÁ TRÌNH HÌNH THÀNH VÀ PHÁT TRIỂN TƯ TƯỞNG HỒ CHÍ MINH	LO.2	**Dạy:** I. CƠ SỞ HÌNH THÀNH TƯ TƯỞNG HỒ CHÍ MINH 1. Cơ sở thực tiễn 2. Cơ sở lý luận 3.Nhân tố chủ quan II.QUÁ TRÌNH HÌNH THÀNH VÀ PHÁT TRIỂN TƯ TƯỞNG HỒ CHÍ MINH 1.Thời kỳ trước ngày 5-6¬1911: Hình thành tư tưởng yêu nước và có chí hướng tìm con đường mới 2.Thời kỳ từ năm 1911 đến cuối năm 1920: Dần dần hình thành tư tưởng cứu nước, giải phóng dân tộc Việt Nam theo con đường cách mạng vô sản 3; Thời kỳ từ cuối năm 1920 đến đầu năm 1930: Hình thành những nội dung cơ bản tư tưởng về cách mạng Việt Nam 4. Thời kỳ đầu năm 1930 đến đầu năm 1941: Vượt qua thử thách, giữ vững đường lối, phương pháp cách mạng Việt Nam đúng đắn, sáng tạo 5.Thời kỳ từ đầu năm 1941 đến tháng 9 - 1969: Tư tưởng Hồ Chí Minh tiếp tục phát triển, hoàn thiện, soi đường cho sự nghiệp cách mạng của Đảng và nhân dân ta III.GIÁ TRỊ TƯ TƯỞNG HỒ CHÍ MINH 1.Đối với cách mạng Việt Nam 2.Đối với sự phát triển tiến bộ của nhân loại **Học ở lớp**: Thảo luận và phát biểu trên lớp **Học ngoài lớp**: Đọc trước tài liệu chương 3	Thi giữa kì (Quiz) Thi cuối kì (FEX)
4	**Chương 3** TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐỘC LẬP DÂN TỘC GẮN LIỀN VỚI CHỦ NGHĨA XÃ HỘI	L0.3 L0.5	**Dạy:** 1. TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐỘC LẬP DÂN TỘC 1.Vấn đề độc lập dân tộc 2.Về cách mạng giải phóng dân tộc **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Các nhóm thuyết trình tại lớp II.TƯ TƯỞNG HỒ CHÍ MINH VỀ	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			CHỦ NGHĨA XÃ HỘI VÀ XÂY DỰNG CHỦ NGHĨA XÃ HỘI Ở VIỆT NAM 1.Tư tưởng Hồ Chí Minh về chủ nghĩa xã hội 2.Tư tưởng Hồ Chí Minh về xây dựng chủ nghĩa xã hội ở Việt Nam 3.Tư tưởng Hồ Chí Minh về thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam III.TƯ TƯỞNG HỒ CHÍ MINH VỀ MỐI QUAN HỆ GIỮA ĐỘC LẬP DÂN TỘC VÀ CHỦ NGHĨA XÃ HỘI 1.Độc lập dân tộc là cơ sở, tiền đề để tiến lên chủ nghĩa xã hội 2.Chủ nghĩa xã hội là điều kiện để đảm bảo nền độc lập dân tộc vững chắc IV.VẬN DỤNG TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐỘC LẬP DÂN TỘC GẮN LIỀN VỚI CHỦ NGHĨA XÃ HỘI TRONG SỰ NGHIỆP CÁCH MẠNG VIỆT NAM GIAI ĐOẠN HIỆN NAY 1.Kiên định mục tiêu và con đường cách mạng mà Hồ Chí Minh đã xác định 2.Phát huy sức mạnh dân chủ xã hội chủ nghĩa 3.Củng cố, kiện toàn, phát huy sức mạnh và hiệu quả hoạt động của toàn hệ thống chính trị 4.Đấu tranh chống những biểu hiện suy thoái về tư tưởng chính trị, đạo đức, lối sống và,"tự diễn biến", "tự chuyển hóa" trong nội bộ **Học ngoài lớp:** Đọc trước tài liệu chương 4	
5	**Chương 4** TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẢNG CỘNG SẢN VỆT NAM VÀ NHÀ NƯỚC CỦA NHÂN DÂN, DO NHÂN DÂN VÀ VÌ NHÂN	LO.4 LO.5	**Dạy:** I. TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẢNG CỘNG SẢN VIỆT NAM 1.Tính tất yếu và vai trò lãnh đạo của Đảng Cộng sản Việt Nam 2.Đảng phải trong sạch, vững mạnh **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Thảo luận tại lớp	Thảo luận nhóm (DIC) Thi cuối kỳ (FEX)

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
	DÂN		II.TƯ TƯỞNG HỒ CHÍ MINH VỀ NHÀ NƯỚC CỦA NHÂN DÂN, DO NHÂN DÂN, VÌ NHÂN DÂN 1.Nhà nước dân chủ 2.Nhà nước pháp quyền 3.Nhà nước trong sạch, vững mạnh III.VẬN DỤNG TƯ TƯỞNG HỒ CHÍ MINH VÀO CÔNG TÁC XÂY DỰNG ĐẢNG VÀ XÂY DỰNG NHÀ NƯỚC 1.Xây dựng Đàng thật sự trong sạch, vững mạnh 2.Xây dựng Nhà nước **Học ngoài lớp:** Hoàn thiện bài thuyết trình	
6	**Chương 5** TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẠI ĐOÀN KẾT DÂN TỘC VÀ ĐOÀN KẾT QUỐC TẾ		**Dạy:** 1. TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẠI ĐOÀN KẾT DÂN TỘC 1.Vai trò của đại đoàn kết dân tộc 2.Lực lượng của khối đại đoàn kết dân tộc 3.Điều kiện để xây dựng khối đại đoàn kết toàn dân tộc 4.Hình thức, nguyên tắc tổ chức của khối đại đoàn kết dân tộc - Mặt trận dân tộc thống nhất 5. Phương thức xây dựng khối đại đoàn kết dân tộc **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Thảo luận tại lớp II.TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐOÀN KẾT QUỐC TẾ 1.Sự cần thiết phải đoàn kết quốc tế 2.Lực lượng đoàn kết quốc tế và hình thức tổ chức 3.Nguyên tắc đoàn kết quốc tế III.VẬN DỤNG TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẠI ĐOÀN KẾT DÂN TỘC VÀ ĐOÀN KẾT QUỐC TẾ TRONG GIAI ĐOẠN HIỆN NAY 1.Quán triệt tư tưởng Hồ Chí Minh về đại đoàn kết dân tộc và đoàn kết quốc tế trong hoạch định chủ trương, đường lối của Đảng 2.xây dựng khối đại đoàn kết toàn dân tộc trên nền tảng liên minh công -	

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
			nông - trí thức dưới sự lãnh đạo của Đảng 3.Đại đoàn kết dân tộc phải kết hợp với đoàn kết quốc tế	
7	**Chương 6** TƯ TƯỞNG HỒ CHÍ MINH VỀ VĂN HÓA, ĐẠO ĐỨC, CON NGƯỜI		**Dạy:** I. TƯ TƯỞNG HỒ CHÍ MINH VỀ VĂN HÓA 1.Một số nhận thức chung về văn hóa và quan niệm giữa văn hóa với các lĩnh vực khác 2.Quan điểm của Hồ Chí Minh về vai trò của văn hóa 3.Quan điểm của Hồ Chí Minh về xây dựng nền văn hóa mới **Dạy:** Chấm thuyết trình & phản biện **Học ở lớp:** Thảo luận tại lớp II. TƯ TƯỞNG HỒ CHÍ MINH VỀ ĐẠO ĐỨC 1. Quan điểm về vai trò và sức mạnh của đạo dức cách mạng 2.Quan điểm về những chuẩn mực đạo đức cách mạng 3.Quan điểm về những nguyên tắc xây dựng đạo đức cách mạng III.TƯ TƯỞNG HỒ CHÍ MINH VỀ CON NGƯỜI 1.Quan niệm Hồ Chí Minh về con người 2.Quan niệm của Hồ Chí Minh về vai trò của con người 3.Quan niệm Hồ Chí Minh về xây dựng con người IV.XÂY DỰNG VĂN HÓA, ĐẠO ĐỨC, CON NGƯỜI VIỆT NAM HIỆN NAY THEO TƯ TƯỞNG HỒ CHÍ MINH 1.Xây dựng và phát triển văn hóa, con người 2.Về xây dựng đạo đức cách mạng	

7. Đánh giá môn học

ST T	Mã	Tên	Mô tả	Tỷ Trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	150%	Thuyết trình và bản báo cáo nhóm	LO.2, LO.3, LO.4, LO.5, LO.6.
2	Quiz	Bài thi giữa kỳ	Giảng viên cho thi	20%	Trắc nghiệm (đề đóng) hoặc tự luận (đề mở)	LO.2, LO.3.
3	DIC	Thảo luận tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. SV có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	LO.3, LO.4, LO.5, LO.6.
4	FEX	Thi cuối kỳ	Thi đề chung Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận (đề mở)	LO.2, LO.3, LO.4, LO.5, LO.6.
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học:

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	- Hiểu được khái niệm tư tưởng Hồ Chí Minh. - Nắm được đối tượng; phương pháp nghiên cứu tư tưởng Hồ Chí Minh và ý nghĩa học tập môn tư tưởng Hồ Chí Minh.	Chương 1	Hỏi - Đáp	Cộng điểm
LO.2	- Hiểu rõ cơ sở, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh. - Nắm dược giá trị tư tưởng Hồ Chí Minh đối với cách mạng Việt Nam và thế giới.	Chương 2	Thi giữa kỳ (Quiz)	Đề thi của GV
LO.3	- Nắm rõ nội dung tư tưởng Hồ Chí Minh về độc lập dân tộc và chủ nghĩa xã hội; mối quan hệ giữa độc lập dân tộc và chủ nghĩa xã hội. - Hiểu được sự vận dụng tư tưởng Hồ về độc lập dân tộc và chủ nghĩa xã hội của Đảng Cộng sản Việt Nam và Nhà nước ta.	Chương 3	Thuyết trình nhóm (GHW) Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Đề thi của GV Ngân hàng đề thi của khoa Chính trị - Hành chính
LO.4	- Nắm rõ nội dung tư tưởng Hồ Chí Minh về Đảng Cộng sản Việt nam và Nhà nước của dân, do dân, vì dân. - Hiểu được sự vận dụng của Đảng và Nhà nước ta vào công tác xây dựng Đảng và xây dựng Nhà nước.	Chương 4	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của khoa Chính trị - Hành chính
LO.5	- Nắm được nội dung tư tưởng Hồ Chí Minh về đại đoàn kết toàn dân tộc và đoàn kết quốc tế. - Hiểu được sự vận dụng của Đảng và Nhà nước ta trong việc hoạch định chủ trương, đường lối, chính sách về đại đoàn kết dân tộc và đối ngoại.	Chương 5	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của khoa Chính trị - Hành chính
LO.6	- Nắm được nội dung tư tưởng Hồ Chí Minh về văn hóa, đạo đức, con người. - Vận dụng tư tưởng Hồ Chí Minh về văn hóa, đạo đức và con người trong việc rèn luyện, tu dưỡng bản thân.	Chương 6	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của khoa Chính trị - Hành chính

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn
- Quy định về Bài thuyết trình nhóm GHW: Thành lập nhóm: 5 sinh viên/nhóm.

+ Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2.

+ Tuần 4 thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

+ Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về đánh giá môn học: theo Quy định về việc giảng dạy và học tập các môn Lý luận chính trị của khoa Chính trị - Hành chính.

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY

COURSE SYLLABUS
General Law
PE021IU

1. General information

Department	Office of Academic Affairs
Course classification	Foundation course
Course designation	Face to face
Semester(s) in which the course is taught	All semesters in each academic year
Person responsible for the course	Dr. Vo Tuong Huan LLM. Bui Doan Danh Thao
Language	English
Relation to curriculum	Compulsory
Teaching methods	Student-centred approach
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 hours) Contact hours (lecture, in class discussions): 37.5 hours (=45 periods) Private study including examination preparation, specified in hours: 90 hours
Credit points	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	N/A

<table>
<tr><td>Course objectives</td><td>The overarching aims of this course are to:
• Provide essential knowledge of Vietnamese legal system through integrated technology and real cases for social and cultural sustainability.
• Raise awareness of responsibility toward others and how to stand for ending all types of legal violations, especially corruption in various social contexts.
• Practice necessary skills to act as an ambassador to ensure social fairness and global equitable rights.
• Use integrated online legal resources and communication tools to help the community to identify issues and develop countermeasures.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply appropriate legal knowledge in the Vietnamese legal system to solve legal issues in various social contexts for a fair sustainable lifelong being.
CLO1.1. Apply general knowledge on state and law to solve legal issues in various social contexts for a fair sustainable lifelong being.
CLO1.2. Apply principle legal norms in some law branches such as constitution, civil, criminal, labor and administrative law to solve legal issues in various social contexts for a fair sustainable lifelong being.</td></tr>
<tr><td>Skill</td><td>CLO2. Communicate knowledge in the Vietnamese legal system to encourage people to raise their legal rights aiming for fair social/cultural moves.
CLO3. Integrate ICTs to solve legal issues in various social contexts.</td></tr>
<tr><td>Attitude</td><td>CLO4. Detect the responsibility to ensure social and cultural fairness, including ending corruption, in various social contexts through understanding importance of law in social contexts.
CLO5. Respond to the base for coexistence in various social contexts.</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The course will introduce students to Vietnamese legal systems. In particular, students will understand their rights and obligations in the Constitution, Criminal law, administrative law, civil law, labor law and enterprise law of Vietnam. From this, students will raise awareness towards their responsibility to ensure justice, including ending corruption, in society.</td></tr>
<tr><td>Examination forms</td><td>Multiple choice questions</td></tr>
</table>

<table>
<tr><td></td><td>Case-based exams
Essay exams
Oral exams</td></tr>
<tr><td>Study and examination requirements</td><td>To pass this course, the students must:
• Achieve a composite mark of at least 50; and
• Make a satisfactory attempt at all assessment tasks (see below).
GRADING POLICY
Grades can be based on the following:
<table>
<tr><td>Assignment</td><td>20%</td></tr>
<tr><td>Midterm examination</td><td>30%</td></tr>
<tr><td>Final examination</td><td>50%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
COURSE POLICIES
Attendance
Regular and punctual attendance at lectures and seminars is expected in this course. University regulations indicate that if students attend less than eighty percent of scheduled classes they may be refused final assessment. Exemptions may only be made on eligible medical grounds.
Workload
It is expected that the students will spend at least six hours per week studying this course. This time should be made up of reading, research, working on exercises and problems, and attending classes. In periods where they need to complete assignments or prepare for examinations, the workload may be greater.
Over-commitment has been a cause of failure for many students. They should take the required workload into account when planning how to balance study with part-time jobs and other activities.
General Conduct and Behaviour
The students are expected to conduct themselves with consideration and respect for the needs of fellow students and teaching staff. Conduct which unduly disrupts or interferes with a class, such as ringing or talking on mobile phones, is not acceptable and students will be asked to leave the class. The use of laptops is also encouraged during law lessons only to search for materials online. More information on student conduct is available on the university webpage.
Keeping informed
The students should take note of all announcements made in lectures or on the course’s Blackboard, and another announced mean of communications. From time to time, the university will send important announcements to their university e-mail addresses without providing a paper copy. The students will be deemed to have received this information.
Academic honesty and plagiarism
Plagiarism is the presentation of the thoughts or work of another as one’s</td></tr>
</table>

	own. Students are also reminded that careful time management is an important part of the study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items. The university regards plagiarism as a form of academic misconduct and has very strict rules regarding plagiarism. **Special consideration** Requests for special consideration (for final examination only) must be made to the Office of Academic Affairs within one week after the examination. General policy and information on special consideration can be found at the Office of Academic Affairs. Absence on the Mid-term is not allowed, or in special cases approved by Lecturer can be replaced with relevant Assignment. **Meeting up with the lecturers after classes** Students must make an appointment via emails if they want to meet up with the lecturer after classes and be on time. If there are any changes to the scheduled time, students must inform the lecturer immediately.
Reading list	Please note that it is very important to gain familiarity with the subject matter in the readings and cases available on Blackboard and the internet *before* attendance in classes. **Required Course Texts and Materials** Legal Texts: 1. Constitution of Vietnam - 2013 2. Civil Code of Vietnam - 2015 3. Criminal Code of Vietnam – 2015 (amended in 2017) 4. Law on Law on Handling of Administrative Violations 2012 5. Law on Enterprises – 2020 6. Labour Code 2019 7. Law on anti-corruption 2018 Available at https://luatvietnam.vn/ or Blackboard Books: • PGS.TS. Phan Trung Hien, *Giáo trình Pháp Luật Đại cương*, NXB Chính Trị Quốc Gia Sự Thật 2022. • Mai Hong Quy (Chief Editor) (2nd 2017), *Introduction to Vietnamese Law*, Hong Duc Publishing House. Additional materials provided in Blackboard The lecturer will attempt to make lecture notes and additional reading available on Blackboard. However, this is not an automatic entitlement for students doing this subject. Note that this is not a distance learning course, and you are expected to attend lectures and take notes. This way, you will get the added benefit of class interaction and demonstration. **Optional Course Texts and Materials** Recommended Internet sites UNCTAD (United Nations Conference on Trade and Development) WTO (World Trade Organization) MOIT - Vietnam (Official website of Ministry of Industry and Trade) MPI - Vietnam (Official website of Ministry of Planning and Investment)

	Other Resources, Support and Information Additional learning assistance is available for students in this course and will be made available on Blackboard. Academic journal articles are available through connections via the VNU - Central Library. Recommended articles will be duly informed to the students. Books: • Nguyen Phu Trong, *Kiên quyết, kiên trì đấu tranh phòng, chống tham nhũng, tiêu cực, góp phần xây dựng đảng và nhà nước ta ngày càng trong sạch, vững mạnh*, NXB Chính Trị Quốc Gia Sự Thật 2023. • University of Law Ho Chi Minh City, *Giáo trình luật Hiến pháp Việt nam*, NXB Hồng Đức 2023. • University of Law Ho Chi Minh City, *Giáo trình Luật hành chính*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật hình sự Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật dân sự Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật lao động Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình pháp luật về chủ thể kinh doanh*, NXB Hồng Đức 2022.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1 - 10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		3								
Skill (Level: 1-7)	2		3					3			
	3		3	3							
Attitudes (Level: 1-5)	4									1	
	5		2							2	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	2.8	3.0	0.0	0.0	0.0	3.0	0.0	1.5	0.0
L,M,H conversion *			L	M				M		L	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	**Introduction to State** • What is State? • Nature of state • Forms of state • Functions of state • Introduction to structure of Vietnamese state	1-5 (level I - introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT - Introduction to Vietnamese legal system available on Blackboard
2	**Introduction to law?** • What is law? • Nature of law • Forms of law • Structure of law • Categorization of legal system. • Enforcement • Breach of law and liabilities for breach of law • Introduction to structure of Vietnamese legal system	1-5 (level I - introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT - Introduction to Vietnamese legal system available on Blackboard
3	**Constitutional Law** • General introduction on Vietnamese Constitution and its nature and basic principles. • Political, economic and other regimes of Vietnam • Basic rights and responsibilities of citizens. Relationship between citizens and the State. • Structure, functions and duties of Vietnamese state, especially in prevention of corruption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPTs – Constitutional law available on Blackboard Constitution 2013 available on Blackboard
4	**Constitutional Law (Cont)** • Structure and functions and duties of Vietnamese state • Duties of the state in prevention of corruption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPTs – Constitutional law available on Blackboard Constitution 2013 available on Blackboard
5	**Administrative Law** • Definition and nature of administrative law • Administrative law violations • Liabilities for breach of administrative law, exemption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies and law on anti-corruption	PPT– Administrative law available on Blackboard Law on handling administrative

Week	Topic	CLO	Assessments	Learning activities	Resources
	from the liability				violations 2012, and Law on anti-corruption 2018 available on Blackboard
6	**Criminal Law** • Definition and nature of criminal law • Crimes • Punishments	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies, especially cases related to corruption	PPT– Criminal law available on Blackboard Criminal code 2015 available on Blackboard
7	**Criminal Law (Cont)** • Crimes related to corruption • Punishments for corruption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies, especially cases related to corruption	PPT– Criminal law available on Blackboard Criminal code 2015 available on Blackboard
8	**Revision for mid-term exam**		Quizzes Projects		
9	**Civil Law (Part I)** • Definition and nature Civil law relationship • Subject of civil law • Property and ownership • Civil transactions	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015 available on Blackboard
10	**Civil Law (Part II)** • Contracts - Definitions - Formation of contracts - Validity of contracts - Liability for breach of contracts	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015 available on Blackboard
11	**Civil Law (Part III)** • Inheritance - Testamentary inheritance - Intestacy	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015 available on Blackboard
12	**Law on Enterprises** • Introduction to law on enterprises • Introduction to forms, features, establishment, reorganization and dissolution of an enterprise	1-5 (Level I - Introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Law on enterprises available on Blackboard Law on enterprises 2020 available on Blackboard
13	**Labor Law** • Definition, and nature of labour law • Employees and employers	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance	Discussions Case studies	PPT– Labor law available on Blackboard

Week	Topic	CLO	Assessments	Learning activities	Resources
	• Working time, and resting time • Salary (including salary for overtime working hours)		evaluations		Labor code 2019 available on Blackboard
14	**Labour Law** (Cont.) • Employment contracts • Labor disciplines • Dispute settlements	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Labor law available on Blackboard Labor code 2019 available on Blackboard
15	**Revision/ Tutoring classes**		Quizzes Projects		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In class evaluation (20%)	70% pass	80% pass	100% pass	100% pass	100% pass
Midterm examination (30%)	70% pass	80% pass	100% pass	100% pass	100% pass
Final examination (50%)	70% pass	80% pass	100% pass	100% pass	100% pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

No.	CLOs	Criteria	COMPLETELY FAIL Below 30%	INADEQUATE 30% – 49%	ADEQUATE 50% - 69%	ABOVE AVERAGE 70% - 89%	EXEMPLARY ≥ 90%
1	CLO 1	**Organisation and clarification**	No evidence of organization and coherence	Does not organise ideas logically and with clarification Limited evidence of coherence Ideas lack consistence	Generally organised logically, with evidence of progression Occasionally, there may be a lack of focus or ideas may be tangential	Clear organization and progression. Responds appropriately and relevantly, although some ideas are underdeveloped	Response is focused, detailed and non-tangential. Shows a high degree of attention to logic and reasoning of points. Clearly leads the reader to the conclusion and stirs thought regarding the topic
2		**Originality and usefulness of the analysis**	Shows no ability to identify legal issues or a clear inability to gather the facts	Demonstrates an incomplete grasp of the task. There is no overall sense of creative coherence. Arguments are addressed incompletely.	Shows ability to identify legal issues, gather the facts and develop claims. Argument are addressed well but no links with evidence	Shows strong ability to identify legal issues, gather the fact and develop claims as well as link claims with evidence. Overall, an acceptable solution is offered and explained	Shows strong ability to identify legal issues, gather the facts and develop claims as well as link claims with evidence. Satisfactory solutions are offered and supported
3		**Use of data/information**	Shows no effort to incorporate information from primary and secondary sources	Shows little information from sources. Poor handling of sources	Shows moderate amount of source information incorporated. Some key points supported by sources. Quotations may be poorly integrated into paragraphs. Some possible problems with source citations	Draws upon sources to support most points. Some evidence may not support arguments or may appear where inappropriate. Quotations integrated well into paragraphs. Sources cited correctly	Draws upon primary and secondary source information in useful and illuminating ways to support key points. Excellent integration of quoted material into paragraphs. Source cited correctly
4	CLO2	**Use of frameworks**	Shows no effort to structure problems in correspondence to theoretical	Shows limited ability to structure problems in correspondence to theoretical frameworks	Shows effort to link problems with the theoretical frameworks. There are still some mistakes	Shows ability to structure problems in correspondence to theoretical frameworks correctly.	Shows ability to structure problems in correspondence to theoretical frameworks correctly. The problems are

			frameworks			Minor mistakes in resolving problems	well resolved
5		**Quality of arguments**	Shows no effort to construct logical arguments. Fails to support analysis	Shows little attempt to offer support for key claims or to relate evidence to analysis. Reasons offered are irrelevant.	Shows argument of poor quality. Weak, undeveloped reasons are offered to support key claims	Shows clear, relevant and logical arguments.	Shows identifiable, reasonable and sound arguments. Clear reasons are offered to support key claims.

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Languages

COURSE SYLLABUS
Course Name: Critical Thinking
Course Code: **PE008IU**

1. General information

Course designation	*This course provides the nature and techniques of thought as a basis for our claims, beliefs, and attitudes about the world. The course also explores the process in which people develop their claims and support their beliefs.* *Specifically, the course includes the theory and practice of presenting arguments in oral and written forms, making deductive and inductive arguments, evaluating the validity or strength of arguments, detecting fallacies in arguments, and refuting fallacious arguments.* *Resources for the reasoning process include hypothetical and real-life situations in various fields of natural sciences, social sciences, and humanities.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Trần Thanh Tú (Ph.D) Nguyễn Thị Thủy (Ph.D) Phạm Ngọc (Ph.D) Nguyễn Văn Tiếp (Ph.D) Vũ Tiến Thịnh (MA) Đỗ Thị Diệu Ngọc (MA)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lectures, discussions, homework assignments, students' presentations
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 Contact hours (lecture, exercise): 37.5 Private study including examination preparation, specified in hours: 90
Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for	None

<table>
<tr><td>joining the course</td><td></td></tr>
<tr><td>Course objectives</td><td>This course will enable students to
develop the habits of assessing and defending the reasonableness of their beliefs and values as well as those of others
appreciate the importance of looking at an issue from a variety of perspectives
apply critical thinking skills in both public and personal settings</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Know the general concepts and standards of critical thinking; and comprehend the disadvantages of barriers to critical thinking in various contexts
CLO2. Know the elements of an argument and two patterns of reasoning
CLO3 Know the fallacies of relevance and insufficient evidence in arguments</td></tr>
<tr><td>Skill</td><td>CLO4. Construct and evaluate deductive and inductive arguments in spoken and written forms
CLO5. Test the validity of deductive arguments using Venn diagram and truth tables
CLO6. Analyze and standardize arguments
CLO7. Evaluate truth claims and refute arguments
CLO8. Analyze weaknesses in inductive arguments to strengthen them</td></tr>
<tr><td>Attitude</td><td>CLO9. Defend personal/group beliefs with good arguments and in appropriate manners (project presentations)</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Critical thinking</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Recognizing arguments</td><td>1</td><td>T, U</td></tr>
<tr><td>Basic logical concepts</td><td>1</td><td>T, U</td></tr>
<tr><td>A little categorical logic</td><td>1</td><td>T, U</td></tr>
<tr><td>A little propositional logic</td><td>1</td><td>T, U</td></tr>
<tr><td>Logical fallacies I</td><td>1</td><td>T, U</td></tr>
<tr><td>Logical fallacies II</td><td>1</td><td>T, U</td></tr>
<tr><td>Review for Midterm test</td><td>1</td><td>U</td></tr>
<tr><td>Analyzing arguments</td><td>1</td><td>T, U</td></tr>
<tr><td>Evaluating arguments and truth claims</td><td>1</td><td>T, U</td></tr>
<tr><td>Inductive reasoning</td><td>1</td><td>T, U</td></tr>
<tr><td>Project: Group presentation</td><td>3</td><td>U</td></tr>
<tr><td>Review for Final Exam</td><td>1</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>40 multiple-choice questions for the midterm and final exams and group presentations for the final project</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Overall passing score: 50/100</td></tr>
<tr><td>Reading list</td><td>[1] Bassham, Irwin, Nardone, and Wallace, Critical Thinking: A Student's Introduction, 6th edition, McGraw-Hill Education, 2020.
[2] Moore, B.N. et al. (2009). Critical Thinking, 9th ed. McGraw-Hill
[3] Patrick J. Hurley (2012). A Concise Introduction to Logic (11th ed.), Wadsworth, Cengage Learning
+ Relevant web resources</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	1									
	2	1									
	3	1									
Skill (Level: 1-7)	4							4			
	5								4		
	6								4		
	7										
	8										
Attitudes (Level: 1-5)	9										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	1.0						4.0	4.0	0.0	4.0
L,M,H conversion *		L						M	M		H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Critical thinking	1	HW 1/Quiz 1	Lecture, Discussion, Homework, Quiz	[1] Chapter 1
2	Recognizing arguments	2	HW 2/Quiz 2	Lecture, Discussion, Homework, Quiz	[1] Chapter 2
3	Basic logical concepts	2	HW 3/Quiz 3	Lecture, Discussion, Homework, Quiz	[1] Chapter 3
4	A little categorical logic	3	HW 4/Quiz 4	Lecture, Discussion, Homework, Quiz	[1] Chapter 9
5	A little propositional logic	3	HW 5/Quiz 5	Lecture, Discussion, Homework, Quiz	[1] Chapter 10
6	Logical fallacies I	4	HW 6/Quiz 6	Lecture, Discussion, Homework, Quiz	[1] Chapter 5
7	Logical fallacies II	4	HW 7/Quiz 7	Lecture, Discussion, Homework, Quiz	[1] Chapter 6

Week	Topic	CLO	Assessments	Learning activities	Resources
8	Review for midterm exam + sample test				
9 + 10	**Midterm exam: Chapters 1, 2, 3, 9, 10**				
11	Analyzing arguments	5	HW 8/Quiz 8	Lecture, Discussion, Homework	[1] Chapter 7
12	Evaluating arguments and truth claims	5	HW 9/Quiz 9	Lecture, Discussion, Homework	[1] Chapter 8
13	Inductive reasoning	2	HW 10/Quiz 10	Lecture, Discussion, Homework	[1] Chapter 11
14	Project: Group presentation	6	Group work	Presentation, Discussion	
15	Project: Group presentation	6	Group work	Presentation, Discussion	
16	Project: Group presentation	6	Group work	Presentation, Discussion	
17	**Review for final exam + sample test**				
18	Reserved week				
19+20	**Final exam: Chapters 5, 6, 7, 8, 11**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**	**CLO7**	**CLO8**	**CLO9**
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass				80% Pass
Midterm exam (30%)						80% Pass	80% Pass	80% Pass	
Final exam (40%)						80% Pass	80% Pass	80% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

6.Date revised: 15 August, 2022

By coordinator: Đỗ Thị Diệu Ngọc

Contact details:

Email: dtdngoc@hcmiu.edu.vn

Mobile: 0904361717

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Civil Engineering and Management

COURSE SYLLABUS

Course Name: Engineering Ethics and Professional Skills

Course Code: **PE020IU**

1. General Information

Module designation	**PE020IU – Engineering Ethics and Professional Skills** This course is designed to introduce engineering students to the concepts, theory and practice of engineering ethics. It will allow students to explore the relationship between ethics and engineering, and apply classical moral theory and decision making for engineering issues encountered in academic and professional careers. This course also provides students with the professional skills: sharing ideas and concepts, team working, and presentation skills.
Semester(s) in which the module is taught	3
Person responsible for the module	Dr. Nguyen, Hoai Nghia, Dr. Huynh, Vo Trung Dung
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, presentation, and assignments.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 Contact hours (lecture): 37.5 Private study including examination preparation, specified in hours: 90
Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Overall objectives** are to equip IU students with knowledge about the philosophies of ethics, professional practice, and world culture. Students who complete the course will be able to perform the following tasks: (1) Having knowledge of the definition of engineering ethics, codes of ethics, ethic philosophies, intellectual property, copyright, and fair use of copyrighted materials and research data.

<table>
<tr><td></td><td>(2) Using different problem-solving techniques to solve ethical dilemmas.
(3) Analyzing social, environmental, legal aspects, safety and sustainability issues of engineering activities.</td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to engineering professionalism and ethics</td><td>1</td><td>I</td></tr>
<tr><td>Engineers in Society</td><td>1</td><td>T, U</td></tr>
<tr><td>Moral choices and codes of ethics</td><td>1</td><td>T, U</td></tr>
<tr><td>Philosophical ethics</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Ethical problem-solving techniques</td><td>1</td><td>T, U</td></tr>
<tr><td>Engineers at the Workplaces - Leadership</td><td>2</td><td>T, U</td></tr>
<tr><td>Truth in actions and words
Academic and Research Ethics</td><td>1</td><td>T</td></tr>
<tr><td>Commitment to Safety</td><td>1</td><td>T, U</td></tr>
<tr><td>Internet ethics, Privacy Issues and Intellectual Property Rights</td><td>1</td><td>T, U</td></tr>
<tr><td>Environmental ethics
Sustainable engineering</td><td>1</td><td>T</td></tr>
<tr><td>Review</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Constructed-response test</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed based on their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this module.</td></tr>
<tr><td>Reading list</td><td>Textbook:
[1] M. W. Martin and R. Schinzinger (2010). Introduction to engineering ethics McGraw-Hill Education 2nd edition
[2] C. B. Fleddermann. (2011). Engineering Ethics, Pearson 4th edition</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (1-3) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		2							2	
Skill (Level: 1-7)	2			3						3	
Attitudes (Level: 1-5)	3		4							4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
L,M,H conversion *			M	M						M	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to engineering professionalism and ethics	1		Lecture, Discussion	[1] Chapter 1
2	Engineers in Society	1	HW1 and/or Quiz1	Lecture, HW1 and/or Quiz1	[1] Chapter 4
3	Moral choices and codes of ethics	1	Presentation 1	Lecture, Presentation1	[1] Chapter 2
4, 5	Philosophical ethics	1, 2	HW2 and/or Quiz2	Lecture, HW2 and/or Quiz2	[1] Chapter 3
6	Ethical problem-solving techniques	2	Presentation 2, HW3 and/or Quiz3	Lecture, HW3 and/or Quiz3	[4] Chapter 4
7, 8	Engineers at the Workplaces - Leadership	1	Quiz4	Lecture, Discussion Quiz4	[1] Chapter 6
9-10	FINAL EXAM				
11-12	Truth in actions and words Academic and Research Ethics	1, 3	Quiz5	Lecture, Quiz5	[1] Chapter 7
13	Commitment to Safety	1, 3	Quiz6	Lecture, Discussion Quiz6	[1] Chapters 5, 6
14-15	Internet Ethics Privacy Issues and Intellectual Property Rights	1, 3	Quiz7	Lecture, Discussion Quiz7	[1] Chapter 13
16	Environmental ethics Sustainable engineering	1, 3	Quiz8	Lecture, Discussion Quiz8	[1] Chapter 9
17	Review				

Week	Topic	CLO	Assessments	Learning activities	Resources
18-19	FINAL EXAM				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class exercises/quizzes (10%)	Qz1, Qz4, 50%Pass	Qz2, Qz3 50%Pass	Qz5, Qz6, Qz7, Qz8, 50%Pass
Homework exercises/ Presentation (20%)	Presentation 1 50%Pass	Presentation 2 50%Pass	
Midterm exam (20%)	MCQ, Case study 50% Pass	MCQ, Case study 50% Pass	
Final exam (50%)			MCQ, Case study 50% Pass

Note: %Pass: % students have scores greater than 50 out of 100.

5. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Languages

COURSE SYLLABUS
Course Name: Writing AE1 (Academic Writing)

Course Code: **EN007IU**

1. General information

Course designation	*This course provides students with comprehensive instructions and practice in essay writing, including transforming ideas into different functions of writing such as process, cause-effect, comparison-contrast, and argumentative essays.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of Department of English
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours: 60
Credits/ECTS	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	Students must fulfil ONE of the following requirements to attend this course: • hold TOEFL iBT certificate with score ≥ 61 • hold IELTS certificate with score ≥ 5.5 • have completed IE2 course
Course objectives	Throughout the whole course, students are required to read university-level texts to develop the ability to read critically and to respond accurately, coherently and academically in writing. Through providing them with crucial writing skills such as brainstorming, paraphrasing, idea developing, revising, and editing, this course prepares the students for research paper writing in the next level of AE2 writing.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand and follow different steps in the writing process to produce a complete essay
CLO2. Employ different methods to improve their writing such as peer feedback and teacher comments</td></tr>
<tr><td>Skill</td><td>CLO3. Read critically, analyze and annotate an academic text
CLO4. Use different functions of writing to successfully communicate their purposes to the audience (describe a process, discuss the causes and effects, compare and contrast, make arguments, paraphrase and summarize)</td></tr>
<tr><td>Attitude</td><td>CLO5. Reason around ethical issues in writing academic essays and avoid committing plagiarism</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>The process of Academic Writing</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Using Outside Sources</td><td>3</td><td>T, U</td></tr>
<tr><td>From Paragraph to Essay</td><td>4</td><td>T, U</td></tr>
<tr><td>Process Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Cause/Effect Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Comparison/ Contrast Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Argumentative Essays</td><td>6</td><td>T, U</td></tr>
<tr><td>Summarizing</td><td>2</td><td>U</td></tr>
<tr><td>Review & Correction</td><td>2</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Essay writing</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance
Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination.

Missed Tests
Students are not allowed to miss any of the tests (both Mid-term and Final). There are very fewexceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re-take the examination.</td></tr>
</table>

	Class Behaviors Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Writing AE1 course with approximately 8-10 hours per week (both in class and self-study). Accordingly, students are supposed to follow the obligations below: - Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request. - Participate fully and constructively in all course activities and discussions (if any). - Display appropriate courtesy to all involved in the class. - Provide constructive feedback to faculty members regarding their performance. *Plagiarism* Students are warned not to copy from other books or from their peers for all assessment tasks. Committing plagiarism will result in 0 point for the task. Students who plagiarize twice will be prohibited from sitting the final examination. *Writing Center (Room 509)* Students are encouraged to visit the Writing Center to schedule an appointment for additional help with essay writing.
Reading list	[1] Oshima, A., & Hogue, A. (2017). *Longman Academic Writing Series, Level 4: Essays* (5th ed.).New Jersey, NJ: Pearson Longman. [2] Oshima, A., & Hogue, A. (2006). *Longman Academic Writing Series, Level 4: Essays* (4th ed.).New Jersey, NJ: Pearson Longman.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		2					2			
	2		3					3			
Skill (Level: 1-7)	3							3			
	4							2			
Attitudes (Level: 1-5)	5							2		2	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	2.5	0.0	0.0	0.0	0.0	2.4	0.0	2.0	0.0
L,M,H conversion *			L					L		L	

3. Planned learning activities and teaching methods

Week	Coursebook		Homework
	Chapter	***Pages***	
1	**The process of Academic Writing** Step 1: Creating (Prewriting) Step 2: Planning (Outlining) Step 3: Writing Step 4: Polishing ***Using Outside Sources*** Paraphrasing Plagiarism and how to avoid plagiarism	[2] pp. 265-279 [1] pp. 58-65	• Do revising & editing exercises • Read pp. [1] pp. 66-72
2	***Using Outside Sources (Cont'd)*** Strategies for writing a successful summary	[1] pp. 58 - 72	• Do paraphrasing exercises • Read [1] pp.74-100. Read, take notes and write the summary of ONE of the following articles: ○ The Challenge of Many Languages (p. 280) ○ Nice by Nature? (p. 281) ○ Marital Exchanges (pp. 283-4) ○ Why We Should Send a Manned Mission to Mars (pp. 286-7) ○ Let's Not Go to Mars (pp. 288-9)
3 & 4	**Review/ Correction**: Lecturergives feedback to one or two students' writings in class. **From Paragraph to Essay** The introductory paragraph: • General statements & Introductory techniques • Thesis statements & Logical division of ideas Body paragraphs: • Topic sentences The concluding paragraph: • Restatement • Final thoughts Outlines of essays	[1] pp. 74 – 100	• Read pp. 101-15 • Do exercises on: ○ Writing thesis statements ○ Writing topic sentences fromthe thesis statement provided ○ Writing restatements

Week	Coursebook		Homework
	Chapter	***Pages***	
5	**Process Essays** Introduction Analyzing the models Thesis statements for process essays Transitional signals **Write together:** Writing from a diagram (p.115)	[1] pp. 101 - 115	• Write a short essay (150-200 words) describing how hydroelectric power is generated (or a topic of the lecturer's choice)
6	**Process Essays (Cont'd) Review/ Correction**: Lecturer gives feedback to one or two students' writings in class. ***In-class Assignment:*** Write a process essay about one of these topics or a topic of the lecturer's choice: • How to cook a favorite food • How to do a favorite hobby • How to succeed in your majorarea or professional field • How to accomplish an academic task (register for classes, apply for a scholarship, pass an exam, etc.)	[1] pp. 101 - 115	• Read [1] pp. 116-132
7	**Cause/ Effect Essays** Introduction Analyzing the models Organization Signal words and phrases **Write together:** Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • The cause of obesity • The effects of involvement in sports on young children • The causes of stress in college students • The effects of regular reading on students' lives	[1] pp. 116 - 132	• Practice 4, 5,6 /pp. 127-9 • Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been used in class: ○ The cause of obesity ○ The effects of involvement in sports on young children ○ The causes of stress in college students o The effects of regular readingon students' lives

Week	Coursebook		Homework
	Chapter	***Pages***	
8	**Cause/ Effect Essays (Cont'd)** **Review/ Correction:** Lecturer gives feedback to one or two students' writings in class. ***In-class Writing:*** Write the introduction, ONE body paragraph and the conclusion on one of the two topics left (except for the ones that has been worked on in class and assigned as homework) or a topic of the lecturer's choice: • The cause of obesity • The effects of involvement in sports on young children • The causes of stress in college students The effects of regular reading on students' lives		• Give peer-feedback using the rubric provided
MID-TERM EXAMINATION			
9	**Comparison/ Contrast Essays** Introduction Analyzing the modelsOrganization: • Points of comparison • Point-by-point organization • Block organization Comparison and Contrast signalwords **Write together:** Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • Compare and contrast the relationship between parentsand children in two different cultures. • Compare and contrast the university culture in two different countries. • Compare and contrast the culture of a small town and a big city.	[1] pp. 133 - 151	• Practice 3, 4, 6, 7/pp.142-6 • Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been used in class: o Compare and contrast the relationship between parents and children in two different cultures. ○ Compare and contrast the university culture in two different countries. ○ Compare and contrast the culture of a small town and abig city.

Week	Coursebook		Homework
	Chapter	***Pages***	
10	**Comparison/ Contrast Essays (Cont'd)** **Review/ Correction:** Lecturergives feedback to one or two students' writings in class. ***In-class Assignment:*** Write a compare and contrast essay on the topic left or a topic ofthe lecturer's choice: • Compare and contrast the relationship between parentsand children in two different cultures • Compare and contrast the university cultures in two different countries • Compare and contrast the cultures of a small town and a big city	[1] pp. 133 - 151	• Read [1] pp. 152-168
11 & 12	**Argumentative Essays** Introduction Analyzing the model	[1] pp. 152-168	• Write an argumentative essay (300 – 350 words) on ONE of the following topics or a topic

Week	Coursebook		Homework
	Chapter	***Pages***	
	Organization: Block vs. Point-by-point pattern The elements of an argumentative essay: • An explanation of the issue • A clear thesis statement • A summary of the opposing arguments • Rebuttals to the opposing arguments • Your own arguments The introductory paragraph: Thesis Statement Statistics as support **Write together:** Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • Can same-sex parenting negatively influence a child's mentality? • Do famous artists have an innate talent, or do they put in great effort to improve their skills? • Is homework helpful?		of the lecturer's choice: ○ Can same-sex parenting negatively influence a child's mentality? ○ Do famous artists have an innate talent, or do they put ingreat effort to improve their skills? ○ Is homework helpful?
13	**Argumentative Essays (Cont'd)** **Review/ Correction:** Lecturer gives feedback to one or two students' writings in class. **In-class Writing:** Write an argumentative essay onthe topic left or a topic of the lecturer's choice: • Can same-sex parenting negatively influence a child's mentality? • Do famous artists have an innate talent, or do they put in great effort to improve their skills? • Is homework helpful?		• Give peer-feedback using the rubric provided
14	Review & Practice: Summarizing		Sample final test

Week	Coursebook		Homework
	Chapter	***Pages***	
15	**Review/Correction:** Lecturer gives feedback to one or two students' argumentative essays +sample final test in class. Lecturer has students check their own assignment scores.		
FINAL EXAMINATION			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Homework completion (10%)	80% Pass	80% Pass	80% Pass		
Week 6: In-class writing assignment: Process essay (10%)				80% Pass	
Week 10: In-class writing assignment: Compare & Contrast essay (10%)				80% Pass	
Midterm exam (30%)	80% Pass			80% Pass	80% Pass
Final exam (40%)				80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Midterm exam rubrics (100 points)

TASK 1: Write 3 topic sentences and the restatement from a thesis statement: 40 points

Parts/ Points	Answers/ Criteria	CLO
Topic sentence 1 10 pts	○ The topic sentence introduces the topic and the controlling idea (1), starting with a transition signal*.	CLO 1
Topic sentence 2 10 pts	○ The topic sentence introduces the topic and the controlling idea (2), starting with a transition signal*.	CLO 1
Topic sentence 3 10 pts	○ The topic sentence introduces the topic and the controlling idea (3), starting with a transition signal*.	CLO 1
Restatement 10 pts	○ The 3 subtopics are well paraphrased: different words and structures while the meaning kept the same.	CLO 1

Notes:

The students are supposed to use **a variety of connecting devices (single word, phrase, clause, or sentence) to show their flexibility and expertise in writing.*

TASK 2: Write a Cause/Effect essay: 60 points

Answers/ Criteria	Parts/ Points	CLO
Language use and Mechanics A wide variety of sentence patterns and vocabulary are presented correctly. Language used for *Cause-Effect Essay* is good and Meaning is clear. Spelling, capitalization, punctuation are correct.	**10**	CLO 1,4

Answers/ Criteria	Parts/ Points	CLO
Content The essay fulfills the requirements of the assignment & the topic is fully addressed. (15) The essay is interesting to read and originally written by the student. (5)	**20**	CLO 1,4,5
Organization ***Introduction****:* The introduction ends with a thesis statement. (10) ***Body****:* Each paragraph discusses a particular point and begins with a clear topic sentence. (5) Each paragraph has specific supporting details (fact, examples, etc.) (5) Each paragraph has cohesion and coherence. (5) ***Conclusion****:* The conclusion summarizes the main points/paraphrases the thesis statement, begins with a conclusion signal, and leaves the readers with the writer's thoughts on the topic. (5)	**30**	CLO 1,4
Total	**60**	

5.2. Final exam rubrics: Write an argumentative essay: 100 points

Criteria/ word count	300-350 words (100%)	200-299 words (80%)	Under 200 words (60%)	CLO
Language use and mechanics (20) A wide variety of sentence patterns and vocabulary are represented correctly. Language control is good, and meaning is clear. Spelling, capitalization and punctuation are correct.	20	16	12	CLO 1,4
Content: (20) The essay fulfills the task requirements, and the topic is fully addressed. The content is originally created by the students.	20	16	12	CLO 1,4,5

Organization: (60) ***Introduction***:				
The introduction has a thesis statement. (10)	10	8	6	
Body:				
At least one paragraph discusses the counter-arguments. (10)	10	8	6	
Each paragraph discusses a particular point and begins with aclear topic sentence. (10)	10	8	6	
Each paragraph has specific supporting details (fact, examples, etc.). There are no sentences that are off-topic. (10)	10	8	6	CLO 1,4
Each paragraph has cohesion and coherence. There are transition signals to show the relationship among ideas and to link paragraphs. (10)	10	8	6	
Conclusion:				
The conclusion summarizes the main points and paraphrases the thesis statement, begins with a conclusion signal, and leaves the readers with the writer's final thought on the topic. (10)	10	8	6	
Total	**100**	**80**	**60**	

6. Date revised: 14 August, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Languages

COURSE SYLLABUS

Course Name: Listening AE1 (Listening & Note-taking)

Course Code: **EN008IU**

1. General information

Course designation	*The course is designed to prepare students for effective listening and note-taking skills, so that they can pursue the courses in their majors without considerable difficulty. The course is therefore lecture-based in that the teaching and learning procedure is built up on lectures on a variety of topics such as business, science, and humanities.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of School of Languages
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours: 60
Credits/ECTS	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	Students must fulfill ONE of the following requirements to attend this course: • hold TOEFL iBT certificate with score ≥ 61 • hold IELTS certificate with score ≥ 5.5 • complete IE2 course
Course objectives	There are a number of objectives embedded in various teaching activities in Listening AE1 course: Pre-listening activities: aim to activate students' current knowledge of the topic, and to provide them with lecture language and effective strategies in listening and note-taking to prepare themselves for the coming lecture. These activities include reading (this can be done before class meetings), discussing and reviewing what they have learned from the reading.

<table>
<tr><td></td><td>While-listening and post-listening activities: aim to enable students to put their newly activated knowledge and acquired strategies into work by taking notes on the lecture, using the outline given by the teacher or prepared by themselves. They are later on asked to assess their understanding based on their notes and discuss them with their classmates. Finally, as an optional activity, depending on time and students' needs, students are asked to summarize the lecture.
Follow-up activities: students are required to discuss the lecture topic and to prepare arguments for or against the topic in the debate. The purpose is to enhance students' comprehension of the lecture, and to allow them to put their acquired academic language into practice, and to experience the atmosphere of a university lecture class.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Remember different strategies and techniques in listening to academic lectures and taking notes.
CLO2. Improve their specialized knowledge of academic lectures</td></tr>
<tr><td>Skill</td><td>CLO3. Respond to academic lectures with appropriate strategies
CLO4. Communicate effectively with their classmates and professors.</td></tr>
<tr><td>Attitude</td><td>CLO5. Respond to academic lectures with confidence</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Orientation & Introduction of strategies and techniques in note-taking</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 1: New Trends in Marketing Research</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 2: Business Ethics</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 3: Trends in Children's Media Use</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 4: The Changing Music Industry</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 5: The Placebo Effect</td><td>2</td><td>T, U</td></tr>
<tr><td>Midterm Sample Test & Review</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 6: Intelligent Machines</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 7: Sibling Relationships</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 8: Multiple Intelligences</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 9: The Art of Graffiti</td><td>3</td><td>T, U</td></tr>
<tr><td>Final Sample Test & Review</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
</table>

Examination forms	Paper and pen tests: Correct the mistakes, Fill in the blanks, Write short answers, Write a summary paragraph.
Study and examination requirements	*Attendance* Regular on-time attendance in this course is expected. It is compulsory that students attend atleast 80% of the course to be eligible for the final examination. *Missed tests* Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.) *Class behavior* Students are supposed to: prepare thoroughly for each class in accordance with the syllabus and complete allassignments upon the instructor's request participate fully and constructively in all class activities (and discussions if any) display appropriate courtesy to all involved in the class provide constructive feedback to faculty members regarding their performance
Reading list	[1] Frazie, L., & Leeming, S. (2013). *Lecture ready 3.* Oxford: Oxford University Press.References: [2] Frazie, L., & Leeming, S. (2013). *Lecture ready 1, 2.* Oxford: Oxford University Press.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1							1			
	2		3					3			
Skill (Level: 1-7)	3							2			
	4							4			
Attitudes (Level: 1-5)	5							2		2	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	3.0	0.0	0.0	0.0	0.0	2.4	0.0	2.0	0.0
L,M,H conversion *			M					L		L	

3. Planned learning activities and teaching methods

WEEK	P.	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 1	2	ORIENTATION		

WEEK	P.	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 2	2	**Chapter 1** **New Trends in Marketing Research**	Recognizing topic introducing and lectureplan presenting expressions Organizing ideas by outlining	Expressing ideas during a discussion
WEEK 3	2	**Chapter 2** **Business Ethics**	Recognizing transition expressions Using symbols and abbreviations	Asking for clarification and elaboration during a discussion
WEEK 4	2	REVIEW		
WEEK 5	2	**Chapter 3** **Trends in Children's Media Use**	Recognizing generalization and support expressions	Giving opinions andasking for opinions during a discussion
WEEK 6	2	**Chapter 4** **The Changing Music Industry**	Recognizing expressions for clarification or emphasis Organizing notes byusing a split-page format	Expressing interest and asking for elaboration during a discussion
WEEK 7	2	**Chapter 5** **The Placebo Effect**	Recognizing cause andeffect expressions Noting causes and effects	Agreeing and disagreeing during a discussion
WEEK 8	2	Sample test correction WRAP-UP AND REVIEW		
MID-TERM EXAMINATION				
WEEK 9	2	**Chapter 6** **Intelligent Machines**	Recognizing expressions used topredict causes and effects Using arrows to showthe relationship between causes and effects	Learning to compromise and reach a consensus during a discussion
WEEK 10	2	REVIEW		

WEEK	P.	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 11	2	**Chapter 7 Sibling Relationships**	Recognizing expressions of comparison and contrast Noting comparison and contrast	Expanding on ideas during a discussion
WEEK 12	2	**Chapter 8 Multiple Intelligences**	Recognizing non-verbalsignals indicating important information Representing information in list form	Keeping the discussionon topic
WEEK 13	2	REVIEW		
WEEK 14	2	**Chapter 9 The Art of Graffiti**	Recognizing expressions of definition Reviewing and practicing all note taking strategies	Indicating to other when preparing to speak or pausing to collect thoughts
WEEK 15	2	WRAP-UP AND REVIEW		
FINAL EXAMINATION				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
On-going assessment (30%) (participation,individual work, group work, assignments, etc.)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass
Midterm exam (30%)	80% Pass		80% Pass		
Final exam (40%)	80% Pass		80% Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

6. Date revised: 14 August, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Languages

COURSE SYLLABUS
Course Name: Writing AE2 (Research Paper Writing)

Course Code: **EN011IU**

1. General information

Course designation	*This course introduces basic concepts in research paper writing, especially the role of generalizations, definitions, classifications, and the structure of a research paper to students who attend English- medium college or university. It also provides them with methods of developing and presenting an argument, a comparison or a contrast.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of School of Languages
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours: 60
Credits/ECTS	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	Students must complete Writing AE1 course

<table>
<tr><td>Course objectives</td><td>Students are required to work on the tasks selected to maximize their exposure to written communication and are expected to become competent writers in the particular genre: the research paper.
As writing is part of an integrated skill of reading and writing where reading serves as input to trigger writing, this course is designed to familiarize non-native students with academic literature in their major study by having them read and critically respond to texts of a variety of topics ranging from natural sciences such as biology to social sciences and humanities like education, linguistics and psychology.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand the structure of a research paper and employ appropriate academic language in writing a research paper</td></tr>
<tr><td>Skill</td><td>CLO2. Read critically, analyze, and annotate academic articles and journals
CLO3. Employ the research writing skills obtained to work on their own paper in their major study.</td></tr>
<tr><td>Attitude</td><td>CLO4. Reason around ethical issues in writing research paper and avoid committing plagiarism</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Unit 1: The Academic Writing Process Introduction</td><td>4</td><td>I, T, U</td></tr>
<tr><td>Unit 2: Researching and Writing</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 3: Fundamentals & Feedback</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 4: Definitions, Vocabulary & Clarity</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 5: Generalizations, Facts and Honesty</td><td>4</td><td>T, U</td></tr>
<tr><td>Unit 6: Seeing Ideas and Sharing Texts</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 7: Description, Methods & Reality</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 8: Results, Discussion & Relevance</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 9: The Whole Academic Text</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 10: Creating the Whole Text</td><td>4</td><td>T, U</td></tr>
<tr><td>Course Review</td><td>2</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Essay writing</td></tr>
</table>

Study and examination requirements	*Attendance* Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination. *Assignment (Literature review)* Purpose: Students will use the knowledge of paraphrasing, summarising, developing arguments, andAPA styles to write a 1,000-word literature review on a research scope of their choice. Task: – Follow guidelines on how to write a literature review. – Use relevant academic writing skills such as paraphrasing, summarising, developing arguments,and APA 7th Style Guidelines – see https://www.apastyle.org/ – Develop arguments in relation to the research scope and identify the research gap **Notes:** All papers should be typed, double-spaced, in 13-pt font, and with 1-inch margins. All papersmust be original for this class. Criterion-referenced grading is used in this course. *Missed Tests* Students are not allowed to miss any of the tests (both Mid-term and Final). There are very fewexceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re-take the examination. *Class Behaviors* Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Writing AE2 course with approximately 8-10 hours per week (both in class and self- study). Accordingly, students are supposed to follow the obligations below: - Prepare thoroughly for each class in accordance with the course syllabus and complete homeassignments as the instructor's request. - Participate fully and constructively in all course activities and discussions (if any). - Display appropriate courtesy to all involved in the class. - Provide constructive feedback to faculty members regarding their performance. *Plagiarism* All forms of plagiarism and unauthorised collusion are seriously regarded and could result in penalties. Plagiarism occurs when students copy or reproduce people's words or ideas and then present them as students' own work without proper acknowledgement, including when students copy the work of their fellow students. Plagiarism in student submissions can be detected by: · some web-based programs such as SafeAssign or Turnitin, or · examiner's judgments with evidence of originals

<table>
<tr>
<td></td>
<td>
The rater will review the paper to check if citations or references are provided properly. Penalties dueto improper citations or references include:
<table>
<tr><th>Degree of magnitude</th><th>Description</th></tr>
<tr><td>Below 15%</td><td>Marked as it is.</td></tr>
<tr><td>15% - 25%</td><td>The score is deducted by 25%.</td></tr>
<tr><td>25% - 40%</td><td>The score is deducted by 50%</td></tr>
<tr><td>Over 40%</td><td>The score is 0.</td></tr>
</table>
Notes: Part of the test is marked as it is if no plagiarism is detected. Students who plagiarize over 40%twice will be prohibited from sitting the final examination.

Writing Center (Room 509)
Students are encouraged to visit the Writing Center or to schedule an appointment for additional help.
</td>
</tr>
<tr>
<td>Reading list</td>
<td>
[1] Hamp-Lyons, L., & Heasley, B. (2006). Study Writing. Cambridge, UK: Cambridge University Press

[2] Articles and Essays taken from The Allyn and Bacon Guide to Writing by Ramage et al (2009),Pearson Longman.

[3] Cormack, J. & Slaught, J. (2009). English for academic study: Extended writing and research skills.Cambridge: Cambridge University Press. Garnet Education

[4] Folse, K. S. & Pugh, T. (2010). Great writing 5: Greater essays. Boston: Heinle, Cengage Learning.

[5] Keezer, S. (Ed.) (2003). Write your research report: A real-time guide. New Jersey: PearsonLearning Group.

[6] Kumar, R. (2019). Research methodology: A step-by-step guide for beginners. Sage Publications
</td>
</tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		3		3			3			
Skill (Level: 1-7)	2							3			
	3							3			
Attitudes (Level: 1-5)	4							3		3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0
L,M,H conversion *			M		M			M		M	

3. Planned learning activities and teaching methods

WEEK	CONTENT—SUGGESTED TASKS	ASSIGNMENT/ HOMEWORK
1	**Orientation of the Course** **Unit 1: The Academic Writing Process** **Introduction**	
2	**Unit 1: The Academic Writing Process (Cont.)** Thinking about writing processes Distinguishing between academic and personal styles of writing Grammar of academic discourse	HW: Task 10
3	**Unit 2: Researching and Writing** Recognizing categories and classification The language of classification The structure of a research paper	HW: Task 17
4	**Unit 3: Fundamentals & Feedback** Exploring comparison and contrast structuresThe language of comparison and contrast Using comparisons and contrasts to evaluate and recommend	HW: Task 12
5	**Unit 3: Fundamentals & Feedback (Cont.)** The research paper Identifying a research gap The writing process	**Assignment 1: Task 20**
6	**Unit 4: Definitions, Vocabulary & Clarity** The clarity principle The language of definition The place of definition The writing process	HW: Task 15
7	**Unit 5: Generalizations, Facts and Honesty** Honesty principle The language of generalization	HW: Task 13
8	**Unit 5: Generalizations, Facts and Honesty (Cont.)** Writing a literature review The writing process Brainstorming and clustering APA 7th Style Guidelines – see https://www.apastyle.org/	**Assignment 2: Writing Literature review**
MID-TERM EXAMINATION		

WEEK	CONTENT—SUGGESTED TASKS	ASSIGNMENT/ HOMEWORK
9	**Unit 6: Seeing Ideas and Sharing Texts** Writing about events in time Connecting events Learning about peer reviews	HW: Tasks 12 & 13
10	**Unit 7: Description, Methods & Reality** Describing processes and products The language for writing about processes Writing the Methods section Giving and getting formal peer feedback	HW: Tasks 9 & 11
11	**Unit 8: Results, Discussion & Relevance** What is an argument? The language of argument The Results and Discussion sections Finding an academic voice	HW: Task 9
12	**Unit 9: The Whole Academic Text** S-P-S-E: Focus on structure S-P-S-E in the introduction The language of coherence and connection Teacher evaluation	HW: Task 9
13	**Unit 10: Creating the Whole Text** Structure of the research paper Creating your own research	
14	**Unit 10: Creating the Whole Text** Plagiarism Creating citations Paraphrase and summary Authorial identity	
15	**Course Review**	**Submitting Literature review**
FINAL EXAM		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	
Midterm exam (30%)	80% Pass		80% Pass	80% Pass
Final exam (40%)	80% Pass		80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Midterm exam sample rubrics (100 points)

TASK 1: 30 points

CATEGORIES	CRITERIA	POINTS	CLO
Category	Farm animals seem to have more complex cognitive and social skills	**7.5**	CLO 1,2
Sub-category 1	1. Sheep experience stress a. increase stress (when isolated from the flock) b. reduce stress (when seeing familiar sheep faces)	**7.5**	
Sub-category 2	2. Cows' co-operative partnerships & physiological response on learning something new a. Those learning tasks experience an increase in heart rate (when facing same situation). b. Those not learning tasks do not experience a heart rate increase.	**7.5**	CLO 1,2
Sub-category 3	3. Pigs' different reactions react differently based on past experience a. avoid the place where they have been shut for long b. go for the place where they were released from quickly.	**7.5**	CLO 1,2
	Total	**30**	

TASK 2: 70 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	All main points relevant to topic Essay question fully answers	**20**	CLO 1,3,4
Organization	Topic and purpose of the essay discussed in the introduction Each main point discussed in a paragraph All main points summarized and rephrased in the conclusion	**20**	CLO 1,3,4
Coherence	Paragraphs ordered in a systematic manner based on, for example, importance, priority, etc. Comparison/contrast transitions are properly used.	**15**	CLO 1,3,4
Style and Tone	Formal writing with full forms Polite writing Academic vocabulary	**15**	CLO 1,3,4
	Total	**70**	

5.2. Final exam rubrics: 100 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	• Presenting his/her view on the question clearly and persuasively	**20**	CLO 1,3,4
Structure of ideas	• Introduction with thesis statement, and conclusion with summary and comment • Topic sentences well supported with explanations, examples, etc.	**40**	CLO 1,3,4
Convincing argumentative techniques, e.g., counterargument		**20**	CLO 1,3,4
Language use: *use vocabulary and grammatical structures*		**20**	CLO 1,3,4
Total		**100**	

6. Date revised: 14 August, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Languages

COURSE SYLLABUS

Course Name: Speaking AE2 (Effective Presentations)

Course Code: **EN012IU**

1. General information

Course designation	*Giving presentations today becomes a vital skill for students to succeed not only in the university but also at work in the future. Speaking AE2, therefore, provides students with the knowledge and skills needed to deliver effective presentations (informative and persuasive presentations).*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of School of Languages
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, mini presentations
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours: 60
Credits/ECTS	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	Students must complete AE1 courses
Course objectives	Speaking AE2 aims at introducing an training students many aspects of giving a presentation: building up confidence, preparing and planning, using the appropriate language, applying effective visual aids, applying delivery techniques, dealing with questions and responding, performing body language, and so on.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand many aspects of giving a presentation: building up confidence, preparing and planning, using the appropriate language, applying effective visual aids, applying delivery techniques, dealing with questions and responding, performing body language</td></tr>
<tr><td>Skill</td><td>CLO2. Prepare and deliver effective, formal, structured presentations that are appropriate to the specific environment and audience.</td></tr>
<tr><td>Attitude</td><td>CLO3. Deliver both informative and persuasive speech with confidence</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Orientation & Introduction
Needs analysis</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Building up confidence</td><td>2</td><td>T, U</td></tr>
<tr><td>The first few minutes</td><td>2</td><td>T, U</td></tr>
<tr><td>Organizing what you want to say</td><td>2</td><td>T, U</td></tr>
<tr><td>Summarizing and concluding</td><td>2</td><td>T, U</td></tr>
<tr><td>Using equipment</td><td>2</td><td>T, U</td></tr>
<tr><td>Delivery techniques: Putting it all together</td><td>2</td><td>T, U</td></tr>
<tr><td>Group presentations for the instructor’s evaluation and advice</td><td>2</td><td>U</td></tr>
<tr><td>Introduction to persuasive speeches</td><td>2</td><td>T, U</td></tr>
<tr><td>Methods of persuasion</td><td>2</td><td>T, U</td></tr>
<tr><td>Maintaining interest</td><td>2</td><td>T, U</td></tr>
<tr><td>Dealing with problems and questions</td><td>2</td><td>T, U</td></tr>
<tr><td>Body language</td><td>2</td><td>T, U</td></tr>
<tr><td>Individual presentations for the instructor’s evaluation and advice</td><td>4</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Oral Presentations</td></tr>
</table>

Study and examination requirements	*Attendance* Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination. *Missed Tests* Students are not allowed to miss any of the tests (both Mid-term and Final). There are very fewexceptions. Only with extremely reasonable excuses (e.g. certified paper from doctors), students may re-take the examination. *Class Behaviors* Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Speaking AE2 course with approximately 8-10 hours per week (both in class and self-study). Accordingly, students are supposed to follow the obligations below: • Prepare thoroughly for each class in accordance with the course syllabus and completehome assignments as the instructor's request. • Participate fully and constructively in all course activities and discussions (if any). • Display appropriate courtesy to all involved in the class. • Provide constructive feedback to faculty members regarding their performance. *Plagiarism* Students are warned not to copy from other books or from their peers for all assessment tasks. Committing plagiarism will result in 0 point for the task. Students who plagiarize twice will be prohibited from sitting the final examination.
Reading list	[1] Lowe, S, & Pile, L. (2010). *Presenting.* Singapore*:* Cengage Learning [2] Comfort, J. (1997). *Effective presentations*. Oxford: Oxford University Press [3] Lucas, S. (2014). *The art of public speaking* (12th edition). New York: McGraw-HillEducation. [4] Harrington, D., & Lebeau, C. (2009). *Speaking of speech*. Macmillan

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (ILO) (1-6) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		2							2	
Skill (Level: 1-7)	2			3						3	
Attitudes (Level: 1-5)	3		4							4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
L,M,H conversion *			M	M						M	

3. Planned learning activities and teaching methods

WEEK	Content	MATERIAL(S) COVERED	ACTIVITIES
WEEK 1	· **Orientation & Introduction** · **Needs analysis**	[1] *Presenting*, p. 5	Students will: • receive an introduction to effectivepresentation • think about their strength and weaknesses in presenting in English • identify and prioritize their immediate and future needs forpresenting • share tips on improving weaknesses
WEEK 2	**Building up confidence**		Student will: - give a short speech about themselves to help them overcomeinitial shyness of standing up and speaking in public
WEEK 3	**Unit 1: The first few minutes**	• *Presenting*, pp. 8-13 • *Effective Presentations*: p.7 + video clip; p.13+ video clip	Students will: • learn the importance of making agood first impression • learn useful phrases for greeting the audience, introducing themselvesand others, and giving the purpose of their presentation

WEEK 4	**Unit 3: Organizing whatyou want to say**	• *Presenting*, pp. 22-27) • *Effective Presentations*: p.19 + video clip	Students will: • look at the importance of structuring their presentation • learn the useful phrases for outlining their presentation, organizing ideas and moving between different sections of their presentation
WEEK 5	**Unit 6: Summarizing and concluding**	• *Presenting*, pp. 40-45 • *Effective Presentations*: p.41 + video clip	Students will: • look at ways of finishing apresentation effectively • learn useful phrases for endingtheir presentation, summarizing, handing over and thanking
WEEK 6	**Unit 2: Using equipment**	• *Presenting*, pp. 14-21) • *Effective Presentations*: p.31 + video clip	Students will: • use equipment and visuals tosupport their presentation • learn useful phrases for referringto visuals, ensuring their audience can see and expanding on notes
WEEK 7	**Delivery techniques: Putting it all together**	[2] *Effective Presentations*: p.50 + video clip Assignment: Topic(s) for group presentation)	Students will: • watch a model presentation and discuss do's and don'ts for effectivedelivery • pick group members and plan their presentations for Week 8
WEEK 8	Group presentations forthe instructor's evaluation and advice		Students will: • take turn to deliver a presentationon the topic(s) assigned by the instructor • consult the instructor for advice on the mid-term exam preparation
MIDTERM EXAMINATION Students will give a five-to-six minute informative presentation on a topic to be determined.			
WEEK 9	**Introduction to persuasive speeches**	[3] *The art of public speaking*, Chapter 15 (Handout given by the instructor)	Students will: • know types of persuasive speeches • know typical organizations of apersuasive speech

WEEK 10	**Methods of persuasion**	[3] *The art of public speaking*, Chapter 16 (Handout given by the instructor)	Students will learn to persuade theaudience by: • building credibility • using evidence • reasoning • appealing to emotions
WEEK 11	**Unit 4: Maintaining interest**	• *Presenting*: pp. 28-33) • *Effective Presentations*: p.25 + video clip)	Students will: • look at maintaining interestthrough effective delivery • learn useful phrases for clarifyingwhat you mean, checking if the audience is following and involving the audience
WEEK 12	**Unit 5: Dealing with problems and questions**	○ *Presenting*: pp. 34-39) ○ *Effective Presentations*: p.44 (Question time)	Students will: • learn strategies for coping inunexpected situations • learn useful phrases for dealingwith problems and questions
WEEK 13	**Unit 6: Body language**	[2] *Effective Presentations* : pp.36-39	Students will: • practise using language and bodylanguage to communicate the message clearly and persuasively • watch video clips about bodylanguage • learn how to control posture, eye contact, gestures and voice inflection
WEEK 14	**Practice**	(to be determined bythe instructor)	Students will: - deliver individual or group presentations (assigned by the instructor)
WEEK 15	**Wrap-up and advice**	(to be determined bythe instructor)	Students will: • consult the instructor for advice onthe final exam preparation • continue to deliver individual or group presentations (if any)
FINAL EXAMINATION Students will deliver a seven-to-eight-minute persuasive presentation on a topic to be determined			

4. Assessment plan

	Very Poor	Poor	Average	Good	Excellent
Pronunciation, Voice Techniques (Pauses, Volume, Speed Change, Stress, Tone, Etc)	− Mumbles, often mispronounces, very difficult to understand. − Dead person talking, voice to text software does better	− Slurred speech, mispronounces some words. Difficult to understand. − Quiet, monotone, sing/song, little or no expression, boring.	− Clear voice, few pronunciation errors. Some slurring Most can understand the presentation − Some use of voice to show interest	− Crisp, clear voice, correct, precise pronunciation, all can understand. − proper volume; steady rate; enthusiasm; confidence	− Native like
Grammar& Vocabulary (Usage And Appropriateness For Audience)	− Frequent grammar or spelling errors − Inappropriate level. for the audience, Misuse vocabulary	− Noticeable Errors − Often too simple or sophisticated, inconsistent. Some vocabulary incorrectly used	− Minor errors − Generally appropriate, little variation or creativity	− No errors, but simple language − Always appropriate for the audience. Excellent use of vocabulary	− No errors. Excellent use of grammar to support ideas − Creative use of language
Body Language, Gestures, Eye Contact (Turns back to audience and reads screen – 0)	− Dead person on stage − Almost no eye contact, reads notes/screen	− Excessive movement or many distracting gestures − Occasionally eye contact, mostly reads notes/screen	− Some distracting gestures, and some movement and useful gestures − Generally maintains eye contact frequently reads notes/screen	− No distracting gestures. Body language supports speech − Excellent eye contact, seldom uses notes	− Excellent use of body language − Constant eye contact, no use of notes
Organization: Intro, Main, Ending, Coherence (see RATING CHECKLIST**)**	− Difficult to follow as disorganized	− Generally follows outline, poor introduction or conclusion.	− Follows outline, material generally well organized. Some use of transitions and linkage of ideas. Conclusion acceptable	− Follows outline, material well organized. − Ideas clearly linked. Some use of transitions	− Excellent, clear linkage of ideas. − Good transitions Arouses interest in Introduction, and summarizes clearly main points in conclusion
Content: Relevant/ Interesting/ Accurate	− Several errors or lacks critical information	− Some errors and has irrelevant information	− Information is generally accurate, minor errors, generally meets needs of the audience	− Accurate information, related to needs of audience	− No errors, answers all needs of the audience
Visual Aids: Appropriate, Clear (Movies, sound – 0)	− Slides consist of full paragraphs of text, no or superfluous graphics − Tiny font	− Slides have full sentences and occasional superfluous graphics, Difficult to read	− Slides have short phrases, Graphics relate to text and presentation. Easily read	− Attractive, informative graphics, only key words, easily understood, Good use of masking	− Professional quality, Excellent use of visual, no unrelated graphics, easily read, supports presentation
Overall effectiveness	− Ineffective, alienated audience	− Little positive effect or exchange of info.. Audience bored	− Audience learned something, no change in attitude	− Audience generally positive and learned from presentation	− Audience was kept interested and would remember key points

Assessment Type	**CLO1**	**CLO2**	**CLO3**
On-going Assessment (30%) (discussion, group presentation, individualpresentation, and so on) *(It is requested that lecturers collect students' scripts or any type of evidence of their participation for possiblefact check).*	80% Pass	80% Pass	80% Pass
Midterm exam (30%) (Students will give a five-to-six-minute informative presentation on a topic to be determined)	80% Pass	80% Pass	80% Pass
Final exam (40%) (Students will deliver a seven-to-eight-minute persuasive presentation on a topic to be determined.)	80% Pass	80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics & Marksheets

5.1.Midterm exam rubrics and marksheets

INTERNATIONAL UNIVERSITY
DEPARTMENT OF ENGLISH

SPEAKING AE2 - **MIDTERM** EXAMINATION
RATING CHECKLIST

ACADEMIC YEAR 2021 - 2022
DATE: _____

Student name : _____ Student ID : _____
Topic : _____

Wtg.	*Criteria*	*Very poor*	*Poor*	*Average*	*Good*	*Excellent*	*Comments*
15	**Pronunciation & Voice Techniques (Pause, Volume, Speed Change, Stress, Tone, etc.)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
15	**Language use: Grammar & Vocabulary (usage and appropriateness for audience)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Body Language: Gestures, Eye contact, Facial expressions** (turns back to the audience and reads from screen: 0 pt)	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
20	**Organization: Intro, Body, Ending, Coherence** (see below)	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
20	**Content: Relevance, Accuracy**	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
10	**Visual aids: Appropriateness, Clarity** (Movies, sound: 0 pt)	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
10	**Overall effectiveness**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
	FINAL SCORE: /100						

Negative points: ✧ Timing: <3m: *-15pts* 3m - 3m29: *-10pts* 3m30 - 3m59: *-5pts* 4m - 6m: OK >6m: *-5pts*

Organization:	*Yes*	*No*
A. Introduction		
a. Greeting, name, position *(Good morning ladies and gentlemen. My name is____. I'm a____)*	☐	☐
b. Purpose/ Objective *(The purpose of this talk is to _____)*	☐	☐
c. Connect with the audience *(I can see that all of you love to___)*	☐	☐
d. Outline/ Main part *(I've divided my presentation into ___ parts)*	☐	☐
e. Questions *(Should you have any questions, please save them until the end of my presentation)*	☐	☐
B. Body *(Transitions: Let's start with____/ That brings me to____/ Firstly, Secondly, Next, Lastly)*	☐	☐
C. Ending		
a. Signaling the end *(That brings me to the end of my presentation)*	☐	☐
b. Summary *(Let me just run over the key points again)*	☐	☐
c. Closing *(Thank you very much for your attention)*	☐	☐
d. Inviting questions *(I'd be glad to answer any questions you might have)*	☐	☐

Examiner : .....

5.2.Final exam rubrics and marksheets

	Very Poor	Poor	Average	Good	Excellent
Pronunciation, Voice Techniques (Pauses, Volume, Speed Change, Stress, Tone, etc.)	– Mumbles, often mispronounces, very difficult to understand. – Dead person talking, voice to text software does better	– Slurred speech mispronounces some words. Difficult to understand. – Quiet, monotone, sing/song, little or no expression, boring.	– Clear voice, few pronunciation errors. Some slurring Most can understand the presentation – Some use of voice to show interest	– Crisp, clear voice, correct, precise pronunciation, all can understand. – Proper volume; steady rate; enthusiasm; confidence	– Native like
Grammar & Vocabulary (Usage and Appropriateness for Audience)	– Frequent grammar or spelling errors – Inappropriate level. for the audience, Misuse vocabulary	– Noticeable Errors – Often too simple or sophisticated, inconsistent. Some vocabulary incorrectly used	– Minor errors – Generally appropriate, little variation or creativity	– No errors, but simple language – Always appropriate for the audience. Excellent use of vocabulary	– No errors. Excellent use of grammar to support ideas – Creative use of language
Body Language: Posture, Gestures, Eye contact, Facial expression (Turns back to audience and reads screen – 0)	– Dead person on stage – Almost no eye contact, reads notes/screen	– Excessive movement or many distracting gestures – Occasionally eye contact, mostly reads notes/screen	– Some distracting gestures, and some movement and useful gestures – Generally maintains eye contact frequently reads notes/screen	– No distracting gestures. Body language supports speech – Excellent eye contact, seldom uses notes	– Excellent use of body language – Constant eye contact, no use of notes
Organization: Intro, Main, Ending, Coherence (see RATING CHECKLIST**)**	– Difficult to follow as disorganized	– Generally follows outline, poor introduction or conclusion.	– Follows outline, material generally well organized. Some use of transitions and linkage of ideas. – Conclusion acceptable	– Follows outline, material well organized. – Ideas clearly linked. Some use of transitions	– Excellent, clear linkage of ideas. – Good transitions Arouses interest in Introduction, and summarizes clearly main points in conclusion
Content: Relevant/Accurate, Informative and Persuasive	– Several errors or lacks critical information	– Some errors and has irrelevant information – Just focus on giving information	– Information is generally accurate, minor errors – Give reasons with little or no emphasis on persuasion	– Accurate information, related to needs of audience – Give frequent emphasis on persuasion	– No errors, answers all needs of the audience – Persuade the audience well
Visual Aids: Appropriateness, Clarity *(Use of video clip exceeding 20 seconds – 0)*	– Slides consist of full paragraphs of text, no or superfluous graphics – Tiny font	– Slides have full sentences and occasional superfluous graphics, – Difficult to read	– Slides have short phrases; Graphics relate to text and presentation. Easily read	– Attractive, informative graphics, only key words, easily understood, good use of masking	– Professional quality, Excellent use of visual, no unrelated graphics, easily read, supports presentation
Question response	– Welcomes the question	– Listens carefully, doesn't interrupt	– Thinks before answering – Clarifies, rephrases as needed	– Answers correctly and briefly	– Checks to see if questioner is satisfied

INTERNATIONAL UNIVERSITY
DEPARTMENT OF ENGLISH

SPEAKING AE2 - **FINAL EXAMINATION**
RATING CHECKLIST

ACADEMIC YEAR 2021 – 2022
DATE: _____

Student name : ..... Student ID : .....
Topic : .....

Wtg.	*Criteria*	*Very poor*	*Poor*	*Average*	*Good*	*Excellent*	*Comments*
15	**Pronunciation & Voice Techniques (Pause, Volume, Speed Change, Stress, Tone, etc.)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Language use: Grammar & Vocabulary (usage and appropriateness for audience)**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
15	**Body Language: Posture, Gestures, Eye contact, Facial expression** (turns back to the audience and reads from screen: 0 pt)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
15	**Organization: Intro, Body, Ending, Coherence** (see below)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
20	**Content: Relevant, Accurate, Informative and Persuasive**	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
15	**Visual aids: Appropriateness, Clarity** (Movies, sound: 0 pt)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Question response**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
	SCORE (max.100): _____	*BONUS (max.10): _____*				**TOTAL SCORE (max.100): _____**	

Deduction points: ✧ No references: -10 ✧ Timing: <5m: *-15pts* 5m - 5m29: *-10pts* 5m30 - 5m59: *-5pts* >8m: *-5pts*

Bonus points: *Up to **10pts for creativity**, which involves PowerPoint design, Organization of information, Presentation style ...*

Organization:	***Yes***	***No***
A. Introduction		
a. Greeting, name, position *(Good morning, ladies and gentlemen. My name is___. I'm a___)*	☐	☐
b. Connect with the audience *(I can see that all of you love to___)*	☐	☐
c. Purpose/ Objective *(The purpose of this talk is to _____)*	☐	☐
d. Time length *(My presentation should last for ___)*	☐	☐
e. Outline/ Main part *(I've divided my presentation into ___ parts)*	☐	☐
f. Questions *(Should you have any questions, please save them until the end of my presentation)*	☐	☐
B. Body *(Transitions: Let's start with___/ That brings me to___/ Firstly, Secondly, Next, Lastly)*	☐	☐
C. Ending		
a. Signaling the end *(That brings me to the end of my presentation)*	☐	☐
b. Summary *(Let me just run over the key points again)*	☐	☐
c. Closing *(Thank you very much for your attention)*	☐	☐
d. Inviting questions *(I'd be glad to answer any questions you might have)*	☐	☐

Examiner : _____

6.Date revised: 14 August, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Mathematics

COURSE SYLLABUS
Course Name: Calculus 1

Course Code: **MA001IU**

1. General information

Course designation	This course equip students with basic concepts of calculus: limits, continuity, differentiation, and integration. Applications of these concepts are extensively discussed.
Semester(s) in which the course is taught	1, 2
Person responsible for the course	
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lectures, assignments
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 170 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 50 (lectures) Private study including examination preparation, specified in hours: 120
Credits/ECTS	4 credits/6.18 ECTS
Required and recommended prerequisites for joining the course	None
Course objectives	**1.** To provide students with the main ideas and techniques of calculus. These include limits, continuity, differentiation, and integration. **2.** To introduce practical applications of these ideas and techniques, through practical examples taken from many areas of engineering, business, and life sciences.

<table>
<tr><td></td><td>3. To develop skills in mathematical modelling and problem solving, ability to think logically, and adapt these skilss creatively to new situations</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Have basic knowledge of limits and derivatives (Program outcomes: a)
CLO2. Have basic knowledge of definite/indefinite integrals
(Program outcomes: a)</td></tr>
<tr><td>Skill</td><td>CLO3. Can compute often used limits, can define and compute derivatives (Program outcomes: a, j)
CLO4. Can compute standard types of integrals. Use integrals in practical situations (Program outcomes: a, j)</td></tr>
<tr><td>Attitude</td><td>CLO5. Confident when dealing with derivatives and integrals. Comfortable with using derivatives and integrals in practical situations. (Program outcome: j, k)</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Functions and Graphs, Inverse Functions, Exponential and Logarithmic Functions</td><td>1</td><td>I, T</td></tr>
<tr><td>Parametric Curves, Limit. One-sided Limits, Laws of Limits</td><td>1</td><td>I, T</td></tr>
<tr><td>Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem</td><td>1</td><td>T, U</td></tr>
<tr><td>Tangent Lines and Velocity Problems. Rates of Change, Derivative.</td><td>1</td><td>T, U</td></tr>
<tr><td>Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences</td><td>1</td><td>T, U</td></tr>
<tr><td>Implicit Differentiation, Differentiation of Inverse Functions,</td><td>1</td><td>T, U</td></tr>
<tr><td>Logarithmic Differentiation, Linear Approximations. Differentials.</td><td>1</td><td>T, U</td></tr>
<tr><td>Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.</td><td>1</td><td>T, U</td></tr>
<tr><td>The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching</td><td>1</td><td>T, U</td></tr>
<tr><td>Indeterminate Forms and l’Hôpital’s Rules, Maxima and Minima Problems, Newton’s Method</td><td>1</td><td>T, U</td></tr>
<tr><td>Anti-derivatives and Indefinite Integrals, The Definite Integral</td><td>1</td><td>I, T</td></tr>
<tr><td>Properties of the Definite Integral.</td><td>1</td><td>I, T, U</td></tr>
</table></td></tr>
</table>

	The Fundamental Theorem of Calculus, Integration by Substitution		
	Integration by Parts, Partial Fractions, Numerical Integration,	1	T, U
	Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves	1	T, U
	Volumes, Arc Length, Applications to Engineering, Economics and Science	1	T, U
Examination forms	Written examination		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	J. Stewart, *Calculus*, Thomson Learning, 7th edition, 2012.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2	2									
Skill (Level: 1-7)	3	2									
	4	2			2		2				
Attitudes (Level: 1-5)	5	3			3					3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.2	0.0	0.0	2.5	0.0	2.0	0.0	0.0	3.0	0.0
L,M,H conversion *		L			L		L			M	

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activitiess
1	Functions and Graphs, Inverse Fun Exponential and Logarithmic Functior	1,3		Lecture

Week	Topics	CLO	Assessment	Teaching and Learning activitiess
2	Parametric Curves, Limit. One-sided I Laws of Limits.	1,3	Quiz	Lectures and Quiz
3	Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem	3, 5	Quiz	Lectures and Quiz
4	The Tangent and Velocity Problems. Rates of Change, The Derivative.	3, 5	HW1	Lectures and HW
5	Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences	3, 5	Quiz	Lectures and Quiz
6	Implicit Differentiation, Differentiation of Inverse Functions,	3, 5	HW2	Lectures and HW
7	Logarithmic Differentiation, Linear Approximations. Differentials.	3, 5	Quiz	Lectures and Quiz
8	Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.	3, 5	HW3	Lectures and HW
Midterm Exam				
9	The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching	2, 4	Quiz	Lectures and Quiz
10	Indeterminate Forms and l'Hôpital's Rules, Maxima and Minima Problems, Newton's Method	2, 4	Quiz	Lectures and Quiz
11	Anti-derivatives and Indefinite Integrals, The Definite Integral	4, 5	HW4	Lectures and HW
12	Properties of the Definite Integral. The Fundamental Theorem of Calculus, Integration by Substitution	2, 4	Quiz	Lectures and Quiz
13	Integration by Parts, Partial Fractions, Numerical Integration,	4, 5	Quiz	Lectures and Quiz
14	Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves	2, 4, 5	HW5	Lectures and HW
15	Volumes, Arc Length, Applications to Engineering, Economics and Science	1, 2, 3, 4, 5	Exercises	

Week	Topics	CLO	Assessment	Teaching and Learning activitiess
Final Exam		1, 2, 3, 4, 5		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80%Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->H3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%
Final exam (50%)		Q1, Q2 80%Pass		Q3, Q4 70%Pass	Q5 50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Chemistry for Engineers
(Hóa học cho Kỹ sư)
Course Code: CH011IU

1. General information

Course designation	This one-semester course is designed for engineering students those who are pursuing a chemistry or non-chemistry engineering degree such as information technology, bio-technology, civil, biomedical, electronic and telecommunication engineering, environmental engineering, and chemical engineering. The course will introduce the basic principles of chemistry and connect those principles to issues in engineering professions.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☒ Semester 1 ☒ Semester 2 ☒ Summer	
Person In-Charge	Dr. Huynh Kim Lam, hklam@hcmiu.edu.vn Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn Dr. Phung Thanh Khoa, ptkhoa@hcmiu.edu.vn Dr. Vu Bao Khanh, vbkhanh@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☒ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify:	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td>3</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>37.5</td><td>37.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>90</td><td>90</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>127.5</td><td>127.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>3</td></tr>
<tr><td>Requirements for taking the course</td><td>☒ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☐ Previous course: (Please specify course ID & course title, if any)</td></tr>
<tr><td>Course objectives</td><td></td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate an understanding of the basic principles of chemistry, including atomic structure, chemical bonding, and the periodic table. [Apply]
CLO2. Apply fundamental chemical concepts, such as stoichiometry, kinetics, and thermodynamics, to solve problems and make predictions about chemical reactions. [Apply]
CLO3. Identify common chemical compounds, including organic and inorganic molecules, acids and bases, and salts. [Remember]
CLO4. Analyze chemical reactions using principles of equilibrium, acid-base reactions, and oxidation-reduction reactions. [Analyze]
CLO5. Apply chemistry knowledge to interdisciplinary fields, such as biochemistry, environmental science, materials science, and engineering. [Apply]</td></tr>
<tr><td>Skill</td><td></td></tr>
</table>
</td></tr>
</table>

	Attitude	

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	Topic	Weight	Level
1	Chemistry and Measurement	1	I, T
2	Atoms, Molecules and Ions	2	T, U
3	Periodicity	1	T, U
4	Chemical Bonds	2	T
5	Intermolecular Forces	2	T, U
6	Gases and Their Properties	2	T
7	Solutions and Their Properties	1	T, U
8	Solids and Their Properties	1	T, U
9	Chemical Reactions	2	I, T
10	Chemical Kinetics	2	I, T
11	Chemical Equilibrium	1	T, U
12	Electrolytes, Acid- Base, pH and Buffer	1	I, T
13	Thermochemistry	2	I, T
14	Thermodynamics	2	I, T

Examination forms	☒ Multiple-choice questions ☐ Oral examination ☐ Report ☒ Written examination ☐ Presentation ☐ Others, please specify: …… ☐ Assignments
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**I. Textbooks** Mary Jane Shultz (2010). Chemistry for Engineers – An Applied Approach. Houghton Mifflin. Darrell Ebbing and Steven D. Gammon (2010). General Chemistry 9th Ed., Brooks/Cole, USA. Nivaldo J. Tro (2008). Chemistry: A Molecular Approach, 2nd Ed., Pearson. Masterton and Hurley (2009). Chemistry, Principles and Reactions, 6th Ed., Cengage learning, USA. **II. References**

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
	3	1									
	4	4									
	5	3									
Skills (Level: 1-7)											
Attitudes (Level: 1-5)											
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.8	0.0	0.0	0.0	0.0			0.0		0.0
L,M,H conversion*		L									

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Chemistry and Measurement	1,5	HW	Lecture	
2.	2	Atoms, Molecules and Ions	1	HW	Lecture	
3.	3	Periodicity	1	HW	Lecture	
4.	4&5	Chemical Bonds	1	HW	Lecture	
5.	6	Intermolecular Forces	1	HW	Lecture	
6.	7	Gases and Their Properties	1	HW	Lecture	
7.	8	Solutions and Their Properties	1	HW	Lecture	
8.	9-10	Midterm				
9.	11	Solids and Their Properties	1,5	HW	Lecture	
10.	12	Chemical Reactions	1,4	HW	Lecture	
11.	13	Chemical Kinetics	2,5	HW	Lecture	
12.	14	Chemical Equilibrium	4	HW	Lecture	
13.	15	Electrolytes, Acid-Base, pH and Buffer	3,4,5	HW	Lecture	
14.	16	Thermochemistry	2,5	HW	Lecture	
15.	17	Thermodynamics	2,5	HW	Lecture	
16.	18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Homework/Quiz (30%)	50%pass		50%pass		
Midterm exam (30%)	50%pass			50%pass	
Final exam (40%)		50%pass			

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Program Learning Outcomes Graduates of Chemical Engineering program will attain
	Knowledge
1	Identify, formulate, and solve complex chemical engineering problems by applying principles of engineering, science, and mathematics
2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	Skills
3	Communicate (in English) effectively with a range of audiences
4	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
5	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
6	Acquire and apply new knowledge as needed, using appropriate learning strategies.
	Attitude
7	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Chemistry Laboratory
(Thực hành hóa đại cương)
Course Code: CH012IU

1. General information

Course designation	The course will introduce students to basic laboratory safety, techniques, and apparatus, and complement the knowledge gained in the lecture. Prior to each lab, students must read the lab manual about the experiment and complete a pre-laboratory report. All students must complete mandatory safety training to participate in the course, which will be provided on the first day of the class. Students are expected to come to each lab on time and be prepared to carry out the day's tasks.	
Teaching schedule	☒ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☐ Semester 1 ☐ Semester 2 ☐ Summer	
Person In-Charge	Dr. Phùng Thanh Khoa, ptkhoa@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☒ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify: Practical experiment	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td></td><td>1</td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>25</td><td>0</td><td>25</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>30</td><td>0</td><td>30</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>55</td><td>0</td><td>55</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>1</td></tr>
<tr><td>Requirements for taking the course</td><td>☒ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☐ Previous course: (Please specify course ID & course title, if any)</td></tr>
<tr><td>Course objectives</td><td>To introduce students to general chemistry laboratory and to provide students with a firm foundation in chemistry laboratory for careers in science and engineering.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1: Applying chemical concepts to draw logical conclusions about the applicability of data to real world problems [Applying].</td></tr>
<tr><td>Skill</td><td>CLO2. Being able to perform lab-work: perform experiment, analyze data, answer questions, make conclusion, research assignments, report writing [Set].</td></tr>
</table>
</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td></td><td>
<table>
<tr><td></td><td>CLO3: Using collected data to calculate physical or chemical quantities to the experiment being performed [Guided Response].
CLO4: Developing teamwork skills that include not only the efficient acquisition of experimental data [Guided Response].</td></tr>
<tr><td>Attitude</td><td>CLO5: An ability to recognize safety in the laboratory setting [Responding to Phenomena].</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>
The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (4.2 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1</td><td>Orientations</td><td>1</td><td>I, T, U</td></tr>
<tr><td>2</td><td>Chemical Reactions</td><td>1</td><td>I, T, U</td></tr>
<tr><td>3</td><td>pH and buffers</td><td>1</td><td>I, T, U</td></tr>
<tr><td>4</td><td>Redox titration</td><td>1</td><td>I, T, U</td></tr>
<tr><td>5</td><td>Chemical Equilibrium</td><td>1</td><td>I, T, U</td></tr>
<tr><td>6</td><td>Factors affecting reaction rate</td><td>1</td><td>I, T, U</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>☒ Multiple-choice questions ☐ Oral examination
☒ Report ☐ Written examination
☐ Presentation ☐ Others, please specify: ……
☐ Assignments</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.

Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>I. Textbooks

[1] Lab manual for chemistry laboratory (internal use only)</td></tr>
</table>

	II. References …..

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
Skill (Level: 1-7)	2				2		2				
	3					3					
	4								3		
Attitudes (Level: 1-5)	5									2	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	2.0	3.0	2.0	0.0	3.0	2.0	0.0
L,M,H conversion *		M			L	M	L		M	L	

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Orientations	1,4		- Lecture	[1].
2.	2	Chemical Reactions	1,2,3,4	Group assignment, Lab report	- Lecture - Practice	[1].
3.	3	pH and buffers	1,2,3,4	Group assignment, Lab report	- Lecture - Practice	[1].
4.	4	Redox titration	1,2,3,4	Group assignment, Lab report	- Lecture - Practice	[1].
5.	5	Chemical Equilibrium	1,2,3,4	Group assignment, Lab report	- Lecture - Practice	[1].

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
6.	6	Factors affecting reaction rate	1,2,3 ,4	Group assignment, Lab report	- Lecture - Practice	[1].
7.	6	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/Pre-Lab (10%)	Pre-Lab 60%Pass	Pre-Lab 60%Pass	Pre-Lab 60%Pass	Pre-Lab 60%Pass
Lab report (60%)	Lab report 50%Pass	Lab report 50%Pass	Lab report 50%Pass	Lab report 50%Pass
Final exam (30%)	Part I 50%Pass		Part II.1,2 50%Pass	Part II.3 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Biochemistry

Course Code: ENEE1015IU

1. General information

Course designation	This course provides Environmental Engineering's students not only with the understanding and applying of knowledge, but also with the analyzing and evaluating mindset and skills in the major of biochemistry. In details, this course will help build up students' perception in the importance of enzymology together with its relationship with four major macromolecules in biological systems, e.g. metabolism and regulatory mechanisms.	
Semester(s) in which the module is taught	Summer Semester (first year)	
Person responsible for the module	Assoc. Prof. Le Hong Phu (PhD.)	
Language	English	
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, Labworks, Assignments, Examination	
Workload (incl. contact hours, self-study hours)		
Credit points	3 credits/4.64 ECTS	
Required and recommended prerequisites for	☒ None ☐ Prerequisite course ☐ Parallel course	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3	0			
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

joining the module	☐ Previous course, Biology (recommended)
Course objectives	• The outcomes of this course will help students master the theoretical knowledge, together with analyzing and evaluating mindset and skills, in enzymology and its relationship with four major macromolecules in biological systems regarding metabolism and regulation. Specifically, special attention of this course will be paid to the context of biochemistry in the field of environmental engineering. • The implications of this course will help students become the next generation of scientists and engineers who will be able to propose solutions to complicated environmental issues.
Course learning outcomes	1. Analyze the structures and functions of 4 important biological molecules including carbohydrates, lipids, amino acids, and nucleotides. (Cognitive – level 4 – Analyzing) 2. Analyze enzymes: the strategies and how they are regulated: - The importance of the citric acid cycle in the generation of cellular energy and precursors used for biosynthesis of cellular building block molecules. (Cognitive – level 4 – Analyzing) - The oxidative phosphorylation and electron transport chain: how electrons are transferred to oxygen to generate energy in the form of ATP - Photosynthesis: products of light reactions, the function of the Calvin cycle, and how the light reactions and the Calvin cycle are coordinated. - Metabolisms of carbohydrates, lipids, and amino acids: Degration pathways: starting and ending products, reaction steps, enzymes, and cofactors used in the pathways 3. Design and conduct experiments, analyze, and compare results and give the best analytical solution. (Psychomotor – level 4 – Mechanism) 4. To know and design a small project at the lab scale from sample preparations to do the reactions. (Psychomotor – level 5 – Complex Overt Response) 5. To know how to design and identify the changes of the kinetics of an enzyme (Michealis Menten equation). (Psychomotor – level 4 – Mechanism) 6. To apply knowledge of science in producing biomass, in producing enzymes, and fermentation for a specific product. (Psychomotor – level 7 – Origination) 7. Students have to do at least 2 big assignments and a project. They will work and adapt to new members. (Psychomotor – level 5 – Complex Overt Response) 8. Ethical responsibility, many toxic chemicals, hot water, and microbes are used, students are warned to follow the lab rules and protect the environment. (Affective – level 4 – Organization)

<table>
<tr><td></td><td>9. To improve skills in the lab for life-long learning and especially for thesis doing. Development of their critical thinking and problem-solving skills. (Affective – level 5 – Internalizing values)</td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture (2.5 hours); Lab work (4.17 hours)
Teaching levels: I (Introduce); T (teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight (theory)</th><th>Level</th></tr>
<tr><td>Introduction to the course
Enzymes: Basic Concepts and Kinetics
Definition & properties; Kinetics; Catalytic mechanisms;
Roles of cofactors; Effects of temperature & pH; Enzyme
regulations: allosteric and covalent modification.</td><td>2</td><td>I, U</td></tr>
<tr><td>Metabolism: Basic Concepts & Design
Metabolism is composed of many coupled, interconnecting reactions; Oxidation of carbon fuels is an important source of cellular energy; Metabolic pathways contain many recurring motif.</td><td>1</td><td>T, U</td></tr>
<tr><td>Carbohydrate-Glycolysis-Glyconeogenesis
Monosaccharides are aldehydes or ketones with multiple hydroxyl groups; Complex carbohydrates are formed by linkage of monosaccharides; Glycolysis is an energy conversion pathway in many organisms; enzymes in glycolysis; Diverse fates of pyruvate: ethanol, lactate or acetyl coenzyme A; Glyconeogenesis is not a reversal of glycolysis; glyconeogenesis & glycolysis are reciprocally regulated; Lactate & alanine formed by contracting muscle are converted into glucose by liver (the Cori cycle).</td><td>2</td><td>T, U</td></tr>
<tr><td>The Citric Acid Cycle (CAC)
Review of oxidation-reduction reactions; Formation of acetyl CoA from pyruvate; 8 reactions of the CAC; Fates of carbon atom in CAC; The CAC is both catabolic & anabolic.
Oxidative Phosphorylation</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
</table>

		Electron transport and its components; Electron transport inhibitors; Oxidative phosphorylation; Control of oxidative phosphorylation; Oxidative stress (reactive oxygen species, antioxidant enzyme system); ATP synthase.		
		Review	1	T, U
		Photosynthesis - The Light Reaction & The Calvin Cycle Photosynthesis occurs in chloroplasts in eukaryotes; Two photosystems generate a proton gradient and NADPH in oxygenic photosynthesis; The Calvin cycle synthesizes hexoses from CO_2 and H_2O; Activity of the Calvin cycle depends on environmental conditions. **Pentose phosphate pathway (PPP)-Glycogen metabolism** Overview of PPP and glycogen pathway.	2	T, U
		Introduction to Lipid Classes and Fatty Acids Degradation Fatty acid activation, Steps of β-oxidation, Energy yielded from fatty acid oxidation; Certain fatty acids (unsaturated, odd chain, long chain) require additional steps for degradation; Fatty acids are synthesized and degraded by different pathways.	2	T, U
		Amino Acid Catabolism Desamination; The urea cycle; Control of the urea cycle; Amino acid degradation to form pyruvate, acetyl CoA, acetoacetyl CoA, α-ketoglutarate, succinyl CoA, fumarate and oxaloacetate; Coenzyme folic acid in amino acid metabolism; Tetrahydrofolate derivatives; Two reactions using vitamin B12; nucleotide degradation (purin-pyrimidine catabolism); Heme biotransformation.	5	T
		Seminar	1	T, U
		Review	1	T, U
Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments		☐ Oral examination ☒ Written examination ☐ Others, please specify:	

Study and examination requirements	+ Attendance: University regulations indicate that students will be refused to take the final examination if they are absent in one lab section. Regular attendance is essential for successful performance and learning in this course, particular in the view of the interactive teaching and learning approach adopted. + Assignments/Examination: Students must have more than 50/100 points overall to pass this module.
Reading list	Textbook: • Jeremy M. Berg, John L. Tymoczko and Lubert Strayer, Biochemistry, 7th edition, 2010. • David L. Nelson and Michael M. Cox, Lehninger, Principles of Biochemistry, 5th edition, 2008.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (1-9) and Intended Learning Outcomes (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2		4								
Skills (Level: 1-7)	3			4							
	4				5						
	5				4						
	6					7					
	7							5			
Attitudes (Level: 1-5)	8									4	
	9										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4	4	4	4.5	7		5		4	5
L, M, H Conversion		M	M	M	M	H		H		M	H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities
1-2	**Introduction to the course** **Enzymes: Basic Concepts and Kinetics** Definition & properties; Kinetics; Catalytic mechanisms; Roles of cofactors; Effects of temperature & pH; Enzyme regulations: allosteric and covalent modification.	4, 6	Lab report, excercise, homework	Lecture, discussion
3	**Metabolism: Basic Concepts & Design** Metabolism is composed of many coupled, interconnecting reactions;	4, 6	excercise homework	Lecture, discussion

Week	Topic	CLO	Assessments	Learning activities
	Oxidation of carbon fuels is an important source of cellular energy; Metabolic pathways contain many recurring motif.			
4-5	**Carbohydrate-Glycolysis-Glyconeogenesis** Monosaccharides are aldehydes or ketones with multiple hydroxyl groups; Complex carbohydrates are formed by linkage of monosaccharides; Glycolysis is an energy conversion pathway in many organisms; enzymes in glycolysis; Diverse fates of pyruvate: ethanol, lactate or acetyl coenzyme A; Glyconeogenesis is not a reversal of glycolysis; glyconeogenesis & glycolysis are reciprocally regulated; Lactate & alanine formed by contracting muscle are converted into glucose by liver (the Cori cycle).	4, 6	Lab report Exercise, homework	Lecture, discussion
6-7	**The Citric Acid Cycle (CAC)** Review of oxidation-reduction reactions; Formation of acetyl CoA from pyruvate; 8 reactions of the CAC; Fates of carbon atom in CAC; The CAC is both catabolic & anabolic.	4, 6	Lab report, lecture, homework	Lecture, discussion
8	**Oxidative Phosphorylation** Electron transport and its components; Electron transport inhibitors; Oxidative phosphorylation; Control of oxidative phosphorylation; Oxidative stress (reactive oxygen species, antioxidant enzyme system); ATP synthase.	4, 6	Exercise, homework	Lecture, discussion
9	**Midterm**			
10	**Photosynthesis - The Light Reaction & The Calvin Cycle** Photosynthesis occurs in chloroplasts in eukaryotes; Two photosystems generate a proton gradient and NADPH in oxygenic photosynthesis; The Calvin cycle synthesizes hexoses from CO_2 and H_2O; Activity of the Calvin cycle depends on environmental conditions.	4, 6	Exercise, homework	Lecture, discussion
11	**Pentose phosphate pathway (PPP)-Glycogen metabolism** Overview of PPP and glycogen pathway.	4, 6	Lab report, Exercise homework	Lecture, discussion
12-13	**Introduction to Lipid Classes and Fatty Acids Degradation**	4, 6	Lab report, exercise, homework	Lecture, discussion

Week	Topic	CLO	Assessments	Learning activities
	Fatty acid activation, Steps of β-oxidation, Energy yielded from fatty acid oxidation; Certain fatty acids (unsaturated, odd chain, long chain) require additional steps for degradation; Fatty acids are synthesized and degraded by different pathways.			
14-15	**Amino Acid Catabolism** Desamination; The urea cycle; Control of the urea cycle; Amino acid degradation to form pyruvate, acetyl CoA, acetoacetyl CoA, α-ketoglutarate, succinyl CoA, fumarate and oxaloacetate; Coenzyme folic acid in amino acid metabolism; Tetrahydrofolate derivatives; Two reactions using vitamin B12; nucleotide degradation (purin-pyrimidine catabolism); Heme biotransformation.	4, 6	Lab report, exercise, homework	Lecture, discussion
16	Seminar	3, 5		Presentation, Q&A
17	Reserve week			
18	**Final exam**			

4. Assessment plan

Course assessment policy

Methods	Frequency	(%)
Assisngment/Homework/Lab report	2/14/4	30
Mid-term exam	1	30
Final exam	1	40

Course assessment plan

Assessment Type	CLO3	CLO4	CLO5	CLO6
Lab report/presentation (30%)	Report 75%Pass		Report 75%Pass	
Midterm exam (30%)		Midterm exam 60%Pass		Midterm exam 60%Pass
Final exam (40%)		Final exam 60%Pass		Final exam 60%Pass

Note: %Pass (Assignment, homework, exam): % students have scores greater than 60 out of 100.
%Pass (lab report): % students have scores greater than 75 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	Capstone	Milestone		Benchmark
	4	3	2	1
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in	Language choices are mundane and commonplace and partially support the effectiveness of the presentation.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in

	Capstone	Milestone		Benchmark
	presentation. Language in presentation is appropriate to audience.	presentation is appropriate to audience.	Language in presentation is appropriate to audience.	presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Biochemistry Lab

Course Code: ENEE1016IU

1. General information

Course designation	This course provides students with lab skills and techniques regarding the analysis of major molecules and enzymes in biochemistry.
Semester(s) in which the module is taught	Summer Semester (first year)
Person responsible for the module	MSc. Le Nguyen Thien Phuc
Language	English
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, Labworks, Assignments, Examination
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**	0	1			
Contact hours	**25.0**	0	25	0	0	0
Self-Study hours	**30.0**	0	30	0	0	0
Total workload	**55.0**	0	55	0	0	0

Credit points	1 credits/2 ECTS
Required and recommended prerequisites for joining the module	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course, Biology (recommended)

<table>
<tr><td>Course objectives</td><td>The students will be able to master basic and advanced lab skills and techniques regarding the analysis of major molecules and enzymes in biochemistry.</td></tr>
<tr><td>Course learning outcomes</td><td>1. Analyze the structures and functions of 4 important biological molecules including carbohydrates, lipids, amino acids, and nucleotides. (Cognitive – level 4 – Analyzing)
2. To know methods being used in many labs. (Psychomotor – level 3 – Guided Response)
3. To know the basic experimental techniques in determining soluble sugars, soluble protein, metal ion (Ca^{2+}), and methods to determine enzyme activity. (Psychomotor – level 4 – Mechanism)
4. Students have to prepare sample and reagent solutions by themselves, many steps as extraction, dilution, building standard curves, and running reaction need the skills of teamwork. (Psychomotor – level 4 – Mechanism)
5. Ethical responsibility, many toxic chemicals, hot water, and microbes are used, students are warned to follow the lab rules and protect the environment. (Affective – level 4 – Organization)
6. To improve skills in the lab for life-long learning and especially for thesis doing. Development of their critical thinking and problem-solving skills. (Affective – level 5 – Internalizing values)</td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: Lab work (4.17 hours)
Teaching levels: I (Introduce); T (teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Week 1:
Orientation</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Week 2:
Protein quantification applying Hartree-Lowry assay</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Week 3:
Exploring the enzymatic activity of bromelain</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Week 4:
Soluble carbohydrate quantification applying Anthrone assay</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Week 5:
Quantitative determination of calcium in powdered milk</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Week 6:
Final examination</td><td>1</td><td>U</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments	☐ Oral examination ☒ Written examination ☒ Others, please specify: Practical test
Study and examination requirements	+ Attendance: University regulations indicate that students will be refused to take the final examination if they are absent in one lab section. Regular attendance is essential for successful performance and learning in this course, particular in the view of the interactive teaching and learning approach adopted. + Assignments/Examination: Students must have more than 50/100 points overall to pass this module.	
Reading list	Textbook: • Jeremy M. Berg, John L. Tymoczko and Lubert Strayer, Biochemistry, 7th edition, 2010. • David L. Nelson and Michael M. Cox, Lehninger, Principles of Biochemistry, 5th edition, 2008.	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (1-6) and Intended Learning Outcomes (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
Skills (Level: 1-7)	2						3				
	3						4				
	4								4		
Attitudes (Level: 1-5)	5									4	
	6										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4					3.5		4	4	5
L, M, H Conversion		M					M		M	M	H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities
1	Orientation	1, 5		+ Lecture
2	Protein quantification applying Hartree-Lowry assay	1, 2, 3, 4, 5, 6	+ Prelab assignment + Lab report	+ Lecture + Labworks
3	Exploring the enzymatic activity of bromelain	1, 2, 3, 4, 5, 6	+ Prelab assignment + Lab report	+ Lecture + Labworks
4	Soluble carbohydrate quantification applying Anthrone assay	1, 2, 3, 4, 5, 6	+ Prelab assignment + Lab report	+ Lecture + Labworks

Week	Topic	CLO	Assessments	Learning activities
5	Quantitative determination of calcium in powdered milk	1, 2, 3, 4, 5, 6	+ Prelab assignment + Lab report	+ Lecture + Labworks
6	Final examination	2, 3, 4, 5	Practical exam	

4. Assessment plan

Course assessment policy

Methods	Frequency	(%)
Prelab Assignments	5	10
Reports	5	40
Written test	1	20
Final exam	1	30

Course assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Prelab Assignment		Prelab 90%Pass	Prelab 90%Pass	Prelab 90%Pass	
Reports		Reports 80%Pass	Report 80%Pass	Reports 80%Pass	
Written test	Written test 70%Pass				Written test 70%Pass
Final exam		Final exam 70%Pass	Final exam 70%Pass	Final exam 70%Pass	

Note: %Pass (Assignment, homework, exam): % students have scores greater than 60 out of 100.
%Pass (lab report): % students have scores greater than 75 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	Capstone	Milestone		Benchmark
	4	3	2	1
	position (perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis

	Capstone	Milestone		Benchmark
	4	3	2	1
	reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: ENVIRONMENTAL MICROBIOLOGY

Course Code: **ENEE2013IU**

1. General information

Course designation	This course provides a general introduction of microbiology in human-impacted and nature environments. In the program of environmental engineering, this is an essential course for further courses such as Biological Processes for Environmental Engineering, and Wastewater treatment.	
Semester(s) in which the course is taught	1, 2	
Person responsible for the course	Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, assignment, seminar	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2	0			
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

Credit points	2
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course, *ENEE2016IU Environmental Microbiology Lab.* ☐ Previous course
Course objectives	Through this course, students will understand the fundamental microbiology in water and wastewater treatment engineering, microbial detection methodologies, dissemination of waterborne pathogen, microbial risk assessment and microbe-mediated cycling of organic materials in a variety of natural and engineered systems.

Course learning outcomes

Upon the successful completion of this course students will be able to:

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1. Define the general introduction, diversity and classification of microorganisms. [Remembering] CLO2. Explain critical cellular components and functionalities that enable microbes to survive and thrive in various environments. [Understanding]
Skill	CLO3. Explain the metabolic processes mediated by microbial organisms. [Set] CLO4. Adapt the suitability of specific molecular methods biotechnological techniques to detect and characterize a specific microorganism, and microbial population. [Adaptation] CLO5. Build the feasible strategies to mitigate adverse impacts of organic pollutants in environmental and engineering system. [Complex Overt Response]
Attitude	CLO6. Practice team-working skills in applying microbiological solution for an environmental issue. [Internalizing values]

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Course Introduction: What is Microbiology?	1	I, T
Microbial cell structure and function. Prokaryote and Eukaryote	1	T, U
Microbial ecology/ Microbial Nutrition, growth and enumeration	1	T, U
Microbial Genetics: Introduction, Genetic Engineering	1	I, T
Fundamentals of Metabolism: Catabolism, Anabolism	1	I, T
Waterborne pathogen and its dissemination in environment	1	T, U
Wastewater, and Drinking Water Treatment Microbiology	1	T, U
Surface Water, Ground water, and Solid Waste Microbiology	1	T, U

	Nitrification / Denitrification principles and applications in wastewater treatment plants	1	T, U
	Phosphorus removal; enhanced biological nutrient removal/ Anaerobic treatment by methanogenesis	1	T, U
Examination forms	☒ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify……	
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	[1] Ian Pepper, Charles Gerba, Terry Gentry (2015). Environmental Microbiology, 3rd ed., Academic Press, New York. [2] Bruce Rittmann, and Perry L. McCarty (2020). Environmental Biotechnology: Principles and Application, 2nd ed., McGraw-Hill, New York. [3] Michael T. Madigan; Kelly S. Bender; Daniel H. Buckley; W. Matthew Sattley; David A. Stahl (2017). Brock Biology of Microorganisms,15th ed., Prentice Hall, New York.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		1								
	2		2			2					
Skill (Level: 1-7)	3			2			2				
	4			6			6				
	5							5			
Attitudes (Level: 1-5)	6										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	1.5	4.0	0.0	2.0	4.0	5.0	0.0	0.0	5.0
L,M,H conversion *			L	M		L	M	H			H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Course Introduction: What is Microbiology?	1, 2		Lecture, Discussion, Homework Lecture,	[1]. 1

Week	Topic	CLO	Assessments	Learning activities	Resources
				Discussion, Homework	
2	Microbial cell structure and function. Prokaryote and Eukaryote	1, 3	HW1	Lecture, Discussion, Homework	[1]. 2
3	Microbial ecology/ Microbial Nutrition, growth and enumeration	2, 3	HW2	Lecture, Discussion, Homework	[1]. 2
4	Microbial Genetics: Introduction, Genetic Engineering	2, 3		Lecture, Discussion, Homework	[2]. 3, 4
5	Fundamentals of Metabolism: Catabolism, Anabolism	4, 5	HW3	Lecture, Discussion, Homework	[2]. 3
6	Waterborne pathogen and its dissemination in environment	5, 6		Lecture, Discussion, Homework	[1]. 15, 16
7	Wastewater, and Drinking Water Treatment Microbiology	5, 6	HW4	Lecture, Discussion, Homework	[1]. 6
8	Surface Water, Ground water, and Solid Waste Microbiology	5, 6		Lecture, Discussion, Homework	[1]. 4, 6
	Midterm				
9	Nitrification / Denitrification principles and applications in wastewater treatment plants	5	HW5	Lecture, Discussion, Homework	[2].13
10	Phosphorus removal; enhanced biological nutrient removal/ Anaerobic treatment by methanogenesis	5		Lecture, Discussion, Homework	[2].14
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Progress assessment (30%)	HW1-5	HW1-5	HW1-5	HW1-5	HW1-5	HW1-5
Midterm exam (35%)	Q1	Q2	Q3	Q4	Q3	
Final exam (35%)	Q1	Q2	Q3	Q4	Q5	

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

Rubric for assessment of calculation and theory/suggestion questions in assignment/HW and exam.

Criteria	Level				
	Excellent	**Good**	**Average**	**Weak**	
	100	**75**	**50**	**25**	**0**
Calculation	Totally correct in calculations with the differences (if any) in results is within 5%	Calculations mainly correct with 1-2 mistakes and the results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps having mistakes and the results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant
Report summary (HW)	Submit on time, summarize the key content (following the guidance and requirement), use Turnitin for plagiarism check with less than 20% similarity	Submit on time, summarize the key content (following the guidance and requirement), around 25-40% similarity	Submit but not following the guidance and requirement; more than 50% similarity	Late submission, not following the guidance and requirement; more than 70% similarity	No submission

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Environmental Microbiology Laboratory

Course Code: **ENEE2016IU**

1. General information

Course designation	This course provides basic microbiological laboratory knowledge for studying environmental engineering.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works, report	
Workload (incl. contact hours, self-study hours)		
Credit points	2	
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: *ENEE2013IU Environmental Microbiology.* ☐ Previous course	
Course objectives	This course provides the fundamental knowledge about how to perform isolation, culturing, storage, and identification of bacterial strains from some environmental samples (e.g., soil, wastewater, surface water).	

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**		2			
Contact hours	**50**	0	50	0	0	0
Self-Study hours	**60**	0	60	0	0	0
Total workload	**110**	0	110	0	0	0

Course learning outcomes

Upon the successful completion of this course students will be able to:

Competency level	Course learning outcome (CLO)
Knowledge	CLO1. Illustrate the principle of the methods using in the experiments. [Analyzing] CLO2. Describe basic aseptic techniques in culturing microorganisms. [Evaluating]
Skill	CLO3. Practice skills to handle, culture and study a microbial cell. [Guided Response] CLO4. Conduct experiments to study microorganisms in different environments. [Guided Response]
Attitude	CLO5. Arrange and manage the time and resource for experiments. [Organization]

Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (4.17 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Observation under a light microscope	1	T, U
Gram staining of bacterial cells	1	T, U
Plate counting of bacteria	1	T, U
Isolation, purification and preservation	1	T, U
Membrane filter method	1	T, U
Most probable number (mpn) method	1	T, U
Microbial growth	1	T, U
Microbial activities	1	T, U
Bacterial indentification based on PCR gene 16S rDNA	2	T, U
GENOMIC DNA/REP-PCR and 16S rDNA/RFLP	2	T, U

Examination forms

☐ Multiple-choice questions
☒ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☒ Others, please specify: free response questions

Study and examination requirements

Attendance: All work must be done exactly as described in the lab instructions and other safety rules, as specified by the instructor, must be followed. All students are required to attend an initial safety lecture before any lab work can be begun. According to International University regulations, attending a 100% practical class is compulsory in order to take the final examination. Students will be assessed on

	the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	[1] I.L. Pepper and C.P. Gerba (2004). Environmental Microbiology: A Laboratory Manual. Elsevier Academic Press, New York. [2] Environmental Microbiology- Methods and Protocols- John F. T. Spencer and Alicia (2004). Humana Press Inc.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2		5			5					
						3		3			
Skill (Level: 1-7)	3						3	3			
	4						3				
Attitudes (Level: 1-5)	5									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	5.0	0.0	0.0	4.0	3.0	3.0	0.0	5.0	0.0
L,M,H conversion *		M	H			M	M	M		H	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Observation under a light microscope	1, 3, 5	A1.1	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 3
2	Gram staining of bacterial cells	3, 5	A1.2	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 5
3	Plate counting of bacteria	3, 4, 5	A1.3	Reading assignment, listening to the	[1]. 1

Week	Topic	CLO	Assessments	Learning activities	Resources
				instruction, Performing experiments, Recording the data	
4	Isolation, purification and preservation	2, 4, 5	A1.4	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[2]. 1
5	Membrane filter method	4, 5	A1.5	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 16
6	Most probable number (mpn) method	4, 5	A1.6	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 6, 15
7	Microbial growth	3, 4, 5	A1.7	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 1
8	Microbial activities	3, 4, 5	A1.8	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 1
	Midterm				
9, 10	Bacterial indentification based on PCR gene 16S rDNA	3, 5	A1.9&10	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 24
11, 12	GENOMIC DNA/REP-PCR and 16S rDNA/RFLP	3, 5	A1.11	Reading assignment, listening to the instruction, Performing experiments, Recording the data	[1]. 24
	Final exam		A2	*Free-response answer*	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Progress assessment (A1. Lab report) (70%)	A1.1-A1.4	A1.5-A1.11	A1.3-A1.7	A1.7-A1.11	A1.1-A1.11
Final exam (30%)	A2 (Q1)	A2(Q2)	A2 (Q3)	A2 (Q4)	

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics

Rubric for lab work assessment

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
Lab activity							
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Preparation for the lab	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
5. Time and resources management	5	Distribute appropriately time and resource to complete well experiments					Distribute inappropriately time and resource to incomplete more than 50% of experiments
Report							
5. Writing skill and format	5	Clear, no spellings and grammar mistakes					Not logical, too much spelling and grammar mistakes, not understandable
6. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information; unclear, inaccurate
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Physics

COURSE SYLLABUS

Course Name: Physics 1 (General Mechanics)

Course Code: **PH013IU**

1. General information

Course designation	*This subject will provide an introduction to mechanics including: concepts and principles of kinetics, dynamics, energetics of motion of a particle and a rigid body.*
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Assos. Prof. Phan Bảo Ngọc Dr. Đỗ Xuân Hội Dr. Phan Hiền Vũ Dr. Trần Nguyên Lân Dr. Nguyễn Quang
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, assignment.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 25 Private study including examination preparation, specified in hours: 60
Credit points/ECTS	2 credits/ 3.09 ECTS
Required and recommended prerequisites for joining the course	None

<table>
<tr><td>Course objectives</td><td>This course will provide students with:
The basic knowledge of general Mechanics Physics
Skills to solve problems in engineering environment by applying both theoretical and experimental techniques
Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment
Confidence and fluency in discussing physics in English.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand basic knowledge of kinematics, dynamics, and laws of conservation of a mechanical system.
CLO2. Apply knowledge of physics to solving problems in science and engineering</td></tr>
<tr><td>Skill</td><td>CLO3. Apply skills to analyzing and solving problems in science and engineering</td></tr>
<tr><td>Attitude</td><td>CLO4. Communicate effectively in writing manner</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Chapter 1: Bases of Kinematics</td><td>2</td><td>I, T,U</td></tr>
<tr><td>Chapter 2: The Law of Motion</td><td>2</td><td>I, T,U</td></tr>
<tr><td>Chapter 3: Work and Mechanical Energy</td><td>3</td><td>I, T,U</td></tr>
<tr><td>Chapter 4: Linear Momentum and Collisions</td><td>2</td><td>I, T,U</td></tr>
<tr><td>Chapter 5: Rotation of a Rigid Object About a Fixed Axis</td><td>2</td><td>I, T,U</td></tr>
<tr><td>Chapter 6: Equilibrium and Elasticity</td><td>2</td><td>I</td></tr>
<tr><td>Chapter 7: Universal Gravitation</td><td>2</td><td>I</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	[1] Lecture Notes [2] Halliday D., Resnick R. and Walker, J. (2011) *Principles of Physics*, 9th edition, John Willey and Sons, Inc. [3] Alonso M. and Finn E.J. (1992) *Physics,* Addison-Wesley Publishing Company. [4] Faughn/Serway (2006) *Serway's College Physics*, Thomson Brooks/Cole.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2	3		3							
Skill (Level: 1-7)	3	2									
Attitudes (Level: 1-5)	4							3			
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.3	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
L,M,H conversion *		L		M				M			

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-3	**Chapter 1**: Basis of Kinematics Motion in One Dimension: - Position, Velocity, and Acceleration - One-Dimensional Motion with Constant Acceleration - Freely Falling Objects Motion in Two Dimensions: - Position, Velocity, and Acceleration Vectors - Two-Dimensional Motion with Constant Acceleration. Projectile Motion - Circular Motion. Tangential and Radial Acceleration - Relative Velocity and Relative Acceleration	1	Assignment/Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 1 [2] 1, 2, 3, 4
4-7	**Chapter 2**: Laws of Motion - Newton's First Law and Inertial Frames - Newton's Second Law - Newton's Third Law Some Applications of Newton's Laws: - Gravitational Force and Weight	1	Assignment//Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 2 [2] 5, 6

Week	Topic	CLO	Assessments	Learning activities	Resources
	- Forces of Friction - Uniform Circular Motion and Non-uniform Circular Motion - Motion in the Presence of Resistive Forces - Motion in Accelerated Frames				
8	**Chapter 3**: Work and Mechanical Energy - Work Done by Force. Power - Kinetic Energy and Work. Kinetic Energy Theorem	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 3 [2] 7, 8
	Midterm				
9	- Potential Energy of a System - Conservation of Mechanical Energy - Conservative and Non-conservative Forces - Changes in Mechanical Energy for Non-conservative Forces - Relationship Between Conservative Forces and Potential Energy			Lecture, Discussion, Inclass-Quiz	
10-11	**Chapter 4**: Linear Momentum and Collisions - Linear Momentum and Its Conservation - Impulse and Momentum - Collisions in One Dimension and Two Dimensions		Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 4 [2] 9
12-14	**Chapter 5**: Rotation of a Rigid Object About a Fixed Axis - Rotational Kinematics. Rotational Motion with Constant Angular Acceleration - Torque and Angular Acceleration - Moments of Inertia - Rotational Kinetic Energy - Rolling Motion of a Rigid Object - Angular Momentum of a Rotating Rigid Object - Conservation of Angular Momentum	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 5 [2] 10, 11
15	**Chapter 6**: Equilibrium and Elasticity The Conditions for Equilibrium The Center of Gravity **Chapter 7**: Universal Gravitation Newton's Law of Gravitation Kepler's Laws and the Motion of Planets The Gravitational Field and Gravitational and Potential Energy	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 6, 7 [2] 12. 13
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz1 60%Pass	Qz2 60%Pass		Qz3 60%Pass

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (20%)	HW2 50%Pass		HW1, HW3, HW4 50%Pass	
Midterm exam (30%)		Q3 50%Pass	Q1, Q2 50%Pass	
Final exam (40%)	Part I 50%Pass		Part II.1,2 50%Pass	Part II.3 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	Capstone	Milestone		Benchmark
	4	3	2	1
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Introduction to Computing

Course Code: **ENEE2017IU**

1. General information

Course designation	This course is designed for students pursuing a degree in chemical/environmental engineering and provides knowledge and skills in contemporary computing and database environments, such as excel, Python, and being exposed to case studies from outside the classroom. Through this unit, students will become acquainted with the challenges of contemporary data science and gain an appreciation of the foundational skills necessary to turn data into information.
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Dr. Ly Tu Nga
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3	0			
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/4.64 ECTS
Required and recommended prerequisites	**None**

<table>
<tr><td>for joining the course</td><td></td></tr>
<tr><td>Course objectives</td><td>Students will be provided with skills of using data from a variety of sources, be introduced to contemporary computing and database environments, such as excel, Python, and be exposed to case studies from outside the classroom. Through this unit, students will become acquainted with the challenges of contemporary data science and gain an appreciation of the foundational skills necessary to turn data into information.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td><td>Level</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the role of environmental problems in data analytics and qualitatives via Excel/Python programming.

CLO2. Describe what Excel/Python programming in environmental problems is and the skill sets needed to be a good programmer.

CLO3. Compare Excel and Python programming, their advantages/disadvantages and propose Python programming to solve practical environmental problems.

CLO4. Apply knowledge to predict models in solving environmental problems.</td><td>4

5

5

3</td></tr>
<tr><td>Skill</td><td>CLO5. Arrange and design the professional works (pseudocode, type code, plot data, pre-processing, fix code)

CLO6. Evaluating basic statistical modeling and analysis using open-source data analysis tools.</td><td>6

5</td></tr>
<tr><td>Attitude</td><td>CLO7. Arrange time and resource following a plan

CLO8. Display critical and creative thinking in solving environmental problems

CLO9. Practice perseverance, and flexibility in</td><td>4

5</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td><table><tr><td></td><td>solving the problem.</td><td>5</td></tr></table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Introduction to Computing</td><td>1</td><td>I, T</td></tr>
<tr><td>Presentation of Quantitative/Qualitative Data</td><td>2</td><td>T, U</td></tr>
<tr><td>Analysis of Quantitative/Qualitative Data</td><td>2</td><td>T, U</td></tr>
<tr><td>Introduction to programming</td><td>2</td><td>I, T</td></tr>
<tr><td>Data structure</td><td>2</td><td>T, U</td></tr>
<tr><td>Time Serie analysis</td><td>2</td><td>T, U</td></tr>
<tr><td>File Manipulation</td><td>1</td><td>T, U</td></tr>
<tr><td>Programming the Application</td><td>1</td><td>T, U</td></tr>
<tr><td>Inferential Statistical Analysis of Data</td><td>1</td><td>T, U</td></tr>
<tr><td>Case study: Linear & Logistic Regression</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] O'Reilly Media, Python for Excel: A Modern Environment for Automation and Data Analysis, 2021.
[2] Guerrero, H. Excel data analysis. Modeling and simulation, 2010.
[3] Khadka, B. Data analysis theory and practice: Case: Python and Excel Tools, 2019</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-9) and Program/Student Learning Outcomes (SLO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1			4			4				
	2				5		5	5			
	3		5	5							
	4	3									
Skill (Level: 1-7)	5			6	6						
	6				5	5					
	7								4		
Attitudes (Level: 1-5)	8										5
	9									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	5.0	5.0	5.3	5.0	4.5	5.0	4.0	5.0	5.0
L,M,H conversion *		M	H	H	H	H	H	H	M	H	H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Computing	1, 4		Lecture, Discussion	[2].0.
2	Presentation of Quantitative/Qualitative Data	1,2	HW1	Lecture, Inclass-Quiz, HW	[2].2,4
3	Analysis of Quantitative/Qualitative Data	3	HW2	Lecture, Group work	[2].3,5
4-5	Introduction to programming (python)	1,2		Lecture, Group work, HW	[1].1-3
6-7	Data structure	1,2,3		Lecture, Group work	[1].3-5
8,10	Time Serie analysis	3	HW3	Lecture, Group work	[1].6
9	Midterm				
11	File Manipulation	3		Lecture, Group work, HW	[1].7
12	Programming the Application	3	HW4	Lecture, Group work	[1].8,9
13	Inferential Statistical Analysis of Data	3		Lecture, Discussion, Presentation	[2].6

Week	Topic	CLO	Assessments	Learning activities	Resources
14-15	Case study: Linear & Logistic Regression	3,4	Quiz1	Lecture, Inclass-Quiz	[3].5.6.9
16	Revision			Review-Test	
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)			Qz1 60%Pass	Qz2 60%Pass
Homework exercises (20%)	HW2 60%Pass	HW1 60%Pass	HW3 60%Pass	HW3 60%Pass
Midterm exam (30%)		Q3 60%Pass	Q1, Q2 60%Pass	
Final exam (40%)	Part I 60%Pass		Part II.1,2 60%Pass	Part II.3 60%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: ……..		
Date: ……..	Evaluator: ……..		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
3	**5**	**5**	**5.3**	**5**

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: ENGINEERING DRAWING
(Vẽ kỹ thuật)
Course Code: ENEE1013IU

1. General information

Course designation	This course aims to provide Environmental Engineering students with the ability to understand technical ideas on the technical scheme and the skill to construct the engineering drawing compliance with TCVN and ISO by hand and by using AutoCAD software. The course also provides the knowledge for using geometrical construction with drawing instruments and AutoCAD software, drawing representation and the standard of presentation of engineering drawing.
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5 ☒ Semester 1 ☐ Semester 2 ☐ Summer
Person In-Charge	Dr. Pham Thanh Tung, pttung@hcmiu.edu.vn
Language	English
Relation to curriculum	☒ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify: Assignments, practice, discussion
Workload	
Credit points	2 credits/3.09 ECTS
Requirements for taking the course	☒ None ☐ Prerequisite course: *(Please specify course ID & course title, if any)* ☐ Parallel course: *(Please specify course ID & course title, if any)* ☐ Previous course: *(Please specify course ID & course title, if any)*

		Lecture	Lab	Project	Internship	Thesis
	Credit	2	0			
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

<table>
<tr><td>Course objectives</td><td>The aim of this course is to
- Use drawing instruments to sketch by hand and to construct geometry on engineering drawings;
- Apply the standard of engineering drawings instruments to present the drawing compliance with TCVN and ISO;
- Present basic geometrical features and solve some basic problems for these features and specify the properties and relationship of geometrical features and the position and the true size of geometrical features;
- Interpret the type of presentations compliance with TCVN and ISO, and orthographic projections, auxiliary views, partial views, and local views
- Construct the engineering drawing to present some types of models and design the AutoCAD software to draw the drawing in compliance with TCVN and ISO and the 2D drawings.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Summarize drawing instruments used to sketch drawings by hand and AutoCAD drawing commands used to construct engineering drawings (Cognitive – Level 2 – Understanding).</td></tr>
<tr><td>Skill</td><td>CLO2. Construct drawings in accordance with TCVN and ISO by using standard instruments and applying orthogonal projections method (Psychomotor – Level 4 – Mechanism).
CLO3. Construct basic engineering drawings in accordance with TCVN and ISO by using the AutoCAD software (Psychomotor – Level 4 – Mechanism).</td></tr>
<tr><td>Attitude</td><td>CLO4. Show self-reliance when working independently (Affective – Level 5 – Internalizing values).</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1</td><td>Introduction to Engineering Drawing</td><td>1</td><td>I,T</td></tr>
<tr><td>2</td><td>Orthographic Projections</td><td>1</td><td>T,U</td></tr>
<tr><td>3</td><td>Pictorial Drawings</td><td>1</td><td>T,U</td></tr>
<tr><td>4</td><td>Dimensioning</td><td>1</td><td>T,U</td></tr>
<tr><td>5</td><td>Sectioning</td><td>1</td><td>T,U</td></tr>
<tr><td>6</td><td>Introduction and Install AutoCAD software</td><td>1</td><td>I,T</td></tr>
</table></td></tr>
</table>

	7	Practice drawing commands	2	T,U
	8	**Practice modifying commands**	2	T,U
Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments		☐ Oral examination ☐ Written examination ☒ Others, please specify: Constructed-response test	
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	**I. Textbooks** [1] Kirstie Plantenberg (2010). Engineering Graphic Essentials, Fourth Edition, SDC Publications [2] Gary R Bertoline (2008). Introduction to Graphics Communication for Engineers, Fourth Edition, Mc Graw-Hill Higher Education. [3] Robert A. Corbitt (1999). Standard handbook of Environmental Engineering, Second Edition, The McGraw-Hill. **II. References** [4] Trần Hữu Quế (2009). Vẽ Kỹ Thuật Cơ Khí Tập 1, NXB Giáo Dục [5] Nguyễn Đình Điện (2005). Hình Học Hoạ Hình, NXB Giáo Dục			

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
Skills (Level: 1-7)	2						4				
	3						4				
Attitudes (Level: 1-5)	4									5	
Contribution of ILOs to CLOs											
Bloom's Taxonomy	AVE	2	0	0	0	0	4	0	0	5	0

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
L, M ,H conversion*		L					H			H	

** L (Low), M (Medium), H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Introduction to Engineering Drawing	1,2, 4	Attendance Q&A Homework 1	Reading materials before class; Doing the lecture; Discussion	[1] 1 [2] 1
2.	2	Orthographic Projections	1,2, 4	Attendance Q&A In-class practice	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[1] 2 [2] 2
3.	3	Pictorial Drawings	1,2, 4	Attendance Q&A Homework 2	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[1] 3 [2] 3
4.	4	Dimensioning	1,2, 4	Attendance Q&A In-class practice	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[1] 4 [2] 4
5.	5	Sectioning	1,2, 4	Attendance Q&A Homework 3	Reading materials before class; Doing the lecture Discussion; and doing Quiz in class	[1] 5 [2] 5
6.	6	Introduction and Install AutoCAD software	1,3, 4	Attendance Q&A	Reading materials before class; Doing the lecture; Discussion	[4] 1 [5] 1
7.	7-8	Practice drawing commands	1,3, 4	Attendance Q&A Homework 4	Reading materials before class; Doing the lecture; Discussion	[4] 2 [5] 2
	9-10	Midterm examination		Writing		

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
8.	11-12	Practice modifying commands	1,3, 4	Attendance Q&A Homework 5	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[4] 3 [5] 3
	18-19	Final examination		Practice on computer		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Class attendance (10%)				Attended 80% Pass
Homework (10%)				Homework submitted 80% Pass
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (50%)	60% Pass		60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: ENGINEERING DRAWING LAB
(Thực Hành Vẽ kỹ thuật)
Course Code: ENEE1014IU

1. General information

Course designation	This course aims to provide Environmental Engineering students with knowledge of AutoCAD software and the use of AutoCAD software to construct basic engineering drawings in accordance to TCVN and ISO quickly and accurately.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☒ Semester 1 ☐ Semester 2 ☐ Summer	
Person In-Charge	Dr. Pham Thanh Tung, pttung@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☒ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify: Assignments, practice, discussion	

Workload

		Lecture	Lab	Project	Internship	Thesis
	Credit	0	1			
Contact hours	**25**	0	25	0	0	0
Self-Study hours	**30**	0	30	0	0	0
Total workload	**55**	0	55	0	0	0

Credit points	1 credits/ 2 ECTS
Requirements for taking the course	☒ None ☐ Prerequisite course: *(Please specify course ID & course title, if any)* ☐ Parallel course: *(Please specify course ID & course title, if any)* ☐ Previous course: (*Please specify course ID & course title, if any)*
Course objectives	The aim of this course is to - Provide the ability of effectively construct and manage basic engineering drawings complied with TCVN and ISO by using AutoCAD software. - Provide fundamental knowledge for using and geometrical construction with the drawing instruments and AutoCAD software, the standard of presentation of engineering drawing.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Summarize the geomatry construction on engieering drawings and AutoCAD commands (Cognitive – Level 2 – Understanding).</td></tr>
<tr><td>Skill</td><td>CLO2. Construct basic AutoCAD drawings quicky and accurately (Psychomotor – Level 5 – Complex Overt Response).</td></tr>
<tr><td>Attitude</td><td>CLO3. Show self-reliance when working independently (Affective – Level 5 – Internalizing values).</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4.2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1</td><td>Practice dimensioning commands</td><td>1</td><td>T,U</td></tr>
<tr><td>2</td><td>Practice layer and printing management</td><td>1</td><td>T,U</td></tr>
<tr><td>3</td><td>Introduction to environmental drawings</td><td>2</td><td>I,T</td></tr>
<tr><td>4</td><td>Practice an environmental drawings</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☒ Others, please specify: Constructed-response test</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>I. Textbooks
[1] Kirstie Plantenberg (2010). Engineering Graphic Essentials, Fourth Edition, SDC Publications
[2] Gary R Bertoline (2008). Introduction to Graphics Communication for Engineers, Fourth Edition, Mc Graw-Hill Higher Education.
[3] Robert A. Corbitt (1999). Standard handbook of Environmental Engineering, Second Edition, The McGraw-Hill.
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[5] Nguyễn Đình Điện (2005). Hình Học Hoạ Hình, NXB Giáo Dục</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
Skills (Level: 1-7)	2						5				
Attitudes (Level: 1-5)	3									5	
Contribution of ILOs to CLOs											
Bloom's Taxonomy	AVE	2					5			5	
L, M ,H conversion*		L					H			H	

** L (Low), M (Medium), H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Practice dimensioning commands	2,3	Attendance Q&A Homework	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[1] 4 [2] 4
2.	2	Practice layer and printing management	2,3	Attendance Q&A Homework	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[1] 5 [2] 5
3.	3-4	Introduction to environmental drawings	1,3	Attendance Q&A In-class practice	Reading materials before class; Doing the lecture; Discussion; and doing Quiz in class	[3] 1, 2 [4] 4 [5] 4
4.	5-6	Practice environmental drawings	2,3	Attendance Q&A Homework	Reading materials before class;	[3] 3 [4] 4 [5] 4

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
					Doing the lecture; Discussion; and doing Quiz in class	
	18-19	Final examination		Practice on computer		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Class attendance (10%)			Attended 80% Pass
Homework (60%)			Homework submitted 80% Pass
Final exam (30%)	60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Introduction to Environmental Engineering

Course Code: **ENEE2001IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides basic knowledge engineering profession and environmental engineering, the preparation for studying environmental engineering program, and the career; Students also know how to interpret basic knowledge about environmental problems, performing professional ethics and soft skills for environmental engineers.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, field trip, seminar, group discussion	
Workload (incl. contact hours, self-study hours)		
Credit points	3 credits/4.64 ECTS	
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

<table>
<tr><td>Course objectives</td><td>This course provides basic knowledge engineering profession and environmental engineering, the preparing for studying environmental engineering program, and the career; Provide methods and practice soft skills for environmental engineers.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate about engineering profession, environmental engineering [applying]
CLO2. Prepare for studying environmental engineering program and prepare for engineer career [applying]
CLO3. Interpret engineering design [understanding]
CLO4. Recognize the working environment of environmental engineers [remembering]</td></tr>
<tr><td>Skill</td><td>CLO5. Follow and practice soft skills related to problem solving [guided response]
CLO6. Follow and practice soft skills related to teamwork [guided response]
CLO7. Follow and practice soft skills related to communication [guided response]
CLO8. Follow and practice computer tool for engineer [guided response]</td></tr>
<tr><td>Attitude</td><td>CLO9. Know and practice professional ethics [Responding to Phenomena]
CLO10. Practices self-leaning [Responding to Phenomena]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Content</th><th>Weight</th><th>Level</th></tr>
<tr><td>1. Understanding about Environmental Engineering</td><td>1</td><td>T</td></tr>
<tr><td>2. Preparing for an engineer career</td><td>1</td><td>T</td></tr>
<tr><td>3. Succeeding in the classroom</td><td>2</td><td>T</td></tr>
<tr><td>4. Engineering design</td><td>2</td><td>T</td></tr>
<tr><td>5. Engineering communication</td><td>2</td><td>T</td></tr>
<tr><td>6. Communication – invited speaker</td><td>1</td><td>T</td></tr>
<tr><td>7. Problem solving</td><td>1</td><td>T</td></tr>
<tr><td>8. Teamwork</td><td>1</td><td>T</td></tr>
<tr><td>9. Computer tools for engineers</td><td>2</td><td>T</td></tr>
<tr><td>10. Engineering ethics</td><td>1</td><td>T</td></tr>
<tr><td>Field trip</td><td>1</td><td>T</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☒ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	*[1] William C. Oakes, Les L. Leone (2017), Engineering your future: a comprehensive introduction to engineering, 9th Edition. New York, NY: Oxford University Press.* *[3] Saeed Moaveni (2010), Engineering fundamentals: an introduction to engineering, 4th Edition. Cengage Learning* *[2] C. David Cooper (2014), Introduction to Environmental Engineering, 1st Edition. Waveland Press Inc.*	

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) (1 - 10) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3					3			3	3
	3	2									
	4	1									
Skill (Level: 1-7)	5					3					3
	6								3		3
	7				3			3			
	8							3			
Attitudes (Level: 1-5)	9						2			2	
	10										2
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.3	0.0	0.0	3.0	3.0	2.5	3.0	3.0	2.5	2.8
L,M,H conversion *		L			M	M	L	M	M	L	L

3. Planned learning activities and teaching methods

Week	Topic	CLOs	Assessments	Learning activities	Resources
1	Part 1. Engineering profession - Environmental engineer 1. Understanding about Environmental Engineering 1.1. Introduction to the Engineering Profession 1.2. What is environmental Engineering 1.3. Courses in Environmental Engineering 1.4. Environmental Engineering jobs	CLO1		Lecture, Discussion,	[2]1
2	2. Preparing for an engineer career 2.1. Making the transition from high school to college 2.2. Budgeting your time 2.3. Daily studying and preparation 2.4. Getting involved with an engineering organization 2.5. Your graduation plan	CLO2		Lecture, Discussion,	[2]2
3	3. Succeeding in the classroom 3.1. Introduction 3.2. Attitude 3.3. Goals	CLO2		Lecture, Discussion,	[1]6
4	3. Succeeding in the classroom 3.5. Keys to effectiveness 3.6. Test taking 3.7. Overcome challenges	CLO2		Lecture, Discussion, Practice	[1]6
5	4. Engineering design 4.1. Engineering design process 4.2. Sustainability in design 4.3. Engineering economics 4.4. Material selection	CLO3		Lecture, Discussion, Practice	[2]3
6	4. Engineering design 4.5. Importance of Teamwork 4.6. Evaluating alternatives 4.7. Patent, trademark, and copyright 4.8. Environmental Engineering standards and codes	CLO3		Lecture, Discussion, Practice	[1] 12, [2]3
7	5. Engineering communication 5.1. Communication skills and presentation of engineering works 5.2. Basic steps involved in the solution of engineering problem 5.3. Giving homework presentation	CLO7, CLO10		Lecture, Discussion, Practice. Introduce assignment 1 (A1.1)	[1]13, [2]4
8	5. Engineering communication 5.4. Detailed technical report 5.5. Oral communication and presentation	CLO7, CLO10		Lecture, Discussion, Practice	[1]13, [2]4

Week	Topic	CLOs	Assessments	Learning activities	Resources
	5.6. Engineering graphical communication				
	Midterm		A2		
9	6. Communication – invited speaker	CLO7	A1.1	Invited speaker, Lecture, Discussion,	
10	7. Problem solving -Introduction -5 steps problem solving methods -Problem solving methods -PDCA-cycle -Techniques to use with PDCA	CLO5		Lecture, Discussion, Practice; Introduce assignment 2 (A1.2)	[1]7, [2]4
11	8. Teamwork	CLO6		Lecture, Discussion, Practice	[2]3
12	9. Computer tools for engineers 9.1. Introduction 9.2. The internet 9.3. Word processing programs	CLO8		Lecture, Discussion, Practice	[2]14
13	9. Computer tools for engineers 9.4. Spreadsheets 9.5. Presentation software	CLO8	A1.2	Lecture, Discussion, Practice	[2]14
14	10. Engineering ethics	CLO9		Lecture, Discussion	[2]5
15	Field trip	CLO4	A1.3	Guide/Explain	
	Final exam		A3		

4. Assessment plan

Assessment Type	(%)	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10
Assignment 1	15							Assi1_1 60%Pass			Assi1_2 60%Pass
Assignment 2	15						Assi2 60%Pass				
Midterm exam (30%)	30	A2.Q1 60%Pass	A2.Q2 60%Pass	A2.Q3 60%Pass		A2.Q4 60%Pass					
Final exam (40%)	40							A3.Q.1 60%Pass	A3.Q.2 60%Pass	A3.Q.3 60%Pass	A3.Q4 60%Pass

Note: %Pass: Target that 60 % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Individual presentation for selected technical reports (assignment 1)

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Introduction, purpose of report (relevant, sufficient, clear)	10	Relevant, sufficient, clear					Not clear, not relevant
2. Methodology (apply for original research report)	5	Sufficient, clear, easy to understand					<50% of contents are shown, not clear, not logical
3. Findings of research (sufficient, clear, understandable)	10	Sufficient, clear, understandable					<50% of contents are shown, not clear, not logical
4. Structure of a technical report (enough, clear)	10	Enough, clear, easy to understand					<50% of contents are shown, not clear, not logical
5. PPT quality (follow the rule of PPT Making, clear, attractive)	20	Follow the rule of PPT Making, clear, attractive					Dull, small word, a lot of spelling and grammar mistakes
6. Presentation (speaking skills, correct pronunciation, attractive, timing)	20	Confident, clear, correct pronunciation, attractive, timing					<50% content has not completed, not clear, dull
7. Answer the questions from instructor and classmates (relevant to questions, satisfiable)	15	Relevant to questions, all answers are correct	80-90% correct	70-80% correct	60-70%correct	50-60% correct	<50% correct
8. Attitude and behavior	5	Processional					Unprofessional
9. Ability for self-leaning	5	Active and efficient					Passive, ineffective

5.2. Teamwork evaluation (assignment 2)

Evaluation of team member							
	Level						
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Attendance	10	Attends all team meeting, arriving on time or early.					Absent for ≥ 50% number of meeting
2. Responsible	40	Gladly accepts work and gets it done. Spirit of excellence					Refuse ≥ 50% the work assigned without reasons; do not complete 50% of the works he/she accepted to do
3. Has abilities the team needs	20	Makes the most of abilities. Gives fully, doesn't hold back. Communicates.					Could not contribute to the team; provide worthless works

Evaluation of team member							
	Level						
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
4. Creative, Energetic	10	Brings energy, excitement to team. "Can do" attitude. Sparks creativity in others.					No ideal for solving problem, no contribution, inactive
5. Personality	20	Positive attitude, encourages others. Seek consensus. Fun. Bring the best in others. Peacemaker.					Negative attitude, no cooperation, create conflicts, no listen, interrupt other, angry, criticize

Evaluation of teamwork		Level						**Point**
Teamwork Skills	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**	
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**	
1) Open and honest communication among members	10	Highly					Without communication among member	
2) Each individual carried his/her own weight	40	High responsibility, excellent quality					no responsibility, unacceptable quality	
3) Collaboration in decision making	10	High level of assertiveness and cooperation, high team decisions					Weak/without assertiveness and cooperation, poor team decisions	
4) Team set goals and milestones	20	Clear and be accepted by all members					Without setting the goals and milestones	
5) People listened to each other	10	Listen to each other, do not interrupt, allow the speaker to feel at ease					Do not listen; interrupt, criticize negatively other members	
6) Leadership was shared among the members	10	Apply sufficiently democratic leadership					Authoritarian leadership	

Instructor's evaluation from teamwork presentation								
		Level						**Point**
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**	
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**	
1. Report quality	40	85-100% of requirement					<50% of requirement	
2. PPT quality (follow the rule of PPT Making, clear, attractive)	10	Follow the rule of PPT Making, clear, beautiful, attractive					Dull, small word, too much spelling and grammar mistakes	
3. Presentation (speaking skills, correct pronunciation, attractive, timing)	10	Confident, clear, correct pronunciation, attractive, timing					<50% content has not completed, not clear, dull	
4. Answer the questions from instructor and classmates (relevant to questions, satisfiable)	20	Relevant to questions, all answers are correct	80-90% correct	70-80% correct	60-70%correct	50-60% correct	<50% correct	
5. Team member participation	20	100% member participated in	80%≤ <90%	70%≤ <80%	60%≤ <70%	50%≤ <60%	<50% member participated in	

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Environmental Ecology**

Course Code: **ENEE2008IU**

1. General information

Course designation	This course aims to teach understanding of the basic principles of ecosystem, ecosystem services and emerging topics in ecosystem management such as climate change and human influences, before being shown more detailed examples of group activities for the application in conservation of natural resources. Increase knowledge of the basic principles of ecosystem services for sustainable development, directed toward eco-economic development, natural resource and environmental protection
Semester(s) in which the course is taught	1
Person responsible for the course	Assoc. Prof. Dr. Truong Thanh Canh
Language	English
Relation to curriculum	☒General ☐Fundamental ☐Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Scheduled learning and teaching activities, independent study, group discussion and presentation and field trip study.
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course, Biology (recommended)

<table>
<tr><td>Course objectives</td><td>
<table>
<tr><th>Goals</th><th>Description</th></tr>
<tr><td>G1</td><td>To understand the fundamental principles of ecosystems: structure, process and changes</td></tr>
<tr><td>G2</td><td>To understand the basic characteristics of ecosystem services underlying the management of ecosystems, particularly for eco-conservation and human development purposes</td></tr>
<tr><td>G3</td><td>To analyze the emerging topics in ecosystem management underlying the effects of human activities and climate change on ecosystem, emphasis is placed on solutions for these effects</td></tr>
<tr><td>G4</td><td>To analyze the relationships between natural resources, economy and environment, the challengers of specific natural resource issues in economic activities, the needs to develop a green economy: Eco-agriculture, Eco-industry, Eco-tourism…</td></tr>
<tr><td>G5</td><td>To apply the knowledge in analyzing the emerging topics in ecosystem management of a case study (Ramsar Tram Chim National Park)</td></tr>
</table>
</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Characterize an ecosystem: structure, process and changes, and ecosystem services for human: Provisioning Services, Regulating Services, Cultural Services and Supporting Services.
CLO2. Explain the effects of climate change and human activities on ecosystem and ecosystem services.
CLO3. Analyze the relationship between nature resources, economy and environment and the need to develop a green economy. System thinking of solutions to mitigate effect of climate change and human activities on ecosystem.</td></tr>
<tr><td>Skill</td><td>CLO4: Discuss and work in group on emerging topics in ecosystem management of adaptation and conservation management methods in a changing climate and economic development. Apply the knowledge to analyze the emerging topics and management of a selected specific ecosystem system: Tropical rain forest, river or marine ecosystem
CLO5: Apply the knowledge to analyze the emerging topics of a specific ecosystem system, a case study of Ramsar Tram Chim National Park, Dong Thap Province.</td></tr>
<tr><td>Attitude</td><td>CLO6. Recognize importance of respecting others with different communication styles, work habits and personalities in order to be accountable and maintain others' accountability to the group and resolve the problem to finish the final team project of environmental ecology.</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>Weight: lecture, field trip (2.5 hours)</td></tr>
</table>

<table>
<tr><td></td><td>Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>Topics</th><th>Weight</th><th>Level</th></tr>
<tr><td>Basic principles of ecosystem and ecosystem services, importance of ecosystem services for human development</td><td>2</td><td>I, T</td></tr>
<tr><td>Emerging issues in ecosystem management, effect of climate change and human on ecosystem. Adapting to climate change and reversing the impacts of human activities</td><td>2</td><td>I, T</td></tr>
<tr><td>The direction from ecosystem services, natural resource, economy and environment</td><td>2</td><td>T</td></tr>
<tr><td>Ecosystem engineering: Eco-industry, eco-agriculture, eco-tourism</td><td>2</td><td>T, U</td></tr>
<tr><td>Ecosystem Management, management issues and solutions</td><td>2</td><td>T, U</td></tr>
<tr><td>Case study of Tram Chim National Park, a Ramsar No 4 of Vietnam, Dong Thap Provice</td><td>5</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☒ Presentation
☐ Assignments
☐ Oral examination
☒ Written examination
☐ Others</td></tr>
<tr><td>Study and examination requirements</td><td>Plagiarism in reports is forbidden. According to the International University's regulation, attending the class less than 80% of periods is not allowed to take the final examinations.
Assignments/Examination: Students must have more than total 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>1.Barker, T., Mortinmer, M. and Perrings,C. 2010. Biodiversity, ecosystems and ecosystem services. http://www.wcs.org/files/pdfs/EBMguide0510_low.pdf
2.Barrow, C.J. 2005. Environmental management and development. Routledge Publisher.
3.Castillon, D., A. 1996. Conservation of natural resources, a resource management approach. Brown & Benchmark Publishers</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) (1 -10) is shown in the following table:

3. Planned learning activities and teaching methods

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2	2									
	3		4								
Skill (Level: 1-7)	4			6							
	5								6		
Attitudes (Level: 1-5)	6										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.0	4.0	6.0	0.0	0.0	0.0	0.0	6.0	0.0	5.0

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Basic principles of ecosystem and ecosystem services, the importance of ecosystem services for human development	1	A2	Introduction of the course Teaching Group formulation	Chap.1,2 [1]
2	Basic principles of ecosystem and ecosystem services, the importance of ecosystem services for human development	1	A2	Introduction of the course Teaching Group formulation	Chap.3,4 [1]
3	Emerging issues in ecosystem management, effect of climate change and human on ecosystem. Adapting to climate change and reversing the impacts of human activities	2	A2	Introduction of the course Teaching Group formulation	Chap.4,6 [1]
4	Emerging issues in ecosystem management, effect of climate change and human on ecosystem. Adapting to climate change and reversing the impacts of human activities	2	A2	Introduction of the course Teaching Group formulation	Chap.7,8 [1]
5	The direction from ecosystem services, natural resource, economy and environment	3	A2	Introduction of the course Teaching Group formulation	Chap.1,2 [2]
6	The direction from ecosystem services, natural resource, economy and environment	3	A2	Introduction of the course Teaching Group formulation	Chap.3,4 [2]
7	Ecosystem engineering: Eco-industry, eco-agriculture, eco-tourism	3	A2	Introduction of the course Teaching Group formulation	Chap.5,6 [2]

Week	Topic	CLO	Assessments	Learning activities	Resources
8	Ecosystem engineering: Eco-industry, eco-agriculture, eco-tourism	3	A2	Introduction of the course Teaching Group formulation	Chap.7,8 [2]
9	Midterm				
10	Ecosystem Management, management issues and solutions	3	A3	Introduction of the course Teaching Group formulation	Chap1,2 [3]
11	Ecosystem Management, management issues and solutions	3	A3	Introduction of the course Teaching Group formulation	Chap.3,4 [3]
12-13	Field trip to Tram Chim National Park and Hau River, Can Tho City	4,5,6	A1,3	Field trip	
14,15	Field trip to Tram Chim National Park and Hau River, Can Tho City	4,5,6	A1, 3	Field trip	
16	Reserved week				
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A1. Presentation task (30%)				60% Pass	60% Pass	60% Pass
A2. Midterm exam (30%)	60% Pass	60% Pass				
A3. Final exam (40%)			60% Pass	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

Oral communication value rubric for evaluating presentation tasks (A1):

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in	Language choices are mundane and commonplace and partially support the effectiveness of the presentation.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in

	Capstone	Milestone		Benchmark
	4	3	2	1
	presentation is appropriate to audience.	presentation is appropriate to audience.	Language in presentation is appropriate to audience.	presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS
Course Name: Engineering Economy

Course Code: **IS020IU**

1. General information

Course designation	*This subject will provide the student with a comprehensive view of economic decisions involving engineering alternatives; annual cost, present & future worth, rate of return, and benefit-to-cost; before and after-tax replacement economy; organizational financing; break-even charts; unit and minimum-cost public sector studies.*
Semester(s) in which the course is taught	2
Person responsible for the course	MSc. Nguyen Hoang Huy
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, homework.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 Contact hours (please specify whether lecture, exercise, etc.): 37.5 Private study including examination preparation, specified in hours: 90
Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	None
Course objectives	Students will be provided with skills of using data from a variety of sources, be introduced to basic principles of economic analysis for decision making among alternative courses of action in engineering; understand knowledges of

<table>
<tr><td></td><td>probabilistic risks, depreciation, tax and benefit-cost ratios in analysing engineering applications. Besides that, students can apply cash flow diagram into economy analysis and alternative analysis techniques for engineering applications; apply techniques and methods of sensitivity analysis for engineering problems to compare and make decisions between alternatives.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand major principles of economic analysis for decision making among alternative courses of action in engineering as breakevent, costs, cash flow.
CLO2. Understand knowledges of probabilistic risks, depreciation, tax and benefit-cost ratios in analyzing engineering applications.</td></tr>
<tr><td>Skill</td><td>CLO3. Apply cash flow diagram into economy analysis and sensitivity analysis for engineering problems to compare and make decisions between among alternatives.</td></tr>
<tr><td>Attitude</td><td>CLO4. Reason around ethical and privacy issues in this course conduct and apply ethical practices.</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Lecture 1: Introduction to EE</td><td>1</td><td>I, T</td></tr>
<tr><td>Lecture 2: Cost concepts and Design Economics</td><td>1</td><td>I, T</td></tr>
<tr><td>Lecture 3: The time value of money</td><td>2</td><td>I, T</td></tr>
<tr><td>Lecture 4: Evaluating a single project.</td><td>2</td><td>I, T</td></tr>
<tr><td>Lecture 5: Comparison and Selection among alternatives</td><td>2</td><td>I, T</td></tr>
<tr><td>Lecture 6: Depreciation and Income taxes</td><td>2</td><td>I, T</td></tr>
<tr><td>Lecture 7: Evaluating projects with the benefit-cost ratio method</td><td>1</td><td>I, T</td></tr>
<tr><td>Lecture 8: Replacement analysis</td><td>1</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions, exercises</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] W.G. Sullivan, E.M. Wicks, C.P. Koelling (2012), Engineering Economy, 15th edition, Prentice Hall.
[2] Blank, L., & Tarquin, A. (2012). Engineering Economy 7th edition.</td></tr>
</table>

	[3]Eschenbach, T. G. (2003). Engineering economy. New York: Oxford University Press.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		2			2					
	2		2			2					
Skill (Level: 1-7)	3		3			3					
Attitudes (Level: 1-5)	4									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	2.3	0.0	0.0	2.3	0.0	0.0	0.0	3.0	0.0

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to EE	1		Lecture, Group work	[1]. 1
2	Lecture 2: Cost concepts and Design Economics	1		Lecture, Group work	[1].2
3 & 4	Lecture 3: The time value of money	1,3,4	HW 1	Lecture, Group work	[1].4
5	Lecture 4: The time value of money (con't)	1,3,4	HW 2	Lecture, Group work	[1]. 4
6 & 7	Lecture 5: Evaluating a single project.	3	HW 3	Lecture, Group work	[1]. 5
8	Review for Midterm				
	Midterm				
9 & 10	Lecture 6: Comparison and Selection among alternatives	2, 3, 4	HW 4	Lecture, Group work	[1]. 6
11&12	Lecture 7: Depreciation and Income taxes	2, 3, 4	HW 5	Lecture, Group work	[1]. 7
13	Lecture 8: Evaluating projects with the benefit-cost ratio method	2, 3, 4	HW 6	Lecture, Group work	[1]. 10

Week	Topic	CLO	Assessments	Learning activities	Resources
14	Lecture 9: Replacement analysis	2, 3, 4	HW 6	Lecture, Group work	[1]. 9
15	Review for Final Exam				
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (30%)	HW1-2 50%Pass	HW4, HW5, HW6 50%Pass	HW1-6 50%Pass	HW1-6 50%Pass
Midterm exam (30%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	
Final exam (40%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Computer Science and Engineering

COURSE SYLLABUS
Course Name: Entrepreneurship
Course Code: IT120

1. General information

Course designation	An introduction to the creative and innovative managerial practices of successful entrepreneurship.
Semester(s) in which the course is taught	1
Person responsible for the course	MSc. Dao Tran Hoang Chau
Language	English
Relation to curriculum	Compulsory (CS, NE, CE) Elective (DS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 127.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 (lecture) Private study including examination preparation, specified in hours: 90
Credit points	3 credits/ 4.64 ECTS
Required and recommended prerequisites for joining the course	
Course objectives	This course reviews the significant economic and social contributions entrepreneurs provide to society, the intense lifestyle commitment, and the skills necessary for entrepreneurial success. It explores how to identify and develop solutions to the most common leadership and personal challenges faced by entrepreneurs when starting new ventures or launching new products. It also promotes a deeper understanding of what is required to be a successful entrepreneur, highlights the skills and tools necessary to start a new business and explores alternatives to common pitfalls.This course applies entrepreneurial marketing approaches used by successful entrepreneurs. These include utilizing industry sector trends, identifying emerging customer niches, developing new products/services, using guerilla marketing strategies, and Internet and social marketing strategies. It emphasizes the importance of managing cash flows, ratio analysis, pro forma development, and the basics of deal structure and harvesting a business venture. Students will identify and interpret sources of information from company financial reports, financial publications, industry benchmarks, the media, and web sites.An introduction to the process of researching, writing, and presenting a business plan. Students identify and screen ideas using a business feasibility study that describes the product

<table>
<tr><td></td><td>features, market opportunity, customer profile, sales forecast, competitive advantage, and profit potential. Following a successful feasibility study, students may use business plan software as each develops their own complete business plan.</td></tr>
<tr><td>Course learning outcomes</td><td>
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand entrepreneurial processes [Understanding].
CLO2. Apply new technology to boost business performance [Applying];</td></tr>
<tr><td>Skill</td><td>CLO3. Manage marketing strategy and financial statements in an enterprise [Mechanism];</td></tr>
<tr><td>Attitude</td><td>CLO4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts [Valuing]</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Entrepreneurship, Creativity and Innovation;</td><td>3</td><td>I, T</td></tr>
<tr><td>Creative Problem Solving Model;</td><td>3</td><td>T, U</td></tr>
<tr><td>Develop a Product. Generate Ideas and Protect Inventions;</td><td>2</td><td>T</td></tr>
<tr><td>Marketing Strategies;</td><td>3</td><td>T, U</td></tr>
<tr><td>Finance and Accounting</td><td>4</td><td>T, U</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>1. Duening & Hisrich & Lechter, Technology Entrepreneurship 2nd, 2014</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2		3				3				
Skill (Level: 1-7)	3				4		4				
Attitudes (Level: 1-5)	4									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.0	3.0	0.0	4.0	0.0	3.5	0.0	0.0	3.0	0.0
L,M,H conversion *		L	M		M		M			M	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Entrepreneurship, Creativity and Innovation;	1	Midterm exam	Lecture, In-class activities, Quiz	
2	Creative Problem Solving Model;	1	Midterm exam	Lecture, In-class activities, Quiz	
3	Develop a Product. Generate Ideas and Protect Inventions;	2	Midterm exam, Assignment	Lecture, In-class activities, Project	
4	Midterm				
5	Marketing Strategies;	3	Final exam, Assignment	Lecture, Project	
6	Finance and Accounting	3	Final exam, Assignment	Lecture, Project	
7	**Final exam**				

4. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Assessment Type	CLO1	CLO2	CLO3
Midterm examination (25%)	50%	50%	
Projects/Presentations/ Report (25%)			60%
Final examination (40%)			40%
Exercises/ Quiz (10%)	50%	50%	

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

	Capstone	Milestone		Benchmark
	4	3	2	1
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

	Capstone	Milestone		Benchmark
	4	3	2	1
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. **Date revised: August 14, 2023**

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Engineering Project Management
(Quản lý dự án kỹ thuật)
Course Code: ENEE4011IU

1. General information

Course designation	This course is developed to provide the principal concept on project management which was characterized by the project management body of knowledge guide (PMBOK Guide). This guide emphasizes the five project process groups of initiating, planning, executing, controlling and closing, and the nine knowledge areas of project integration, scope, time, cost, quality, human resources, communication, risk, and procurement management.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☒ Semester 1 ☐ Semester 2 ☐ Summer	
Person In-Charge	Tran Van Ly	
Language	English	
Relation to curriculum	☒ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify:	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td>3</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>37.5</td><td>37.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>90</td><td>90</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>127.5</td><td>127.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>3 credits/4.64 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☒ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☐ Previous course: (Please specify course ID & course title, if any)</td></tr>
<tr><td>Course objectives</td><td>Students will be provided with knowledge and skills of constructing the network (AON & AOA), GANNT Chart, solving the network; Resource allocation, resource loading & levelling; Project budgeting & cost estimation, risk management; Project quality management; Project human resource management; Project procurement management; Project executing, monitoring & control to closing the project</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Align the project to the organization's strategic plans and business justification throughout its lifecycle; to identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders. [Applying]</td></tr>
</table>
</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

		CLO2. Manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders Able to Implement general business concepts, practices, and tools to facilitate project success. [Applying]
	Skill	CLO3. Work effectively in group project in a specific context; combining the techniques to conduct practical cases. Respond to the needs of community and industrial sectors. [Guided Response]
	Attitude	CLO4. Apply appropriate legal and ethical standards. Adapt project management practices to meet the needs of stakeholders from multiple sectors of the economy (i.e. consulting, government, arts, media, and charity organizations); Identify and follow strictly ethical disciplines in project management. [Organization]

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	Topic	Weight	Level
1	Introduction to Project Management	1	I, T
2	Project management processes for a project	1	I, T
3	Work breakdown structure	1	I, T
4	Project scheduling	1	I, T
5	Resource allocation	1	I, T
6	Logical Framework	2	I, T
7	Project cost management	1	I, T
8	Project risk management	1	I, T
9	Project quality management	1	I, T

<table>
<tr><td></td><td>
<table>
<tr><td>10</td><td>Project human resource management</td><td>1</td><td>I, T</td></tr>
<tr><td>11</td><td>Project procurement management</td><td>1</td><td>I, T</td></tr>
<tr><td>12</td><td>Project executing, monitoring & control.</td><td>1</td><td>I, T</td></tr>
<tr><td>13</td><td>Project closing</td><td>1</td><td>I, T</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions ☐ Oral examination
☐ Report ☒ Written examination
☐ Presentation ☐ Others, please specify: ……
☐ Assignments</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>I. Textbooks
[1] Book name: A Guide to the project management body of knowledge (PMBOK® Guide). 5th Edition, Newtown Square, Pa. : Project Management Institute, Inc.
[2] Project management: A managerial approach / Jack R. Meredith, Samuel J. Mantel. 7th Edition, Hoboken, N.J. : Wiley ; Chichester : John Wiley [distributor], 2009.
[3] The project management life cycle/ Jason West land. Kogan Page Limited, 2006
II. References
N/A</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3			3						
	2		3				3				
Skill (Level: 1-7)	3						3		3		
Attitudes (Level: 1-5)	4									4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	4.0	0.0
L,M,H conversion *		M	M		M		M		M	H	

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Lecture 1: Introduction to Project Management, project life cycle and organization	1		Lecture, Group work	[1].
2.	2	Lecture 2: Project management processes for a project - Common project management process interactions. - Project management process groups. - Initiating process group Planning process group	1	HW 1	Lecture, Group work	[1].
3.	3	Lecture 3: Work breakdown structure	1,3,4	HW 2	Lecture, Group work	[1].

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
4.	4	Lecture 4: Project scheduling. - Constructing the network: AON & AOA - Gantt chart - Solving the network Using Microsoft Project software	1,3,4	HW 3	Lecture, Group work	[1].
5.	5	Lecture 5: Resource allocation - Critical path method – Crashing a project - Resource allocation problem - Resource loading - Resource leveling Constrained resource scheduling	1,3,4	HW 4	Lecture, Group work	[1].
6.	6-7	Lecture 6: Logical Framework Approach (LFA)	3		Lecture, Group work	[1].
7.	8	Review for Midterm				
8.		Midterm				
9.	9	Lecture 7: Project cost management Project budgeting & Cost estimation - Top-Down budgeting - Bottom-Up budgeting Improving the process of cost estimation	2, 3, 4	HW 5	Lecture, Group work	[1].
10.	10	Lecture 8: Risk management. - Risk management planning - Risk identification - Risk analysis - Risk monitoring and control		HW 6	Lecture, Group work	

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
		Using Crystal Ball software				
11.	11	Lecture 9: Project quality management - Plan quality - Perform quality assurance Perform quality control	2, 3, 4	HW 7	Lecture, Group work	[1].
12.	12	Lecture 10: Project human resource management - Develop human resource plan - Acquire project team - Develop project team Manage project team	2, 3, 4	HW 8	Lecture, Group work	[1].
13.	13	Lecture 11: Project procurement management - Plan procurements - Conduct procurements - Administer procurements Close procurements	2, 3, 4	HW 9	Lecture, Group work	[1].
14.	14	Lecture 12: Project executing, monitoring & control.	2, 3, 4	HW 10	Lecture, Group work	[1].
15.	15	Lecture 13: Project closing Project Presentation Review for Final Exam	2, 3, 4		Problems solving Group work	[1].
16.		Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	HW1-2 50%Pass	HW4, HW5, HW6 50%Pass	HW7-8 50%Pass	HW9-10 50%Pass

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (20%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	
Midterm exam (30%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	
Final exam (40%)	HW1-2 50%Pass	HW4, HW5, HW6 50%Pass	HW7-8 50%Pass	HW9-10 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Business

COURSE SYLLABUS

Module Name: Introduction to Business Administration

Module Code: **BA115IU**

1	**Course Name**	INTRODUCTION TO BUSINESS ADMINISTRATION
2	**Course Code**	BA115IU
3	**No of credits**	3 credits/4.64 ECTS
4	**Degree Level**	Bachelor in Business Administration
5	**Time Allocation**	Estimated) Total workload: 127.5 hours Contact hours: 37.5 hours (lecture Private study including examination preparation, specified in hours: 90 hours
6	**Pre-requisite**	*No*
7	**Main objectives**	This course is designed to provide the student with the below objectives - To provide knowledge of functional areas of business management and the integration among them. - To give students a strong awareness of global issues, including an understanding of approaches to business ethics, business environment and multinational issues. - To develop students' basic research, analysis, writing, teaming, and presentation skills. - To develop students' applied critical thinking skills and communication through the development of a portfolio of a firm in an industry in which they are interested.
8	**Course Learning Outcomes**	LO1. Explain how rapidly the business world is changing and the importance of life long learning. LO2. Explain how global issues influence business entities. LO3. Understanding forms of business of ownership. LO4. Develop a high level of familiarity with four function of business management. LO5. Understaing basic characteristic of production and operation management. LO6. Explain theories about motivation. LO7. Understanding basic characteristic of HRM in an organisation. LO8. Understanding basic characteristic of marketing mix.

9	**Description**	Employing the interactive learning and problem-based teaching approach, this course emphasises the interaction between lecturers and students. The lecture materials will be uploaded in Blackboard to help the students to preview the materials and to concentrate on listening and critical thinking during the lecture. This will help students to interact with the lecturer during the classroom. The sessions for presentations and discussions comprise company case studies as well as answering some theoretical and conceptual questions, which help the students to see how the concepts are applied in the real business context. Students will present the case to the class and discuss with the peers. Guest speakers are invited to talk about selected topics or real life experiences.	
9	**Student's tasks**	1. Attend more than 80% of contact hours in order to be accepted to the final examination 2. Actively participate in class activities. 3. Fulfill tasks given by instructor after class. 4. Use their own laptop in class only for learning purpose. 5. Read the textbook in advance. 6. Access the Blackboard for up-to-date information and material of the course, for online supports from teachers and other students and for practicing and assessment.	
10	**Teaching & Learning Materials**	**Main textbooks:** William G. Nickels, James M. McHugh, Susan M.McHugh – Understanding Business, 11th edition , McGraw-Hill	
		IM, Video, PPT, Test bank	
11	**Assessment scheme**	1. Homework/ asignments/ presentation; 30% ; 2. Midterm exam: 30%; 3. Final Exam; 40%	
12	**Scoring scale**	**100**	
13	**Schedule**	See Appendix 1	
14	**Exam structure**	See Appendix 2	
15	**Approval Date**		
16	**Approval Level**		

APPENDIX 1

Session	Content	Learning Outcomes	Bloom's Taxonomy	Category	Teacher's Material	Student Homework's Material
1	**Chapter 1:** Managing Within The Dynamic Business Environment: Taking Risks And Making Profits	LO1, LO2	KN, AN	Lecture	Instructor Manual, Teacher's Resource	Student's book
2	**Chapter 2**: How Economics Affects Business: the Creation and Distribution of Wealth *Short essay*	LO1, LO2	KN, AN, AP	Lecture	Instructor Manual, Teacher's Resource	Student's book
3	**Chapter 5:** Choosing a Form of Business Ownership	LO3	KN, AP	Lecture	Instructor Manual, Teacher's Resource	Student's book
3	**Chapter 7**:Management, Leadership, And Employee Empowerment *Short essay*	LO4	KN, AP, AN	Lecture	Instructor Manual, Teacher's Resource	Student's book Casestudy
4	**Chapter 8** Adapting Organizations To Today's Markets	LO4	KN, AP, AN	Lecture	Instructor Manual, Teacher's Resource	Student's book Casestudy
4	**Review for midterm**	LO 1-5	**AN,SY**			
5	**Chapter 9** Producing World-Class Goods and Services	LO5	KN	Lecture	Instructor Manual, Teacher's Resource	Student's book
6	**Chapter10** Motivating Employees And Building Self-Managed Teams	LO6	KN, AP, AN	Lecture	Case-study, Teacher's Resource	Case-study, Student's book
5	**Chapter 11** HRM: Finding and Keeping the Best Employees	LO7	KN, AP, AN,EV	Lecture	Instructor Manual, Teacher's Resource	Student's book

7	**Chapter 13** Marketing: Building Customer Relationships	LO8	AN,KN	Lecture	Instructor Manual, Teacher's Resource	Student's book
8	**Chapter14** Developing and Pricing Products and Services	LO8	KN,AN, SY, AP	Lecture	Instructor Manual, Teacher's Resource	Student's book
6	**Chapter 15** Distributing Products Quickly and Efficiently	LO7	KN,AN, SY, AP	Lecture	Instructor Manual, Teacher's Resource	Student's book
9	**Chapter 16** Using Effective Promotional Techniques	LO7	KN,AN, SY, AP	Lecture	Instructor Manual, Teacher's Resource	Student's book
10	**COURSE REVIEW**	**LO1-7**	**AN,SY**		Instructor Manual, Teacher's Resource	Student's book
7	**GROUP PRESENTATION AND REPORT SUBMISSION**	**LO1-7**	**AP, EV**	**Group Presentation and Report Submission**		

APPENDIX 2

Evaluation structure

Evaluation Category	Part	Weight	Duration	Learning outcomes	Type of questions	Number of questions	Scope of knowledge and skill of questions	How?	Note
2 short essays		**15%**		**LO1,2,4**	**Individual students will be give topics relating to chapters to write about. By using references from the textbook and other sources, students**	**Maximum length of the individual assignment should be 5 pages excluding appendices**	**Based on topics of studied units**	**Individual assignment submitted in class**	**All assignments should be typed and double-spaced with 11-point font, and must be submitted in both soft and hard copy. *A deduction of 10% of the assignment mark will be applied for each day of late submission***

					will outline the key aspects of this topic, identify a real-world example, and discuss how theories can be applied to produce a positive outcome.				
Class participation and preparation		**5%**							**Participation grade will be given based on students' preparation, quantity as well as quality of participation in classroom; quality of participation is demonstrated through asking relevant questions, making statements that add to and facilitate class discussion, and builds upon others' comments.**
Group report		**10%**		**LO1-7**	**A group of four or five students will choose a real company to write on marketing mix of that company under the light of theories in the textbooks.**	**Minimum length of the group assignment should be 10 pages excluding appendices**	**Based on topics of studied units**	**Group report submission and Group presentation in class room**	**All assignments should be typed and double-spaced with 11-point font, and must be submitted in both soft and hard copy. *A deduction of 10% of the assignment mark will be applied for each day of late submission* Evaluation will be based on both presentation (40%) and written report (60%). Specific contacts of interviews including phone number, addresses, websites must be provided in the appendix of the report.**
Mid-term Exam		**30%**	**90'**	**LO3,5,6, 7**	**Close questions**		**The question will cover the lectures, class discussions,**	**Class room**	

							activities, exercises, and textbook.		
Final exam		**40%**	**90'-120'**	**LO1-7**	**Multiple choice, apr. 40 questions. Other types of questions may be included.**		**The question will cover the lectures, class discussions, activities, exercises, and textbook.**	**Exam room**	**Not allow to use any document/information in any form in exam room**
Total		**100%**							

APPENDIX 3

Matching the Program's Expected Learning Outcomes and the Course Learning Outcomes

The relationship between Course Learning Outcomes (CLO) (1-8) and Intended Learning Outcomes (ILO) of the EV program is shown in the following table:

CLOs	**ILOs**									
	Knowledge		Skills						Attitudes	
	1	2	3	4	5	6	7	8	9	10
1		2								2
2		2								
3		2								
4		6								
5		2			2					
6		2								
7		2								
8		2								
Contribution of CLOs to ILOs										
AVE	0.0	2.5	0.0	0.0	2.0	0.0	0.0	0.0	0.0	2.0
		L			L					L

** L (Low); M (Medium); H (High)*

BLOOM'S TAXONOMY

Knowledge (KN)

Knowledge involves recognizing or remembering facts, terms, basic concepts, or answers without necessarily understanding what they mean. Its characteristics may include:

Knowledge of specifics—terminology, specific facts

Knowledge of ways and means of dealing with specifics—conventions, trends and sequences, classifications and categories

Knowledge of the universals and abstractions in a field—principles and generalizations, theories and structures

Example: Name three common varieties of apple.

Comprehension (CO)

Comprehension involves demonstrating an understanding of facts and ideas by organizing, summarizing, translating, generalizing, giving descriptions, and stating the main ideas.

Example: Summarize the identifying characteristics of a Golden Delicious apple and a Granny Smith apple.

Application (AP)

Application involves using acquired knowledge—solving problems in new situations by applying acquired knowledge, facts, techniques and rules. Learners should be able to use prior knowledge to solve problems, identify connections and relationships and how they apply in new situations.

Example: Would apples prevent scurvy, a disease caused by a deficiency in vitamin C?

Analysis (AN)

Analysis involves examining and breaking information into component parts, determining how the parts relate to one another, identifying motives or causes, making inferences, and finding evidence to support generalizations. Its characteristics include:

Analysis of elements

Analysis of relationships

Analysis of organization

Example: Compare and contrast four ways of serving foods made with apples and examine which ones have the highest health benefits.

Synthesis (SY)

Synthesis involves building a structure or pattern from diverse elements; it also refers to the act of putting parts together to form a whole. Its characteristics include:

Production of a unique communication

Production of a plan, or proposed set of operations

Derivation of a set of abstract relations

Example: Convert an "unhealthy" recipe for apple pie to a "healthy" recipe by replacing your choice of ingredients. Argue for the health benefits of using the ingredients you chose versus the original ones.

Evaluation (EV)

Evaluation involves presenting and defending opinions by making judgments about information, the validity of ideas, or quality of work based on a set of criteria. Its characteristics include:

Judgments in terms of internal evidence

Judgments in terms of external criteria

Example: Which kinds of apples are best for baking a pie, and why?

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Business

COURSE SYLLABUS

Course Name: Entrepreneurship and Small Business Management

Course Code: BA154IU

1. General information

Course designation	*This course aims to provide a hands-on introduction to the scalable venture creation process for students with a strong interest in entrepreneurship. The course is designed for a variety of student interests. It directly addresses the concerns of students wanting to become entrepreneurs in the near or more distant future. It is also useful to anyone who expects to be interacting with entrepreneurs in their business careers. Finally, this course is useful for anybody with a curious mind and a willingness to combine serious analysis with creative thinking.*
Semester(s) in which the course is taught	1, 2,3
Person responsible for the course	Nguyen Vo Hien Chau, MBA.
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, project, discussion, presentation.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 hours Contact hours: 37.5 hours Private study including examination preparation, specified in hours: 90 hours
Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	None
Course objectives	After studying this course, the students would be able to build on personal as well as external resources with a view to successfully launching and subsequently

<table>
<tr><td></td><td>managing their enterprises. They would have not only a definite idea as to which support/developmental agency to look up to and for what purpose, but also the necessary know-how and wherewithal for accessing their help. They would have basic skills in operations, finance, marketing, and human resource management.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Describe the entrepreneurial profile and evaluate your potential as an entrepreneur
CLO2. Explain the steps the entrepreneur must complete when starting a new business venture
CLO3: Describe the elements of a solid business plan
CLO4: Describe key business terms demonstrating overall business knowledge</td></tr>
<tr><td>Skill</td><td>CLO5. Complete self-analysis of entrepreneurial competencies
CLO6: Analyze various new business options
CLO7: Complete a written business plan
CLO8: Demonstrate the keys to making an effective business plan presentation</td></tr>
<tr><td>Attitude</td><td>CLO9. Build up entrepreneurship spirit from a curious mind and a willingness to combine serious analysis with creative thinking.</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Content</td><td>
The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Foundation of Entrepreneurship</td><td>1</td><td>I, T</td></tr>
<tr><td>Creative and Innovation: Key to Entrepreneurial success</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Conducting a Feasibility Analysis and Designing a business model</td><td>3</td><td>T, U</td></tr>
<tr><td>Crafting a business plan and building a solid strategic plan</td><td>1</td><td>T, U</td></tr>
<tr><td>Building a powerful bootstrap marketing plan</td><td>1</td><td>T, U</td></tr>
<tr><td>Pricing Strategy</td><td>1</td><td>T, U</td></tr>
<tr><td>Ecommerce and the entrepreneur</td><td>1</td><td>T, U</td></tr>
<tr><td>Creating a successful financial plan and managing cash flow</td><td>2</td><td>T, U</td></tr>
<tr><td>Source of financing: finance vs debt</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Choosing the right location and layout</td><td>1</td><td>T, U</td></tr>
<tr><td>Buying an existing business</td><td>1</td><td>T</td></tr>
<tr><td>Franchising and entrepreneur</td><td>1</td><td>T</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, Essay Questions, Business Plan.</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>Textbook:
[1] Norman M. Scarborough. 2019. Essentials of Entrepreneurship and Small Business Management, 9th edition, Pearson.

Reference Books:
[2] Alexander Osterwalder & Yves Pigneur. 2010. Business Model Generation, Wiley.
[3] Alexander Osterwalder & Yves Pigneur. 2010. Value Proposition Design, Wiley.
[4] Robert A. Baron, Scott A. Shane, and A. Rebecca Reuber. 2008. Entrepreneurship, 1st edition, Thomson.
[5] Richard Dorf, Thomas Byers. 2006. Technology Ventures, From Idea to Enterprise, 2nd edition, McGraw Hill.</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-9) and Intended Learning Outcomes (ILO) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		1								
	2		2								
	3		1								
	4		1								
Skill (Level: 1-7)	5		3								
	6		4								
	7		3					3			
	8		3								
Attitudes (Level: 1-5)	9			3						3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	2.3	3.0	0.0	0.0	0.0	3.0	0.0	3.0	0.0
L,M,H conversion *			L	M				M		M	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	The Foundations of Entrepreneurship	1	**Homework 1:** 1.Search through recent business publications (especially those focusing on small companies) and find an example of an entrepreneur, past or present, who exhibits the entrepreneurial spirit of striving for success in the face of failure.2. Do you want to become an entrepreneur? Why? Prepare a brief report for your class (300 words).	Lecture, Discussion, HW	[1]
2	Creative and Innovation: Keys to Entrepreneurial success	1,4,9	**Homework 2:** Find an easily available product (for example, a pen). Think of all the creative ways the product can be used. You need to prepare at least 10 alternative uses including unconventional methods for that particular product.	Lecture, Discussion, HW	[1]
3-4-5	Conducting a Feasibility analysis and designing a business model	2,3,4, 6,7,8	**Homework 3:** 1. Five Forces Model of Highlands Coffee. 2. Value Proposition Canvas of Grab Car/bike	Lecture, Discussion, HW Group presentation	[1] [2]

Week	Topic	CLO	Assessments	Learning activities	Resources
			3. Business Model Canvas of Grab Car/bike **Feasibility Analysis Presentation:** Each group will choose 01 new start up business (already started up by someone else) and conduct a feasibility analysis. Please note that the business you choose should be established less than 5 years. It's up to you to choose which industry and which company to analyze, but to save time, you can choose the business in the same industry with your business idea. The presentation should have three main parts: 1.Introduction of the business (Its name, Founder, Product/Service, Established year, Business size, current situation) 2. A feasibility analysis includes: -Industry and Market feasibility -Product or Services feasibility -Financial Feasibility 3.Discussion: your group opinion about the success/failure, challenge, and opportunity of the business.		
6	Crafting a Business Plan and Building a solid strategic plan	2,3,4, 6,7,8	**Class Discussion:** 1. Advantages and Disadvantages of SWOT analysis 2. Prepare a competitive profile matrix for Shopee. **Homework 4:** Choose 1 of your favorite company. Find at least 4 of its competitors. Put all of them in a Positioning map	Lecture, Discussion, HW	[1][2][3]
7	Building a powerful bootstrap marketing plan	7,8	**Homework 5:** Select 2 businesses (1 large and 1 small) and play the role of "Mystery shopper" 1.How would you rate their service, quality, and convenience of each of the businesses based on your mystery shopper experience? 2.Compare and contrast the staff at the two stores based on how helpful, friendly, professional, and courteous they were to you during your mystery shopper visits? 3. How would you describe each company's competitive advantage based on your mystery shopper visits?	Lecture, Discussion, HW	[1][2][3]

Week	Topic	CLO	Assessments	Learning activities	Resources
8	Pricing strategy	7,8	**Homework 6:** Apple Inc. dominates the market for tablets with its line of iPads, which currently includes the classic iPad, the iPad Mini, and the iPad Air. Because the company constantly introduces new models and features, it also adjusts prices on these popular devices. Use the Web to research the history of the iPad and write a brief summary of Apple's pricing strategy on its tablet. Which products compete with the iPad?	Lecture, Discussion, HW	[1]
9,10	Midterm				
11	E-commerce and the entrepreneur	6,7	**HW7:** Select one online company with which you are familiar and visit their Web sites. What percentage of them have privacy policies posted on their sites? View the Web site and provide comments based on what you have studied in this chapter. Does the Web site follow the techniques of designing a killer Web site? You may provide some suggestions to the business owner for improvement.	Lecture, Discussion, HW	[1]
12	Creating a successful financial plan	6,7,9	**Homework 8:** 1. Find a publicly held company of interest to you that provides its financial statements on the Web. You can conduct a Web search using the company's name, or you can find lists of companies at the Securities and Exchange Commission's EDGAR database or visit AnnualReports.com to download the annual report of a company that interests you. 2. Analyze the company's financial statements by calculating the first 3 ratios covered in this chapter and compare these ratios to industry averages found in RMA's *Annual Statement Studies, Bizminer,* or one of the other financial analysis resources found in your library. 3. Do you spot any problem areas in the company's financials? 4. What are the financial strengths of the company?	Lecture, Discussion, HW	[1]

Week	Topic	CLO	Assessments	Learning activities	Resources
12,13	Managing cash flow	7	Make a cash flow management for your monthly expense.	Lecture, Exercise	[1]
13	Sources of Financing: Equity vs Debt	6,9	**Homework 9:** Interview or find an article on the internet several local business owners about how they financed their businesses. (you can easily find it in Shark Tank TV Show or other sources) 1. Where did the initial capital come from for the small business owners you interviewed/or found? 2. Ask the small business owners or find in the article how much money they needed to launch their businesses. 3. Ask the small business owners how they raised the additional capital they needed to start their businesses. 4. Ask the small business owners about any advice they might offer others seeking capital? (if applicable)	Lecture, Discussion, HW	[1]
14	Choosing the right location and layout	7,9	**Homework 10:** What factors should a seafood processing plant, a beauty shop, and an exclusive jewelry store consider in choosing a location? List factors for each type of business	Lecture, Discussion, HW	[1]
15	Buying an existing business	6,9		Lecture, Discussion	[1]
15	Franchising and the Entrepreneur	6,9		Lecture, Discussion	[1]
15	Business Plan Review		**Written Plan**:Length and Style: 6,000 words (+-10%), excluding footnotes, figures and references. The format for assignments is to be 1.5 spaced with 2.5 cm margins and font size of 12 cpi. Please show the word count, along with all other details on the cover sheet. The business plan will be assessed for analytical content and presentation. The business plan must be submitted before presented. Peer reviews to evaluate each member's contribution to the group work and define your final grade. All work must be original and must not have been submitted for any other subject or course here or elsewhere. Copying or plagiarizing works of other authors, including your fellow students or cutting and pasting from	Review, Q&A	

Week	Topic	CLO	Assessments	Learning activities	Resources
			the internet and other sources is an offence and will be seriously penalized. **Final Presentation:** Duration: 10 minutes presentation + 5 minutes Q&A Please present as if you were in a business idea competition or finding funds for your business. BE PROFESSIONAL!		
16,17	Business Plan Presentation				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9
In-Class presentation (10%)		Feasibility Analysis 80% Pass				Feasibility Analysis 80% Pass	Feasibility Analysis 80% Pass		
Homework (15%)	HW1.1 80%Pass		HW3 60%Pass	HW3-9 60% Pass	HW1.2 80%Pass	HW4-8 80% Pass			HW2
Midterm exam (20%)	Q1-4 70%Pass	Q5-13 50% Pass	Q4-22 50% Pass	Q23-31 50%Pass		Q32-40 50% Pass			
Business Plan (55%)		Written Plan 90%Pass	Written Plan 90%Pass	Written Plan 90%Pass			Written Plan, Final Presentation 90% Pass	Final Presentation 90% Pass	Written Plan, Presentation 90% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Plan			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (90%)			
Executive Summary	5		
Product/Service Feasibility	15		
Business Strategy and Competitor Analysis	30		
Marketing Strategy	15		
Financial Plan	15		
Implementation Plan	10		
Presentation (10%)			
Clear, attractive, and persuasive presentation	5		
Professional attitude	5		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Biotechnology
Department of Biotechnology

COURSE SYLLABUS

Course Name: Plant Physiology

Course Code: **BT010IU**

1. General information

Course designation	*Plant physiology is a foundation course for more advanced ones in Plant Biotechnology. This course covers a wide range of knowledge regarding plant physiology such as plant metabolism, development and essential conditions for development, environmental stresses and secondary metabolites and engineered plants in plant biotechnology.*
Semester(s) in which the course is taught	1, 2
Person responsible for the course	A/Prof. Tran Van Minh
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 127.5 Contact hours (lecture): 37.5 Self-study: 90
Credits/ECTS	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	Prerequisite: Biology, Organic Chemistry
Course objectives	To provide information on plant physiological background; the cell in growth, development and stress environment; plant growth regulators; the synthesis pathways of biotransformation and secondary metabolites production; and plant biotechnology application with a good balance between traditional plant physiology and modern topics

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1: Various important physiological processes in higher plants to acquire energy and nutrients, including photosynthesis, nutrient and water uptake, and gaseous exchange, and explore the implications for their structure and function.
Explain the structure, processes and importance of internal communication, control, reproduction and development in plants
Design a stress tolerant strategy for use in plant biotechnology based on stress physiology
CLO2. Explain the process and the limit in plant growth and development.</td></tr>
<tr><td>Skill</td><td>CLO3. Describe and explain principles, structure, function and adaptation related to various physiological processes in a high degree of accuracy and thoroughness and understanding of the impacts of stress on plant physiology and explain the potential in plant biotechnology with appropriate justifications. Demonstrates ability to integrate theories and practical results, and gives clear oral and written communication</td></tr>
<tr><td>Attitude</td><td>CLO4. Issues and ethical practices in application</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Chapter 1: Bioenergetics and ATP Synthesis
-The Dual Role of Sunlight: Energy and Information.
-Energy Conservation in Photosynthesis: CO_2Assimilation</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Chapter 2: Cellular Respiration:
-Unlocking the Energy Stored in Photo-Assimilation.
-Nitrogen Assimilation</td><td>1</td><td>T, U</td></tr>
<tr><td>Chapter 3: Allocation, Translocation, and Partitioning of Photo-Assimilates
-Carbon Assimilation and Productivity.
-Plant Cells and Water. Hypothesis Testing and Statistical Inference</td><td>1</td><td>T, U</td></tr>
<tr><td>Chapter 4: Whole Plant Water Relations.</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
</table>

	-Plants and Inorganic Nutrients. *-Roots, Soils and Nutrients Uptake*		
	Chapter 5: Plant Stem Cell: Meristem Cell	1	T, U
	Chapter 6: Patterns in Plant Growth and Development.	1	T, U
	Chapter 7: The Plant Hormones: Biochemistry and Metabolism	1	T, U
	Chapter 8: The Plant Hormones: Control of Growth and Development	1	T, U
	Chapter 9: Photomorphogenesis: Responding to Light.	1	T, U
	Chapter 10: Plant Movements – Orientation in Space	1	T, U
	Chapter 11: Measuring Time: The Control of Development by Photoperiod and Endogenous Clocks.	1	T, U
	Chapter 12: Temperature: Plant Development and Distribution	1	T, U
	Chapter 13: Plant Environment and Stress Physiology	1	T, U
	Chapter 14: Plant Metabolites Physiology *-Primary Plant Metabolites* *-Secondary Plant Metabolites*	1	T, U
	Chapter 15: Biotechnology: Plants Engineering for the Future	1	T, U
Examination forms	Short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	[1] William G. Hopkins, Norman P. A. Hüner, *Introduction to Plant Physiology*, 3rd Edition, 2003, Publisher : Wiley [2] American Society of Plant Physiology, *Plant Physiology* (Journal) (http://intl.plantphysiol.org/) [3] American Society of Plant Physiology, *The Plant Cell* (Journal) (http://intl.plantcell.org/		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) is shown in the following table:

	ILO									
CLO	1	2	3	4	5	6	7	8	9	10
1		x								
2		x								
3		x					x			
4									x	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Chapter 1: Bioenergetics and ATP Synthesis *-The Dual Role of Sunlight: Energy and Information.* *-Energy Conservation in Photosynthesis: CO_2Assimilation*	1,2,3		Lecture, Discussion,	[1][2][3]
2	Chapter 2: Cellular Respiration: *-Unlocking the Energy Stored in Photo-Assimilation.* *-Nitrogen Assimilation*	1,2,3		Lecture, Discussion,	[1][2][3]
3	Chapter 3: Allocation, Translocation, and Partitioning of Photo-Assimilates *-Carbon Assimilation and Productivity.* *-Plant Cells and Water.* Hypothesis Testing and Statistical Inference	1,2,3		Lecture, Discussion,	[1][2][3]
4	Chapter 4: Whole Plant Water Relations. *-Plants and Inorganic Nutrients.* *-Roots, Soils and Nutrients Uptake*	1,2,3		Lecture, Discussion,	[1][2][3]
5	Chapter 5: Plant Stem Cell: Meristem Cell	1,2,3		Lecture Discussion,	[1][2][3]
6	Chapter 6: Patterns in Plant Growth and Development	1,2,3		Discussion,	[1][2][3]
7	Chapter 7: The Plant Hormones: Biochemistry and Metabolism	1,2,3		Lecture, Discussion,	[1][2][3]
8	Midterm				
9	Chapter 8: The Plant Hormones: Control of Growth and Development	1,2,3		Lecture, Discussion,	[1][2][3]
10	Chapter 9: Photomorphogenesis: Responding to Light	1,2,3		Lecture, Discussion,	[1][2][3]
11	Chapter 10: Plant Movements – Orientation in Space	1,2,3		Lecture, Discussion,	[1][2][3]
12	Chapter 11: Measuring Time: The Control of Development by Photoperiod and Endogenous Clocks	1,2,3		Lecture, Discussion,	[1][2][3]
13	Chapter 12: Temperature: Plant Development and Distribution	1,2,3		Lecture, Discussion,	[1][2][3]
14	Chapter 13: Plant Environment and Stress Physiology	1,2,3		Lecture, Discussion,	[1][2][3]
15	Chapter 14: Plant Metabolites Physiology *-Primary Plant Metabolites* *-Secondary Plant Metabolites*	1,2,3		Lecture, Discussion,	[1][2][3]
16	Chapter 15: Biotechnology: Plants Engineering for the Future	4		Lecture, Discussion,	[1][2][3]
17	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (30%)	100			
Midterm exam (30%)	50			
Final exam (40%)	50			

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: August 14, 2023

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Nanomaterials
(Vật liệu nano)
Course Code: CHE3211IU

1. General information

Course designation	This course will discuss the synthesis, properties characterization and applications of materials structured on the nanometer scale.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☒ Year 4 ☐ Year 5	
	☒ Semester 1 ☐ Semester 2 ☐ Summer	
Person In-Charge	Dr. Vu Bao Khanh, vbkhanh@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☒ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify:	

Workload

		Lecture	Lab	Project	Internship	Thesis
	Credit	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

<table>
<tr><td>Credit points</td><td>3 credits/4.64 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☒ Previous course: Analytical chemistry 2 (CHE1061IU); Inorganic Chemistry (CHE2103IU); Physical Chemistry 2 (CHE1043IU)</td></tr>
<tr><td>Course objectives</td><td>The course will discuss fabrication methods for nanomaterials, including physical and chemical methods. The optical, electronic, and catalytic properties of nanomaterials will be presented. The section dealing with the applications of nanomaterials is interactive: each group of students will be assigned a specific type or application of nanomaterials, which will be studied and presented to the class in a short lecture.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Describe the fundamental principles of nanomaterials, including size-dependent properties, quantum confinement. [Remember]
CLO2. Apply analytical and characterization tools to study the structure and properties of nanomaterials. [Apply]
CLO3. Analyze the physical, chemical, and biological properties of nanomaterials for use in various applications. [Analyze]</td></tr>
<tr><td>Skill</td><td>CLO4. Differentiate the diverse synthesis methods used to produce nanomaterials. [Perception]
CLO5. Participate in a group research project and present the results of this project in a professional manner. [Adaptation]</td></tr>
<tr><td>Attitude</td><td></td></tr>
</table>
</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination

Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	Topic	Weight	Level
1	Introduction to Nanomaterials	1	I, T
2	Crystal Structure of Nanomaterials	2	T, U
3	Length Scales of Nanomaterials	1	T, U
4	Types of Nanostructures (0D, 1D, 2D)	2	T
5	Synthesis of Nanomaterials	2	T, U
6	Characterization of Nanomaterials	2	T
7	Applications of nanomaterials	1	T, U
8	Special Topics presented by Students	1	T, U
9	Porous Nanomaterials: Structure and Synthesis	0.5	I, T
10	Recent developments in nanomaterials	0.5	I, T

Examination forms

☐ Multiple-choice questions ☐ Oral examination

☐ Report ☒ Written examination

☒ Presentation ☐ Others, please specify: ……

☐ Assignments

Other requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.

Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

I. Textbooks

[1] A.S.Edelstein and R.C.Cammarata Ed. Nanomaterials: Synthesis, Properties and Applications, Institute of Physics Publishing, Bristol and Philadelphia, 1996

[2] Guozhong Cao, Nanostructures & nanomaterials, Imperial College Press, London, 2004

	[3] Gregory Timp Ed., Nanotechnology, AIP Press, Springer, 1998 [4] J. H. Fendler Ed., Nanoparticles and Nanostructured Films, Wiley-VCH, 1998 [5] C. P. Poole, Jr. and F .J. Owens, Introduction of Nanotechnology, Wiley, 2003 **II. References**

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills							Attitudes
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	1									
	2	3									
	3	4									
Skills (Level: 1-7)	4								1		
	5			6							
Attitudes (Level: 1-5)											
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.7	0.0	6.0	0.0	0.0			1.0		0.0
L,M,H conversion*		L		H					L		

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Introduction to Nanomaterials	1	HW	Lecture	
2.	2&3	Crystal Structure of Nanomaterials	1,2,3	HW	Lecture	
3.	4&5	Length Scales of Nanomaterials	1	HW	Lecture	
4.	6	Types of Nanostructures (0D, 1D, 2D)	1,2,3	HW	Lecture	
5.	7&8	Synthesis of Nanomaterials	4	HW	Lecture	
6.	9-10	Midterm				
7.	11&12	Characterization of Nanomaterials	2	HW	Lecture	
8.	13&14	Porous Nanomaterials: Structure and Synthesis	2,3	HW	Lecture	

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
9.	15	Special Topics Presented by Students	5	HW	Teamwork presentation	
10.	16	Special Topics Presented by Students	5	HW	Teamwork presentation	
11.	17	Special Topics Presented by Students	5	HW	Teamwork presentation	
12.	18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Homework/Presentation (30%)					>50%pass
Midterm exam (30%)	>50%pass				
Final exam (40%)		>50%pass	>50%pass	>50%pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Program Learning Outcomes Graduates of Chemical Engineering program will attain
	Knowledge
1	Identify, formulate, and solve complex chemical engineering problems by applying principles of engineering, science, and mathematics
2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	Skills
3	Communicate (in English) effectively with a range of audiences
4	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
5	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
6	Acquire and apply new knowledge as needed, using appropriate learning strategies.
	Attitude
7	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

	VIETNAM NATIONAL UNIVERSITY HCMC **INTERNATIONAL UNIVERSITY** **School of Chemical and Environmental Engineering**

COURSE SYLLABUS

Course Name: Biomaterials
(Vật liệu sinh học)
Course Code: CHE3221IU

1. General information

Course designation	An engineer of chemical engineering major should understand biomaterials, and its surface modification for specific applications. Also, an engineer must understand how to choose materials and how to design a scaffold for specific implantation zone.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☒ Year 4 ☐ Year 5 ☐ Semester 1 ☐ Semester 2 ☐ Summer	
Person In-Charge		
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☒ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify:	

Workload

		Lecture	Lab	Project	Internship	Thesis
	Credit	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/4.64 ECTS
Requirements for taking the course	☒ None ☐ Prerequisite course: ☐ Parallel course: ☐ Previous course:
Course objectives	To explain basic principles of biocompatibility and implants performance, review different strategies to modify and/or design materials that are biocompatible.

Also, this course will explain what biodegradability is and how it affects biomaterial design. These allow students to understand material selection and structure-function relationships and read, understand and assimilate papers, publications and lectures in the biomaterials. Student will obtain enough knowledge to develop analysis and critical-thinking skills for the evaluation of relevant literature.

Course learning outcomes

Upon the successful completion of this course, students will be able to:

Competency level[1]	**Course learning outcome (CLO)**
Knowledge	CLO1. Give the definition of a biomaterial. [Understanding] CLO2. Describe the structure and composition of naturally occurring biomaterials, such as tooth enamel, bone, collagen, skin etc. [Remembering] CLO3. Describe methods of manufacture of the different types of materials used in medicine and biosciences, their properties and their suitability for a particular function. [Remembering] CLO4. Describe methods of modifying surfaces and their impact on the material/biological interface. [Remembering] CLO5. Describe physical techniques used in biomaterials research, such as x-ray photoelectron spectroscopy, electron microscopy, scanning probe microscopy, force microscopy and quartz crystal resonance and apply these to qualitatively and quantitatively derive information about how materials interact with biological systems. [Remembering]
Skill	CLO6. Derive mathematical expressions relating to material stress, strain and viscoelastic properties and describe and quantify failure mechanisms. [Guided response]
Attitude	CLO7. Participate in a group research project and present the results of this project in a professional manner. [Responding to phenomena]

Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	**Topic**	**Weight**	**Level**
1	Course introduction	1	I, T

	2	Polymers: Polymer synthesis, Polymer characterization	2	T, U
	3	Biodegradable polymers: chemistry of hydrolysis, degradation mechanisms	1	T, U
	4	Hydrogels: hydrogel structure and crosslinking, hydrogel swelling and characterization	2	T
	5	Hydrogels: Polyelectrolyte swelling and applications	2	T, U
	6	Adhesives and coatings: Natural polymers and adhesion; Surface treatments and analysis	2	T
	7	Biomaterial analysis: Thermal & Advanced mechanical analysis	1	T, U
	8	Biologic Recognition: Protein adsorption; Engineered recognition	1	T, U
	9	Biologic Response: Thrombosis/Blood compatibility; Tissue compatibility and testing	0.5	I, T
Examination forms	☐ Multiple-choice questions ☐ Report ☒ Presentation ☐ Assignments ☐ Oral examination ☒ Written examination ☐ Others, please specify: ……			
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	**I. Textbooks** 1. Encyclopedia of Biomaterials and Biomedical Engineering. Editors, Gary E. Wnek, Gary L. Bowlin. Informa Healthcare Publishing, 2008 2. Biomaterials Science: An Introduction to Materials in Medicine, eds. Ratner, B.D. et al. 2nd Ed. 2004. 3. Biomaterials: An Introduction, Park JB. 2007, 3rd Edition. (full text available online) 4. Materials Science and Engineering: An Introduction, Callister, W.D.Jr. 2002. 6th Ed. 5. Principles of Polymer Chemistry, Flory, Paul J., 1953. 6. Tissue engineering. Editors, Bernhard O. Palson, Sangeeta N. Bhatia. Prentice Hall Publishing. 2004 **II. References**			

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-7) and Intended Learning Outcomes (ILO) (1-10) of the EV program is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2	1									
	3	1									
	4	1									
	5	1									
Skills (Level: 1-7)	6							3			
Attitudes (Level: 1-5)	7										2
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	1.2	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	2.0
L,M,H conversion*		L						M			L

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Course introduction	1,2	HW	Lecture	
2.	2&3	Polymers: Polymer synthesis, Polymer characterization	3	HW	Lecture	
3.	4&5	Biodegradable polymers: chemistry of hydrolysis, degradation mechanisms	3	HW	Lecture	
4.	6	Hydrogels: hydrogel structure and crosslinking, hydrogel swelling and characterization	3	HW	Lecture	
5.	7	Hydrogels: Polyelectrolyte swelling and applications	3	HW	Lecture	
6.	8	Adhesives and coatings: Natural polymers and adhesion; Surface treatments and analysis	3,4	HW	Lecture	
7.	9-10	Midterm exam				
8.	11	Biomaterial analysis: Thermal & Advanced mechanical analysis	5			
9.	12	Biologic Recognition: Protein adsorption; Engineered recognition	4	HW	Lecture	
10.	13	Biologic Response: Thrombosis/Blood compatibility; Tissue compatibility and testing	3	HW	Lecture	
11.	14	Controlled Release: Membrane systems; Swellable systems	3	HW	Lecture	

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
12.	15	Micro and nanoparticle systems: Overview; Stealth systems	3	HW	Lecture	
13.	16	Special Topics Presented by Students	7		Presentation	
14.	17	Special Topics Presented by Students	7		Presentation	
15.	18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
HW/Presentation (30%)		>50%pass		>50%pass			
Midterm exam (30%)		>50%pass	>50%pass				
Final exam (40%)				>50%pass	>50%pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Applied Statistics
(Thống kê ứng dụng)
Course Code: ENEE1019IU

1. General information

Course designation	This course is designed for students pursuing a degree in chemical/environmental engineering and provides knowledge on statistical data, plotting data, descriptive statistics, probability and distribution, hypothesis test, T-test, analysis of variance (ANOVA), time series analysis and forecasting.	
Semester(s) in which the course is taught	1,2	
Person responsible for the course	Dr. Tran Thanh Tu, tttu@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson	
Workload		
Credits/ECTS	2 credits/ 3.09 ECTS	
Requirements for taking the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE1020IU Applied Statistics Lab ☒ Previous course: Introduction to Computing (ENEE2017IU)	

		Lecture	Lab	Project	Internship	Thesis
Credit	2	2				
ECTS	3.09					
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

<table>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge about statistical data, plotting data, descriptive statistics, probability and distribution, hypothesis test, T-test, analysis of variance (ANOVA), time series analysis and forecasting.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Interpret the principles of data and statistics, plotting and smoothing data, descriptive statistics; discrete probability distributions, continuous probability distributions, sampling and sampling distributions in chemical/environmental statistical analyses. [2-Understanding]
CLO2. Apply hypothesis testing and decision making, paired t-Test and independent t-Test, Analysis of Variance (ANOVA) as well as time series analysis and forecasting in chemical/environmental statistical analyses. [3-Applying]</td></tr>
<tr><td>Skill</td><td>CLO3. Proceed exercises related to data plotting and smoothing, descriptive statistics, probability distributions in chemical/environmental statistical analyses. [2-Set]
CLO4. Show the difference of hypothesis tests, the importance of ANOVA, time series analysis and forecasting in chemical/environmental statistical analyses. [2-Set]</td></tr>
<tr><td>Attitude</td><td>CLO5. Follow the ethical guidelines in chemical/environmental statistical practices. [3-Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1.</td><td>Introduction to Data and Statistics</td><td>1</td><td>T,U</td></tr>
<tr><td>2.</td><td>Plotting and Smoothing data</td><td>1</td><td>T,U</td></tr>
<tr><td>3.</td><td>Descriptive statistics</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	4.	Probability and Distribution	1	I,T
	5.	Hypothesis tests	1	I,T
	6.	t-Tests	1	I,T
	7.	Analysis of Variance (ANOVA)	2	I,T
	8.	Time series analysis and forecasting	2	I,T

Examination forms	☒ Multiple-choice questions ☐ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the theory session and 100 percent is compulsory for the labwork session. Students will be assessed based on their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	[1] Paul Mac Berthouex. Linfield C. Brown, *Statistics for Environmental Engineers, 2nd Edition.* Lewis Publishers, 2002. [2] Nathabandu T. Kottegoda and Renzo Rosso, *Applied Statistics for Civil and Environmental Engineers, 2nd Edition*. Blackwell publishing, 2008. [3] Yuri A.W.Shardt, *Statistics for Chemical and Process Engineers: A Modern Approach,* Springer, 2015. [4] David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Jeffrey D. Camm, James J. Cochran, *Statistics for Business & Economics, 13th Edition.* Cengage Learning, USA, 2017.	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**								
		Knowledge		Skills						Attit
		1	2	3	4	5	6	7	8	9
Knowledge (Level: 1-6)	1	2								
	2	3								
Skill (Level: 1-7)	3			2						
	4				2					
Attitudes (Level: 1-5)	5									3
Contribution of CLOs to ILOs										
Bloom's Taxonomy	AVE	2.5	0.0	2.0	2.0	0.0	0.0	0.0	0.0	3.0
L,M,H conversion *		L		L	L					M

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Introduction to Data and Statistics	1,5	Quiz1	Lecture, Discussion, Quiz	[1] Chapter 1,2 [4] Chapter 1
2.	2	Plotting and Smoothing data	1,3	HW1	Lecture, Discussion, Homework	[1] Chapter 3,4 [3] Chapter 1 [4] Chapter 2
3.	3	Descriptive statistics	1,3		Lecture, Discussion	[1] Chapter 5,6 [3] Chapter 1 [4] Chapter 3
4.	4	Probability and Distribution	1,3	HW2	Lecture, Discussion, Homework	[2] Chapter 2,3,4 [4] Chapter 4,5,6
5.	5	Hypothesis tests	2,4	Quiz2	Lecture, Discussion, Quiz	[1] Chapter 16 [2] Chapter 5 [3] Chapter 2 [4] Chapter 9
6.	6	t-Tests	2,4	HW3	Lecture, Discussion, Homework	[1] Chapter 17,18 [4] Chapter 9
7.	7	Analysis of Variance (ANOVA) (part 1)	2,4		Lecture, Discussion	[1] Chapter 24 [2] Chapter 6 [4] Chapter 13
8.	8	Analysis of Variance (ANOVA) (part 2)	2,4	HW3	Lecture, Discussion, Homework	[1] Chapter 25 [4] Chapter 13
9.	9	Midterm		A1		
10.	9	Time series analysis and forecasting (part 1)	2,4		Lecture, Discussion	[1] Chapter 53 [3] Chapter 5 [4] Chapter 17
11.	10	Time series analysis and forecasting (part 2)	2,4	HW4	Lecture, Discussion, Homework	[1] Chapter 53 [3] Chapter 5 [4] Chapter 17
		No class				
		Reserved week				
12.	17	Final exam		A2		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class Quiz and homework (HW) (30%)	HW1 Quiz1 60%Pass (R5.1)	HW3 Quiz2 60%Pass (R5.1)	HW2 60%Pass (R5.1)	HW4 60%Pass (R5.1)	Quiz1 60%Pass (R5.1)
Midterm exam (A1) (30%)	A1. Part I 60%Pass (R5.2)		A1. Part II 60%Pass (R5.2)		
Final exam (A2) (40%)		A2. Part I 60%Pass (R5.2)		A2. Part II 60%Pass (R5.2)	

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

5.1 Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2 Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts

	Capstone	Milestone		Benchmark
	4	3	2	1
			than one's own (or vice versa).	when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	General Information	Reduce the credit of course to 2 (theory only) due to the separating of Lab works to a new course	May 26th, 2023	Dr. Tran Thanh Tu
2	General Information	Add Parallel course: ENEE1020IU Applied Statistics Lab		
3	Assessment plan	Revise assessment plan according to the changes in CLOs.		
4	Rubrics	Add rubric for presentation assessment		
5	Course learning outcomes	Add detail of Bloom taxonomy	June 13th, 2023	Dr. Tran Thanh Tu
6	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
7	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
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School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Applied Statistics Lab
(Thực hành Thống kê ứng dụng)
Course Code: ENEE1020IU

1. General information

Course designation	This course is designed for students pursuing a degree in chemical/environmental engineering and provides knowledge and skills in using Python/R software for plotting data, descriptive statistics, hypothesis test, T-test, analysis of variance (ANOVA), time series analysis and forecasting.	
Semester(s) in which the course is taught	1,2	
Person responsible for the course	Dr. Tran Thanh Tu, tttu@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works	
Workload		
Credits/ECTS	1 credits/ 2.00 ECTS	
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE1019IU Applied Statistics ☒ Previous course: Introduction to Computing (ENEE2017IU)	

		Lecture	Lab	Project	Internship	Thesis
Credit	1	0	1			
ECTS	2.00					
Contact hours	**25**	0	25	0	0	0
Self-Study hours	**30**	0	30	0	0	0
Total workload	**55**	0	55	0	0	0

<table>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge and skills about using Python/R software to analyze chemical/environmental statistical data, plotting data, test hypothesis, conduct analysis of variance (ANOVA), time series analysis and forecasting.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Explain the application of Python/R software in plotting, smoothing, analyzing chemical/environmental data. [2-Understanding]
CLO2. Use Python/R software in chemical/environmental hypothesis tests and time series data analysis. [3-Applying]</td></tr>
<tr><td>Skill</td><td>CLO3. Display codes in Python/R to plot, smooth data and show descriptive statistics of chemical/environmental data. [2-Set]
CLO4. Proceed programming in Python/R for chemical/environmental hypothesis tests and time series data analysis. [2-Set]</td></tr>
<tr><td>Attitude</td><td>CLO5. Follow the ethical integrity in Python/R programming. [3-Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1.</td><td>Data with Python/R</td><td>1</td><td>I, T</td></tr>
<tr><td>2.</td><td>Graphics with Python/R</td><td>1</td><td>I, T</td></tr>
<tr><td>3.</td><td>Statistical analyses with Python/R (part 1)</td><td>1</td><td>I, T</td></tr>
<tr><td>4.</td><td>Statistical analyses with Python/R (part 2)</td><td>1</td><td>T, U</td></tr>
<tr><td>5.</td><td>Programming with Python/R in practice (Hypothesis tests)</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	6.	Programming with Python/R in practice (Regression models)	1	T, U

Examination forms	☒ Multiple-choice questions ☐ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☐ Written examination ☒ Others, please specify: Lab work (coding)
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the theory session and 100 percent is compulsory for the labwork session. Students will be assessed based on their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	[1] Yosef Cohen and Jeremiah Y. Cohen, *Statistics and data with R - An applied approach through examples*. John Wiley & Sons, 2008. [2] C. Reimann, P. Filzmoser, R. G. Garrett, R. Dutter, *Statistical Data Analysis Explained: Applied Environmental Statistics with R*. John Wiley & Sons, 2008. [3] Thomas Haslwanter, *An Introduction to Statistics with Python with Applications in the Life Sciences*, Springer, 2016. **Software:** [1] The R Foundation for Statistical Computing (2019), *R 3.5.3*. (https://cran.r-project.org/) [2] https://www.python.org/	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2	3									
Skill (Level: 1-7)	3			2							
	4				2						
Attitudes (Level: 1-5)	5									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.5	0.0	2.0	2.0	0.0	0.0	0.0	0.0	3.0	0.0
L,M,H conversion *		L		L	L					M	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	11	Data with Python/R	1,3		Discussion, Coding	[1] Chapter 1,2 [2] Chapter 2 [3] Chapter 3
2.	12	Graphics with Python/R	1,3	Quiz1	Discussion, Coding, Quiz	[1] Chapter 3 [2] Chapter 3 [3] Chapter 4
3.	13	Statistical analyses with Python/R (part 1)	1,3	CE1	Discussion, Coding, Quiz	[1] Chapter 4,5,6 [2] Chapter 4 [3] Chapter 6
4.	14	Statistical analyses with Python/R (part 2)	2,4	Quiz2	Discussion, Coding, Quiz	[1] Chapter 10 [2] Chapter 9 [3] Chapter 7
5.	15	Programming with Python/R in practice (Hypothesis tests)	2,4		Discussion, Coding	[1] Chapter 14,15 [2] Chapter 16 [3] Chapter 11
6.	16	Programming with Python/R in practice (Regression models)	2,4,5	CE2	Discussion, Coding	CE1,2
7.	17	Final exam		A		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class Quiz (20%)	Quiz1 (R5.1) 60%Pass	Quiz2 (R5.1) 60%Pass	Quiz1 (R5.1) 60%Pass	Quiz2 (R5.1) 60%Pass	
Coding exercise (CE) (40%)	CE1 (R5.2) 60%Pass	CE2 (R5.2) 60%Pass	CE1 (R5.2) 60%Pass	CE2 (R5.2) 60%Pass	CE2 (R5.2) 60%Pass
Final exam (A) (40%)		A (R5.3) 60%Pass			A (R5.3) 60%Pass

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Rubric for lab work assessment

		Level					
Criteria	**% contribute**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Preparation for the lab	5	Prepare well, answer all questions correctly					Not prepare well, could not answer correctly 50% questions
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Coding skills during the classes (arrange the data, correct commands, fix bugs, etc.)	70	Correct in procedures for data input, write command, fix bugs					Incorrect in procedures for data input, write command, fix bugs
5. Code submission (after the classes)	10	On time					No submission
Total	**100**						

5.3. Critical thinking value rubric for evaluating questions in exams

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts

	Capstone	Milestone		Benchmark
	4	3	2	1
				when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Create new course (due to the separating of Lab works from course: ENEE1019IU Applied Statistics)	May 26th, 2023	Dr. Tran Thanh Tu
2	Course learning outcomes	Add detail of Bloom taxonomy	June 13th, 2023	Dr. Tran Thanh Tu
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Fundamental of Analytical Chemistry**
(Cơ sở Hóa phân tích)

Course Code: **ENEE1017IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental field and provides a fundamental knowledge of analytical chemistry and some applications in environmental monitoring.	
Semester(s) in which the course is taught	3	
Person responsible for the course	Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture	

Workload (incl. contact hours, self-study hours)

		Lecture	Project	Internship	Thesis
Credit	**2**	2			
ECTS	**3.09**				
Contact hours	**25**	25	0	0	0
Self-Study hours	**60**	60	0	0	0

Credit points	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE1018IU Fundamental of Analytical Chemistry

<table>
<tr><td></td><td>☒ Previous course: CH011IU Chemistry for Engineers</td></tr>
<tr><td>Course objectives</td><td>The course will provide the basic principles of analytical chemistry including range and unit usage in analytical methods, errors in measurement and performance of analytical results. The course also introduces analytical techniques, from volumetric techniques to instrumental techniques with emphasis on techniques relevant to environmental analysis.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify a wide range of techniques used in analytical chemistry for environmental monitoring [1_Remembering]
CLO2. Apply chemical reactions of neutralization, precipitation, complexion and redox in analyzing ions or organic compounds [3_Apply]</td></tr>
<tr><td>Skill</td><td>CLO3. Explain acid-base, complexion, redox titration, UV-VIS and chromatography techniques to analyze qualitatively/quantitatively substances in water [2_Set]
CLO4. Display experimental data to describe result in analytical chemistry. [2-Set]</td></tr>
<tr><td>Attitude</td><td>CLO5. Select an analytical technique that is applied in environmental engineering [1_Recieving phenomena]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>Weight: lecture session 2.5 hour
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Fundamental of Analytical chemistry</td><td>1</td><td>I, T</td></tr>
<tr><td>Data handling in analytical chemistry</td><td>2</td><td>I, T</td></tr>
<tr><td>Chemical equilibria</td><td>2</td><td>I, T</td></tr>
<tr><td>Acid-base titration</td><td>1</td><td>T, U</td></tr>
<tr><td>Complexion titration</td><td>1</td><td>T</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	Redox titration	1	T
	Introduction to spectrochemical analysis	1	T
	Introduction to chromatography	1	I, T

Examination forms	☒ Multiple-choice questions ☐ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	[1] Douglas A. Skoog, Donald M. West and F. James Holler, *Fundamentals of analytical chemistry*. 9th Edition, Cengage Learning, Inc., 2012. [2] Gary D. Christian, *Analytical chemistry*, 7th edition, Wiley, 2014.	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		1								
	2	3									
Skill (Level: 1-7)	3			2							
	4				2						
Attitudes (Level: 1-5)	5									1	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	1.0	2.0	2.0	0.0	0.0	0.0	0.0	1.0	0.0
L,M,H conversion *		M	L	L	L					L	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to fundamental of Analytical chemistry	1, 5	A1.1	Lecture, Discussion, In-class	[1].Chapter 1
2	Data handling in analytical chemistry _ Errors in chemical analyses	4	A1.2	Lecture, Discussion, In-class	[1].Chapter 2-4

Week	Topic	CLO	Assessments	Learning activities	Resources
				activities	
3	Data handling in analytical chemistry _ data interferences	4	A1.3	Lecture, Discussion, In-class activities	[1].Chapter 5-7 [2].Chapter 2
4	Chemical equilibria	2	A1.4	Lecture, Discussion, In-class activities	[2].chapter 3
5	Introduction to titration techniques	2	A1.5		
6	Acid-base titration	2, 3	A1.6	Lecture, Discussion, In-class activities	[1].Chapter 14,16 [2].Chapter 5.1
7	Complexion titration	2, 3	A1.7	Lecture, Discussion, In-class activities	[1].Chapter 17 [2].Chapter 5.1
8	Redox titration	2, 3	A1.8	Lecture, Discussion, In-class activities	[1].Chapter 17 [2].Chapter 5.1
9, 10	Midterm	1245	A2		
11	Introduction to spectrochemical analysis	3	A1.9	Lecture, Discussion, In-class activities	[1].Chapter 24, 26 [2].Chapter 7
12	Introduction to Chromatography	3	A1.10	Lecture, Discussion, Inclass activities, do report	[1].Chapter 23
13-17	No class				
18	Reserved week				
19	Final exam	234	A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	LO5
In-class activities (30%) (A1)	A1.1 (60% pass)	A1.4–A1.8 (60% pass)	A1.6-A1.10 (60% pass)	A1.2, A1.3 (60% pass)	A1.1 (60% pass)

Assessment Type	CLO1	CLO2	CLO3	CLO4	LO5
Midterm exam (30%) (A2)	A2.I (Q1-Q6) (50% pass)	A2.I (Q7-Q30) (50% pass)		A2.II (Q.01) (50% pass)	A2.II (Q.02) (50% pass)
Final exam (40%) (A3)		A3.I (50% pass)	A3.II (Q.01) (50%)	A3.II (Q.02) (50%)	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken

	Capstone	Milestone		Benchmark
	4	3	2	1
			Viewpoints of experts are taken as mostly fact, with little questioning.	as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

	VIETNAM NATIONAL UNIVERSITY HCMC **INTERNATIONAL UNIVERSITY** **School of Chemical and Environmental Engineering**

COURSE SYLLABUS

Course Name: **Fundamental of Analytical Chemistry Lab**

(Thực hành Cơ sở Hóa phân tích)

Course Code: **ENEE1018IU**

1. General information

<table>
<tr><td>Course designation</td><td colspan="2">This course is designed for students pursuing a degree in environmental field and provides fundamental skills of analytical chemistry and its application in environmental monitoring.</td></tr>
<tr><td>Semester(s) in which the course is taught</td><td colspan="2">III</td></tr>
<tr><td>Person responsible for the course</td><td colspan="2">Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn</td></tr>
<tr><td>Language</td><td colspan="2">English</td></tr>
<tr><td>Relation to curriculum</td><td>☐ General
☒Fundamental
☐Specialization
☐Project/Internship/Thesis</td><td>☒ Compulsory
☐ Elective</td></tr>
<tr><td>Teaching methods</td><td colspan="2">Lecture & labwork</td></tr>
<tr><td>Workload (incl. contact hours, self-study hours)</td><td colspan="2">
<table>
<tr><td></td><td></td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td>Credit</td><td>1</td><td>1</td><td></td><td></td><td></td></tr>
<tr><td>ECTS</td><td>2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>25</td><td>25</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>30</td><td>30</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td colspan="2">1 credit/2 ECTS</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td colspan="2">☐ None
☐ Prerequisite course
☒ Parallel course: ENEE1017IU_Fundamental of Analytical Chemistry
☒ Previous course: CH012IU_Chemistry Laboratory</td></tr>
</table>

<table>
<tr><td>Course objectives</td><td>This course aims to provide students with laboratory work including basic laboratory safety, usage of laboratory glassware, chemical preparation and volumetric and spectroscopic techniques in analyzing some basic environmental parameters.</td></tr>
<tr><td>Intended learning outcomes</td><td>
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate principle of volumetric and instrumental techniques in analyzing concentrations of acid-base, metal ions and redox substances [3_applying]</td></tr>
<tr><td>Skill</td><td>CLO2. Display chemical preparation used in the related experiment [2_Set]
CLO3. Reproduce a scientific report to describe analytical procedure and results collected from the related experiment [3_guided response]</td></tr>
<tr><td>Attitude</td><td>CLO4. Conform honesty in management of analytical data and laboratory safety for analytical chemistry [2_responding to phenomena]</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>Laboratory session (4.17 hours/weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Usage of basic tools in analytical chemistry and chemical preparation</td><td>1</td><td>I, T</td></tr>
<tr><td>Determine pH in water by titration</td><td>1</td><td>I, T</td></tr>
<tr><td>Determination of iron (II) in water by $K_2Cr_2O_7$ and $KMnO_4$ methods</td><td>1</td><td>I, T</td></tr>
<tr><td>Titration of hardness in Water by EDTA</td><td>1</td><td>I, T</td></tr>
<tr><td>Spectrophotometric determination of iron</td><td>1</td><td>I, T</td></tr>
<tr><td>Chromatography</td><td>1</td><td>I, T</td></tr>
</table>
</td></tr>
<tr><td>Examination</td><td>☒ Multiple-choice questions</td><td>☐ Oral examination</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

forms	☒ Report ☒ Presentation ☐ Assignments	☐ Written examination ☐ Others, please specify
Study and examination requirements	-Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course	
Reading list	[1] Fifield F.W. and Kealey D. *Principle and practice of Analytical Chemistry*. 5th Edition, Blackwell Science, Inc, USA, 2012. [2] Rice E.W., Baird R.B., and Eaton A.D., *Standard methods for the examination of water and wastewater*, 23rd, American Public Health Association, American Water Works Association, Water Environment Federation, 2017.	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2				2						
Skill (Level: 1-7)	3				3			3			
	4									2	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	2.5	0.0	0.0	3.0	0.0	2.0	0.0
L,M,H conversion *		M			L			M		L	

3. Planned learning activities and teaching methods

Week	Content	CLO	Assessment	Learning activities
1-10	No class			
11	Lab 1: Usage of basic tools in analytical chemistry and chemical preparation	1	A1	Observing, manipulating, and doing prelab and report
12	Lab 2: Determine pH in water by neutralization titration.	1,2,3,4	A2.1	Observing, manipulating, and doing prelab and report
13	Lab 3: Determination of iron (II) in water by	1,2,3,4	A2.2	Observing,

Week	Content	CLO	Assessment	Learning activities
	redox titration			manipulating, and doing prelab and report
14	Lab 4: Titration of hardness in Water by EDTA	1,2,3,4	A2.3	Observing, manipulating, and doing prelab and report
15	Lab 5: Determination of iron (II) with 1,10-phenanthroline method	1,2,3,4	A2.4	Observing, manipulating, and doing prelab and report
16	Lab 6: Chromatography	1,2,3,4	A2.5	Observing, manipulating, and doing prelab and report
	Final exam	1,2,3,4	**A3**	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Presentation (10%) (A1)	A1 (70%)			
Lab works (60%) (A2)	A2.1 - A2.5 (A2.I) (70%)	A2.1 - A2.5 (A2.II) (70%)	A2.1 - A2.5 (A2.III) (70%)	A2.1 - A2.5 (A2.IV) (70%)
Final exam (30%) (A3)	A3 (Q1-Q5) (60%)	A3 (Q6-Q10) (60%)	A3 (Q11-Q15) (60%)	A3 (Q16-Q20) (60%)

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and

	Capstone	Milestone		Benchmark
	4	3	2	1
	discussed in priority order.	implications) are identified clearly.	outcomes (consequences and implications) are identified clearly.	implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Environmental Chemistry 1**

(Hóa môi trường 1)

Course Code: **ENEE2002IU**

1. General information

Course designation	This course is designed for students who are pursuing a degree in environmental engineering or any other related fields such as environmental chemistry, environmental science.	
Semester(s) in which the course is taught	2	
Person responsible for the course	*Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn*	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	***Lecture***	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2				
ECTS	**3.09**					
Contact hours	**25.0**	25	0	0	0	0
Self-Study hours	**60.0**	60	0	0	0	0

Credit points	**02 credits/3.09 ECTS**

<table>
<tr><td>Required and recommended prerequisites for joining the course</td><td>☐ None
☐ Prerequisite course
☒ Parallel course: ENEE2010IU Environmental Chemistry 1 Lab
☒Previous course: ENEE1003IU Fundamental of Analytical Chemistry (recommended)</td></tr>
<tr><td>Course objectives</td><td>Students are provided fundamental understanding of water chemistry including natural processes and pollution problems to water that will serve the students as a basis in all common phases of practice and research on environmental engineering, water pollution control, management, and monitoring water resource quality.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Interpret properties and fate and some behaviors of pollutants in water [2_understanding]</td></tr>
<tr><td>Skill</td><td>CLO2. Follow fundamental theory, signification, and guided standard of analysis for solids, hardness, alkalinity, turbidity, DO, COD, BOD_5, nitrate, phosphate, sulfate, metal in water quality assessment [3-guided response]
CLO3. Reproduce a presentation of a selected topic to demonstrate problems of water quality [3-guided response]</td></tr>
<tr><td>Attitude</td><td>CLO4. Identify water resource conservation and environment protection to recognize the need for lifelong learning [1_receiving phenomena]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>Weight: lecture session (2.5 hours/weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Course introduction. Water quality</td><td>1</td><td>I, T</td></tr>
<tr><td>Contaminant behavior in the water environment</td><td>1</td><td>I, T</td></tr>
<tr><td>Major water quality parameters and applications: pH, Acidity – Alkalinity, Oxidation – reduction potential (ORP), Biochemical oxygen demand (BOD), chemical oxygen demand (COD), Total organic carbon, Turbidity, Color, Solid</td><td>3</td><td>T</td></tr>
<tr><td>Nutrients and odors: nitrogen, phosphorus and sulfur.</td><td>3</td><td>T, U</td></tr>
<tr><td>Behavior of metal species in the natural water.</td><td>1</td><td>T, U</td></tr>
<tr><td>Case study</td><td>1</td><td>I, T</td></tr>
</table></td></tr>
</table>

Examination forms	☒ Multiple-choice questions ☐ Report ☒ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify: Free-response questions
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	[1] Eugene R. Weiner. *Applications of Environmental Aquatic Chemistry – A Practical Guide*. 3rd Edition. CRC Press, 2013. [2] Patrick L. Brezonik and William A. Arnold, *Water chemistry*. Oxford University Press, 2011.	

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2			3							
Skill (Level: 1-7)	3							3			
	4										1
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	1.0
L,M,H conversion *		L		M				M			L

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods.

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Course introduction. Water quality introduction	1	A1.1	Lecture, Discussion, In class	[1] chapter 1 [2] chapter 2

Week	Topic	CLO	Assessments	Learning activities	Resources
2	Contaminant behavior in the water environment	1	A1.2	Lecture, Discussion, In class activities	[1] chapter 2 [2] chapter 3
3	Major water quality parameters and applications: pH, Acidity – Alkalinity, Oxidation – reduction potential (ORP)	2	A1.3	Lecture, Discussion, In class activities	[1] chapter 3 [2] chapter 4
4	Major water quality parameters and applications: Hardness, Dissolved oxygen, Biochemical oxygen demand, Chemical oxygen demand, Total organic carbon	2	A1.4	Lecture, Discussion, In class activities	[1] chapter 4 [2] chapter 3
5	Major water quality parameters and applications: Turbidity, color, solid	2	A1.5	Lecture, Discussion, In class activities	[1] chapter 5 [2] chapter 4
6	Nutrients and odors: Ammonia, nitrite and nitrate	2	A1.6	Lecture, Discussion, In class activities	[1] chapter 6 [2] chapter 5
7	Nutrients and odors: Phosphorus, eutrophication, and algae problems	2	A1.7	Lecture, Discussion, In class activities	[1] chapter 7 [2] chapter 6
8	Nutrients and odors: sulfide and hydrogen sulfide	2	A1.8	Lecture, Discussion, In class activities	[1] chapter 8 [2] chapter 7
9,10	Midterm	1,2	A2		
11	Behavior of metal species in the natural water	2	A1.9	Lecture, Discussion, In class activities	[1] chapter 8 [2] chapter 7
12	Present a selected topic	4	A1.10	Lecture, Discussion, In class activities	[1] chapter 9 [2] chapter 8
13-17	No class				
18	Reserved week				
19,20	Final exam	2,3,4	A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class activities (30%) (A1)	A1.1-A1.2 (>60% pass)	A1.3-A1.9 (>60% pass)	A1.10.I (>60% pass)	A1.10.II (>60% pass)

Assessment Type	CLO1	CLO2	CLO3	CLO4
Midterm exam (30%) (A2)	A2.I (>60% pass)	A2.II (>60% pass)		
Final exam (40%) (A3)		A3.I (>60% pass)	A3.II (>60% pass)	A3.II (>60% pass)

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	Capstone	Milestone		Benchmark
	4	3	2	1
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 14th, 2023	Dr. Ngo Thi Thuan
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Environmental Chemistry 1 lab**

(Thực hành hóa môi trường 1)

Course Code: **ENEE2010U**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering or other related fields such as environmental chemistry or environmental science and provides professional skills in environmental monitoring with emphasizing on analysis of compounds in water. Students will practice basic techniques for chemical analysis of common parameters to assess water quality.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, discussion, experiment, report	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**		2			
ECTS	**4**					
Contact hours	**50.0**	0	50	0	0	0
Self-Study hours	**60.0**	0	60	0	0	0

Credit points	2 credits/4 ECTS

<table>
<tr><td>Required and recommended prerequisites for joining the course</td><td>☐ None
☐ Prerequisite course
☒ Parallel course: ENEE2002IU Environmental Chemistry 1
☒ Previous course: ENEE1018IU Fundamental of Analytical chemistry Lab</td></tr>
<tr><td>Course objectives</td><td>Students will be provided professional skills and techniques to analyze common parameters in water quality assessment such as sample digestion, titration, spectroscopy, and distillation. Students will also be familiar with analytical devices such as UV-VIS, Kjeldahl system and further develop their scientific writing skills.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate the function of tools and their principle used in analyzing some basic parameters of water [3_Applying]</td></tr>
<tr><td>Skill</td><td>CLO2. Respond experiments of gravimetric, titration, UV-VIS, distillation, and digestion to analyze the basic parameters in drinking water [3_Guided response]
CLO3. Display a scientific report of water quality which is based on experimental data and explain possible errors as well as suggest improvement [3_Guided response]</td></tr>
<tr><td>Attitude</td><td>CLO4. Complete experiments of analyzing the water quality in a safe and ethical manner [3_valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4.17 hours/eight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Alkalinity in water</td><td>1</td><td>T</td></tr>
<tr><td>Total Iron in water</td><td>1</td><td>T</td></tr>
<tr><td>COD in water</td><td>1</td><td>T</td></tr>
<tr><td>DO, pH, turbidity with sensors</td><td>1</td><td>T</td></tr>
<tr><td>Solid/color in water</td><td>1</td><td>T</td></tr>
<tr><td>BOD in water</td><td>1</td><td>T</td></tr>
<tr><td>NH_3_N in water</td><td>1</td><td>T</td></tr>
<tr><td>NO_2_N in water</td><td>1</td><td>T</td></tr>
<tr><td>Orthophosphate in water</td><td>1</td><td>T</td></tr>
<tr><td>Total phosphor/nitrogen in water</td><td>1</td><td>T</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☒ Report ☐ Presentation ☐ Assignments	☐ Oral examination ☐ Written examination ☒ Others, please specify: Labwork
Study and examination requirements	-Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course	
Reading list	[1]. Rice E.W., Baird R.B., and Eaton A.D., *Standard methods for the examination of water and wastewater*, 23rd, American Public Health Association, American Water Works Association, Water Environment Federation, 2017 [2] Pradyot Patnaik, *Handbook of Environmental Chemical Pollutants in Air, Water, Soil and Solid Wastes*, CRC Press, USA, 1997. [3] Standard methods: ISO 17289:2014, ISO 5813:1983	

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2				2						
Skill (Level: 1-7)	3							3			
	4									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	2.0	0.0	0.0	3.0	0.0	3.0	0.0
L,M,H conversion *		M			L			M		M	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1,2	No class				
3	Lab orientation	1	A1	Discussion, Experiment, Write report	[1], [2]: part I
4	Alkalinity in water	1234	A2.1	Discussion, Experiment, Write report	[1]: SWEWW 2310B:2012; [2]: part I
5	Total iron in water	1234	A2.2	Discussion, Experiment, Write report	[1] SWEWW 3500-Fe.B.2012 [2]: part I
6	COD in water	1234	A2.3	Discussion, Experiment, Write report	[1]: SMEWW 5220B:2012 [2] Part I
7	DO, pH, turbidity with sensors	1234	A2.4	Discussion, Experiment, Write report	[3] ISO 17289:2014
8	Dissolved oxygen in water by Winkler method	1234	A2.5	Discussion, Experiment, Write report	[3] ISO 5813:1983
9,10	No class due to midterm				
11	BOD in water	1234	A2.6	Discussion, Experiment, Write report	[1] SMEWW 5220B:2012
12	Solid/color in water	1234	A2.7	Discussion, Experiment, Write report	[1] SMEWW 2540D:2012
13	NH_3_N in water	1234	A2.8	Discussion, Experiment, Write report	[1] SMEWW 4500 B:2012
14	NO_2_N in water in water	1234	A2.9	Discussion, Experiment, Write report	[1] SMEWW 4500-NO2B:2012
15	Orthophosphate & total phosphorus in water	1234	A2.10	Discussion, Experiment, Write report	[1] SMEWW 4500-P.D, E:2012
16	Lab work for final examination	123	A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Lab work (70%) (A1&A2)	A1 A2.1-A2.10 (R5.2_A) 60% Pass	A2.1-A2.10 (R5.2_B) 60%Pass	A2.1-A2.10 (R5.2_B) 60%Pass	A2.1-A2.10 (R5.2_C) 60%Pass
Final exam (30%) (A3)	A3 (R5.3-A) 60%Pass	A3 (R5.3-B) 60%Pass	A3 (R5.3-C) 60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	Capstone	Milestone		Benchmark
	4	3	2	1
			mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 14th, 2023	Dr. Ngo Thi Thuan
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Environmental Chemistry 2
(Hoá môi trường 2)
Course Code: ENEE2005IU

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides core knowledge in environmental monitoring with emphasizing on the chemistry of atmosphere and solid waste. The knowledge of this course will be helpful for students to explain fate and behaviors of typical compounds in solid waste and ambient air.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Ngo Thi Thuan, nnthuan@hcmiu.edu.vn Dr. Tran Thanh Tu, tttu@ hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, homework	
Workload		
Credits/ECTS	2 credits/ 3.09 ECTS	
Required and recommended prerequisites for joining the	☐ None ☐ Prerequisite course ☒ Parallel course: Environmental chemistry 2 Lab (ENEE2011IU) ☐ Previous course	

		Lecture	Lab	Project	Internship	Thesis
Credit	2	2				
ECTS	3,09					
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

<table>
<tr><td>course</td><td></td></tr>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge about basic concepts related to atmospheric chemistry, solid waste and solid waste chemistry as well as basic compositions of solid waste and relevant solid waste treatment methods. Through this unit, students will know how to use chemical reaction occurring in environment to identify origin of products in solid waste treatment and atmosphere.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply the fundamental knowledge related to the atmosphere and atmospheric chemistry and chemical reactions of common parameters in ambient air. [3-Apply]
CLO2. Demonstrate basic concepts related to solid waste and solid waste chemistry as well as basic compositions of solid waste and relevant solid waste treatment methods. Cal reactions of common parameters in ambient air. [3-Apply]</td></tr>
<tr><td>Skill</td><td>CLO3. Explain the origin of common parameters in ambient air from their sources and chemical reactions. [2-Set]
CLO4. Display chemical reaction occurring in environment to identify origin of products from solid waste treatment. [2-Set]</td></tr>
<tr><td>Attitude</td><td>CLO5. Discuss the effects of air pollution on human health to recognize need for lifelong learning in the field of air pollution control. [2-Responding to Phenomena]
CLO6. Present a sense of environmental protection in solid waste to ecosystem and human health. [2-Responding to Phenomena]</td></tr>
</table></td></tr>
<tr><td>3 Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
</table></td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td></td><td colspan="2"><table>
<tr><td>1.</td><td>Atmosphere and atmospheric chemistry</td><td>1</td><td>I, T</td></tr>
<tr><td>2.</td><td>Particles in the atmosphere</td><td>1</td><td>I, T</td></tr>
<tr><td>3.</td><td>Gaseous inorganic air pollutants</td><td>1</td><td>I, T</td></tr>
<tr><td>4.</td><td>Gaseous organic air pollutants</td><td>1</td><td>I, T</td></tr>
<tr><td>5.</td><td>Photochemical smog</td><td>1</td><td>I, T</td></tr>
<tr><td>6.</td><td>Classification, sources, component and characteristic of solid waste & hazardous waste</td><td>1</td><td>I, T</td></tr>
<tr><td>7.</td><td>Physical, chemical and biological properties of solid waste</td><td>1</td><td>I, T</td></tr>
<tr><td>8.</td><td>Chemistry in composting
Compost quality indicators</td><td>1</td><td>I, T</td></tr>
<tr><td>9.</td><td>Chemistry in biogas
Biogas purification</td><td>1</td><td>I, T</td></tr>
<tr><td>10.</td><td>Waste incineration
Waste-to-energy</td><td>1</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☒ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☒ Written examination
☐ Others, please specify</td></tr>
<tr><td>Other requirements</td><td colspan="2">Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">[1] Colin Baird, Michael Cann, Environmental chemistry. 5th edition, W. H. Freeman and Company, New York, 2012.
[2] Stanley E. Manahan, Environmental chemistry, 9th edition, Taylor and Francis Group, 2009.
[3] Roy M. Harrison, Principles of Environmental Chemistry, RSC Publishing, UK, 2007.
[4] William A. Worrell and P. Aarne Vesilind, Solid Waste Engineering 2nd edition. CENGAGE learning. USA, 2012.
[5] Pradyot Patnaik, Handbook of Environmental Chemical Pollutants in Air, Water, Soil and Solid Wastes, CRC Press, USA, 1997.
[6] Murray B. McBride, Environmental Chemistry of Soil, Oxford University Press, New York, 2012.
[7] L.F. Diaz, M. de Bertoldi, W. Bidlingmaier, Compost Science and Technology Vol.8. Elsevier. UK, 2007.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
Skill (Level: 1-7)	3			2							
	4			2							
Attitudes (Level: 1-5)	5										2
	6										2
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
L,M,H conversion *		M		L							L

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Course introduction. The atmosphere and atmospheric chemistry	1	A1.1	Lecture, Discussion, In class	[1] Chapter 1 [2] Chapter 2
2.	2	Particles in the atmosphere	1,3,5	A1.1	Lecture, Discussion, In class activities	[1] Chapter 2 [2] Chapter 3
3.	3	Gaseous inorganic air pollutants	1,3,5	A1.3	Lecture, Discussion, In class activities	[1] Chapter 3 [2] Chapter 4
4.	4	Gaseous organic air pollutants	1,3,5	A1.4	Lecture, Discussion, In class activities	[1] Chapter 4 [2] Chapter 3
5.	5	Photochemical smog	1,3,5	A1.5	Lecture, Discussion, In class activities	[1] Chapter 5 [2] Chapter 4
6.	6	Classification, sources, component and characteristic of solid waste & hazardous waste	2,4,6	A1.6	Lecture, Discussion, Homework	[4] Chapter 2

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
7.	7	Physical, chemical and biological properties of solid waste	2,4,6	A1.7	Lecture, Discussion, Homework	[5] Part 2 [6] Chapter 2
8.	8	Chemistry in composting Compost quality indicators	2,4,6		Lecture, Discussion, Homework	[4] Chapter 8 [7] Chapter 3,4
9.	**9,10**	**Midterm**	**1,3,5**	**A2**		
10.	11	Chemistry in biogas Biogas purification	2,4,6	A1.8	Lecture, Discussion, Homework	[7] Chapter 9
11.	12	Waste incineration Waste-to-energy	2,4,6		Lecture, Discussion, Homework	[4] Chapter 7
	18	Reserved week				
12.	**19,20**	**Final exam**	**2,4,6**	**A3**		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
In-class activities (30%) (A1)	A1.1-A1.4 (R5.1) (>70% pass)	A1.6,1.7 (R5.1) 60%Pass	A1.5 (R5.1) (>70% pass)	A1.8 (R5.1) 60%Pass		
Midterm exam (35%) (A2)	A2 (MCQ) (R5.2) (>60% pass)		A2 (FRQ1) (R5.2) (>60% pass)		A2 (FRQ2) (R5.2) (>60% pass)	
Final exam (35%) (A3)		A3.Part1 (Q11->20) A3.Part2 (Q1) (R5.2) 60%Pass		A3.Part2 (Q2) (R5.2) 60%Pass		A3.Part1 (Q1->10) (R5.2) 60%Pass

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	Capstone	Milestone		Benchmark
	4	3	2	1
	synthesized within position (perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 13th, 2023	Dr. Tran Thanh Tu
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Environmental Chemistry 2 Lab
(Thực hành Hóa môi trường 2)
Course Code: ENEE2011IU

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides professional skills in environmental monitoring with emphasizing on sampling and analysis of compounds in ambient air and solid waste. Students will practice basic techniques for chemical analysis of common parameters to assess solid waste's product and air quality.
Semester(s) in which the course is taught	2
Person responsible for the course	Dr. Ngo Thi Thuan, nnthuan@hcmiu.edu.vn Dr. Tran Thanh Tu, tttu@ hcmiu.edu.vn
Language	English
Relation to curriculum	☐ General ☒ Fundamental ☐ Specialization ☐ Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, discussion, experiment, report
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**		2			
ECTS	**4**					
Contact hours	**50.0**	0	50	0	0	0
Self-Study hours	**60.0**	0	60	0	0	0

Credit points	2 credits/4 ECTS
Required and recommended prerequisites for	☐ None ☐ Prerequisite course

<table>
<tr><td>joining the course</td><td>☒ Parallel course: Environmental chemistry 2 (ENEE2005IU)
☒ Previous course: ENEE1018IU Fundamental of Analytical chemistry Lab</td></tr>
<tr><td>Course objectives</td><td>Students will be provided with knowledge about sampling and analysis of compounds in solid waste and air pollutants in ambient air. Through this unit, students will know how to use basic techniques for chemical analysis of common parameters to assess solid waste's product and air quality.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Show function of each sampling tool and principle of analytical methods of TSP, NO_2, SO_2, O_3 and oxidizing agent [3_apply]
CLO2. Demonstrate sampling techniques and sampling tools for solid waste [3_apply]
CLO3. Explain principle of analytical method to analyze characteristics of solid waste [2_understand]</td></tr>
<tr><td>Skill</td><td>CLO4. Follow standard procedure to sampling and analyze SO_2, NO_2, O_3 and oxidizing agent levels in ambient air and write report based on experimental data [3_Guided response]
CLO5. Follow experiments to analyze substance concentration in solid waste and write report based on analysis [3_Guided response]</td></tr>
<tr><td>Attitude</td><td>CLO6. Join the air experiments in a safe and ethical manner. [3_valuing]
CLO7. Work the solid waste experiments in a safe and ethical manner [3_valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4.17 hours/weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Lab orientation</td><td>1</td><td>T,U</td></tr>
<tr><td>Meteorological measurement: humidity, wind, temperature, noise, radiation</td><td>1</td><td>T,U</td></tr>
<tr><td>Determination of total suspended particulates (TSP) in ambient air</td><td>1</td><td>T,U</td></tr>
<tr><td>Determination of Nitrogen dioxide in ambient air</td><td>1</td><td>T,U</td></tr>
<tr><td>Determination of Sulfur Dioxide in ambient air</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
</table>

	Determination of Ozone and other oxidizing agents in ambient air	1	T,U
	- Solid waste composition - Fertilizer sampling - Sample preparation	1	T,U
	- Moisture content - pH	1	T,U
	- Total carbon	1	T,U
	- Total nitrogen	1	T,U
	- Total phosphorus	1	T,U
	- Total kali	1	T,U

Examination forms	☒ Multiple-choice questions ☒ Report ☒ Presentation ☐ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	[1] James P. Lodge, JR., *Methods of Air Sampling and Analysis*, 2000. [2] Pradyot Patnaik, *Handbook of Environmental Chemical Pollutants in Air, Water, Soil and Solid Wastes*, CRC Press, USA, 1997. [3] M.R. Carter and E.G. Gregorich, *Soil Sampling and Methods of Analysis*, Taylor & Francis Group, LLC, CRC Press, USA, 2008. [4] Vietnam National Standard: TCVN 9461:2012, TCVN 9486:2018, TCVN10683:2015, TCVN 12597:2018, TCVN 13263-9:2020, TCVN 9294:2012, TCVN 8557:2010, TCVN 8563:2010, TCVN 8562:2010; TCVN 7878-1,2:2008; TT 26/2016/TT-BYT	

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
Skill (Level: 1-7)	3	2									
	4				3						
Attitudes (Level: 1-5)	5				3						
	6									3	
	7									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.7	0.0	0.0	3.0	0.0	0.0	0.0	0.0	3.0	0.0
L,M,H conversion *		L			M					M	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1,2	**No class**				
3	Lab orientation	1	A1.AA	Discussion	[1] &[2] Part I
4	Meteorological measurement: humidity, wind, temperature, noise, radiation	4,6	A1.AA	Discussion, Experiment, Write report	[4] TCVN 7878-1,2:2008; TT 26/2016/TT-BYT
5	Determination of TSP in ambient air	4,6	A1.AA	Discussion, Experiment, Write report	[1] Part II (501)
6	Determination of Nitrogen dioxide in ambient air	4,6	A1.AA	Discussion, Experiment, Write report	[1] Part II (406)
7	Determination of Sulfur Dioxide in ambient air	4,6	A1.AA	Discussion, Experiment, Write report	[1] Part II (704A)
8	Determination of Ozone in ambient air	4,6	A1.AA	Discussion, Experiment, Write report	[1] Part II (417)
9,10	Midterm				
11	- Solid waste	2,3,5,7	A1.SW	Discussion,	[2] Part 1

Week	Topic	CLO	Assessments	Learning activities	Resources
	composition - Fertilizer sampling - Sample preparation			Experiment, Write report	[3] Chapter 2 [4] TCVN 9461:2012, TCVN 9486:2018, TCVN 10683:2015
12	- Moisture content - pH	2,3,5,7	A1.SW	Discussion, Experiment, Write report	[2] Part 1 [4] TCVN 12597:2018, TCVN 13263-9:2020
13	- Total carbon	2,3,5,7	A1.SW	Discussion, Experiment, Write report	[2] Part 1 [4] TCVN 9294:2012
14	- Total nitrogen	2,3,5,7	A1.SW	Discussion, Experiment, Write report	[2] Part 1 [4] TCVN 8557:2010
15	- Total phosphorus	2,3,5,7	A1.SW	Discussion, Experiment, Write report	[2] Part 1 [4] TCVN 8563:2010
16	- Report and Presentation	2,3,5,7	A1.SW	Submit report and present results	
17,18	**Reserved week**				
19,20	**Final exam**		**A2**		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7
Lab works (70%) (A1.AA, A1.SW)	A1. AA (R5.2_A) 70%Pass	A1.SW (R5.2-A) 70%Pass	A1.SW (R5.2-A) 70%Pass	A1.AA (R5.2-B) 70%Pass	A1.SW (R5.2-B) 70%Pass	A1.AA (R5.2-C) 70%Pass	A1.SW (R5.2-C) 70%Pass
Final exam (30%) (A2)	A2 Part 1 (Q.1-Q10, R5.1) 60% Pass		A2.Part1 (Q11->20) (R5.1) 60%Pass	A2 Part 2 (Q1, R5.1) 60% Pass	A2.Part2(Q2) (R5.1) 60%Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

	Capstone	Milestone		Benchmark
	4	3	2	1
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 13th, 2023	Dr. Ngo Thi Thuan Dr. Tran Thanh Tu
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Mechanics of Materials**

Course Code: **ENEE2024IU**

1. General information

Course designation	This course aims to introduce the students to Internal loading, axial force, shear, a moment in structural members; stress, strain, and stress-strain relations; mechanical properties of the material; strain energy; bending of singly symmetric beams; combined loadings; stress and strains transformations, principal stresses and strains, stress, strain, and stress-strain relationship; design of beams.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Nguyễn Bá Quang Vinh (PhD)	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, presentation, discussion, and assignments	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2				
Contact hours	**25.0**	25	0	0	0	0
Self-Study hours	**60.0**	60	0	0	0	0
Total workload	**85.0**	85	0	0	0	0

Credit points	2
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course

<table>
<tr><td>Course objectives</td><td>The aim of this course is to
- Describe equilibrium equations, geometrical properties of a sectional area, internal force, moment diagrams for 2-D frames, beams, bars…
- Recognize behaviour of materials under loading in the tension test, mechanical properties of materials, allowable stress and some simple connections.
- Explain stress developed within structure member subjected individually by normal force, shear force, bending moments, or torsion either, and stress distribution in member subjected combined loading.
- Analysis of beams, deformation of structure member under axial loading, torsion, or bending, and critical load on elastic and inelastic buckling of columns.
- Practice to solve statically indeterminate problems.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1 (2 Understanding). Understanding in the mathematics and basic sciences required to solve structural engineering and mechanics problems.</td></tr>
<tr><td>Skill</td><td>CLO2 (4 Mechanism). Demonstrating the ability to organize, approach, and solve engineering problems that are multi-step problems in which the solutions are not visible at the beginning of the process.</td></tr>
<tr><td>Attitude</td><td>CLO3 (5 Characterization). Work independently and professionally</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>2</td><td>I</td></tr>
<tr><td>Geometric properties</td><td>1</td><td>T, U</td></tr>
<tr><td>Internal loadings</td><td>1</td><td>T, U</td></tr>
<tr><td>Stress and Strain</td><td>1</td><td>T, U</td></tr>
<tr><td>Axial Load</td><td>2</td><td>T, U</td></tr>
<tr><td>Bending</td><td>2</td><td>T, U</td></tr>
<tr><td>Transverse Shear</td><td>1</td><td>T, U</td></tr>
<tr><td>Design of beams</td><td>1</td><td>T, U</td></tr>
<tr><td>Combined Loadings</td><td>1</td><td>T, U</td></tr>
<tr><td>Stress and Strain Transformation</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☒ Others, please specify: Constructed-response test</td></tr>
</table>

Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have GPA more than 50/100 points overall to pass this course.
Reading list	**Textbooks:** [1] R.C. Hibbeler, Statics and Mechanics of Materials, Fifth edition, Prentice Hall, 2019. **Additional references:** [2] James M Gere, Berry J Goodno, Mechanics of Materials, Seventh Edition, Cengage Learning, 2009

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1 -10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
Skill (Level: 1-7)	2			4							
Attitudes (Level: 1-5)	3									5	
Contribution of CLOs to ILOs											
Bloom's Taxanomy	AVE	2.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0
L, M, H conversion		L		M						H	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-2	Introduction Static	1,2, 3	Attendance Q&A	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 1
3	Geometric properties	1,2, 3	Attendance Q&A Homework 1	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 6
4	Internal loadings	1,2, 3	Attendance Q&A Homework 2	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 5
5	Stress and Strains	1,2, 3	Attendance Q&A Homework 3	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 7

Week	Topic	CLO	Assessments	Learning activities	Resources
6-7	Axial loading	1,2, 3	Attendance Q&A Homework 4	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 9
8-9	Mid examination		Writing		
10-11	Bending	1,2, 3	Attendance Q&A Homework 5	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 11
12	Transverse shear	1,2, 3	Attendance Q&A Homework 6	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 12
13	Design of beams	1,2, 3	Attendance Q&A Homework 7	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 15
14	Combined Loadings	1,2, 3	Attendance Q&A Homework 8	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 13
15-16	Stress and Strain Transformation	1,2, 3	Attendance Q&A Homework 9	Reading materials before class; Attending the lecture; Discussion;	[1] Chapter 14
17-18	Final examination		Writing		

4. Assessment plan

- The type of assessment is grading based on exam questions. The range of scores is from 0 to 100.
- The final GPA of students is integrated from 3 components, including progress assessment, mid-term exam, and final exam. The contribution of each component (in percentage) is shown in the table below.

No	Assessment Type (% contribute to GPA)	CLO1	CLO2	CLO3
1	**Progress Assessment (PA, 20%)**			
1.1	Class attendance (25% of PA)			Attended 80%Pass
1.2	In-class activity: Discussion and doing Quizzes in class (25% of PA)			Participated in class Q&A 60%Pass
1.3	Homework (50% of PA)			HW1-9, Submitted 80%Pass
2	**Midterm exam (Mid, 30%)**	Q1-4, 60%Pass	Q1-4, 60%Pass	

No	Assessment Type (% contribute to GPA)	CLO1	CLO2	CLO3
3	**Final exam (Fin, 50%)**	Q1-6, 60%Pass	Q1-6, 60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

- No

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Changed course code to ENEE2024IU	05/06/2023	Nguyen Ba Quang Vinh
2	Page 1	Reduced the credit of course to 2		
3	Page 2	Changed weight of lecture session to 2 hours in *Content*		
4	Pages 1, 2, 3, 4	Removed parts related to Torsion and buckling in *Course designatio , Content*		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: BASIC THEORY OF ENVIRONMENTAL STRUCTURES

Course Code: **ENEE2025IU**

1. General information

Course designation	*This course aims to introduce the students for analyzing, designing of some common structures in environmental engineering field. After this course the students familiarize themselves with analysis of internal forces, understand of design skills, and apply for real structures.*	
Semester(s) in which the course is taught	1, 2	
Person responsible for the course	MSc. Pham Nhan Hoa, pnhoa@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, Assignment	
Workload (incl. contact hours, self-study hours)		
Credit points	2 credits/3.09 ECTS	
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course	

		Lecture	Lab	Project	Internship	Thesis
Credit	2	2				
ECTS	3.09					
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

<table>
<tr><td>Course objectives</td><td>This course aims to introduce the students for analyzing engineering fundamental knowledge to design of environmental engingeering structures including reinforced concrete structures and steel structures in designing conrete water tanks, steel silos, and pipeline</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply engineering fundamental knowledge to design of environmental engingeering structures including reinforced concrete structures and steel structures
CLO2. Apply knowledge of theory of elasticity to determine internal forces. Apply knowledge of engineering drawing to show detailing of structures.</td></tr>
<tr><td>Skill</td><td>CLO3. Ability of team-working and communication</td></tr>
<tr><td>Attitude</td><td>CLO4. Work independently and professionally</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction To Civil Engineering</td><td>0.5</td><td>I,</td></tr>
<tr><td>Basic Areas in Civil Engineering</td><td>0.5</td><td>I</td></tr>
<tr><td>Materials of Construction</td><td>0.5</td><td>I</td></tr>
<tr><td>Structural analysis and design Steel Structures with SAP</td><td>2.5</td><td>T, U</td></tr>
<tr><td>Reinforced Concrete Analysis And Design</td><td>1.5</td><td>T, U</td></tr>
<tr><td>Steel Structures - In-Plane Bending Of Beams</td><td>2</td><td>T, U</td></tr>
<tr><td>Construction of Sub-Structures</td><td>1.5</td><td>T, U</td></tr>
<tr><td>Reservoir Tanks</td><td>2.5</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☒ Written examination
☐ Others, please specify: ……</td></tr>
<tr><td>Other requirements</td><td><u>Attendance</u>: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
<u>Assignments/Examination</u>: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	**I. Textbooks:** **[1]** C P Kaushik, S S Bhavikatti, Anubha Kaushik, "Basic Civil and Environmental Engineering", New Age International (P) Ltd., Publishers, 2010. **[2]** Pham Nhan Hoa, "Lecture Note,: STRUCTURAL ANALYSIS AND DESIGN WITH CIVIL ENGINEERING SOFTWARE", Sep 2019 **[3]** R.C. Hibbeler, "Structural Analysis", 9th Edition, Pearson Prentice Hall, US **[4]** W. H. Mosley, J. H. Bungey and R. Hulse, "Reinforced concrete design to Eurocode 2", PALGRAVE MACMILLAN, 7th Edition, 2012. [4.1] Eurocode 2: Design of Concrete Structures - Part 1-1: General rules and rules for buildings **[5]** Trahair, NS.; Bradford MA.; Nethercot DA. and Gardner, L. "The Behavior Design of Steel Structures to EC 3", 4th Edition, Taylor and Francis, 2007. [5.1] Eurocode 3 (BS EN 1993-1-1:2005) Part 1-1: Design of Steel Structures - GENERAL RULES and RULES OF BUILDINGS, British Standards Institution, London, UK. [5.2] Eurocode 3 (BS EN 1993-1-1:2005) Part 1-5: General rules - PLATED STRUCTURAL ELEMENTS, British Standards Institution, London, UK. [5.3] Eurocode 3 (BS EN 1993-1-1:2005) Part 1-8: Design of Steel Structures - DESIGNS OF JOINS, British Standards Institution, London, UK. **[6]** BRAJA M. DAS, KHALED SOBHAN, "Principles of Geotechnical Engineering", 9th Edition, Cengage Learning, 2018 **[7]** BRAJA M. DAS, "Principles of Foundation Engineering, SI", 7th Edition, Cengage Learning, 2011 **II. Reference books:** **[1a]** S. S. Bhavikatti, "Basic_Civil_Engineering", New Age International (P) Ltd., Publishers, 2010. **[5a]** Gardner, L. and Nethercot, D.A., "Designer's Guide to Eurocode 3: Design of Steel Structures", 3rd Edition, Thomas Telford, 2009

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
Skill (Level: 1-7)	3						3				
Attitudes (Level: 1-5)	4										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	5.0
L,M,H conversion *		M					M				H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduce Course's Contents And Requirements **BASIC CIVIL ENGINEERING** **Chapter 1. Introduction To Civil Engineering** 1.1. Civil Engineering Infrastructure Projects 1.2. Role of Civil Engineers Importance of an Interdisciplinary Approach	1, 4	Quiz1	Lecture, Discussion, Inclass-Quiz	[1].
2	**Chapter 2. Basic Areas in Civil Engineering**	3	Quiz2	Lecture, Inclass-Quiz,	[1].
3	**Chapter 3. Materials of Construction**	3	Quiz3	Lecture, Group work, Inclass-Quiz,	[1]
4-8	**Chapter 4. Structural analysis and design Steel Structures with SAP** 4.1 PART 1: CONTINUOUS BEAMS 4.2 PART 2: 2D FRAMES 4.3 PART 3: 3D FRAMES 4.4 PART 4: WALL RESISTING HYROSTATIC LOAD AND WATER TANK	2	HW1, HW2, Quiz4	Lecture, Group work, HW, Inclass-Quiz,	[1][2][3] [4][5]
9,10	Midterm				
11-13	**Chapter 5. Reinforced Concrete Analysis And Design** 5.1 Types Of Loads On Superstructures 5.2 Dead Loads 5.3 Imposed Loads (Il) 5.4 Wind Loads 5.5 Snow Loads 5.6 Earthquake Forces 5.7 Other Forces And Effects 5.8 Load Combinations 5.9 Types Of Construction 5.9 Composite Construction 5.10 Example	3	HW3, HW4, Quiz5	Lecture, Group work, HW, Inclass-Quiz,	[1][2][3] [4][5][6]
14	**Chapter 6 - Steel Structures - In-Plane Bending Of Beams** 6.1 Introduction 6.2 Design Procedure 6.3 In-Plane Bending of Beams 6.4 Example	3	HW5	Lecture, Group work	[1][2][3] [4][5][6]
15-16	**Chapter 7 - Construction of Sub-Structures** 7.1 Functions Of Foundation 7.2 Bearing Capacity 7.3 Types Of Shallow Foundations 7.4 Axial Load Of Pad Footing	3	HW6	Lecture, Discussion, HW	[2][3][4] [5][6][7]

Week	Topic	CLO	Assessments	Learning activities	Resources
	7.5 Example 7.6 Stability of Footing 7.7 Example				
17	**Chapter 8 - Reservoir Tanks** 8.1 Introduction 8.2 Reinforce concrete Water Tank 8.3 Example 8.4 Steel Water Tank 8.5 Example	3,4	HW7	Lecture, Discussion, HW	[2][3][4] [5][6][7]
18-19	Final exam		WRITING		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Class attendance (25% of PA)				Class attendance (25% of PA)
In-class activity: Discussion and doing Quizzes in class (25% of PA)				Participated in class Q&A 60%Pass
Homeworks (50% of PA)				HW1-7, Submitted 80%Pass
Midterm exam (20%)	Q1-4, 60%Pass	Q1-4, 60%Pass	Q1-4, 60%Pass	
Final exam (50%)	Q1-8, 60%Pass	Q1-8, 60%Pass	Q1-8, 60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored,	Issue/ problem to be considered critically is stated without clarification or description.

	Capstone	Milestone		Benchmark
	4	3	2	1
			boundaries undetermined, and/ or backgrounds unknown.	
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	Capstone	Milestone		Benchmark
	4	3	2	1
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/08/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
	Page 1-8	Change the number of credits from 3 Cr to 2 Cr Change to new template	14/06/2023	MSc. Pham Nhan Hoa

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **HEAT AND MASS TRANSFER**

Course Code: ENEE2014U

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides fundamental knowldege of physical processes in environmental engineering field, especially in mass and heat transfer.	
Semester(s) in which the course is taught	1	
Person responsible for the course	*Pham Thi Hoa*	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	*lecture, assignments, discussion*	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/ 4.64 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course

<table>
<tr><td>Course objectives</td><td>This course provides knowledge of diffusion phenomenon and transfer processes that influence natural and engineered environmental systems. Students will be able to evaluate species transport and transformations in these systems by mass transport, chemical kinetics, chemical equilibria and interfacial phenomena reactor engineering: adsorption, ion exchange, membrane separation, chemical oxidation, neutralization. In addition, students will be able to apply the basic principles of thermodynamics and heat transfer to perform calculations and explain thermal engineering application of heat exchangers.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. understanding of the principles of heat and mass transfer
CL02. Applied principles of heat and mass transfer in environmental system design</td></tr>
<tr><td>Skill</td><td>CLO3. Calculate the heat transfer problem for conduction, convection and radiation</td></tr>
<tr><td>Attitude</td><td>CLO4. Reason around ethical and responsibility of an engineer in providing design data.</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>1</td><td>U, T</td></tr>
<tr><td>First law and second law of thermodynamic and heat transfer</td><td>2</td><td>T</td></tr>
<tr><td>Conduction</td><td>2</td><td>T</td></tr>
<tr><td>One dimension conduction</td><td>3</td><td>T</td></tr>
<tr><td>Convection</td><td>2</td><td>T</td></tr>
<tr><td>Diffusion mass transfer</td><td>2</td><td>T</td></tr>
<tr><td>Radiation</td><td>1</td><td>T</td></tr>
<tr><td>Heat exchanger</td><td>1</td><td>I, T</td></tr>
<tr><td>Revision</td><td>1</td><td>U,T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☒ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☒ Others, please specify: Short answer questions</td></tr>
</table>

Study and examination requirements	*Requirements for successfully passing the module* Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	Textbook [1] Bergman, T. L., Incropera, F. P., DeWitt, D. P., & Lavine, A. S. (2017). *Fundamentals of heat and mass transfer 8 edition*. John Wiley & Sons. References [1] Warren L. McCabe (2005). *Unit Operations of Chemical Engineering,* Seventh Edition, Mc.Graw Hill Inc., New York. [2] Yunus A. Cengel (1997). *Heat Transfer: A Practical Approach,* 2nd Edition, WCB McGraw-Hill. [3] Kirk Othmer (2008). *Separation Technology*, 2nd Edition, Wiley-Intersciences. [4] Jaime Benitez (2009). *Principles and Modern Applications of Mass Transfer Operations*. 2nd Edition, Wiley-Intersciences.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1 -10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2					3					
Skill (Level: 1-7)	3			3							
Attitudes (Level: 1-5)	4						3				
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
L,M,H conversion *		L		M		M	M				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction	1		Lecture, Discussion,	[1]. 1

Week	Topic	CLO	Assessments	Learning activities	Resources
2-3	First and second law of thermodynamic and heat transfer	1, 4	Quiz 1	Lecture, Discussion, Inclass-Quiz	[1]. 1
4-5	Conduction	1, 4	Quiz 2	Lecture, Discussion, Inclass-Quiz	[1] . 2
6-8	One-dimension conduction	2	Quiz 3	Lecture, Discussion, Inclass-Quiz	[1]. 3
9	Midterm				
10-11	Convection	2	Quiz 5	Lecture, Discussion, Inclass-Quiz	[1]. 6
12-13	Diffusion mass transfer	2, 3	Quiz 6	Lecture, Discussion, Inclass-Quiz	[1]. 14
14	Radiation	2		Lecture, Discussion,	[1]. 12
15	Heat exchanger	2, 3	Quiz 7	Lecture, Discussion, Inclass-Quiz	[1]. 11
16	Revision			Review - test	
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (30%)	x	x	x	X
Midterm exam (30%)	x	x		X
Final exam (40%)		x	x	X

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.

1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/08/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Hydraulics for Environmental Engineering**

Course Code: **ENEE1011IU**

1. General information

Course designation	This course provides engineering students with fundamentals of fluid mechanics and its applications in environmental engineering. Fluid mechanics is a basic course for the civil and environmental engineering programs. The course will first cover the basic concepts in fluid mechanics such as fluid properties, hydrostatic forces on surfaces, buoyancy and flotation, and other principles governing fluids at rest or in motion. The students should be able to use this foundation for more in-depth topics in the second part of the course which are pipe flow hydraulics and open channel flow hydraulics. This course provide the students a good foundation to be able to tackle higher engineering courses related to the field of water engineering and handling of other fluids.
Semester(s) in which the course is taught	2
Person responsible for the course	Cabaltica Doliente Angeli, angeli.dc@hcmiu.edu.vn
Language	English
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, class discussion, quizzes, homeworks
Workload (incl. contact hours, self-study hours)	
Credit points	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☒ Parallel course: Hydraulics for Environmental Engineering Laboratory ☐ Previous course: MA001IU Calculus 1, PH013IU Physics 1 (Recommended)
Course objectives	This course aims to:

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2	0			
Contact hours	**25.0**	25	0	0	0	0
Self-Study hours	**60.0**	60	0	0	0	0
Total workload	**85.0**	85	0	0	0	0

<table>
<tr><td></td><td>
- provide students an understanding of the basic laws, principles and phenomena in the areas of fluid mechanics, pipe flow and open channel hydraulics;
- enable students to analyze and solve fluid mechanics problems, pipe flow (pressurized) problems, and open channel flow problems; and
- enable students to apply the acquired knowledge and skills in specialization courses and to solve related real-world engineering problems.
</td></tr>
<tr><td>Course learning outcomes</td><td>
Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Explain the basic principles of fluid mechanics including fluid properties, behavior of fluids at rest and in motions, and fluid flow in closed conduits and open channels [5 Evaluating].</td></tr>
<tr><td>Skill</td><td>CLO2. Carry out analysis and computations involved in fluid mechanics and hydraulics of closed conduits, and open channels [5 Complex Overt Response].</td></tr>
<tr><td>Attitude</td><td>CLO3. Work professionally whether independently or in a team [5 Characterization].</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>
The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1. Course Introduction</td><td>0.5</td><td>I</td></tr>
<tr><td>2. Fluid properties</td><td>1.5</td><td>I, T, U</td></tr>
<tr><td>3. Fluid statics</td><td>3</td><td>I, T, U</td></tr>
<tr><td>4. Fluid kinematics</td><td>2</td><td>I, T, U</td></tr>
<tr><td>5. Fluid dynamics</td><td>2</td><td>I, T, U</td></tr>
<tr><td>6. Steady incompressible flow in pipes</td><td>3</td><td>I, T, U</td></tr>
<tr><td>7. Open channels</td><td>1</td><td>I, T, U</td></tr>
<tr><td>8. Uniform flows in open channels</td><td>2</td><td>I, T, U</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>
☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☒ Written examination
☒ Others, please specify: Constructed response test
</td></tr>
<tr><td>Study and examination requirements</td><td>
Attendance: Students are expected to attend the lectures every week. University regulations indicate that if students attend less than 80% of scheduled classes they may be refused final assessment.
Quizzes (written or oral), and homeworks: are given regularly, whether individually or done by group, for the students to understand the concepts better and to improve their problem-solving skills.
Examinations: A midterm exam will be given halfway through the semester and a final exam at the end. Students must have an overall score of at least 50/100 points to pass this course.
</td></tr>
<tr><td>Reading list</td><td>
[1] Robert L. Mott. Applied fluid mechanics. Upper Saddle River, NJ : Prentice Hall ; London : Prentice-Hall International, 2000
[2] Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, Fundamentals of fluid mechanics John Wiley & Sons Inc. 2006.
</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	5									
Skill (Level: 1-7)	2			5							
Attitudes (Level: 1-5)	3									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0
L,M,H conversion *		H		H						H	

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Lecture

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Course introduction	1	Attendance, Q&A	Lecture, class discussion, self-study	[1], [2]
2	Fluid properties	1, 2,3	Attendance, Q&A, Quiz1	Lecture, class discussion, self-study	[1], [2]
3-5	Fluid statics	1, 2,3	Attendance, Q&A, Homework 1	Lecture, class discussion, group work, self-study	[1], [2]
6-7	Fluid kinematics	1, 2,3	Attendance, Q&A, Homework 2	Lecture, class discussion, self-study	[1], [2]
8	Fluid dynamics	1, 2,3	Attendance, Q&A,	Lecture, class discussion, self-study	[1], [2]
9	Midterm				
10-13	Steady incompressible flow in pipes	1, 2,3	Attendance, Q&A, Quiz 2, Homework 3	Lecture, class discussion, self-study	[1], [2]
14	Introduction to open channels	1, 2,3	Attendance Q&A, Homework 4	Lecture, class discussion, self-study	[1], [2]
15-16	Uniform flow calculations in open channels	1, 2,3	Attendance, Q&A, Quiz 3,	Lecture, class discussion, self-study	[1], [2]
17	Final exam				

4. Assessment plan

- The type of assessment is grading based on exam questions. The range of scores is from 0 to 100.
- The final GPA of students is integrated from 3 components, including progress assessment, mid-term exam, and final exam. The contribution of each component (in percentage) is shown in the table below.

No.	Assessment Type	CLO1	CLO3	CLO5
1	**Progress Assessment (30%)**			
1.1	Class Attendance			Attended 80%Pass
1.2	In-class activities: Participation in discussion, quizzes; Other activities: homeworks (10%)	Qz1-3, HW1-4 60%Pass	Qz1-3, HW1-4 60%Pass	
2	**Midterm Exam (30%)**	Q1-Q4 60%Pass	Q1-Q4 60%Pass	
3	**Final Exam (40%)**	Q1-Q4 60%Pass	Q1-4 60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1 Rubric for assessment of calculation and theory questions in exams, assignments, quizzes

Criteria	(%)	Scale				
		Very Good	Good	Satisfactory	Poor	Fail
		≥90	70≤ <90	50≤ <70	<50	0
Theory	30 - 40%	- Answers are all correct	- Most answers are correct	- More incorrect that correct answers	- Most answers are incorrect or irrelevant	- No answer
Calculations	60 - 70%	- At least 90% of calculations are correct, some minor mistakes in calculations due to carelessness but equations set up are correct	- About 70-90% of calculations are correct - answers to some items may be correct but incomplete	- Answered most of the required values but only about 50 to 70% are correct - answers to some items may be partially correct or incomplete	- most answers are wrong or irrelevant	- No answer
Total score:						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Changed course code to ENEE1011IU	01/6/2023	Cabaltica Doliente Angeli
2	Page 1	Revised course designation to remove the parts related to the lab.		
3	Page 1	Reduced the credit of course to 2		
4	Page 2	Added parallel course: ENEE1012IU Hydraulics for Environmental Engineering Lab		
5	Page 2	Adjusted CLO by removing the CLOs related to the lab in *Course Learning Outcomes*		
6	Page 2	Removed parts related to Lab in *Content*		
7	Page 2	Changed weight of lecture session to 2 hours in *Content*		
8	Page 2	Removed the parts related to the lab in *Study and examination requirements*		
9	Page 3	Changed Learning Outcomes Matrix to to reflect the change in the number of CLOs		
10	Page 3	Changed the CLO numbers in the planned learning activities and teaching methods		
11	Page 4	Changed Assessement Plan to to reflect the change in the number of CLOs		
12	Page 4	Added rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Hydraulics for Environmental Engineering Laboratory**

Course Code: **ENEE1012IU**

1. General information

Course designation	This course provides engineering students with fundamentals of fluid mechanics and its applications in environmental engineering. The students carry out experiments in the laboratory to understand well the principles of fluid mechanics and to know how to use the equipment for measuring flows.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Cabaltica Doliente Angeli, angeli.dc@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, class discussion, quizzes, homeworks, laboratory	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**	0	1			
Contact hours	**25.0**	0	25	0	0	0
Self-Study hours	**30.0**	0	30	0	0	0
Total workload	**55.0**	0	55	0	0	0

Credit points	1 Credits/2 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☒ Parallel course: Hydraulics for Environmental Engineering ☐ Previous course: MA001IU Calculus 1, PH013IU Physics 1 (Recommended)
Course objectives	This course aims to:

<table>
<tr><td></td><td>- provide students an understanding of the basic laws, principles and phenomena in the areas of fluid mechanics, pipe flow and open channel hydraulics through the conduct of laboratory experiments</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Conduct different experiments to investigate fluid properties, behavior of fluids in motions, and flow measurements in closed conduits and open channels [3 Applying].</td></tr>
<tr><td>Skill</td><td>CLO2. Perform analysis and calculations of laboratory data collected and prepare related laboratory reports [5 Complex Overt Response].</td></tr>
<tr><td>Attitude</td><td>CLO3. Work professionally whether independently or in a team [5 Characterization].</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Teaching levels: I (Introduce); T (Teach); U (Utilize)
Weight: laboratory session (4.17 hours)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1. Introduction; Reynolds Number</td><td>1</td><td>I, T, U</td></tr>
<tr><td>2. Flow Measurement Apparatus</td><td>1</td><td>T, U</td></tr>
<tr><td>3. Jet Trajectory and Flow Through an Orifice</td><td>1</td><td>T, U</td></tr>
<tr><td>4. Fluid Friction Apparatus</td><td>1</td><td>T, U</td></tr>
<tr><td>5. Discharge Over a Notch</td><td>1</td><td>T, U</td></tr>
<tr><td>6. Presentations</td><td>1</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☒ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☐ Others, please specify</td></tr>
<tr><td>Study and examination requirements</td><td>Students are expected to attend the practice every week. Students are divided into groups. Each group performs the laboratory and must prepare and submit a laboratory report, one week after the laboratoryexercise is done. Each group must do a final presentation of all their results during the last week.</td></tr>
<tr><td>Reading list</td><td>[1] Robert L. Mott. Applied fluid mechanics. Upper Saddle River, NJ : Prentice Hall ; London : Prentice-Hall International, 2000
[2] Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, Fundamentals of fluid mechanics John Wiley & Sons Inc. 2006.</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
Skill (Level: 1-7)	2				5			4			
Attitudes (Level: 1-5)	3									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	5.0	0.0	0.0	4.0	0.0	5.0	0.0
L,M,H conversion *		M			H			H		H	

3. Planned learning activities and teaching methods

Laboratory

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction; Reynolds Number	1, 2, 3	Conducting Lab Exer 1, Lab Report L01	Pre-lab discussions and demonstrations	[1], [2]
2	Flow Measurement Apparatus	1, 2, 3	Conducting Lab Exer 2, Lab Report L02	Pre-lab discussions and demonstrations	[1], [2]
3	Jet Trajectory and Flow Through an Orifice	1, 2, 3	Conducting Lab Exer 3, Lab Report L03	Pre-lab discussions and demonstrations	[1], [2]
4	Fluid Friction Apparatus	1, 2, 3	Conducting Lab Exer 4, Lab Report L04	Pre-lab discussions and demonstrations	[1], [2]
5	Discharge Over a Notch	1, 2, 3	Conducting Lab Exer 5, Lab Report L05	Pre-lab discussions and demonstrations	[1], [2]
6	Presentations	2, 3	Presentation		

4. Assessment plan

- The type of assessment is grading based on attendance in laboratory sessions, written lab report, and final presentation. The range of scores is from 0 to 100. The contribution of each component (in percentage) is shown in the table below.

No.	Assessment Type	CLO1	CLO2	CLO3
1	Laboratory Attendance (40%)	L01-L05 80%Pass		Attended 80%Pass
2	Laboratory Reports (40%)		L01-L05 60%Pass	L01-L05 60%Pass
3	Final Presentation (20%)			L01-L05 60%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1 Rubric for assessment of final grades

Criteria	Weight (%)	Scale				
		Very Good	Good	Satisfactory	Poor	Fail
		≥90	70≤ <90	50≤ <70	<50	0
Laboratory	40	- Complete attendance in laboratory sessions				- At least one absence from lab session
Lab reports	40	- Calculations are all correct - Discussions are provided and are correct - All parts of the report are present - Some minor mistakes	- Calculations are mostly correct - Discussions are provided but are only satisfactory - All parts of the report are present - Some minor mistakes	- Many mistakes in calculations - Discussions may be less relevant or incorrect - Some parts of the report are not present	- most calculations are wrong or irrelevant - insufficient or no discussion presented	- No submitted report
Final Presentation	20	- Separate Rubrics for presentation is provided (see 5.2)				
Total score:						

5.2 Rubric for assessment of presentations

Criteria	%	Scale				
		Very Good	Good	Satisfactory	Poor	Fail
		≥90	70≤ <90	50≤ <70	<50	0
Content	40	- Met objectives - Different parts of the report are sufficently covered - Amount of relevant information included in the report is sufficient - Quality of information is very good - Used various and reliable references/ sources				No presentation
Presentation skills	30	- Excellent use of English - Excellent use of time - Excellent handling of Q & A - Proper behavior				No presentation
Powerpoint quality	30	- Organization; clear and organized flow of presentation - Creativity and aesthetics - Overall impact				No presentation

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Changed course name to Hydraulics for Environmental Engineering Lab	01/6/2023	Cabaltica Doliente Angeli
2	Page 1	Changed course code to ENEE1012IU		
3	Page 1	Revised course designation to reflect separation from the theory class		
4	Page 1	Reduced the credit of course to 1		
5	Page 1	Added Parallel course: ENEE1011IU Hydraulics for Environmental Engineering		
6	Page 2	Revised *Course Objectives* to reflect separation from the theory class		
7	Page 2	Adjusted CLOs		
8	Page 2	Removed parts related to theory in *Content*		
9	Page 2	Changed examination form to Presentations		
10	Page 2	Revised *Study and examination requirements* to reflect separation from the theory class		
11	Page 2	Changed Learning Outcomes Matrix to to reflect the change in the number of CLOs		
12	Page 3	Removed contents related to theory class and changed the CLO numbers in the planned learning activities and teaching methods		
13	Page 3	Changed Assessment Plan to reflect the change in assessment types and the number of CLOs		
14	Page 3-4	Added rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
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School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Physical and Chemical Processes for Environmental Engineering**

Course Code: **ENEE2020IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides fundamental knowledge in chemical and physical processes of pollutants/contaminants removal from the environment.	
Semester(s) in which the course is taught	5	
Person responsible for the course	*Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn*	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	*Lecture*	

Workload (incl. contact hours, self-study hours)

		Lecture	Project	Internship	Thesis
Credit	**2**	2			
ECTS	**3.09**				
Contact hours	**25.0**	25	0	0	0
Self-Study hours	**60.0**	60	0	0	0

Credit points	2 credits/3.09 ECTS
Other requirements	☐ None ☐ Prerequisite course ☒Parallel course: ENEE1021IU Physical and Chemical processes for Environmental Engineering Lab

<table>
<tr><td></td><td>☒ Previous course: ENEE2002IU Environmental chemistry 1</td></tr>
<tr><td>Course objectives</td><td>Students are provided with mass balance, reaction kinetics to study physical and chemical processes in EE. In addition, principles, and calculations of physical and chemical processes for particle and soluble contaminant removal such as sedimentation, filtration, flocculation/coagulation, redox process, gas transfer will be discussed.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply mass balance and reaction kinetics to track pollutants' fate in environmental engineering [3_apply]
CLO2.Demonstrate principles of coagulation/flocculation, adsorption, ion exchange used in water and wastewater treatment plants [3_apply]</td></tr>
<tr><td>Skill</td><td>CLO3. Perform calculation of parameters in sedimentation, filtration, ion exchange, redox process/Fenton oxidation processes and gas transfer used in water and wastewater treatment plants [3_guided response]</td></tr>
<tr><td>Attitude</td><td>CLO4. Demonstrate ability to choose proper-process units for pollutants removal from water quality [3_Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>1. Theoretical session (2.7 hours/1 weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to physical and chemical processes in environmental engineering</td><td>1</td><td>I, T</td></tr>
<tr><td>Mass transfer of pollutants in environmental engineering</td><td>1</td><td>I, T</td></tr>
<tr><td>Coagulation/Flocculation</td><td>1</td><td>T</td></tr>
<tr><td>Ion exchange</td><td>1</td><td>T, U</td></tr>
<tr><td>Adsorption</td><td>1</td><td>T, U</td></tr>
<tr><td>Redox processes</td><td>2</td><td>T</td></tr>
<tr><td>Sedimentation</td><td>1</td><td>T</td></tr>
<tr><td>Filtration</td><td>1</td><td>T</td></tr>
<tr><td>Aeration and Stripping</td><td>1</td><td>I, T</td></tr>
</table>
2. Laboratory session (4.17 hours/1 weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
</table></td></tr>
</table>

	Coagulation/Flocculation	1	I, T
	Ion exchange	1	I, T
	Adsorption	2	I, T
	Redox processes	1	I, T
Examination forms	☒ Multiple-choice questions ☐ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify	
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	[1] John C. Crittenden, R. Rhodes Trussell, David W. Hand, Kerry J. Howe, George Tchobanoglous (2012). *Water treatment: principles and design.* 3rd edition, John Wiley & Sons, Inc. [2] Benjamin Lawler, Desmond F. Lawler (2013). *Water Quality Engineering/Physical /Chemical treatment process. Wiley.*		

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
Skill (Level: 1-7)	3			3							
Attitudes (Level: 1-5)	4										3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
L,M,H conversion *		M		M							M

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to physical and chemical processes in environmental engineering	1	A1.1	Lecture, Discussion, In class	[1] chapter 1 [2] chapter 2
2	Mass transfer in environmental engineering	1	A1.2	Lecture, Discussion, In class activities	[1] chapter 2 [2] chapter 3
3	Coagulation/Flocculation	2	A1.3	Lecture, Discussion, In class activities	[1] chapter 3 [2] chapter 4
4	Ion exchange	2	A1.4	Lecture, Discussion, In class activities	[1] chapter 4 [2] chapter 3
5	Adsorption	2	A1.5	Lecture, Discussion, In class activities	[1] chapter 5 [2] chapter 4
6	Redox processes	3	A1.6	Lecture, Discussion, In class activities	[1] chapter 6 [2] chapter 5
7	Advanced oxidation processes	3	A1.7	Lecture, Discussion, In class activities	[1] chapter 7 [2] chapter 6
8	Sedimentation	3	A1.8	Lecture, Discussion, In class activities	[1] chapter 8 [2] chapter 7
9,10	Midterm	1,2,4	A2		
11	Filtration	3	A1.9	Lecture, Discussion, In class activities	[1] chapter 9 [2] chapter 10
12	Aeration and Stripping	3	A1.10	Lecture, Discussion, In class activities	[1] chapter 10 [2] chapter 11
13-17	No class				
18	Reserved week				
19,20	Final exam	3,4	A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class activities (30%) (A1.1-A1.11)	A1.1, A1.2 (70% pass)	A1.3-A1.5 (70% pass)	A1.6-A1.10 (70% pass)	
Midterm exam (30%) (A2)	A2.I (Q.1-Q.10) (60% pass)	A2.I (Q.11-Q20) A2.II (60% pass) (60% pass)		A2.II (60% pass)
Final exam (40%) (A4)			A3.I (Q.1-Q20) A3.II (60% pass)	A3.II (60% pass)

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

	Capstone	Milestone		Benchmark
	4	3	2	1
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 14th, 2023	Dr. Ngo Thi Thuan
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Physical and Chemical Processes for Environmental Engineering Lab**

Course Code: **ENEE2021IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides experimental skills in demonstrating chemical and physical processes of pollutants/contaminants removal from the environment.
Semester(s) in which the course is taught	V
Person responsible for the course	*Dr. Ngo Thi Thuan, ntthuan@hcmiu.edu.vn*
Language	English
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	*Lecture, lab works*
Workload (incl. contact hours, self-study hours)	
Credit points	1 credit/2 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE2020IU Physical and chemical processes for EE ☒ Previous course: ENEE1010IU Environmental Chemistry 01 lab
Course	Students will experience some of these basic processes **of**

		Lab	Project	Internship	Thesis
Credit	**1**	1			
ECTS	**2**				
Contact hours	**25.0**	25	0	0	0
Self-Study hours	**30.0**	30	0	0	0

<table>
<tr><td>objectives</td><td>coagulation/flocculation, adsorption, ion exchange and redox by practicing in the laboratory to gain better understanding of theories and improve professional skills for future careers.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate principles of coagulation/flocculation, adsorption, ion exchange, redox process/Fenton oxidation processes by doing experiments [3_apply]</td></tr>
<tr><td>Skill</td><td>CLO2. Follow lab-scale experiments of coagulation/flocculation, adsorption, hardness removal and Fenton oxidation processes used in water treatment [3_Guided response]
CLO3. Reproduce a technical report to describe experiments of physical and chemical processes [3_Guided response]</td></tr>
<tr><td>Attitude</td><td>CLO4. Join the physical and chemical processes experiments in safe and ethnic manners [3_Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>Laboratory session (4.17 hours/1 weight)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Coagulation/Flocculation</td><td>1</td><td>I, T</td></tr>
<tr><td>Ion exchange</td><td>1</td><td>I, T</td></tr>
<tr><td>Adsorption</td><td>2</td><td>I, T</td></tr>
<tr><td>Redox processes</td><td>1</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☒ Report
☒ Presentation
☐ Assignments
☐ Oral examination
☒ Written examination
☐ Others, please specify</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] John C. Crittenden, R. Rhodes Trussell, David W. Hand, Kerry J. Howe, George Tchobanoglous. Water treatment: principles and design. 3rd edition, John Wiley & Sons, Inc., 2012
[2] Benjamin Lawler, Desmond F. Lawler. Water Quality Engineering/Physical /Chemical treatment process. Wiley, 2013.</td></tr>
</table>

Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
Skill (Level: 1-7)	2			3							
	3							3			
Attitudes (Level: 1-5)	4										3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0
L,M,H conversion *		M		M				M			M

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods.

Week	Content	CLO	Assessment	Learning activities
1-10	**No class**			
11	Lab 1: Lab orientation	1	A1	Observing, manipulating
12	Lab 2: Turbidity removal from water by coagulation process-Jar test experiments	1234	A2.1	Observing, manipulating, and doing prelab/report
13	Lab 3: Water Softening by ion exchange	1234	A2.2	Observing, manipulating, and doing prelab/report
14	Lab 4: Dye removal by adsorption: time equilibrium	1234	A2.3	Observing, manipulating, and doing prelab/report
15	Lab 5: Dye removal by adsorption: adsorption capacity	1234	A2.3	Observing, manipulating, and doing prelab/report
16	Lab 6: Dye removal from water by Fenton oxidation	1234	A2.4	Observing, manipulating, and doing prelab/report

Week	Content	CLO	Assessment	Learning activities
17	**Final exam**	**123**	**A3**	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Presentation (10%) (A1)	A1 (70%)			
Lab works (60%) (A2)	A2.1 - A2.4 (A2.I) (70%)	A2.1 - A2.4 (A2.II) (70%)	A2.1 - A2.4 (A2.III) (70%)	A2.1 - A2.4 (A2.IV) (70%)
Final exam (30%) (A3)	A3 (Q1) (60%)	A3 (Q2) (60%)	A3 (Q3) (60%)	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2. Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken

	Capstone	Milestone		Benchmark
	4	3	2	1
			experts are taken as mostly fact, with little questioning.	as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Update to new format	June 14th, 2023	Dr. Ngo Thi Thuan
2	Course learning outcomes	Add detail of Bloom taxonomy		
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Biological Processes for Environmental Engineering**

Course Code: **ENEE2022IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core knowledge about biological processes those environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works, assignment	
Workload (incl. contact hours, self-study hours)		

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2	0			
Contact hours	**25.0**	25	0	0	0	0
Self-Study hours	**60.0**	60	0	0	0	0
Total workload	**85.0**	85	0	0	0	0

Credit points	2 credits/3.09 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course: ☐ Parallel course: ENEE2023IU_Biological Processes for Environmental Engineering Lab

<table>
<tr><td></td><td>☒ Previous course: ENEE2013IU- Environmental Microbiology; ENEE1015IU- Biochemistry</td></tr>
<tr><td>Course objectives</td><td>This course equips students with knowledge and skills in environmental biotechnology to be applicable in the calculation and design of wastewater and solid waste treatment systems.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Illustrate the fundamentals of biological process and process kinetics for wastewater and solid waste treatment. [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO2. Develop the stoichiometric for biological transformation reaction. [Adaptation]

CLO3. Explain principles of biological processes applied to remove organic materials, nitrogen, phosphorus from wastewater. [Set]

CLO4. Apply fundamental and kinetics for design of environmental biological processes and units. [Guided Response]</td></tr>
<tr><td>Attitude</td><td>CLO5. Practice self – reading, literature reviewing and enhancing knowledge for promoting lifelong learning and educating. [Internalizing values]</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organizatio n	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.

Theory part

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Fundamentals of Biological Treatment</td><td>3</td><td>I, T</td></tr>
<tr><td>Suspended Growth Biological Treatment Process</td><td>2</td><td>T, U</td></tr>
<tr><td>Attached Growth and Combined Biological Treatment Processes</td><td>2</td><td>T, U</td></tr>
<tr><td>Anaerobic Suspended and Attached Growth Biological Treatment Processes</td><td>1</td><td>T, U</td></tr>
<tr><td>Methanogenesis</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☒ Assignments</td><td>☐ Oral examination
☒ Written examination
☐ Others, please specify: Lab work</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Questions and comments are strongly encouraged.
Assignments/Examination:
Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">Textbooks:
[1] Rittmann, B. E., & McCarty, P. L. (2012). Environmental biotechnology: principles and applications. Tata McGraw-Hill Education.
References:
[2] C. P. Leslie Grady Jr., Glen T. Daigger, Nancy. G. Love, and Carlos D. M. Filipe (2011). Biological Wastewater Treatment 3rd edition, Co-published by IWA Publishing, London, UK and CRC Press, Taylor and Francis Group, Boca Raton, FL.
[3] H.-J. Jordening and J. Winter (2005), Environmental Biotechnology: Concepts and Applications, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.
[4] M. Henze, M. van Loosdrecht, G. Ekama, D. Brdjanovic (2008), Biological Wastewater Treatment, Principles, Modeling, and Design. IWA Publishing, London, UK.
[5] Metcalf & Eddy (2003), Wastewater Engineering: treatment and reuse, fourth edition, p. 545-1034, McGraw-Hill.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4			4						
Skill (Level: 1-7)	2			6							
	3					2		2			
	4						3	3			
Attitudes (Level: 1-5)	5										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	6.0	4.0	2.0	3.0	2.5	0.0	0.0	5.0
L,M,H conversion *		M		H	M	L	M	L			H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1, 2, 3	Fundamentals of Biological Treatment	1, 2, 3, 7	A1.1.1	Lecture, Discussion,	[1], [5]
4, 5	Suspended Growth Biological Treatment Process	3, 4, 5,7	A1.1.2	Lecture, Discussion, Calculation	[5]
6, 7	Attached Growth and Combined Biological Treatment Processes	3, 4, 5,7	A1.1.3	Lecture, Design demo, Discussion, Calculation	[5]
	Midterm		A2		
8	Anaerobic Suspended and Attached Growth Biological Treatment Processes		A1.1.4	Lecture, Discussion, Calculation	[5]
9-10	Methanogenesis		A1.1.5	Lecture, Design demo, Discussion, Calculation	[1]
	Final exam		A3		

4. Assessment plan

Assessment Type		CLO1	CLO2	CLO3	CLO4	CLO5
A1. Progress assessment (30%)	Assignment				A1.1, A1.3, A1.4	A1.2, A1.5
A2. Mid-term exam (30%)		A2.1	A2.3	A2.2		
A3. Final examination (40%)			A3.1		A3.3	A3.2

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics

Rubric for assessment of calculation and theory/suggestion questions in assignment and exam

Criteria	Level				
	Excellent	Good	Average	Weak	
	100	75	50	25	0
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Biological Processes for Environmental Engineering Lab**

Course Code: **ENEE2023IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the experimental skills about biological processes those environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☐General ☒Fundamental ☐Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works, assignment	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**		1			
Contact hours	**25.0**		25	0	0	0
Self-Study hours	**30.0**		30	0	0	0
Total workload	**55.0**		55	0	0	0

Credit points	1 credits/ 2 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course: ENEE2022IU-Biological Processes for Environmental Engineering ☒ Previous course: ENEE2013IU-Environmental Microbiology; 2. ENEE1015IU-

<table>
<tr><td></td><td>Biochemistry</td></tr>
<tr><td>Course objectives</td><td>This course equips students with knowledge and skills in environmental biotechnology to be applicable in the calculation and design of wastewater and solid waste treatment systems.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Apply kinetics parameters for biological treatment system lab-scale experimental set up, operation and determination of biological process kinetic coefficients and some design parameters. [Applying]</td></tr>
<tr><td>Skill</td><td>CLO2. Operate experiment as the guideline. [Mechanism]
CLO3. Explain principles of biological processes applied to remove organic materials, nitrogen, phosphorus from wastewater. [Set]
CLO4. Apply fundamental and kinetics for analyzing environmental biological processes and units. [Guided Response]</td></tr>
<tr><td>Attitude</td><td>CLO5. Follow the safety guidelines of Lab during conducting experiments. [Valuing]</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.
Lab work
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Experiment 1: Algae growth</td><td>2</td><td>T, U</td></tr>
<tr><td>Experiment 2: Aerobic digester</td><td>2</td><td>T, U</td></tr>
<tr><td>Experiment 3: Anaerobic digester</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☒ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☒ Others, please specify: Lab work</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Lab work: Attendance of 100 percent is compulsory for the Lab work.
Assignments/Examination:
Students must have more than 50/100 points overall to pass this course.
Lab work must have more than 50/100 points.</td></tr>
<tr><td>Reading list</td><td colspan="2">Textbooks:
[1] Rittmann, B. E., & McCarty, P. L. (2012). Environmental biotechnology: principles and applications. Tata McGraw-Hill Education.
References:
[2] C. P. Leslie Grady Jr., Glen T. Daigger, Nancy. G. Love, and Carlos D. M. Filipe (2011). Biological Wastewater Treatment 3rd edition, Co-published by IWA Publishing, London, UK and CRC Press, Taylor and Francis Group, Boca Raton, FL.
[3] H.-J. Jordening and J. Winter (2005), Environmental Biotechnology: Concepts and Applications, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.
[4] M. Henze, M. van Loosdrecht, G. Ekama, D. Brdjanovic (2008), Biological Wastewater Treatment, Principles, Modeling, and Design. IWA Publishing, London, UK.
[5] Metcalf & Eddy (2003), Wastewater Engineering: treatment and reuse, fourth edition, p. 545-1034, McGraw-Hill.</td></tr>
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CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3			3						
Skill (Level: 1-7)	2	4									
	3					2		2			
	4					3		3			
Attitudes (Level: 1-5)	5										
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.5	0.0	0.0	3.0	2.5	0.0	2.5	0.0	0.0	0.0
L,M,H conversion *		M			M	L		L			

3. Planned learning activities and teaching methods

Lab work

Week	Content	CLOs	Assessments	Learning activities
1	Experiment: Algae growth	6, 7	A1.2.1	Observing Manipulating Reporting
2	Experiment: Aerobic digester	6, 7	A1.2.2	Observing Manipulating Reporting
3	Experiment: Anaerobic digester	6, 7	A1.2.3	Observing Manipulating Reporting

4. Assessment plan

Assessment Type		CLO1	CLO2	CLO3	CLO4	CLO5
A1. lab work assessment (100%)		A1.1	A1.2-4	A1.3	A1.5	A1.3

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for lab work assessment

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
Lab activity							
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Preparation for the lab	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
5. Time and resources management	5	Distribute appropriately time and resource to complete well experiments					Distribute inappropriately time and resource to incomplete more than 50% of experiments
Report							
5. Writing skill and format	5	Clear, no spellings and grammar mistakes					Not logical, too much spelling and grammar mistakes, not understandable
6. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information; unclear, inaccurate
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Occupational Health Safety and Environment (HSE)
(An toàn sức khỏe nghề nghiệp và môi trường)
Course Code: CHE2081IU

1. General information

Course designation	The course is to introduce students to the application of health safety and environment (HSE) concepts in engineering. It emphasizes mainly the management of risk associated with any hazardous products and processes throughout its life cycle. Generally, implementing an HSE program is to minimize and control the risks that come from any hazards of products and processes. This makes HSE an integral part of any engineering discipline.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☐ Semester 1 ☒ Semester 2 ☐ Summer	
Person In-Charge	Dr. Phùng Thanh Khoa, ptkhoa@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☒ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify:	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td>2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>25</td><td>25</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>60</td><td>60</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>85</td><td>85</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>2 credits/3.09 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☒ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☐ Previous course: (Please specify course ID & course title, if any)</td></tr>
<tr><td>Course objectives</td><td>Upon successful completion of this course, the students should:
Demonstrate an understanding of product handling and management; principles of process system engineering and environment management.
Demonstrate knowledge of dangerous and risky components in a given system or work environment.
Demonstrate knowledge of HSE system.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Be able to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and environmental [Applying].</td></tr>
</table>
</td></tr>
</table>

[1] [1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

		CLO2. Be able to identify the potentially dangerous and risky components in a given system or work environment [Evaluating].
	Skill	CLO3. Be able to perform safe and workplace practices [Mechanism].
	Attitude	CLO4. Be able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts [Valuing].

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	Topic	Weight	Level
1	Introduction to Health Safety and Environment	1	I, T
2	**Product Handling and Management:** Product stewardship, product information guidelines (MSDS, CAS, EINECS, PICCS), toxic and hazardous materials, GMP, HACCP.	1	I, T, U
3	**Principles of Process Safety Engineering:** Process and system safety (i.e. reactor; storage tank, pressure relief system, etc.), construction safety, equipment safety, fire and explosion, prevention of fires and explosions	1.5	I, T, U
4	**Chemical reactivity**	0.5	I, T, U
5	**Principles of Environmental Engineering:** Pollution prevention, air pollution engineering, waste treatment and disposal technologies, storage and containment.	1	I, T, U
6	**Principles of Occupational Health and Industrial Hygiene:** Chemical handling and hazard assessment (i.e. toxicity levels, OELs), personal protective equipment, equipment safety	1	I, T, U

		(ventilation, radiation and noise hazard), and ergonomics.		
	7	**Risk Management:** Hazard identification, risk assessment, mitigation and control. Hazard evaluation, exposure assessment (quantification), risk characterization (qualification) and accident probability (i.e. hardware and operator failure, event trees and fault trees).	1	I, T, U
	8	Introduction to the law in occupational safety and hygiene	1	I, T, U
	9	Factory field trip	1	I, T, U
	10	Factory field trip	1	I, T, U
Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments ☐ Oral examination ☒ Written examination ☐ Others, please specify: ……			
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	**I. Textbooks** [1] T.S.S. Dikshith, *Handbook of Chemicals and Safety*, 2017, CRC Press, 2017. [2] Daniel Crowl and Joseph F. Louvar, *Chemical Process Safety*, Prentice Hall, 3rd edition, 2011. **II. References** …..			

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		3								
	2		5								
Skill (Level: 1-7)	3						4				
Attitudes (Level: 1-5)	4									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	4.0	0.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0
L,M,H conversion *			M				M			M	

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Introduction to Health Safety and Environment	1, 4		Lecture, Discussion	[1]. [2].
2.	2	**Product Handling and Management:** Product stewardship, product information guidelines (MSDS, CAS, EINECS, PICCS), toxic and hazardous materials, GMP, HACCP.	1,2,3 ,4	HW1	Lecture, HW	[1]. [2].
3.	3	**Principles of Process Safety Engineering:** Process and system safety (i.e. reactor;	1,2,3 ,4	Quiz 1	Lecture, Inclass-Quiz	[1]. [2].

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
		storage tank, pressure relief system, etc.), construction safety, equipment safety, fire and explosion, prevention of fires and explosions				
4.	4	**Chemical reactivity**	1,2,3,4	HW2, Group work	Lecture, Group work, HW	[1]. [2].
5.	5	**Principles of Environmental Engineering:** Pollution prevention, air pollution engineering, waste treatment and disposal technologies, storage and containment.	1,2,3,4	Quiz 2	Lecture, Inclass-Quiz	[1]. [2].
6.	6	**Principles of Occupational Health and Industrial Hygiene:** Chemical handling and hazard assessment (i.e. toxicity levels, OELs), personal protective equipment, equipment safety (ventilation, radiation and noise hazard), and ergonomics.	1,2,3,4	Quiz 3	Lecture, Inclass-Quiz	[1]. [2].
7.	7	**Risk Management:** Hazard identification, risk assessment, mitigation and control. Hazard evaluation, exposure assessment (quantification), risk characterization (qualification) and accident probability (i.e.	1,2,3,4	HW3, Group work	Lecture, Group work, HW	[1]. [2].

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
		hardware and operator failure, event trees and fault trees).				
8.	8	Introduction to the law in occupational safety and hygiene	1,2,4	Group work	Lecture, Group work	
9.	9	Midterm				
10.	11,12	Factory Field trip	1,2,3 ,4	Report	Visiting	
11.	18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes/ Homework exercises (10%)	HW1, Qz 1 60%Pass	HW2, Qz 2 60%Pass		HW3, Qz 3 60%Pass
Group work (20%)	50%Pass	50%Pass	50%Pass	50%Pass
Midterm exam (30%)		Q3 50%Pass	Q1, Q2 50%Pass	
Final exam (40%)	Part I 50%Pass		Part II.1,2 50%Pass	Part II.3 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional): No

6. Revision Date: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Program Learning Outcomes Graduates of Chemical Engineering program will attain
	Knowledge
1	An ability to identify, formulate, and solve complex chemical engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	Skills
3	An ability to communicate (in English) effectively with a range of audiences
4	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
5	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
6	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
	Attitude
7	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Water Treatment**

Course Code: **ENEE3012IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core knowledge about water treatment that environmental engineers must achieve.
Semester(s) in which the course is taught	2
Person responsible for the course	Dr. Nguyen Thi Thuy
Language	English
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, presentation, assignment

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37,5**	37,5	0	0	0	0
Self-Study hours	**90,0**	90	0	0	0	0
Total workload	**127,5**	127,5	0	0	0	0

Credit points	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3013IU Water Treatment Lab ☒ Previous course: ENEE2020U Physical and Chemical Processes for environmental Engineering; ENEE2010IU Environmental Chemistry 1 Lab

<table>
<tr><td>Course objectives</td><td>The course provides skills and knowledge related to the water treatment engineering for identifying water quality, description and design water treatment process and technologies such as coagulation – flocculation, sedimentation, filtration, disinfection, and iron removal.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Analyze water quality in comparison to Technical Standard [Analyzing]
CLO2. Illustrate the principle of water treatment processes and devices [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Display an ability to design water treatment devices [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO4. Form professional ethics in water treatment [Valuing]
CLO5. Formulate self – reading, reviewing and enhancing knowledge about water treatment for promoting lifelong learning and educating [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Theory part
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction
Water characteristics</td><td>2</td><td>T,U</td></tr>
<tr><td>Mixing process</td><td>2</td><td>T,U</td></tr>
<tr><td>Coagulation process</td><td>2</td><td>T,U</td></tr>
<tr><td>Sedimentation process</td><td>2</td><td>T,U</td></tr>
<tr><td>Filtration process</td><td>2</td><td>T,U</td></tr>
<tr><td>Disinfection process
Iron removal</td><td>2</td><td>T,U</td></tr>
<tr><td>Ion exchange</td><td>1</td><td>T,U</td></tr>
<tr><td>Special Treatment process</td><td>1</td><td>T,U</td></tr>
<tr><td>Seminar: Treatment Plant Design/ Operation</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☒ Presentation
☒ Assignments</td><td>☐ Oral examination
☒ Written examination
☐ Others, please specify: lab assessment</td></tr>
</table>

Study and examination requirements	Attendance: Theory sessions: A minimum attendance of 80 percent is compulsory for the class sessions. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	Textbooks: [1] American Water Works Association, American Society of Civil Engineers (2012). Water Treatment Plant Design, Fifth Edition 5th Edition: McGraw-Hill [2]. Ministry of construction (2006). TCXDVN 33: 2006: Design standard water supply – external networks and facilities. [3] Ministry of Health (2018). QCVN No. 01-1:2018/BYT National technical regulation on domestic water quality. [4], James Edzwald (2010). Water Quality & Treatment: A Handbook on Drinking Water 6th Edition, McGraw-Hill Education. [5] NALCO Chemical Company (2009). The Nalco Water Handbook 3rd Edition: McGraw-Hill Education.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4		4							
	2	4									
Skill (Level: 1-7)	3	4				4					
Attitudes (Level: 1-5)	4									3	
	5										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	4.0	0.0	4.0	0.0	0.0	0.0	3.0	4.0
L,M,H conversion *		M		M		M				M	H

3. Planned learning activities and teaching methods

Theory

Week	**Topic**	**CLO**	**Assessment**	**Learning activities**	**Resources**
1-2	Introduction: ▪ Course Introduction ▪ Natural water sources ▪ Drinking water quality	1,4		Lecture, Discussion,	[1]2; [3]
3	Mixing process: ▪ Hydraulic mixing ▪ Design calculation	2,3		Lecture, discussion, calculation,	[1]6; [2]

Week	Topic	CLO	Assessment	Learning activities	Resources
4	Mixing process: ▪ Mechanical mixing ▪ Design calculation	2,3	A1.1	Lecture, discussion, calculation, assignment	[1]6; [2]
5-6	Coagulation process: ▪ Principle ▪ Design calculation	2,3		Lecture, discussion, calculation,	[1]6; [2]
7	Sedimentation process: ▪ Principle	2,		Lecture, discussion	[1]7; [2]
	Midterm		A2		
8	Sedimentation process: ▪ Design calculation	3	A1.2	Lecture, discussion, calculation, assignment	[1]7; [2]
9-10	Filtration process: ▪ Principle ▪ Design calculation	2,3		Lecture, discussion, calculation, assignment	[1]8; [2]
11	Disinfection process: ▪ Principle ▪ Design calculation	2,3		Lecture, discussion, calculation, assignment	[1]10; [2]
12	Iron removal ▪ Principle ▪ Design calculation/ select equipment	2,3	A1.3	Lecture, discussion, calculation, assignment	[1]10; [2]
13	Ion exchange	2,3		Lecture, discussion, calculation, assignment	[1]; [2]
14	Special Treatment process	2		Lecture, discussion,	
15	Reviewing papers	1,2,5	A1.2	Presentation, discussion, answer	
	Final exam		A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Assignment 1 (20%)			A1.1-A1.3		
Assignment 2 (10%)		A.1.2			A.1.2
Midterm exam (30%)	A2_Q1.1	A2_Q2	A2_Q3,4	A2_Q1.2	
Final exam (40%)		A3_Q1	A3_Q2,3	A3_Q4	

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for assessment of calculation and theory/suggestion questions in assignment and exam (R1)

Criteria	Level				
	Excellent	**Good**	**Average**	**Weak**	
	100	**75**	**50**	**25**	**0**
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

5.2. Rubric for self-reading and presentation (R2)

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Selecting papers	20	Appropriate with the topic					Inappropriate with the topic, less relevant
2. Contacting instructor for discussion	10	Frequently (>5 times)					No contact
2. Expanding the reading with various related references for unclear issues from papers	10	Expanding for more than 2 related other papers					No expanding the reading other references
3. Present about the contents of papers and answer the questions from instructor and classmates	60	Deeply understand about the contents of papers; all answers are correct					Little understanding about the paper contents; less than 50% answers are correct

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Reduce the credit of course from 4 to 3 (theory only) due to the separating of Lab works to a new course	22/5/2023	Dr. Nguyen Thi Thuy
2	Page 1	Add Parallel course: ENEE3013IU - Water Treatment Lab		
3	Page 2	Change CLOs for theory course only		
4	Page 5	Add students' presentation for papers related to advanced technologies in water treatment		
5	Page 4	Revise assessment plan according to the changes in CLOs.		
6	Page 4	Remove the field trip because this part will be provided in Internship 1		
7	Page 5	Add rubric for presentation assessment		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Water Treatment Lab**

Course Code: **ENEE3013IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core skills about water treatment system operation that environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, Lab work, seminar, field trip	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**		1			
Contact hours	**25,0**	0	25	0	0	0
Self-Study hours	**30,0**	0	30	0	0	0
Total workload	**55,0**	0	55	0	0	0

Credit points	1 credits/2 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course: ENEE3012IU: Water Treatment ☒ Previous course: ENEE2020IU Physical and Chemical Processes for environmental Engineering; ENEE2010IU: Environmental Chemistry 1 Lab

<table>
<tr><td>Course objectives</td><td>The course provides skills related to the operation and measurement of water treatment units such as coagulation – flocculation, sedimentation, filtration, adsorption, …</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Illustrate the principle of water treatment processes and devices [Analyzing]
CLO2. Analyze data, report and suggest improvement for devices [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Organize for the time and resource management of experiments, and follow the guideline of measurement/operation [Mechanism]
CLO4. Measure of water quality parameters [Mechanism]
CLO5. Operate water treatment processes at laboratory and pilot scale [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO6. Follow the safety guideline of Lab during conducting experiments [Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Lab work
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Experiment: Analyze water quality</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Coagulation-flocculation</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Determine settling velocity</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Water filtration process</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Adsorption process</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Water softening process</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☒ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☒ Others, please specify: lab assessment</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Attendance:
Lab work: Attendance of 100 percent is compulsory for the Lab work.
Assignments/Examination:
Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">[1] Lab manual (internal use)</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2				4			4			
Skill (Level: 1-7)	3				4						
	4				4		4				
	5				4		4				
Attitudes (Level: 1-5)	6									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	3.0	0.0
L,M,H conversion *		M			M		M	M		M	

3. Planned learning activities and teaching methods

Laboratory

Week	Content	CLO	Assessment	Learning activities
1	Experiment: Analyze water quality			Observing, measuring
2	Experiment: Coagulation-flocculation	1,2,3,4,5,6	A1.1	Observing, operating, measuring
3	Experiment: determine settling velocity	1,2,3,4,5,6	A1.2	Observing, operating, measuring
4	Experiment: water filtration process	1,2,3,4,5,6	A1.3	Observing, operating, measuring
5	Experiment: Adsorption process	1,2,3,4,5,6	A1.4	Observing, operating, measuring
6	Experiment: water softening process	1,2,3,4,5,6	A1.5	Observing, operating, measuring

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Lab assessment (20%)	A1. 1-A1. 5 (II.7)	A1.1-A1.5 (II)	A1. 1-A1. 5 (I.1,2,3,5)	A1.1-A1.5 (I.3,4)	A1.1-A1.5 (I.3, 4)	A1.1-A1.5 (I.3)

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for lab work assessment

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
I. Lab activity							
1. Attendance	10	Participate on time					Be late ≥15 min
2. Prepare for contents and plans of lab works	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
5. Time and resources management	5	Distribute appropriately time and resource to complete well experiments					Distribute inappropriately time and resource to incomplete more than 50% of experiments
II. Report							
6. Writing skill and format	5	Clear, no spellings and grammar mistakes					Not logical, too much spelling and grammar mistakes, not understandable
7. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/ suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information; unclear, inaccurate
Total	**100**						

6. Date revised: August 14, 2023

Ho Chi Minh City,14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Municipal Wastewater treatment**

Course Code: **ENEE3014IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core knowledge of municipal wastewater treatment that environmental engineers must achieve.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Associate Professor Tran Tien Khoi Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, assignment	
Workload (incl. contact hours, self-study hours)		
Credit points	3 Credits/4.64 ECTS	
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3015IU-Municipal Wastewater Treatment Lab ☒ Previous course: ENEE2010IU-Environmental Chemistry 1 Lab; ENEE2022IU-	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

<table>
<tr><td></td><td>Biological Processes for Environmental Engineering.</td></tr>
<tr><td>Course objectives</td><td>This course provides the fundamental knowledge for the selection and design of the most appropriate, cost-effective and sustainable municipal wastewater treatment systems. The course concentrates on typical processes including aerobic, nitrification, denitrification, sludge treatment processes; and specific design of septic tank, aero tank, sequencing batch bioreactor (SBR), trickling filter (TF), aerobic-membrane bioreactor (aerobic-MBR), sludge digester.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the environmental issues of municipal wastewater pollution in reference to the National Technical Regulations. [Analyzing]
CLO2. Illustrate the principle of processes and units used in municipal wastewater treatment. [Analyzing]
CLO3. Design municipal wastewater treatment units in reference to professional standards. [Creating]</td></tr>
<tr><td>Skill</td><td>CLO4. Identify the environmental problem, propose an appropriate municipal wastewater treatment train and perform design calculation steps. [Adaptation]</td></tr>
<tr><td>Attitude</td><td>CLO5. Practice self – reading, literature reviewing and enhancing knowledge of wastewater treatment for promoting lifelong learning and educating. [Internalizing values]</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.

Theory part

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>2</td><td>I, T</td></tr>
<tr><td>Primary treatment: Principle and Design calculation</td><td>3</td><td>T, U</td></tr>
<tr><td>Aerobic process: Principle and Design calculation</td><td>3</td><td>T, U</td></tr>
<tr><td>Nitrification process: Principle and Design calculation</td><td>1</td><td>T, U</td></tr>
<tr><td>Denitrification process: Principle and Design calculation</td><td>1</td><td>T, U</td></tr>
<tr><td>Biofilm attached growth process: Principle and Design calculation</td><td>1</td><td>T, U</td></tr>
<tr><td>Sludge treatment process: Principle and Design calculation</td><td>2</td><td>T, U</td></tr>
<tr><td>Aerobic-MBR: Principle and Design calculation</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☒ Assignments</td><td>☐ Oral examination
☒ Written examination
☐ Others, please specify: Lab work assessment</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Questions and comments are strongly encouraged.
Assignments/Examination:
Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">[1] Mecalf and Eddy (2013) Wastewater Engineering, Treatment, Disposal and Resource Recovery, Fifth Edison, McGraw-Hill Education.
[2] Duncan Mara (2003), Domestic Wastewater Treatment in Developing countries, Earthscan, London.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2		4			4					
	3	6			6						
Skill (Level: 1-7)	4					6	6				
Attitudes (Level: 1-5)	5										5
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	4.0	0.0	6.0	5.0	6.0	0.0	0.0	0.0	5.0
L,M,H conversion *		H	M		H	H	H				H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction: Sewer system, municipal wastewater characteristics and disposal standards	1, 5	A1.1	Lecture, Discussion	*[1].1, 2* *[2]. 1*
2	Water consumption, estimation of wastewater flowrate	1	A1.2		
3, 4, 5, 6, 7	Primary treatment: ● Principle ● Design calculation	2, 3, 4		Lecture, Discussion, Calculation	*[1]. 3, 4*
	Midterm		A3		
7, 8, 9	Aerobic process: ● Principle ● Design calculation	2, 3, 4	A1.3 A1.4 A1.5	Lecture, Discussion, Calculation	*[1]. 8, 9*
9	Nitrification processes: ● Principle ● Design calculation	2, 3, 4	A1.6	Lecture, Discussion, Calculation	*[1]. 8, 9*
10	Denitrification process: ● Principle ● Design calculation	2, 3, 4	A1.7	Lecture, Discussion, Calculation	*[1]. 8, 9*
11	Biofilm attached growth process:	2, 3,	A1.8	Lecture,	*[1]. 9*

Week	Topic	CLO	Assessments	Learning activities	Resources
	● Principle ● Design calculation	4		Discussion, Calculation	
12, 13	Sludge treatment process: ● Principle ● Design calculation	2, 3, 4	A1.9	Lecture, Discussion, Calculation	*[1]. 11*
14, 15	Aerobic-MBR: ● Principle ● Design calculation	2, 3, 4	A1.10	Lecture, Discussion, Calculation	*[1]. 11*
	Final Exam		A4		

4. Assessment plan

Assessment Type		CLO1	CLO2	CLO3	CLO4	CLO5
A1. Progress assessment (30%)	A1 Assignment	A1.1		A1.2-A1.10	A1.2-A1.10	
A2. Mid-term exam (30%)	A3		Q1	Q2,3	Q2,3	
A3. Final examination (40%)	A4		Q1	Q2,3	Q2,3	Q4, 5

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for assessment of calculation and theory/suggestion questions in assignment and exam

Criteria	Level				
	Excellent	Good	Average	Weak	
	100	75	50	25	0
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Municipal Wastewater Treatment Lab**

Course Code: **ENEE3015IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core skills of municipal wastewater treatment that environmental engineers must achieve.
Semester(s) in which the course is taught	1
Person responsible for the course	Associate Professor Tran Tien Khoi Dr. Nguyen Thi Hoang Hai
Language	English
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works
Workload (incl. contact hours, self-study hours)	
Credit points	1 credits/ 2ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3014IU-Municipal Wastewater Treatment ☒ Previous course: ENEE2010IU-Environmental Chemistry 1 Lab; ENEE2022IU-Biological Processes for Environmental Engineering.

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**	0	1			
Contact hours	**25.0**	0	25	0	0	0
Self-Study hours	**30.0**	0	30	0	0	0
Total workload	**55.0**	0	55	0	0	0

<table>
<tr><td>Course objectives</td><td>This course provides skill of experimental set-up used for design of processes and operation units of municipal wastewater treatment plants.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Illustrate the principle of processes and units used in municipal wastewater treatment. [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO2. Plan for the measurement of water quality parameters and the operation of water treatment models. [Complex Overt Response]
CLO3. Measure the water quality parameters, operate municipal wastewater treatment processes at laboratory and pilot scale. [Complex Overt Response]
CLO4. Analyze data, report and suggest improvement for industrial wastewater treatment. [Adaptation]</td></tr>
<tr><td>Attitude</td><td>CLO5. Follow the safety guidelines of Lab during conducting experiments. [Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Lab work
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Experiment: Analyze wastewater quality and design of experiment</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment: Analyze activated sludge quality</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment: Aerobic process at lab-scale</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment: Aerobic-MBR process at lab-scale</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment: Disinfection</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment: Nitrogen removal</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report</td><td>☐ Oral examination
☐ Written examination</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	☐ Presentation ☐ Assignments	☒ Others, please specify: Lab work assessment
Study and examination requirements	Lab work: Attendance of 100 percent is compulsory for the Lab work. Lab work must have more than 50/100 points.	
Reading list	*[1] Mecalf and Eddy (2013) Wastewater Engineering, Treatment, Disposal and Resource Recovery, Fifth Edison, McGraw-Hill Education.* *[2] Duncan Mara (2003), Domestic Wastewater Treatment in Developing countries, Earthscan, London..*	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		4				4				
Skill (Level: 1-7)	2	5				5					
	3						5		5		
	4				6	6					
Attitudes (Level: 1-5)	5										3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	4.0	0.0	6.0	5.5	4.5	0.0	5.0	0.0	3.0
L,M,H conversion *		H	M		H	H	H		H		M

3. Planned learning activities and teaching methods

Lab work

Week	**Content**	**CLOs**	**Assessments**	**Learning activities**
1	Experiment: Analyze wastewater quality and design of experiment	1, 2, 3, 4, 5	A1	Observing Manipulating Reporting
2	Experiment: Analyze activated sludge quality	1, 2, 3, 4, 5	A2	Observing Manipulating Reporting
3	Experiment: aerobic process at lab-scale	1, 2, 3, 4, 5	A3	Observing Manipulating Reporting

Week	Content	CLOs	Assessments	Learning activities
4	Experiment: aerobic-MBR process at lab-scale	1, 2, 3, 4, 5	A4	Observing Manipulating Reporting
5	Experiment: Disinfection	1, 2, 3, 4, 5	A5	Observing Manipulating Reporting
6	Experiment: Nitrogen removal	1, 2, 3, 4, 5	A6	Observing Manipulating Reporting

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Lab work assessment (100%)	A1→A6	A1→A6	A1→A6	A1→A6	A1→A6

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

Rubric for lab work assessment

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
Lab activity							
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Preparation for the lab	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
5. Time and resources management	5	Distribute appropriately time and resource to complete well experiments					Distribute inappropriately time and resource to incomplete more than 50% of experiments
Report							
5. Writing skill and format	5	Clear, no spellings and					Not logical, too much spelling and

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
		grammar mistakes					grammar mistakes, not understandable
6. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information;unclear, inaccurate
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Industrial Wastewater Treatment**

Course Code: **ENEE3016IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core knowledge that environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Associate Professor Tran Tien Khoi Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, Lab work	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2				
Contact hours	**25.0**	25		0	0	0
Self-Study hours	**60.0**	60		0	0	0
Total workload	**85.0**	85		0	0	0

Credit points	2 credits/ 3.09 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3017IU-Industrial Wastewater Treatment Lab ☒ Previous course: ENEE2010IU Environmental Chemistry 1 Lab
Course objectives	This course provides the fundamental knowledge for the selection and design of the most appropriate, cost-effective and sustainable industrial

<table>
<tr><td></td><td>wastewater treatment systems. The course concentrates on anaerobic, flotation and advanced oxidation processes.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the issues of industrial wastewater pollution in reference to the National Technical Regulations. [Analyzing]
CLO2. Illustrate the principle of processes and units used in industrial wastewater treatment. [Analyzing]
CLO3. Apply integrated knowledge to design industrial wastewater treatment units in reference to professional standards. [Applying]</td></tr>
<tr><td>Skill</td><td>CLO4. Identify the environmental problem, propose an appropriate treatment train and perform design calculation steps. [Adaptation]</td></tr>
<tr><td>Attitude</td><td>CLO.5 Practice self – reading, literature reviewing and enhancing knowledge of wastewater treatment for promoting lifelong learning and educating. [Internalizing values]</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.
Theory part
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction
Wastewater characteristics and the National Technical Regulations on industrial wastewater</td><td>1</td><td>T, U</td></tr>
<tr><td>Treatment Technologies applied for industrial wastewater</td><td>1</td><td>T, U</td></tr>
<tr><td>Flow and Load Equalization</td><td>1</td><td>T, U</td></tr>
<tr><td>Removal of Fats, Oils and Grease</td><td>1</td><td>T, U</td></tr>
<tr><td>Removal of Organics using Anaerobic process</td><td>1</td><td>T, U</td></tr>
<tr><td>Chemical Unit Processes</td><td>1</td><td>T, U</td></tr>
<tr><td>Removal of Inorganics</td><td>1</td><td>T, U</td></tr>
<tr><td>Design Approaches</td><td>1</td><td>T</td></tr>
<tr><td>Design Approaches</td><td>1</td><td>T</td></tr>
<tr><td>Presentation</td><td>1</td><td>U, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☒ Assignments</td><td>☐ Oral examination
☒ Written examination
☐ Others, please specify: lab assessment</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Attendance:
Theory sessions: A minimum attendance of 80 percent is compulsory for the class sessions. Questions and comments are strongly encouraged.
Assignments/Examination:
Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">Textbooks:
[1] Mecalf and Eddy (2013) Wastewater Engineering, Treatment, Disposal and Resource Recovery, Fifth Edison, McGraw-Hill Education
[2]Water and Environment Federation, Industrial Wastewater: Management, Treatment, and Disposal, WEF Press, Mc Graw-Hill (2008)</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2		4			4					
	3	3			3						
Skill (Level: 1-7)	4			6			6				
Attitudes (Level: 1-5)	5									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.5	4.0	6.0	3.0	4.0	6.0	0.0	0.0	5.0	0.0
L,M,H conversion *		M	M	H	M	M	H			H	

3. Planned learning activities and teaching methods

Theory

Week	Topic	CLO	Assessment	Learning activities	Resources
1	Introduction ▪ Wastewater characteristics and the National Technical Regulations on industrial wastewater	1	A1.1	Lecture, Discussion,	[1]2; [3]
2	Treatment Technologies applied for industrial wastewater	2, 3		Lecture, discussion, calculation,	[1]6; [2]
3	Flow and Load Equalization ▪ Principle ▪ Design calculation	2, 3	A1.2	Lecture, discussion, calculation, assignment	[1]6; [2]
4	Removal of Fats, Oils and Grease	2		Lecture, discussion	[1]7; [2]
5	Removal of Organics using Anaerobic process ▪ Principle ▪ Design calculation	2, 3, 5		Lecture, discussion	
6	Chemical Oxidation Processes ▪ Principle ▪ Applications	2		Lecture, discussion	
7	Removal of Inorganics ▪ Principle ▪ Applications			Lecture, discussion	

Week	Topic	CLO	Assessment	Learning activities	Resources
	Midterm		A4		
8	Design Approach ▪ Principle ▪ Design calculation	3, 4		Lecture, discussion, assignment	[1]7; [2]
9	Design Approach ▪ Principle Design calculation	3, 4		Seminar/ guest speakers Discussion,	[1]8; [2]
10	Presentation	5	A2	Observation	
	Final exam		A5		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Assignment (15%)	A1.1		A1.2, A1.3, A1.4	A1.2, A1.3, A1.4	
Presentation (15%)					A2
Midterm exam (30%)	A4_Q1	A4_Q2,3 4,5		A4_Q6	
Final exam (40%)		A5_Q1,2, 3	A5_Q4	A5_Q5	

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Rubric for assessment of calculation and theory/suggestion questions in assignment and exam (R1)

Criteria	Level				
	Excellent	Good	Average	Weak	
	100	75	50	25	0
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

5.2. Rubric for self-reading, reviewing and enhancing knowledge (R2)

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Selecting papers	20	Appropriate with the topic					Inappropriate with the topic, less relevant
2. Contacting instructor for discussion	10	Frequently (>5 times)					No contact

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
2. Expanding the reading with various related references for unclear issues from papers	10	Expanding for more than 2 related other papers					No expanding the reading other references
3. Present about the contents of papers and answer the questions from instructor and classmates	60	Deeply understand about the contents of papers; all answers are correct					Little understanding about the paper contents; less than 50% answers are correct

5.3. Rubric for presentation (R3)

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Level of practicing of self - reading and enhancing knowledge about water treatment		Show strong motivating in self - reading and enhancing knowledge					
1. Introduction, purpose of report (relevant, sufficient, clear)	10	Relevant, sufficient, clear					Not clear, not relevant
2. Methodology (apply for original research report)	5	Sufficient, clear, easy to understand					<50% of contents are shown, not clear, not logical
3. Findings of research (sufficient, clear, understandable)	10	Sufficient, clear, understandable					<50% of contents are shown, not clear, not logical
4. Structure of a technical report (enough, clear)	10	Enough, clear, easy to understand					<50% of contents are shown, not clear, not logical
5. PPT quality (follow the rule of PPT Making, clear, attractive)	20	Follow the rule of PPT Making, clear, attractive					Dull, small word, a lot of spelling and grammar mistakes
6. Presentation (speaking skills, correct pronunciation, attractive, timing)	20	Confident, clear, correct pronunciation, attractive, timing					<50% content has not completed, not clear, dull
7. Answering the questions from instructor and classmates	15	Focus, correct, clear, convincible					Less relevant, less than 50% answers are incorrect; not convincible
8. Attitude and behavior	5	Processional					Unprofessional

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Industrial Wastewater Treatment Lab**

Course Code: **ENEE3017IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core skills that environmental engineers must achieve.
Semester(s) in which the course is taught	2
Person responsible for the course	Associate Professor Tran Tien Khoi Dr. Nguyen Thi Hoang Hai
Language	English
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab work

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**		2			
Contact hours	**50.0**		50	0	0	0
Self-Study hours	**60.0**		60	0	0	0
Total workload	**110.0**		110	0	0	0

Credit points	2 credits/ 4 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3016IU-Industrial Wastewater Treatment ☒ Previous course: ENEE2010IU-Environmental Chemistry 1 Lab
Course objectives	This course provides skills of experimental set-up used for design of processes and operation units of industrial wastewater treatment plants.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level[1]</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Illustrate the principle of processes and units used in industrial wastewater treatment. [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO2. Plan for the measurement of water quality parameters and the operation of water treatment models. [Complex Overt Response]

CLO3. Measurement of water quality parameters. [Mechanism]

CLO4. Follow, operate, and manage industrial wastewater treatment processes at laboratory and pilot scale. [Complex Overt Response]

CLO5. Analyze data, report and suggest improvement for industrial wastewater treatment. [Adaptation]</td></tr>
<tr><td>Attitude</td><td>CLO6. Follow the safety guideline of Lab during conducting experiments. [Valuing]</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.
Lab work
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Experiment 1: Wastewater characterization</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment 2: Removal of organics by anaerobic process</td><td>6</td><td>T, U</td></tr>
<tr><td>Experiment 3: Coagulation and flocculation process</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment 4: Membrane bioreactor</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment 5: pH control</td><td>1</td><td>T, U</td></tr>
<tr><td>Experiment 6: Oxidation process</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☒ Others, please specify: lab assessment</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Attendance:
Attendance of 100 percent is compulsory for the Lab work.
Lab work must have more than 50/100 points.</td></tr>
<tr><td>Reading list</td><td colspan="2">Textbooks:
[1] Mecalf and Eddy (2013) Wastewater Engineering, Treatment, Disposal and Resource Recovery, Fifth Edison, McGraw-Hill Education
[2]Water and Environment Federation, Industrial Wastewater: Management, Treatment, and Disposal, WEF Press, Mc Graw-Hill (2008)</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1		4								
Skill (Level: 1-7)	2			5				5			
	3				4			4			
	4				5				5		
	5			6					6		
Attitudes (Level: 1-5)	6										3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	0.0	4.0	5.5	4.5	0.0	0.0	4.5	5.5	0.0	3.0
L,M,H conversion *			M	H	H			H	H		M

3. Planned learning activities and teaching methods

Laboratory

Week	Content	CLO	Assessment	Learning activities
1	Experiment 1: Wastewater characterization	1, 2, 3, 4, 5, 6	A1	Observing, measuring
2	Experiment 2: Removal of organics by anaerobic process	1, 2, 3, 4, 5, 6	A2	Observing, operating, measuring
3	Experiment 3: Coagulation and flocculation process	1, 2, 3, 4, 5, 6	A3	Observing, operating, measuring
4	Experiment 4: Membrane bioreactor	1, 2, 3, 4, 5, 6	A4	Observing, operating, measuring
5	Experiment 5: pH control	1, 2, 3, 4, 5, 6	A5	Observing, operating, measuring
6	Experiment 6: Phosphorus removal process	1, 2, 3, 4, 5, 6	A6	Observing, operating, measuring

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Lab assessment (100%)	A1→A6	A1→A6	A1→A6	A1→A6	A1→A6	A1→A6

Note: %Pass: Target that 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

Rubric for lab work assessment (R2)

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
Lab activity (R2.1)							
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Prepare for contents and plans of lab works	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Plan and assign the works for each member in groups	5	Appropriate					No plan and assignment for each member
4. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
5. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
Report (R2.2)							
6. Writing skill and format	5	Clear, no spellings and grammar mistakes					Not logical, too much spelling and grammar mistakes, not understandable
7. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information; unclear, inaccurate
Total	**100**						

5. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Solid Waste and Hazardous Waste Management
(Quản lý chất thải rắn và chất thải nguy hại)
Course Code: ENEE3018IU

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides knowledge about solid waste and hazardous waste management (SWM), types and amounts of waste, storage, collecting and transportation systems, technology for waste treatment, and political instruments; properties of hazardous wastes and materials, transformation and behaviour of hazardous chemicals in soil, groundwater, and treatment systems, assessment of toxicity and risk associated with exposure to hazardous chemicals, application of scientific principles of hazardous waste to their management, remediation, and treatment.
Semester(s) in which the course is taught	2
Person responsible for the course	Dr. Tran Thanh Tu, tttu@hcmiu.edu.vn
Language	English
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, homework
Workload	

		Lecture	Lab	Project	Internship	Thesis
Credit	3	3				
ECTS	4.64					
Contact hours	**38**	38	0	0	0	0
Self-Study hours	**90**	90	0	0	0	0
Total workload	**128**	128	0	0	0	0

<table>
<tr><td>Credits/ECTS</td><td>3 credits/ 4.64 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course
☒ Parallel course: ENEE3019IU Solid Waste and Hazardous Waste Management Lab
☒ Previous course: Recommended: Solid waste part of Environmental Chemistry 2 (ENEE2005IU); Solid waste part of Environmental Chemistry 2 Lab (ENEE2011IU)</td></tr>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge about urban solid waste management and treatment methods Through this unit, students will become aware of the impacts of solid waste to the environment.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate the classification, sources, component, quantity and characteristic of urban solid waste; the storage and collection system of urban solid waste; the transfer and transport process in SWM. [3-Applying]
CLO2. Analyze the waste composting, biogas, incineration and waste to energy, landfill and sludge treatment as well as modern technologies for SWM. [4-Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Show the difference in the component and characteristics of urban solid wastes. [2-Set]
CLO4. Explain difference methods of solid waste treatment and management towards the development of national SWM strategies. [2-Set]</td></tr>
<tr><td>Attitude</td><td>CLO5. Identify the impacts of solid waste to the environment. [4-Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)</td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td></td><td>
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1.</td><td>Solid waste management (SWM) status and principles
Vietnam SWM Law and Policy</td><td>1</td><td>I, T</td></tr>
<tr><td>2.</td><td>Classification, sources, component and characteristic of solid waste & hazardous waste</td><td>1</td><td>T, U</td></tr>
<tr><td>3.</td><td>Storage system of solid waste & hazardous waste</td><td>1</td><td>T</td></tr>
<tr><td>4.</td><td>Collection system of solid waste & hazardous waste</td><td>1</td><td>T</td></tr>
<tr><td>5.</td><td>Transfer and transport of solid waste & hazardous waste</td><td>1</td><td>T</td></tr>
<tr><td>6.</td><td>Waste composting: Basic principles</td><td>1</td><td>T</td></tr>
<tr><td>7.</td><td>Biogas: Basic principles</td><td>1</td><td>T</td></tr>
<tr><td>8.</td><td>Waste composting and biogas: Calculations</td><td>1</td><td>T, U</td></tr>
<tr><td>9.</td><td>Modern technologies for SWM (e.g. Black soldier flies, etc.)</td><td>1</td><td>I, T</td></tr>
<tr><td>10.</td><td>Incineration and Waste to Energy: Basic principles</td><td>1</td><td>T</td></tr>
<tr><td>11.</td><td>Incineration and Waste to Energy: Calculation</td><td>1</td><td>T, U</td></tr>
<tr><td>12.</td><td>Landfill: Basic principles and Calculation</td><td>1</td><td>T</td></tr>
<tr><td>13.</td><td>Sludge treatment</td><td>1</td><td>T, U</td></tr>
<tr><td>14.</td><td>8Rs
Development of national SWM strategies</td><td>1</td><td>I, T</td></tr>
<tr><td>15</td><td>Fieldtrip</td><td>1</td><td>T</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>☒ Multiple-choice questions
☐ Report
☒ Presentation
☒ Assignments
☐ Oral examination
☒ Written examination
☐ Others, please specify</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the theory session and 100 percent is compulsory for the labwork session. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] John Pichtel, Waste Management Practices: Municipal, Hazardous, and Industrial. Taylor & Fracis Group, New York, 2016.
[2] William A. Worrell and P. Aarne Vesilind, Solid Waste Engineering 2nd edition. CENGAGE learning. USA, 2012.
[3] Sudha Goel, Advances in Solid and Hazardous Waste Management. Springer. New York, 2017.
[4] Forbes R McDougall, Peter R White, Marina Franke and Peter Hindle, Integrated Solid Waste Management: A Life Cycle Inventory. Blackwell Publishing. USA, 2001.</td></tr>
</table>

	[5] L.F. Diaz, M. de Bertoldi, W. Bidlingmaier, *Compost Science and Technology Vol.8.* Elsevier. UK, 2007. [6] Tchobanoglous. G, Theisen.H, and Samel, *Integrated Solid Waste Management: Engineering Principles and Management Issues*. McGraw-Hill Inc.. New York, 1993. [7] M.N. Rao, Razia Sultana and Sri Harsha Kota, *Solid and Hazardous Waste Management: Science and Engineering*. Elsevier. UK, 2016.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	4									
Skill (Level: 1-7)	3			2							
	4				2						
Attitudes (Level: 1-5)	5									4	4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.5	0.0	2.0	2.0	0.0	0.0	0.0	0.0	4.0	4.0
L,M,H conversion *		M		L	L					H	H

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Solid waste management (SWM) status and principles Vietnam SWM Law and Policy	1,5		Lecture, Discussion, Homework	[1] Chapter 1,2,3 [6] Chapter 1,2
2.	2	Classification, sources, component and characteristic of solid waste & hazardous waste	1,3	HW1	Lecture, Discussion, Homework	[1] Chapter 4,11 [2] Chapter 2 [3] Chapter 4,5 [4] Chapter 8 [6] Chapter 3,4,5 [7] Chapter 2,3
3.	3	Storage system of solid waste & hazardous waste	1,3	IP1	Lecture, Presentation, Discussion, Homework	[4] Chapter 4,18 [6] Chapter 6,7 [7] Chapter 4
4.	4	Collection system of solid waste & hazardous waste	1,3	IP2	Lecture, Presentation, Discussion, Homework	[1] Chapter 5,11 [2] Chapter 3 [4] Chapter 9,17 [6] Chapter 8,9
5.	5	Transfer and transport of solid waste & hazardous waste	1,3	HW2	Lecture, Discussion, Homework	[1] Chapter 11,13 [6] Chapter 10

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
6.	6	Waste composting: Basic principles	2,4	IP3	Lecture, Presentation, Discussion	[1] Chapter 8 [2] Chapter 8 [3] Chapter 13 [4] Chapter 11, 19 [5] Chapter 2,3
7.	7	Biogas: Basic principles	2,4	IP4	Lecture, Presentation, Discussion, Homework	[4] Chapter 19 [5] Chapter 2,3
8.	8	Waste composting and biogas: Calculations	2,4	HW3	Lecture, Discussion	[1] Chapter 8 [4] Chapter 19 [5] Chapter 4,5,6,8
9.		Midterm		A1		
10.	9	Modern technologies for SWM (e.g. Black soldier flies, etc.)	2,4	HW4	Lecture, Discussion, Homework	[4] Chapter 6,7
11.	10	Incineration and Waste to Energy: Basic principles	2,4	IP5	Lecture, Presentation, Discussion, Homework	[1] Chapter 9,15 [2] Chapter 7 [4] Chapter 12
12.	11	Incineration and Waste to Energy: Calculation	2,4	HW5	Lecture, Discussion	[1] Chapter 9,15 [2] Chapter 7 [4] Chapter 20
13.	12	Landfill: Basic principles	2,4	IP6	Lecture, Presentation, Discussion	[1] Chapter 10,16,17 [2] Chapter 4 [4] Chapter 13
14.	13	Landfill: Calculation	2,4	HW6	Lecture, Discussion, Homework	[4] Chapter 21
15	14	Sludge treatment	2,4		Lecture, Discussion, Homework	[7] Chapter 5
16.	15	8Rs Development of national SWM strategies	2,4		Lecture, Discussion	[1] Chapter 6,7 [2] Chapter 1 [3] Chapter 2 [4] Chapter 2,3
		Reserved week				
17.		Final exam		A2		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class presentation (IP) and homework (HW) (30%)	IP1,IP2 (R5.2) 60%Pass	IP3-6 (R5.2) 60%Pass	HW1,2 (R5.1) 60%Pass	HW3-6 (R5.1) 60%Pass	
Midterm exam (A1) (30%)	A1.Q2 (R5.3) 60%Pass		A1.Q3 (R5.3) 60%Pass		A1.Q1 (R5.3) 60%Pass
Final exam (A2) (40%)		A2.Q3,Q4 (R5.3) 60%Pass		A2.Q2 (R5.3) 60%Pass	A2.Q1 (R5.3) 60%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1 Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.2 Oral communication value rubric for evaluating presentation tasks

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

	Capstone	Milestone		Benchmark
	4	3	2	1
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5.3 Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	Capstone	Milestone		Benchmark
	4	3	2	1
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	General Information	Reduce the credit of course to 3 (theory only) due to the separating of Lab works to a new course	May 26th, 2023	Dr. Tran Thanh Tu
2	General Information	Add Parallel course: ENEE3019IU Solid Waste and Hazardous Waste Management Lab		
3	Assessment plan	Revise assessment plan according to the changes in CLOs.		
4	Rubrics	Add rubric for presentation assessment		
5	Course learning outcomes	Add detail of Bloom taxonomy	June 13th, 2023	Dr. Tran Thanh Tu
6	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
7	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Solid Waste and Hazardous Waste Management Lab
(Thực hành Quản lý chất thải rắn và chất thải nguy hại)

Course Code: ENEE3019IU

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides knowledge about solid waste and hazardous waste management (SWM), focusing on the biological treatment methods for organic solid wastes.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Tran Thanh Tu, tttu@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lab works	

Workload

		Lecture	Lab	Project	Internship	Thesis
Credit	1		1			
ECTS	2.00					
Contact hours	**25**	0	25	0	0	0
Self-Study hours	**30**	0	30	0	0	0
Total workload	**55**	0	55	0	0	0

Credits/ECTS	1 credits/ 2.00 ECTS

<table>
<tr><td>Required and recommended prerequisites for joining the course</td><td>☐ None
☐ Prerequisite course
☒ Parallel course: ENEE3018IU Solid Waste and Hazardous Waste Management
☒ Previous course: Recommended: Solid waste part of Environmental Chemistry 2 (ENEE2005IU); Solid waste part of Environmental Chemistry 2 Lab (ENEE2011IU)</td></tr>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge about urban solid waste management and treatment methods as well as skills to conduct composting/biogas or black soldier fly models. Through this unit, students will become aware of the importance of biological methods in organic solid wastes treatment.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Discover physiochemical and biological characteristics of organic solid wastes. [3-Applying]
CLO2. Analyze the effectiveness and efficiency of biological methods for organic solid wastes treatment. [4-Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Proceed the steps in choosing and preparing the substrates for the organic solid wastes treatment model(s). [2-Set]
CLO4. Follow instructions to build model(s) for organic solid wastes treatment by biological methods. [3-Guided Response]</td></tr>
<tr><td>Attitude</td><td>CLO5. Recognize factors affecting the effectiveness and efficiency of the model(s) for organic solid wastes treatment by biological methods. [4-Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1.</td><td>Sample preparation</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	2.	Set up SW treatment models: - Composting - Biogas **- Black soldier flies (BSF)**	1	T, U
	3.	Monitor SW treatment models	3	U
	4.	Report and Presentation	1	T, U
Examination forms	☒ Multiple-choice questions ☒ Report ☐ Presentation ☐ Assignments		☐ Oral examination ☒ Written examination ☐ Others, please specify	
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the theory session and 100 percent is compulsory for the labwork session. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	[1] John Pichtel, *Waste Management Practices: Municipal, Hazardous, and Industrial*. Taylor & Fracis Group, New York, 2016. [2] William A. Worrell and P. Aarne Vesilind, *Solid Waste Engineering 2nd edition*. CENGAGE learning. USA, 2012. [3] Sudha Goel, *Advances in Solid and Hazardous Waste Management*. Springer. New York, 2017. [4] L.F. Diaz, M. de Bertoldi, W. Bidlingmaier, *Compost Science and Technology Vol.8.* Elsevier. UK, 2007. [5] Domenico Caruso, Emilie Devic, I Wayan Subamia, Pascale Talamond, Etienne Baras, Technical handbook of domestication and production of diptera Black Soldier Fly (BFS) *Hermetia illucens*, Stratiomyidae. PT Penerbit IPB Press. Bogor, 2013.			

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	4									
Skill (Level: 1-7)	3			2							
	4				3						
Attitudes (Level: 1-5)	5									4	4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.5	0.0	2.0	3.0	0.0	0.0	0.0	0.0	4.0	4.0
L,M,H conversion *		M		L	M					H	H

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	11	Sample preparation	1,2,5	Report	Discussion, Draft report	[1] Chapter 4,11 [2] Chapter 2 [3] Chapter 4,5 [4] Chapter 8
2.	12	Set up SW treatment models: - Composting - Biogas - Black soldier fly platform	1,2,3	Report	Discussion, Set up models, Update report	[1] Chapter 8 [4] Chapter 19 [5] Chapter 2,3,4,5,8
3.	13	Monitor SW treatment models	3,4	Report	Discussion, Monitoring, Update report	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
4.	14	Monitor SW treatment models	3,4	Report	Discussion, Monitoring, Update report	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
5.	15	Monitor SW treatment models	3,4	Report	Discussion, Monitoring, Update report	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
6.	16	Report and Presentation	3,4,5	Final report and Presentation	Finalize report, Presentation	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
7.	17	Final exam		A		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Lab works (Report and presentation) (R&P) (70%)	R&P (R5.1-R5.3) 60%Pass	R&P (R5.1-R5.3) 60%Pass	R&P (R5.1-R5.3) 60%Pass	R&P (R5.1-R5.3) 60%Pass	R&P (R5.1-R5.3) 60%Pass
Final exam (A) (30%)	A. Part 1 (R5.4) 60%Pass	A. Part 1 (R5.4) 60%Pass	A. Part 2 (R5.4) 60%Pass	A. Part 2 (R5.4) 60%Pass	A. Part 1 (R5.4) 60%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1 Rubric for lab work assessment

		Level					
Criteria	**% contribute**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Attendance	10	Participate (100)					Be late ≥15 min
2. Preparation for the lab	5	Prepare well, answer all questions correctly					Not prepare well, could not answer correctly 50% questions

		Level					
Criteria	**% contribute**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
3. Follow the guide, be active	5	Strictly follow, active					Not follow, inactive
4. Coding skills during the classes (arrange the data, correct commands, fix bugs, etc.)	70	Correct in procedures for data input, write command, fix bugs					Incorrect in procedures for data input, write command, fix bugs
5. Code submission (after the classes)	10	On time					No submission
Total	**100**						

5.2 Grading checklist (for Written Reports)

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: ……		
Date: ……	Evaluator: ……		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.3 Oral communication value rubric for evaluating presentation tasks

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

	Capstone	Milestone		Benchmark
	4	3	2	1
	presentation cohesive.			
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5.4 Critical thinking value rubric for evaluating questions in exams

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and

	Capstone	Milestone		Benchmark
	4	3	2	1
	discussed in priority order.		(consequences and implications) are identified clearly.	implications) are oversimplified.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Create new course (due to the separating of Lab works from course: ENEE3018IU Solid Waste and Hazardous Waste Management)	May 26th, 2023	Dr. Tran Thanh Tu
2	Course learning outcomes	Add detail of Bloom taxonomy	June 13th, 2023	Dr. Tran Thanh Tu
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Air Pollution Control**

Course Code: **ENEE3202IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core knowledge about air pollution control those environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, assignment, field trip	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3	0			
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/ 4.64 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE3021IU Air pollution control Lab ☒ Previous course: ENEE2014IU Heat and Mass Transfer; ENEE2011IU Environmental Chemistry 2 Lab

<table>
<tr><td></td><td></td></tr>
<tr><td>Course objectives</td><td>This course provides student knowledge of principles and methods of treatment of particles and gaseous pollutants in air stream; also train the students with calculation, design skills for air pollution control devices, e.g., settling chamber, cyclone, filtration, scrubber, absorption, adsorption, …</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Analyze air pollution sources in comparison to Technical Standard [Analyzing]
CLO2. Illustrate the principle of particulate matter and gaseous control [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Display an ability Design control equipment for particulate matter and gaseous pollutants [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO4. Form professional ethics in air pollution control [Valuing]
CLO5. Practices self-leaning [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Theory part
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>1</td><td>I</td></tr>
<tr><td>Particle control: review</td><td>1</td><td>U</td></tr>
<tr><td>Settling chamber</td><td>1</td><td>T,U</td></tr>
<tr><td>Cyclone</td><td>1</td><td>T,U</td></tr>
<tr><td>Fabric Filter</td><td>1</td><td>T,U</td></tr>
<tr><td>Wet Dust Collectors</td><td>1.5</td><td>T,U</td></tr>
<tr><td>Electrostatic precipitator</td><td>0.5</td><td>T</td></tr>
<tr><td>Gaseous control: review</td><td>1</td><td>U</td></tr>
<tr><td>Absorption</td><td>3</td><td>T,U</td></tr>
<tr><td>Adsorption</td><td>2</td><td>T,U</td></tr>
<tr><td>Thermal/condensation
Biofiltration</td><td>1</td><td>T,U</td></tr>
<tr><td>Seminar/Presentation</td><td>1</td><td>T</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☐ Report ☒ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	*[1] C.David Cooper & F.C. Alley (2011), Air Pollution Control - A Design Approach, Fourth Edition, Waveland Press, Inc., New York.* *[2] Theodore, L. (2008), Air Pollution Control Equipment Calculations, Wiley.* *[3] Perry, R. H., & Green, D. W. (2008). Perry's chemical engineers' handbook. New York: McGraw-Hill.* *[4] Wood, G. O. (2002). "Review and comparisons of D/R models of equilibrium adsorption of binary mixtures of organic vapors on activated carbons." Carbon 40(3): 231-239.* *[5] Yaws, Carl L. (2003). Yaws' Handbook of Thermodynamic and Physical Properties of Chemical Compounds: Physical, Thermodynamic and Transport Properties for 5,000 Organic Chemical Compounds. Norwich, New York: Knovel,*	

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4		4							
	2	4									
Skill (Level: 1-7)	3	4				4					
Attitudes (Level: 1-5)	4									3	
	5										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	4.0	0.0	4.0	0.0	0.0	0.0	3.0	4.0
L,M,H conversion *		M		M		M				M	H

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction: ● Course Introduction ● Air pollution sources ● Technical standard for air emission ● Review of previous essential	1,4		Lecture, Discussion,	Various references

Week	Topic	CLO	Assessments	Learning activities	Resources
	knowledge				
2	Particles control: ● Particulate matter ● Characterization	1 2		Lecture, Discussion, Calculation	Various references
3	Settling chamber: ● Principle ● Design calculation	2 3	A1.1.1	Lecture, Design demo, Discussion, Calculation	[2] Chapter 3
4	Cyclone ● Principle ● Design parameters	2 3	A1.1.2	Lecture, Design demo, Discussion, Calculation	[1] Chapter 4
5	Fabric Filter ● Principle ● Design parameters	2 3	A1.1.3	Lecture, Design demo, Discussion, Calculation	[2] Chapter 12
6-7	Wet Dust Collectors ● Principle ● Design parameters	2 3	A1.1.4	Lecture, Design demo, Discussion, Calculation	[1] Chapter 7
	Electrostatic precipitator ● Principle ● Design parameters Review for application	2 3		Lecture, Design demo, Discussion	[2] Chapter 10
	Midterm		A2		
8	Review of previous essential knowledge	1		Lecture, Discussion, Calculation	[3]
9-10	Absorption: ● Principle ● Design calculation	2 3	A1.1.5	Lecture, Design demo, Discussion, Calculation	[2] Chapter 6,[3] [4] [5]
11-12-13	Adsorption: ● Principle ● Design calculation	2 3	A1.1.6	Lecture, Design demo,	[1] Chapter 13,[2] Chapter 5, [3][4][5]

Week	Topic	CLO	Assessments	Learning activities	Resources
				Discussion, Calculation	
14	Thermal/condensation: ● Principle ● Technologies/devices Biofiltration: ● Principle ● Design calculation	2		Lecture, Design demo, Discussion,	Various references
15	Seminar/ presentation: application of advanced technology	1,2,5		Present, Q&A	Papers
	Final exam		A3		

4. Assessment plan

Assessment Type		CLO1	CLO2	CLO3	CLO4	CLO5
A1. Progress assessment (30%)	A1.1. Assignment (20%)			A1.1.1-A1.1.6		
	A1.2. Presentation (10%)		A1.2			A1.2.
A2. Mid-term exam (30%)		Q1.1	Q2	Q3 Q4	Q1.2	
A3. Final examination (40%)		Q1	Q2	Q3 Q4	Q5	

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for assessment of calculation and theory/suggestion questions in assignment and exam

Criteria	Level				
	Excellent	Good	Average	Weak	
	100	75	50	25	0
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

5.2. Rubric for self-reading and presentation (R2)

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Selecting papers	20	Appropriate with the topic					Inappropriate with the topic, less relevant
2. Contacting instructor for discussion	10	Frequently (>5 times)					No contact
2. Expanding the reading with various related references for unclear issues from papers	10	Expanding for more than 2 related other papers					No expanding the reading other references
3. Present about the contents of papers and answer the questions from instructor and classmates	60	Deeply understand about the contents of papers; all answers are correct					Little understanding about the paper contents; less than 50% answers are correct

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Reduce the credit of course to 3 (theory only) due to the separating of Lab works to a new course	22/5/2023	Dr. Nguyen Thi Thuy
2	Page 1	Add Parallel course: ENEE3021IU Air pollution control Lab		
3	Page 2	Change CLOs (CLO 4,5) for theory course		
4	Page 5	Add students' presentation for papers related to advanced technologies in air pollution control		
5	Page 5	Revise assessment plan according to the changes in CLOs.		
6	Page 5	Remove the field trip because this part will be provided in Internship 1		
7	Page 6	Add rubric for presentation assessment		

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Air pollution control Lab**

Course Code: **ENEE3021IU**

1. General information

Course designation	This course is one of the main specialized courses of the environmental engineering curriculum as it conveys the core skills about air pollution control those environmental engineers must achieve.	
Semester(s) in which the course is taught	2	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Lecture, lesson, lab works, assignment, field trip	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**1**	0	1			
Contact hours	**25,0**	0	25	0	0	0
Self-Study hours	**30,0**	0	30	0	0	0
Total workload	**55,0**	0	55	0	0	0

Credit points	1 credits/ 2 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course: ENEE3020IU Air Pollution Control ☒ Previous course: ENEE2014IU Heat and Mass Transfer; ENEE2011IU Environmental Chemistry 2 Lab

<table>
<tr><td></td><td></td></tr>
<tr><td>Course objectives</td><td>This course provides student skills for operating air pollution control devices, e.g., cyclone, bag house, scrubber, absorption, adsorption, …</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Illustrate the principle of air pollution treatment processes and devices [Analyzing]
CLO2. Analyze data, report and suggest improvement for devices [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Organize for the time and resource management of experiments, and follow the guideline of measurement/operation [Mechanism]
CLO4. Measure pollutants in air stream [Mechanism]
CLO5. Operate air pollution control devices [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO6. Follow the safety guideline of Lab during conducting experiments [Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Lab work
Weight: lecture session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Experiment: Characterize air pollution sources, Overview all devices</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Operate cyclone system</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Operate fabric filter system</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Operate absorption system</td><td>1</td><td>T,U</td></tr>
<tr><td>Experiment: Operate the adsorption system</td><td>2</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☒ Report
☐ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☒ Others, please specify: lab assessment</td></tr>
<tr><td>Study and examination requirements</td><td colspan="2">Lab work: Attendance of 100 percent is compulsory for the Lab work.
Students must have at least 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td colspan="2">[1] Lab manual (internal use)</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4									
	2				4			4			
Skill (Level: 1-7)	3				4						
	4				4		4				
	5				4		4				
Attitudes (Level: 1-5)	6									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	0.0	4.0	0.0	4.0	4.0	0.0	3.0	0.0
L,M,H conversion *		M			M		M	M		M	

3. Planned learning activities and teaching methods

Lab work

Week	Content	CLOs	Assessments	Learning activities
1	Experiment: Characterize air pollution sources, Overview all devices			Lecture; Observing; Manipulating
2	Experiment: Operate cyclone system	1,2,3,4,5,6	A1.1	Observing; Manipulating; Reporting
3	Experiment: Operate fabric filter system	1,2,3,4,5,6	A1.2	Observing; Manipulating; Reporting
4	Experiment: Operate absorption system	1,2,3,4,5,6	A1.3	Observing; Manipulating; Reporting
5,6	Experiment: Operate the adsorption system	1,2,3,4,5,6	A1.4 A1.5	Observing; Manipulating; Reporting

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
A1. Lab assessment (100%)	A1. 1-A1. 5 (II.7)	A1.1-A1.5 (II)	A1. 1-A1. 5 (I.1,2,3,5)	A1.1-A1.5 (I.3,4)	A1.1-A1.5 (I.3, 4)	A1.1-A1.5 (I.3)

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Rubric for lab work assessment

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
I. Lab activity							
1. Attendance	10	Participate on time					Be late ≥15 min
2. Preparation for the lab	10	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Follow the operating and safety guideline, be active	5	Strictly follow, active					Not follow, inactive
4. Experimental skills (measure, operate, manage)	20	Correct in procedures for measuring, operating and management)					Incorrect in procedures for measuring, operating and management)
5. Time and resources management	5	Distribute appropriately time and resource to complete well experiments					Distribute inappropriately time and resource to incomplete more than 50% of experiments
II. Report							
6. Writing skill and format	5	Clear, no spellings and grammar mistakes					Not logical, too much spelling and grammar mistakes, not understandable
7. Introduction, method	10	Sufficient, concise, accurate					Incomplete contents ≥50%, not clear, inaccurate
8. Experimental Results	20	Achieve accurate results					Incomplete results ≥ 50%;
9. Data analysis	5	Logical, sufficient data analysis					No data analysis; Wrong in data analysis
10. Conclusion/suggestion	5	concise, valuable					not valuable
11. Images and support information	5	Accurate, abundant, clear and beautiful					Too little or no images or supporting information; unclear, inaccurate
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Project 1**

Course Code: **ENEE3110IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides professional skills in water treatment.
Semester(s) in which the course is taught	1,2
Person responsible for the course	Dr. Nguyen Thi Thuy Associate Prof. Tran Tien Khoi
Language	English
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Project
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**			2		
Contact hours	**75.0**	0	0	75	0	0
Self-Study hours	**60.0**	0	0	60	0	0
Total workload	**135.0**	0	0	135	0	0

Credit points	2 credits/4.91 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course ☒ Previous course: ENEE3012IU - Water Treatment; ENEE4017IU- Advanced Engineering Drawing
Course objectives	Students practice a project for water treatment, including identification of raw water's sources and characteristics, specifying treatment's requirements, technology proposal, and performing necessary calculation and design for main/principal units in the system.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the characteristics of water sources assigned, conclude about the necessary of treatment [Evaluating]
CLO2. Review current water treatment methods, propose a technical solution for the treatment [Analyzing]
CLO3. Calculate and design main treatment units [Creating]</td></tr>
<tr><td>Skill</td><td>CLO4. Display the treatment units on drawings [Mechanism]
CLO5. Dispaly effectively communication through oral, written, and electronic forms [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO9. Formulate self – reading, reviewing and enhancing knowledge about water treatment for promoting lifelong learning and educating [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: Project session (6.25 hours/week)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction,</td><td>1</td><td>T,U</td></tr>
<tr><td>Overview of pollution source</td><td>1</td><td>T,U</td></tr>
<tr><td>Review treatment technologies and technical proposal</td><td>1</td><td>T,U</td></tr>
<tr><td>Technical calculation and Design for treatment works</td><td>5</td><td>T,U</td></tr>
<tr><td>Technical drawings</td><td>4</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Advisor’s assessment, reviewer’s assessment</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.
In order to have reviewer assessment, the thesis’s grade of student evaluated by advisor must be equal or higher than 50 points.</td></tr>
<tr><td>Reading list</td><td>Textbooks:
[1] American Water Works Association, American Society of Civil Engineers (2012). Water Treatment Plant Design, Fifth Edition 5th Edition: McGraw-Hill
[2]. Ministry of construction (2006). TCXDVN 33: 2006: Design standard water supply – external networks and facilities.
[3] Ministry of Health (2018). QCVN No. 01-1:2018/BYT National technical regulation on domestic water quality.
[4], James Edzwald (2010). Water Quality & Treatment: A Handbook on Drinking Water 6th Edition, McGraw-Hill Education.</td></tr>
</table>

	[5] NALCO Chemical Company (2009). The Nalco Water Handbook 3rd Edition: McGraw-Hill Education.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	5		5		5	5				
	2	4		4	4	4	4				
	3	6		6			6				
Skill (Level: 1-7)	4			4			4	4			
	5							4			
Attitudes (Level: 1-5)	6										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	4.8	4.0	4.5	4.8	4.0	0.0	0.0	4.0
L,M,H conversion *		H		H	M	H	H	M			H

3. Planned learning activities and teaching methods

Week	Design topic	CLO	Assessments	Learning activities	Resources
1	Plan for doing project Introduction	6		Meeting and practicing	
2	Overview of water source characteristics	1, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
3	Review treatment technologies and technical proposal	2, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
4	Technical calculation and Design for treatment works (1)	3,6,7,8,9		Meeting and practicing	[1][2][3][4][5]
5	Technical calculation and Design for treatment works (2)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
6	Technical calculation and Design for treatment works (3)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
7	Technical calculation and Design for treatment works (4)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
8	Technical calculation and Design for treatment works (5)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
9	Technical drawings (1)	4, 6,7,8,9		Meeting and practicing	

Week	Design topic	CLO	Assessments	Learning activities	Resources
10	Technical drawings (2)	4, 6,7,8,9		Meeting and practicing	
11	Technical drawings (3)	4, 6,7,8,9		Meeting and practicing	
12	Technical drawings (4)	4, 6,7,8,9		Meeting and practicing	
	Process assessment		Advisor assessment	-	
	Reviewer assessment		Reviewer assessment		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9
Progress assessment	R1(2)	R1(2,3)	R1(4)	R1(5)	R1(1)	R1(7)	R1(6)	R1(8)	R1(9)
Reviewer assessment	R2(2)	R2(2,3)	R2(4)	R2(5)	R2(1) R2(7)		R2(6)		

Note: %Pass: Target that 60 % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	5	Compliance well to guidelines					Not follow
2. Introduction, literature review	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology choice	10	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	30	right, sufficient, clear					More than 50% of calculations are wrong.
5. Drawing	30	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	5	Significant					Insignificant
7. Meeting with advisor, planning for project and management of time	5	Plan well and complete project on time					Without plan, manage time
8. Level of commitment and independence in work,	5	High responsible to complete tasks; Stick to the task and keep working confidently until the task is					Irresponsible; Little persistence on the tasks; Give up early; Closed-minded for

Criteria	%	Level					
		Excellent	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
perseverance, flexibility		complete; Being open-minded for comments and discussion					comments and discussion
9. Self-reading, reviewing and enhancing knowledge	5	Selecting appropriate references, expanding the reading with various related references for unclear issues, apply effectively the knowledge of the references into the project					Selecting inappropriate/ unreliable references, no expanding the reading with various related references for unclear issues, apply ineffectively/do not apply the knowledge of the references into the project
Total	100						

5.2. Evaluation of reviewer (R2)

Criteria	%			Level			
		Excellent	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Writing skill and format	5	Compliance well to guidelines					Not follow
2. Introduction, literature review	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology proposal	10	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	30	right, sufficient, clear					More than 50% of calculations are wrong.
5. Design drawing	20	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	5	Significant					Insignificant
7. Answer the questions from reviewer	20	Relevant to questions, all answers are correct					irrelevant to questions, less than 50% answers are correct
8. Attitude	5	Professional					Unprofessional
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Project 2**

Course Code: **ENEE3111IU**

1. General information

Course designation	*This course is designed for students pursuing a degree in environmental engineering and provides professional skills of wastewater treatment*	
Semester(s) in which the course is taught	1,2	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Project	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**			2		
Contact hours	**75.0**	0	0	75	0	0
Self-Study hours	**60.0**	0	0	60	0	0
Total workload	**135.0**	0	0	135	0	0

Credit points	2 credits/4.91 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course ☒ Previous course: ENEE3014IU - Municipal Wastewater Treatment; ENEE4017IU-Advanced Engineering Drawing
Course objectives	Students practice a project for wastewater treatment, including identification of wastewater characteristics, specifying treatment's requirements, technology proposal, and performing necessary calculation and design for main/principal units in the system.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the characteristics of wastewater assigned, conclude about the necessary of treatment [Evaluating]
CLO2. Review current wastewater treatment methods, propose a technical solution for the treatment [Analyzing]
CLO3. Calculate and design main treatment units [Creating]</td></tr>
<tr><td>Skill</td><td>CLO4. Display the treatment units on drawings [Mechanism]
CLO5. Display effectively communication through oral, written, and electronic forms [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO6. Formulate self – reading, reviewing and enhancing knowledge about water treatment for promoting lifelong learning and educating [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (6.25 hours/week)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction,</td><td>1</td><td>T,U</td></tr>
<tr><td>Overview of pollution source</td><td>1</td><td>T,U</td></tr>
<tr><td>Review treatment technologies and technical proposal</td><td>1</td><td>T,U</td></tr>
<tr><td>Technical calculation and Design for treatment works</td><td>5</td><td>T,U</td></tr>
<tr><td>Technical drawings</td><td>4</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Advisor’s assessment, reviewer’s assessment</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.
In order to have reviewer assessment, the thesis’s grade of student evaluated by advisor must be equal or higher than 50 points.</td></tr>
<tr><td>Reading list</td><td>[1] Mecalf and Eddy (2013), Wastewater Engineering, Treatment, Disposal and Resource Recovery, Fifth Edison, McGraw-Hill Education.
[2] Duncan Mara (2003), Domestic Wastewater Treatment in Developing countries, Earthscan, London.
[3] Mc Graw-Hill (2008), Water and Environment Federation, Industrial Wastewater: Management, Treatment, and Disposal, WEF Press.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	5		5		5	5				
	2	4		4	4	4	4				
	3	6		6			6				
Skill (Level: 1-7)	4			4			4	4			
	5							4			
Attitudes (Level: 1-5)	6										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	4.8	4.0	4.5	4.8	4.0	0.0	0.0	4.0
L,M,H conversion *		H		H	M	H	H	M			H

3. Planned learning activities and teaching methods

Week	Design topic	CLO	Assessments	Learning activities	Resources
1	Plan for doing project Introduction	6		Meeting and practicing	
2	Overview of wastewater characteristics	1, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
3	Review treatment technologies and technical proposal	2, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
4	Technical calculation and Design for treatment works (1)	3,6,7,8,9		Meeting and practicing	[1][2][3][4][5]
5	Technical calculation and Design for treatment works (2)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
6	Technical calculation and Design for treatment works (3)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
7	Technical calculation and Design for treatment works (4)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
8	Technical calculation and Design for treatment works (5)	3, 6,7,8,9		Meeting and practicing	[1][2][3][4][5]
9	Technical drawings (1)	4, 6,7,8,9		Meeting and practicing	

Week	Design topic	CLO	Assessments	Learning activities	Resources
10	Technical drawings (2)	4, 6,7,8,9		Meeting and practicing	
11	Technical drawings (3)	4, 6,7,8,9		Meeting and practicing	
12	Technical drawings (4)	4, 6,7,8,9		Meeting and practicing	
	Process assessment		Advisor assessment	-	
	Reviewer assessment		Reviewer assessment		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9
Progress assessment	R1(2)	R1(2,3)	R1(4)	R1(5)	R1(1)	R1(7)	R1(6)	R1(8)	R1(9)
Reviewer assessment	R2(2)	R2(2,3)	R2(4)	R2(5)	R2(1) R2(7)		R2(6)		

Note: %Pass: Target that 60 % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	5	Compliance well to guidelines					Not follow
2. Introduction, literature review	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology choice	10	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	30	right, sufficient, clear					More than 50% of calculations are wrong.
5. Drawing	30	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	5	Significant					Insignificant
7. Meeting with advisor, planning for project and management of time	5	Plan well and complete project on time					Without plan, manage time
8. Level of commitment and independence in work, perseverance, flexibility	5	High responsible to complete tasks; Stick to the task and keep working confidently until the task is complete; Being open-					Irresponsible; Little persistence on the tasks; Give up early; Closed-minded for comments and discussion

Criteria	%	Level					
		Excellent	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
		minded for comments and discussion					
9. Self-reading, reviewing and enhancing knowledge	5	Selecting appropriate references, expanding the reading with various related references for unclear issues, apply effectively the knowledge of the references into the project					Selecting inappropriate/ unreliable references, no expanding the reading with various related references for unclear issues, apply ineffectively/do not apply the knowledge of the references into the project
Total	100						

5.2. Evaluation of reviewer (R2)

Criteria	%			Level			
		Excellent	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Writing skill and format	5	Compliance well to guidelines					Not follow
2. Introduction, literature review	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology proposal	10	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	30	right, sufficient, clear					More than 50% of calculations are wrong.
5. Design drawing	30	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	5	Significant					Insignificant
7. Answer the questions from reviewer	10	Relevant to questions, all answers are correct					irrelevant to questions, less than 50% answers are correct
8. Attitude	5	Professional					Unprofessional
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Construction Measurement and Cost Estimating

Course Code: ENEE4016IU

1. General information

Module designation	This course is designed to provide students knowledge about quantity measurement and cost estimation. The measured quantity is used to estimate construction cost and developed procurement and contract documents.
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Nguyen, Hoai Nghia
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, presentation, and assignments.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hour: 90
Credit points	3 credits/ 4.64 ECTS
Required and recommended prerequisites for joining the module	Advanced Engineering Drawing
Module objectives/intended learning outcomes	Upon the successful completion of this course students will be able to:

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1. Explain roles of quantity surveyors and construction industry. CLO2. Describe principles of construction measurement.
Skill	CLO3. Carry out construction measurment and cost estimating.
Attitude	CLO4. Reason around accuracy of measurement and cost estimating

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Quantity surveyors and construction industry</td><td>1</td><td>I</td></tr>
<tr><td>Measurement and quantification</td><td>7</td><td>T, U</td></tr>
<tr><td>Forecasting costs and value</td><td>4</td><td>T, U</td></tr>
<tr><td>Pricing and tendering</td><td>2</td><td>T, U</td></tr>
<tr><td>Procurement procedure</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Constructed-response test</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed based on their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this module.</td></tr>
<tr><td>Reading list</td><td>[1] Duncan Cartlidge, Quantity Surveyor’s Pocket Book, 2009, 1st edition.
[2] Parviz F. Rad, Project Estimating and Cost Management, 2002.
[3] Sean D.C. Ostrowski, Measurement Using the New Rules of Measurement, 2013, 1st edition.</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (1-4) and Program/Student Learning Outcomes (1-10) is shown in the following table:

Expected Learning Outcome	**Course Learning Outcomes**			
	1	2	3	4
1	4	4		
2				
3				
4				
5				
6			4	
7				
8				
9				4
10				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Quantity surveyors and construction industry	1	HW/Quiz C1	Lecture, Discussion, HW	[1] Chapter 1
2-6	Measurement and quantification - structures	2	HWs/Quizes C2	Lecture, Discussion, HW, Quiz,	[1] Chapter 3
7-8	Measurement and quantification – MEP	2	HWs/Quizes C3, Presentations	Lecture, Discussion, HW, Quiz, Presentations	[1] Chapter 3
9-10	Midterm Examination				
11-14	Cost estimation	3	HWs/Quizes C4	Lecture, Discussion, HW, Quiz,	[1] Chapter 2
15-16	Pricing and tendering	3	HWs/Quizes C5	Lecture, Discussion, HW, Quiz,	[1] Chapter 4
17	Procurement	3	HWs/Quizes	Lecture, Discussion	[1] Chapter 5
19-20	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz C1 60% Pass	Qz C2, C3 50% Pass	Qz C4, C5 50% Pass,	Qz C4, C5 50% Pass,
Homework exercises/ Presentation (20%)	HWs C1 60% Pass	HWs C2, C3 50% Pass, Presentations 60% Pass	Qz C4, C5 50% Pass,	Qz C4, C5 50% Pass,
Midterm exam (30%)		Questions 50% Pass		
Final exam (40%)		Questions 50% Pass	Questions 50% Pass	Questions 50% Pass

Note: %Pass: % students have scores greater than 50 out of 100.

5. Rubrics (optional)

- No

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Treatment Plant Operation**

Course Code: **ENEE3105IU**

1. General information

Course designation	This course provides the fundamentals for cost-effective, safe and lawful operation of wastewater or sanitation treatment systems. This course provides skill of experimental set-up used for operation units of wastewater treatment plants. It also provides the basics on environmental legislation and regulations, risk management and HSE.	
Semester(s) in which the course is taught	1,2	
Person responsible for the course	Associate Prof. Tran Tien Khoi	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	Lecture	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/4.64 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course

<table>
<tr><td>Course objectives</td><td>This course provides student knowledge of wastewater treatment systems, the legislation and regulations for the treatment, disposal, and management; application of knowledge for operation, analyzing factors, detecting technical problems.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td rowspan="6">Knowledge</td><td>CLO1. Understand the wastewater treatment systems</td></tr>
<tr><td>CLO2. Apply the legislation and regulations of wastewater treatment, disposal and management</td></tr>
<tr><td>CLO3. Apply knowledge of physico-chemical processes and biological processes operation of wastewater treatment plants</td></tr>
<tr><td>CLO4. List the fundamentals of the operational units that are part of the wastewater treatment plants</td></tr>
<tr><td>CLO5. Analyze and estimate factors relating to planning of wastewater management system</td></tr>
<tr><td>CLO6. Detect and assess technical problems in wastewater treatment plants operation</td></tr>
<tr><td rowspan="2">Skill</td><td>CLO7. Manipulate and operate wastewater treatment systems,</td></tr>
<tr><td>CLO8. Set up targets and requirements of wastewater treatment systems</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Lecture 1. Overview</td><td>2</td><td>I, T</td></tr>
<tr><td>Lecture2. Wastewater Treatment Plant Management</td><td>3</td><td>T, U</td></tr>
<tr><td>Lecture 3. Management and Control of Emission from the Plant</td><td>3</td><td>T, U</td></tr>
<tr><td>Lecture 4. Operation</td><td>4</td><td>T,U</td></tr>
<tr><td>Lecture 5. Optimizing system operation</td><td>3</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☒ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☒ Others, please specify: Short answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	**Textbook** [1].George, T., Franklin, L. B., & Stensel, H. D (2003). Wastewater Engineering: Treatment and Resource Recovery, 4th edition, Metcalf and Eddi Inc. **Reference book** [2]. Wesley Eckenfelder (2000). Industrial Water Pollution Control, 3rd edition, McGraw-Hill Education [3]. Mecalf and Eddy (2013). Wastewater Engineering, Treatment, Disposal and Resource Recovery, 5th edition, McGraw-Hill Education.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-8) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
	2		3							3	
	3	3									
	4			2							
	5			4							
	6			5							
Skill (Level: 1-7)	7						4				
	8		4								
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	2.5	3.5	3.7	0.0	0.0	4.0	0.0	0.0	3.0	0.0
L,M,H conversion *		L	M	M			M			M	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	**Lecture 1. Overview** 1.1. Legislations and Regulations 1.2. Technical Standards 1.3. Risk Management	1,2		Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]

Week	Topic	CLO	Assessments	Learning activities	Resources
2	**Lecture 1. Overview** 1.4. Safety Regulations 1.5. Important factor in management and operation of wastewater treatment system	1,2,3,4		Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
3	**Lecture2. Wastewater Treatment Plant Management** 2.1. Management Concepts, Content and Objectives 2.2. Team Building 2.3. 4Organization and Structure of M5anagement systems	3,4,5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
4	**Lecture2. Wastewater Treatment Plant Management** 2.4. Operation Instructions 2.5. Forms, Documents and Records	3,4,5,6	A1	- Group discussion -Class discussion	[1], [2], [3]
5	**Lecture2. Wastewater Treatment Plant Management** 2.6. Training and Maintenance plan 2.7. HSE 2.8. Operation Cost Estimation	3,4,5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
6	**Lecture 3. Management and Control of Emission from the Plant** 3.1. Air and Odor Sources	5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]

Week	Topic	CLO	Assessments	Learning activities	Resources
	3.2. Sludge				
7	**Lecture 3. Management and Control of Emission from the Plant** 3.3. Solid Wastes 3.4. Hazardous Wastes	5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
8	**Lecture 3. Management and Control of Emission from the Plant** 3.5. Sources Monitoring and Control	5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
	Midterm		A2		
9	**Lecture 4. Operation** 4.1. Operation Process 4.2. Equipment and Instruments – PID Drawing	3,4,5,6,7,8	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
10	**Lecture 4. Operation** 4.3. Pumps and Piping Systems 4.4. Chemical Handling Systems	3,4,5,6,7,8	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
11	**Lecture 4. Operation** 4.5. Aeration Systems 4.6. Sludge Handling Systems	3,4,5,6,7,8	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
12	**Lecture 4. Operation** 4.6. Sludge Handling Systems 4.6. Electrical Control Systems	3,4,5,6,7,8	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]

Week	Topic	CLO	Assessments	Learning activities	Resources
13	**Lecture 5. Optimizing system operation** 5.1. Operation Diary 5.2. Laboratory Management	3,4,5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
14	**Lecture 5. Optimizing system operation** 5.3. Energy Saving 5.4. System Failure	3,4,5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
15	**Lecture 5. Optimizing system operation** 5.5. Lost and Prevention 5.6. Biological Process Monitoring	3,4,5,6	A1	Learning in class: listen/take note, ask questions Learning at home: reading	[1], [2], [3]
	Final exam		A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10
A1. Progress assessment (assignment) 30%			A1.1	A1.2	A1.3	A1.4				
A2. Midterm exam (writing test) 30%	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6				
A3. Final exam (writing test) 40%			A3.1	A3.2	A3.3	A3.4	A3.5	A3.6	A3.7	A3.8

Note: %Pass: Target that 70 % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Rubric for assessment of calculation and theory/suggestion questions in assignment and exam (R1)

Criteria	Level				
	Excellent	**Good**	**Average**	**Weak**	
	100	**75**	**50**	**25**	**0**
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes; Results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps containing mistakes; Results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

5.2. Rubric for self-reading, reviewing and enhancing knowledge (R2)

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Selecting papers	20	Appropriate with the topic					Inappropriate with the topic, less relevant
2. Contacting instructor for discussion	10	Frequently (>5 times)					No contact
2. Expanding the reading with various related references for unclear issues from papers	10	Expanding for more than 2 related other papers					No expanding the reading other references
3. Present about the contents of papers and answer the questions from instructor and classmates	60	Deeply understand about the contents of papers; all answers are correct					Little understanding about the paper contents; less than 50% answers are correct

5.4. Rubric for presentation (R3)

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Level of practicing of self - reading and enhancing knowledge about water treatment		Show strong motivating in self - reading and enhancing knowledge					
1. Introduction, purpose of report (relevant, sufficient, clear)	10	Relevant, sufficient, clear					Not clear, not relevant
2. Methodology (apply for original research report)	5	Sufficient, clear, easy to understand					<50% of contents are shown, not clear, not logical
3. Findings of research (sufficient, clear, understandable)	10	Sufficient, clear, understandable					<50% of contents are shown, not clear, not logical
4. Structure of a technical report (enough, clear)	10	Enough, clear, easy to understand					<50% of contents are shown, not clear, not logical

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Aver age**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
5. PPT quality (follow the rule of PPT Making, clear, attractive)	20	Follow the rule of PPT Making, clear, attractive					Dull, small word, a lot of spelling and grammar mistakes
6. Presentation (speaking skills, correct pronunciation, attractive, timing)	20	Confident, clear, correct pronunciation, attractive, timing					<50% content has not completed, not clear, dull
7. Answering the questions from instructor and classmates	15	Focus, correct, clear, convincible					Less relevant, less than 50% answers are incorrect; not convincible
8. Attitude and behavior	5	Processional					Unprofessional

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC

INTERNATIONAL UNIVERSITY

School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Experimental Design**

Course Code: **ENEE4019IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides advanced knowledge of experimental design and data analysis with emphasis on environmental engineering cases.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	Lecture, assignment, presentation	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	2				
Contact hours	**25,0**	25	0	0	0	0
Self-Study hours	**60,0**	60	0	0	0	0
Total workload	**85,0**	85	0	0	0	0

Credit points	2
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course: ENEE4020IU - Experimental Design Lab ☒ Previous course: ENEE1019IU - Applied statistics

<table>
<tr><td>Course objectives</td><td>This course provides students with knowledge and skills in experimental design, data analysis, visualization and data archiving for environmental engineering's experiments.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply knowledge of statistical analysis to assess hypothesis by selecting and performing appropriate statistical tests [Applying]

CLO2. Analyze the resulting data for obtaining the valid and objective conclusion [Analyzing]

CLO3. Interpret steps to develop an optimization problem [Understanding]</td></tr>
<tr><td>Skill</td><td>CLO4. Classify single factor, two-factor factorial, 2k factorial and two-level fractional factorial designs in term of concepts, objectives and application; Estimate effects and interpret ANOVA analysis [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO5. Formulate self – reading, reviewing and enhancing knowledge about experimental design [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Theory
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>1</td><td>T</td></tr>
<tr><td>Single comparative experiments</td><td>2</td><td>T, U</td></tr>
<tr><td>Experiments with a single factor: The analysis of Variance</td><td>1</td><td>T, U</td></tr>
<tr><td>Randomized Blocks, Latin Squares, and Related designs</td><td>1</td><td>T, U</td></tr>
<tr><td>Introduction to Factorial Designs</td><td>1</td><td>T, U</td></tr>
<tr><td>The 2^k factorial Design</td><td>1</td><td>T, U</td></tr>
<tr><td>Two-Level fractional Factorial designs</td><td>1</td><td>T, U</td></tr>
<tr><td>Fitting regression models</td><td>1</td><td>T, U</td></tr>
<tr><td>Response surface methods and designs</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☒ Assignments	☐ Oral examination ☒ Written examination ☐ Others, please specify: lab assessment
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	*[1] Douglas C.montgomery (2013). Design and analysis of experiments. John Wiley and Sons, Inc.* *[2] Raymond H.Myers, Douglas C. Montgomery, C. M. Anderson-cook (2016). Response surface methodology: Process and product optimization using designed experiments. 4th edition, John Wiley and Sons, Inc.*	

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	4		4	4						
	3				2						
Skill (Level: 1-7)	4	4			4						
Attitudes (Level: 1-5)	5									4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.7	0.0	4.0	3.3	0.0	0.0	0.0	0.0	4.0	0.0
L,M,H conversion *		M		M	M					H	

3. Planned learning activities and teaching methods

Week	Topic	CLOs	Assessment	Learning activities	Resources
1	**Introduction** -Strategy of experimentation -Some typical application of experimental design - Basic principles - Guidelines for Designing Experiments	1		Lecture, Discussion	[1]1

Week	Topic	CLOs	Assessment	Learning activities	Resources
2-3	**Chapter 1: Single comparative experiments** -Basic statistical concepts -Sampling and sampling Distributions -Inferences about the differences in Means, Randomized Designs -Inferences about the differences in Means, paired Comparison Designs -Inferences about the variances of Normal Distributions -Problem	1,2	A1.1	Lecture, Discussion, Calculation	[1]2
4	**Chapter 2: Experiments with a single factor: The analysis of Variance** -The analysis of Variance -Analysis of the fixed effects Model -Model adequacy checking -Practical interpretation of results -Sample computer output -Determining sample size -Other examples of single-factor experiments -The random effects model	1,2	A1.2	Lecture, Discussion, Calculation	[1]3
5	**Chapter 3: Randomized Blocks, Latin Squares, and Related designs** -The randomized Complete Block Design - The Latin Square Design - The Graeco-Latin Square Design -Balanced Incomplete Block Design	4		Lecture, Discussion, Calculation	[1]4
6	**Chapter 4: Introduction to Factorial Designs** -Basic definitions and principles -The Advantage of factorials -The two-factor factorial design -The general factorial design -Fitting response curves and surface -Blocking in a factorial Design	4		Lecture, Discussion, Calculation	[1]5
7	**Chapter 5: The 2^k factorial Design** - Introduction - The 2^2 design -The 2^3 design -The general 2^k design -A single replicate of the 2^k design -Additional examples of unreplicated 2^k design -2^k designs are optimal designs -The addition of center points to the 2^k design	4		Lecture, Discussion, Calculation	[1]6

Week	Topic	CLOs	Assessment	Learning activities	Resources
8	**Chapter 6: Two-Level fractional Factorial designs** - Introduction - The one-half fraction of the 2^k design - The one-quarter fraction of the 2^k design - The general 2^{k-p} fractional factorial design -Alias structures in fractional factorials and other designs -Resolution III designs -Resolution IV and V designs -Supersaturated design	4	A1.3	Lecture, Discussion, Calculation	[1]8
	Midterm examination		A2		
9	**Chapter 7: Fitting regression models** - Introduction - Linear regression models -Estimation of the parameters in linear regression models -Hypothesis testing in multiple regression -Confidence intervals in multiple regression -Prediction of new response observations -Regression model diagnostics -Testing for Lack of Fit	4		Lecture, Discussion, Calculation	[1]10
10	**Chapter 8: Response surface methods and designs** - Introduction to response surface methodology - The Method of steepest Ascent - Analysis of a second-order response surface - Experimental design for fitting response surface - Mixture experiments -Evolutionary operation	3	A1.3	Lecture, Discussion, Calculation	[1]11
	Review paper and presentation	5	A1.4		
	Final examination		A3		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Progress - Assignment (15%)	A1.1	1.2	A1.3		
Progress – Reviewing paper and presentation (15%)					A1.4
Midterm exam (30%)	Q1	Q2,3			
Final exam (40%)		Q1	Q4	Q2,3	

*Note: %Pass: Target that **70 %** of students having scores greater than 50 out of 100.*

5. Rubrics (optional)

5.1. Rubric for assessment of calculation in assignment and exam

Criteria	Level				
	Excellent	**Good**	**Average**	**Weak**	
	100	**75**	**50**	**25**	**0**
Calculation	Totally correct in calculations with the differences (if have) in results in within 5%	Calculations mainly correct with 1-2 mistakes and the results not strongly affect (within 10%)	Direction is correct, calculations with 50% steps having mistakes and the results strongly affect	Calculation is done but mainly wrong or less relevance	No calculation; calculation is not relevance
Theory/suggestion	Answer is totally correct	Answer is mainly correct at 75%	Answer is correct at 50%	Answer is not clear and less relevance	No answer; answer is not relevance

5.2. Rubric for self-reading and presentation

		Level					
Criteria	%	Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Selecting papers	20	Appropriate with the topic					Inappropriate with the topic, less relevant
2. Contacting instructor for discussion	10	Frequently (>5 times)					No contact
2. Expanding the reading with various related references for unclear issues from papers	10	Expanding for more than 2 related other papers					No expanding the reading other references
3. Present about the contents of papers and answer the questions from instructor and classmates	60	Deeply understand about the contents of papers; all answers are correct					Little understanding about the paper contents; less than 50% answers are correct

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 1	Reduce the credit of course from 4 to 2 (theory only) due to the separating of Lab works to a new course	22/5/2023	Dr. Nguyen Thi Thuy
2	Page 1	Add Parallel course: ENEE4020IU - Experimental Design Lab		
3	Page 2	Change CLOs for theory course only		
4	Page 5	Add students' presentation for papers related to experimental design and data analysis		
5	Page 5	Revise assessment plan according to the changes in CLOs.		
6	Page 6	Add rubric for presentation assessment		

	VIETNAM NATIONAL UNIVERSITY HCMC **INTERNATIONAL UNIVERSITY** **School of Chemical and Environmental Engineering**

COURSE SYLLABUS

Course Name: **Experimental Design Lab**

Course Code: **ENEE4020IU**

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides advanced skills of experimental design and data analysis with emphasis on environmental engineering cases.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	Laboratory	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**		2			
Contact hours	**50,0**	0	50	0	0	0
Self-Study hours	**60,0**	0	60	0	0	0
Total workload	**110,0**	0	110	0	0	0

Credit points	2 credits/ 4 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☒ Parallel course ENEE4019IU: Experimental Design ☒ Previous course: ENEE1019IU- Applied statistics

<table>
<tr><td>Course objectives</td><td>This course provides students with skills by practicing practical, powerful and accessible tools such as Excel, SPSS, Design expert, Python statistical software that allow them to design, execute, analyze, and interpret data of environmental engineering’s experiments.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Analyze the resulting data for obtaining the valid and objective conclusion [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO2. Use Excel, SPSS, Python software for data analysis (Descriptive analysis, test hypothesis and make graphs) [Mechanism]
CLO3. Use Design expert, Python software for experimental design to generate layout for experimental design and data analysis [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO4. Demonstrate professional responsibilities in the practice of experimental design and data analysis [Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Lab works
Weight: Lab session (4.17 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Software installation</td><td>1</td><td>T, U</td></tr>
<tr><td>Descriptive statistics and visualization of experimental design in Excel</td><td>1</td><td>T, U</td></tr>
<tr><td>Descriptive statistics and visualization of experimental design in SPSS</td><td>2</td><td>T, U</td></tr>
<tr><td>Experimental Design by Design expert: One factor categoric</td><td>1</td><td>T, U</td></tr>
<tr><td>Experimental Design by Design expert: Two-factor categoric; regular two-level</td><td>1</td><td>T, U</td></tr>
<tr><td>Experimental Design by Design expert: Fractional factorial</td><td>1</td><td>T, U</td></tr>
<tr><td>Experimental Design by Design expert: Response Surface methods (RSM)</td><td>1</td><td>T, U</td></tr>
<tr><td>Application of Python (1): Data analysis</td><td>2</td><td>T,U</td></tr>
<tr><td>Application of Python (2): Experimental Design</td><td>2</td><td>T,U</td></tr>
</table></td></tr>
</table>

Examination forms	☐ Multiple-choice questions ☐ Report ☐ Presentation ☐ Assignments	☐ Oral examination ☐ Written examination ☒ Others, please specify: lab assessment
Study and examination requirements	Attendance: Attendance of 100 percent is compulsory for the lab sessions. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	*[1] Lab manual (internal use)*	

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4		4	4						
Skill (Level: 1-7)	2				4		4				
	3				4		4				
Attitudes (Level: 1-5)	4									3	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.0	0.0	4.0	4.0	0.0	4.0	0.0	0.0	3.0	0.0
L,M,H conversion *		M		M	M		M			M	

3. Planned learning activities and teaching methods

Lab work

Week	Topic	CLOs	Assessment	Learning activities	Resources
1	Software installation			Prepare for lab, practice and take note	
2	Descriptive statistics and visualization of experimental design in Excel	1,2,3,4		Prepare for lab, practice and take note	
3,4	Descriptive statistics and visualization of experimental design in SPSS	1,2,3,4		Prepare for lab, practice and take note	
5	Experimental Design by Design expert: **O**ne factor categoric	1,2,3,4		Prepare for lab, practice and take note	
6	Experimental Design by Design expert: Two-factor categoric; regular two-level	1,2,3,4		Prepare for lab, practice and take note	
7	Experimental Design by Design expert: **F**ractional factorial	1,2,3,4		Prepare for lab, practice and take note	

Week	Topic	CLOs	Assessment	Learning activities	Resources
8	Experimental Design by Design expert: Response Surface methods (RSM)	1,2,3,4		Prepare for lab, practice and take note	
9-10	Application of Python: Data analysis	1,2,3,4		Prepare for lab, practice and take note	
11-12	Application of Python (2): Experimental Design	1,2,3,4			
	Lab assessment		A1		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Process assessment (15%)		R1(3)	R1(3)	R1.(1,2)
Lab exam (85%)	Q1.2, Q2.2, Q3.2, Q4.2	Q1.1, Q2.1	Q3.1,Q4.1	

*Note: %Pass: Target that **70 %** of students having scores greater than 50 out of 100.*

5. Rubrics (optional)

5.1. Rubric for lab work assessment (R1)

		Level					
Criteria	**%**	**Excellent**	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
I. Process assessment							
1. Attendance	5	Participate (100)					Be late ≥15 min
2. Preparation for the lab	5	Prepare well, answer correct all questions					Not prepare well, could not answer correctly 50% questions
3. Skills of using software (during practice)	5	Correct in procedures, achieve correct results					Incorrect in procedures, achieve wrong results
II. Exam							
Lab exam	85	Answers are totally correct					No answer; answer is not relevance
Total	**100**						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: PIPE AND INSTRUMENTS DESIGN

Course Code: ENEE4021IU

1. General information

Course designation	This subject aims at providing the abilities of design Piping and Control System for water /Wastewater Treatment Plant. The subject provides the knowledge of pipes and fitting, pumps airblowers and electrial control systems for water/ wastewater treatment plant.	
Semester(s) in which the module is taught		
Person responsible for the module	Mr Duong Vo Nhi Anh, dvnanh@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☒ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☐ Elective
Teaching methods	Lecture	

Workload

		Lecture	Lab	Project	Internship	Thesis
Credit	2	2	0			
ECTS	3.09					
Contact hours	**25**	25	0	0	0	0
Self-Study hours	**60**	60	0	0	0	0
Total workload	**85**	85	0	0	0	0

<table>
<tr><td>Credits/ECTS</td><td>2 credits/ 3.09 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course
☐ Parallel course
☒ Previous course
1. ENEE1002IU Hydraulics for Environmental Engineering</td></tr>
<tr><td>Course objectives</td><td>This course aims to provide students with the necessary skills and knowledge to effectively apply engineering drawing principles and AutoCAD software in the preparation of Process and Instrumentation Diagrams (P&IDs) for industrial purposes. Additionally, students will develop a comprehensive understanding of pipe types and fittings used in Water/Wastewater treatment plant design, allowing them to design efficient and well-functioning systems. They will also learn to solve control circuit problems, enabling them to design reliable control systems. Lastly, students will gain proficiency in developing and manipulating equipment control systems, encompassing the integration of components and implementation of control strategies for optimal performance.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply knowledge of engineering drawing principle and AutoCAD software in preparation of PID [Applying].
CLO2. Understanding the appropriate pipe and fitting the Water/Wastewater treatment plant design [Applying].</td></tr>
<tr><td>Skill</td><td>CLO3. Solve the control circuit problems for designing a control system [Mechanism].</td></tr>
<tr><td>Attitude</td><td>CLO4. Develop and manipulate equipment control systems s [].</td></tr>
</table>
</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1</td><td>Classify Pipe Drafting and Design</td><td>1</td><td>T, U[1]</td></tr>
<tr><td>2</td><td>Classify and apply technical standards for creating Piping Drawings</td><td>1</td><td>T</td></tr>
<tr><td>3</td><td>Explain the principle of materials and application of steel pipes, ductile iron pipes, cast iron pipes, pvc pipes, hdpe pipes</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>4</td><td>Explain the principle of pipe joining and fittings such as: elbow, tee, bend, stub-in, coupling, weld cap, screw and socket weld fittings, flange, pipes nipples, valves</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>5</td><td>Explain the principle of Essential Equipment such as Pumps, Airblower and Aeration systems, Air Compressor, Mixer, Sludge Scraper</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>6</td><td>Explain the principle of Control System Basic as Controller Construction, Control Circuit, Control Methods</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>7</td><td>Explain the principle of Control Elements as Switches and Contact, Selectors Switches, Contact Sensors, Pressure Switches, Level Switches, Ultrasonic Sensors, Non-contact Sensors</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>8</td><td>Explain the principle of Output Devices as Relay, Contactors, Solenoids, Indicators</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>9</td><td>Design diagram and instrumments: flow diagram, flow diagram instrumments</td><td>3</td><td>T, I[3]</td></tr>
<tr><td>10</td><td>Design Control piping system</td><td>3</td><td>T, I[3]</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions ☐ Oral examination
☐ Report ☐ Written examination
☐ Presentation ☐ Others, please specify: ……
☐ Assignments</td></tr>
<tr><td>Other requirements</td><td><u>Attendance:</u> A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</td></tr>
</table>

	Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**I. Textbooks** Template: (Author FirstName) (Author LastName), …, (*Book Tittle*), (Edition), (Publisher), (Year) [1] Roy A. Parisher, Robert A. Rhea (2011), Pipe Drafting and Design, Third Edition, Gulf Professional Publishing. [2] Bob Mercer (2009), Electrical Control Systems. Part One. Control Components, Amazon. **II. References** …..

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4	3								
	2	2	3								
Skill (Level: 1-7)	3			6	3	2	4	5	4		
Attitudes (Level: 1-5)	4									5	1
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	3.0	6.0	3.0	2.0	4.0	5.0	4.0	5.0	1.0
L,M,H conversion *		M	M	H	M	L	M	H	M	H	L

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Introduction: ▪ Course Introduction ▪ Piping systems Overview of Pipe Drafting and Design	1	Exercise	Listening/questioning Exercise	[1].0. [2].1.

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
2.	2	**Materials and Application**: ▪ Steel Pipes ▪ Ductile Iron Pipes ▪ Cast Iron Pipes ▪ PVC Pipes HDPE Pipes	2,3	Exercise	Listening/questioning Exercise	[1].9.
3.	3	**Pipe Joining and Fittings** ▪ Elbow, Tee, Bend ▪ Stub-in ▪ Coupling ▪ Weld Cap ▪ Screw and Socket Weld Fittings ▪ Flange ▪ Pipes Nipples ▪ Valves Use of Fittings	2,3	Exercise	Listening/questioning Exercise	[2].2.
4.	4	**Diagram and Instruments** ▪ Use of Flow Diagram ▪ Types of Flow Diagram ▪ Flow Diagram Instruments ▪ Flow Diagram Drawing Symbols Flow Plan Arrangement	2,3	Exercise	Listening/questioning Exercise	[1]. 2, 4 [2]. 2
5.	5 - 6	**Essential Equipment** ▪ Pumps ▪ Air blower and Aeration systems ▪ Air Compressor ▪ Mixer Sludge Scraper	2,3	Exercise	Listening/questioning Exercise	

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
6.	7 - 8	**Control System Basic** ▪ Controller Construction ▪ Control Circuit Control Methods	2,3	Exercise	Listening/questioning Exercise	[2]. 3
7.	9	Midterm	1,2, 3			
8.	9	**Control Elements** ▪ Switches and Contact ▪ Selectors Switches ▪ Contact Sensors ▪ Pressure Switches ▪ Level Switches ▪ Ultrasonic Sensors Non-contact Sensors	2,3	Exercise	Listening/questioning Exercise	[2]. 4. [1]. 18.
9.	10-12	**Output Devices** ▪ Relay ▪ Contactors ▪ Solenoids Indicators	2,3	Exercise	Listening/questioning Exercise	[3]. 10
10.	13-14	**Putting It All Together** ▪ Control Devices and Loads ▪ Connecting Control Devices ▪ Line Numbering ▪ Control Circuit Control Transformer	4	Exercise	Listening/questioning Exercise	[2]. 8
11.		Final exam	2,3, 4			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Exercise 60%Pass	Exercise 60%Pass		
Report (20%)	50%Pass	50%Pass		
Midterm exam (30%)	50%Pass	50%Pass	50%Pass	
Final exam (40%)		50%Pass	50%Pass	50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW

Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

	Capstone	Milestone		Benchmark
	4	3	2	1
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	Capstone	Milestone		Benchmark
	4	3	2	1
	appropriate to audience.		appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: PIPE AND INSTRUMENTS DESIGN LAB

Course Code: ENEE4022U

1. General information

Course designation	This subject aims at providing the abilities of design Piping and Control System for water /Wastewater Treatment Plant. The subject provides the knowledge of pipes and fitting, pumps airblowers and electrial control systems for water/ wastewater treatment plant.	
Semester(s) in which the module is taught		
Person responsible for the module	Mr Duong Vo Nhi Anh, dvnanh@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☒ Specialization ☐ Project/Internship/Thesis	☐ Compulsory ☐ Elective
Teaching methods	Lecture	

Workload

Credit	2	0	2			
ECTS	4.00					
Contact hours	**50**	0	50	0	0	0
Self-Study hours	**60**	0	60	0	0	0
Total workload	**110**	0	110	0	0	0

<table>
<tr><td>Credits/ECTS</td><td>2 credits/ 4.00 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course
☐ Parallel course
☒ Previous course
1. ENEE1002IU Hydraulics for Environmental Engineering</td></tr>
<tr><td>Course objectives</td><td>This course aims to provide students with the necessary skills and knowledge to effectively apply engineering drawing principles and AutoCAD software in the preparation of Process and Instrumentation Diagrams (P&IDs) for industrial purposes. Additionally, students will develop a comprehensive understanding of pipe types and fittings used in Water/Wastewater treatment plant design, allowing them to design efficient and well-functioning systems. They will also learn to solve control circuit problems, enabling them to design reliable control systems. Lastly, students will gain proficiency in developing and manipulating equipment control systems, encompassing the integration of components and implementation of control strategies for optimal performance.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply knowledge of engineering drawing principle and AutoCAD software in preparation of PID [Applying].
CLO2. Understanding the appropriate pipe and fitting the Water/Wastewater treatment plant design [Applying].</td></tr>
<tr><td>Skill</td><td>CLO3. Solve the control circuit problems for designing a control system [Mechanism].</td></tr>
<tr><td>Attitude</td><td>CLO4. Develop and manipulate equipment control systems s [].</td></tr>
</table>
</td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

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<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
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<tr><td>2</td><td>Classify and apply technical standards for creating Piping Drawings</td><td>1</td><td>T</td></tr>
<tr><td>3</td><td>Explain the principle of materials and application of steel pipes, ductile iron pipes, cast iron pipes, pvc pipes, hdpe pipes</td><td>2</td><td>T, U[2]</td></tr>
<tr><td>4</td><td>Explain the principle of pipe joining and fittings such as: elbow, tee, bend, stub-in, coupling, weld cap, screw and socket weld fittings, flange, pipes nipples, valves</td><td>2</td><td>T, U[2]</td></tr>
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<tr><td>Examination forms</td><td>☐ Multiple-choice questions ☐ Oral examination
☐ Report ☐ Written examination
☐ Presentation ☐ Others, please specify: ……
☐ Assignments</td></tr>
<tr><td>Other requirements</td><td><u>Attendance:</u> A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</td></tr>
</table>

	Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**I. Textbooks** Template: (Author FirstName) (Author LastName), …, (*Book Tittle*), (Edition), (Publisher), (Year) [1] Roy A. Parisher, Robert A. Rhea (2011), Pipe Drafting and Design, Third Edition, Gulf Professional Publishing. [2] Bob Mercer (2009), Electrical Control Systems. Part One. Control Components, Amazon. **II. References** …..

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4	3								
	2	2	3								
Skill (Level: 1-7)	3			6	3	2	4	5	4		
Attitudes (Level: 1-5)	4									5	1
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	3.0	6.0	3.0	2.0	4.0	5.0	4.0	5.0	1.0
L,M,H conversion *		M	M	H	M	L	M	H	M	H	L

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1-2	Pipe types, design, pipe connection	1	Exercise	Teaching Design demo	[1].0. [2].1.
2.	3-4	**Control System Basic** ▪ Controller Construction	2,3	Exercise	Teaching Design demo	[1].9.

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
		▪ Control Circuit Control Methods				
3.	5-6	**Control Elements** ▪ Switches and Contact ▪ Selectors Switches ▪ Contact Sensors ▪ Pressure Switches ▪ Level Switches ▪ Ultrasonic Sensors Non-contact Sensors	2,3	Exercise	Teaching Design demo	[2].2.
4.	9	Midterm	1,2,3			
5.	7-8	**Output Devices** ▪ Relay ▪ Contactors ▪ Solenoids Indicators	2,3	Exercise	Teaching Design demo	[2]. 4. [1]. 18.
6.	9-10	**Putting It All Together** ▪ Control Devices and Loads ▪ Connecting Control Devices	2,3	Exercise	Teaching Design demo	[3]. 10
7.	11-12	▪ Line Numbering ▪ Control Circuit Control Transformer	4	Exercise	Teaching Design demo	[2]. 8
8.	13-14	**Overload Protection** ▪ Protective Devices ▪ Thermal Overload Units ▪ The Power Circuit ▪ Emergency Stop Systems	4		Design demo	
9.		Final exam	2,3,4			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Exercise 60%Pass	Exercise 60%Pass		
Report (20%)	50%Pass	50%Pass		
Midterm exam (30%)	50%Pass	50%Pass	50%Pass	
Final exam (40%)		50%Pass	50%Pass	50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW

Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

	Capstone	Milestone		Benchmark
	4	3	2	1
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	Capstone	Milestone		Benchmark
	4	3	2	1
	appropriate to audience.		appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Water Supply & Drainage Systems**

Course Code: **ENEE3103IU**

1. General information

Course designation	In this course the students will learn the basic structure of a community water supply as well as that of sewerage systems. They will learn and practice the computations and decision-making involved in the planning and design of these systems. Furthermore, they will be taught some computer softwares to model a simple water disctribution system and a stormwater sewer system. This course helps students understand basic principles in addressing real life engineering problems and issues in water supply and sewerage. This is one of the elective courses.
Semester(s) in which the course is taught	1
Person responsible for the course	Cabaltica Doliente Angeli, angeli.dc@hcmiu.edu.vn
Language	English
Relation to curriculum	☐General ☐Fundamental ☒Specialization ☐Project/Internship/Thesis ☐ Compulsory ☒ Elective
Teaching methods	Lecture, class discussion, quizzes, computer exercises, homeworks, group reports
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**	3				
Contact hours	**37.5**	37.5	0	0	0	0
Self-Study hours	**90.0**	90	0	0	0	0
Total workload	**127.5**	127.5	0	0	0	0

Credit points	3 credits/ 4.64 ECTS
Required and recommended prerequisites for joining the course	☒ None ☐ Prerequisite course ☐ Parallel course ☐ Previous course: Recommended: ENEE1002IU Hydraulics for Environmental Engineering
Course objectives	This course aims to:

<table>
<tr><td></td><td>
- provide the students the fundamentals of drinking water supply systems from the extraction of raw water from its sources to the distribution of treated water;
- provide the fundamentals of sewerage systems, from learning the sources and impacts of wastewater to the different types of sewers and wastewater collection systems;
- equip the students with knowledge involving the design of a simple water distribution system; and
- equip the students with knowledge involving the design of sanitary sewers and stormwater sewers.
</td></tr>
<tr><td>Course learning outcomes</td><td>
Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Describe and explain in detail the components of water supply systems and of sewerage systems [5 Evaluating].</td></tr>
<tr><td>Skill</td><td>CLO2. Perform the computations and decision-making involved in the design of community water supply system and in the design of sanitary and stormwater sewers [5 Complex Overt Response].
CLO3. Construct a simple water distribution model using EPANET and a simple drainage system using SWMM [7 Origination].</td></tr>
<tr><td>Attitude</td><td>CLO4. Work professionally whether independently or in a team [5 Characterization].</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>
The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2.5 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1. Introduction to Community Water Supply Systems (CWSS)</td><td>1</td><td>I, T</td></tr>
<tr><td>2. Water Consumption and Water Demand</td><td>1</td><td>I, T, U</td></tr>
<tr><td>3. Elements of CWSS</td><td>2</td><td>I, T, U</td></tr>
<tr><td>4. Pipe Flow Hydraulics</td><td>2</td><td>T, U</td></tr>
<tr><td>5. Water Distribution Network Modelling using EPANET</td><td>2</td><td>I, T, U</td></tr>
<tr><td>6. Wastewater</td><td>1</td><td>I, T</td></tr>
<tr><td>7. Sewers and Sewer Systems</td><td>2</td><td>I, T</td></tr>
<tr><td>8. Sanitary Sewer Design</td><td>1</td><td>I, T, U</td></tr>
<tr><td>9. Storm Sewer Design</td><td>1</td><td>I, T, U</td></tr>
<tr><td>10. Introduction to EPA SWMM</td><td>1</td><td>I, T, U</td></tr>
<tr><td>11. Sustainable Urban Drainage Systems</td><td>1</td><td>I</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>
☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☒ Written examination (Constructed response test)
☐ Others, please specify
</td></tr>
<tr><td>Study and examination requirements</td><td>
Attendance: Students are expected to attend the lectures every week. University regulations indicate that if students attend less than 80% of scheduled classes they may be refused final assessment.
Quizzes (written or oral), homeworks, and reports: are given regularly, whether individually or done by group, for the students to understand the concepts better and to improve their problem-solving skills.
</td></tr>
</table>

	Examinations: A midterm exam will be given halfway through the semester and a final exam at the end. Students must have an overall score of at least 50/100 points to pass this course.
Reading list	**Main Reference:** [1] Terence J. McGhee (1991). Water Supply and Sewerage, 6th ed. McGraw-Hill, Inc. **Other References:** [2] Jerry A. Nathanson (2008). Basic Environmental Technology: Water Supply, Waste Management and Pollution Control, 5th ed. Prentice Hall. [3] Larry Mays (2001). Stormwater Collection Systems Design Handbook. McGraw-Hill, Inc. [4] Walski T. M. et al. Water distribution modeling. Haestad Press, 2001. **Local Codes:** [5] TCXDVN 33: 2006. Water Supply – Distribution System and Facilities Design Standard [6] TCXDVN 51: 2008. Drainage and Sewerage - External Networks and Facilities. Design Standard

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		**ILOs**									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	5									
Skill (Level: 1-7)	2			5		7					
	3										
Attitudes (Level: 1-5)	4									5	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	5.0	0.0	7.0	0.0	0.0	0.0	5.0	0.0
L,M,H conversion *		H		H		H				H	

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to Community Water Supply Systems (CWSS)	1,4	Attendance Q&A Homework1	Lecture, class discussion, self-study	[1], [2]
2	Water Consumption and Water Demand	1,2,4	Attendance Q&A Report 1	Lecture, class discussion, self-study, group work, presentation	[1], [2], [5]
3-5	Elements of CWSS	1,2	Attendance Q&A Quiz 1	Lecture, class discussion, self-study	[1], [2], [4]

Week	Topic	CLO	Assessments	Learning activities	Resources
6	Pipe Flow Hydraulics	2,4	Attendance Q&A Homework 2	Lecture, class discussion, self-study	[1]
7-8	Water Distribution Network Modelling using EPANET	3,4	Attendance Q&A Homework 3	Lecture, computer exercise, self-study	[4], [5]
9	Midterm				
10	Wastewater	1	Attendance Q&A	Lecture, class discussion, self-study	[1], [2], [3]
11-12	Sewers and Sewer Systems	1	Attendance Q&A Quiz 2	Lecture, class discussion, self-study	[1], [2], [3]
13	Sanitary Sewer Design	1,2,4	Attendance Q&A Quiz 3	Lecture, class discussion, self-study	[1], [2]
14	Storm Sewer Design	1,2	Attendance Q&A	Lecture, class discussion, self-study	[1], [2], [3]
15	Presentation: Sewerage systems from all over the world	1,4	Report 2, Written Report	Presentation	Various research references
16	Introduction to EPA SWMM	3,4	Homework 4	Lecture, class discussion, self-study	[6]
17	Final exam				

4. Assessment plan

- The type of assessment is grading based on exam questions. The range of scores is from 0 to 100.
- The final GPA of students is integrated from 3 components, including progress assessment, mid-term exam, and final exam. The contribution of each component (in percentage) is shown in the table below.

No.	Assessment Type	CLO1	CLO2	CLO3	CLO4
1	**Progress Assessment (30%)**				
1.1	Class Attendance (30% of PA)				Attended 80%Pass
1.2	In-class activities: Participation in discussion, quizzes; Other activities: homeworks, group reports (70% of PA)	Qz1-3, HW1-2, Report2 60%Pass	Qz1-3, HW1-2, Report1 60%Pass	HW3-4 60%Pass	Reports 1-2 60%Pass
2	**Midterm Exam (30%)**	P1 60%Pass	P2. Q1-Q4 60%Pass		
3	**Final Exam (40%)**	P1 60%Pass	P2. Q1-Q4 60%Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1 Rubric for assessment of calculation and theory questions in exams, assignments, quizzes

Criteria	(%)	Scale				
		Very Good	**Good**	**Satisfactory**	**Poor**	**Fail**
		≥90	**70≤ <90**	**50≤ <70**	**<50**	**0**
Theory	30 - 40%	- Answers are all correct	- Most answers are correct	- More incorrect that correct answers	- Most answers are incorrect or irrelevant	- No answer
Calculations	60 - 70%	- At least 90% of calculations are correct, some minor mistakes in calculations due to carelessness but equations set up are correct	- About 70-90% of calculations are correct - answers to some items may be correct but incomplete	- Answered most of the required values but only about 50 to 70% are correct - answers to some items may be partially correct or incomplete	- most answers are wrong or irrelevant	- No answer
Total score:						

5.2 Rubric for assessment of presentations

Criteria	%	Scale				
		Very Good	**Good**	**Satisfactory**	**Poor**	**Fail**
		≥90	**70≤ <90**	**50≤ <70**	**<50**	**0**
Content	40	- Met objectives - Different parts of the report are sufficently covered - Amount of relevant information included in the report is sufficient - Quality of information is very good - Used various and reliable references/ sources				No presentation
Presentation skills	30	- Excellent use of English - Excellent use of time - Excellent handling of Q & A - Proper behavior				No presentation
Powerpoint quality	30	- Organization; clear and organized flow of presentation - Creativity and aesthetics - Overall impact				No presentation

5.3 Rubric for assessment of written reports

Criteria	%	Scale				
		Very Good	**Good**	**Satisfactory**	**Poor**	**Fail**
		≥90	**70≤ <90**	**50≤ <70**	**<50**	**0**
Content	40	- Met objectives - Different parts of the report are sufficently covered - Amount of relevant information included in the report is sufficient				No report

		- Quality of information is very good - Used various and reliable references/ sources				
Writing skills	30	- Use of English - Follow prescribed format in writing reports - Tables, plots, diagrams, images, are properly captioned and correctly presented				No report
Aesthetics	30	- Organization; presentation of ideas is clear and orderly - Creative				No report

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	Page 4	Added students' presentation on Sewerage systems from all over the world	01/6/2023	Cabaltica Doliente Angeli
2	Page 4-5	Added rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Project 3**

Course Code: **ENEE3112IU**

1. General information

Course designation	*This course is designed for students pursuing a degree in environmental engineering and provides professional skills of air pollution control*	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Nguyen Thi Thuy	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Project	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Pre-Thesis
Credit	**1**			1		
Contact hours	**37,5**	0	0	37,5	0	0
Self-Study hours	**30,0**	0	0	30	0	0
Total workload	**67,5**	0	0	67,5	0	0

Credit points	1 Credits/ 2.45 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course ☒ Previous course: ENEE3220IU - Air Pollution Control; ENEE4017IU-Advanced Engineering Drawing
Course objectives	Students practice a project for air pollution control, including identification of air stream characteristics, specifying treatment's requirements, technology proposal, and performing necessary calculation and design for main/principal units in the system.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Compare the characteristics of air pollution streams assigned to the corresponding standards, conclude about the necessary of treatment [Evaluating]
CLO2. Review current air pollution treatment methods, select a technical solution for the treatment [Analyzing]
CLO3. Calculate and design main treatment units [Creating]</td></tr>
<tr><td>Skill</td><td>CLO4. Display the treatment units on drawings [Mechanism]
CLO5. Display effectively communication through oral, written, and electronic forms [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO6. Formulate self – reading, reviewing and enhancing knowledge about water treatment for promoting lifelong learning and educating [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: practice session (week)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction,</td><td>0.5</td><td>T,U</td></tr>
<tr><td>Overview of pollution source</td><td>0.5</td><td>T,U</td></tr>
<tr><td>Review treatment technologies and technical proposal</td><td>1</td><td>T,U</td></tr>
<tr><td>Technical calculation and Design for treatment works</td><td>2</td><td>T,U</td></tr>
<tr><td>Technical drawings</td><td>2</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Advisor’s assessment</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] C.David Cooper & F.C. Alley (2011), Air Pollution Control - A Design Approach, Fourth Edition, Waveland Press, Inc., New York.
[2] Theodore, L. (2008), Air Pollution Control Equipment Calculations, Wiley.
[3] Perry, R. H., & Green, D. W. (2008). Perry's chemical engineers' handbook. New York: McGraw-Hill.
[4] Wood, G. O. (2002). "Review and comparisons of D/R models of equilibrium adsorption of binary mixtures of organic vapors on activated carbons." Carbon 40(3): 231-239.
[5] Yaws, Carl L. (2003). Yaws' Handbook of Thermodynamic and Physical Properties of Chemical Compounds: Physical, Thermodynamic and Transport Properties for 5,000 Organic Chemical Compounds. Norwich, New York: Knovel,</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	5		5		5	5				
	2	4		4	4	4	4				
	3	6		6			6				
Skill (Level: 1-7)	4			4			4	4			
	5							4			
Attitudes (Level: 1-5)	6										4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	4.8	4.0	4.5	4.8	4.0	0.0	0.0	4.0
L,M,H conversion *		H		H	M	H	H	M			H

3. Planned learning activities and teaching methods

Week	Design topic	CLO	Assessments	Learning activities	Resources
1	Plan for doing project Introduction	6		Meeting and practicing	
	Overview of wastewater characteristics	1, 6		Meeting and practicing	[1][2][3][4][5]
2	Review treatment technologies and technical proposal	2, 6		Meeting and practicing	[1][2][3][4][5]
3-4	Technical calculation and Design for treatment works (1)	3,6		Meeting and practicing	[1][2][3][4][5]
5-6	Technical drawings (1)	4, 5, 6		Meeting and practicing	[1][2][3][4][5]
	Process assessment		Advisor assessment	-	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Progress assessment	R1(2)	R1(2,3)	R1(4)	R1(5)	R1(1) (5)	R1(6,7)

Note: %Pass: Target that 60 % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	**Very good**	**Good**	**Fair**	**Average**	**Weak**
		90≤ ≤100	**80≤ <90**	**70≤ <80**	**60≤ <70**	**50≤ <60**	**<50**
1. Writing skill and format	5	Compliance well to guidelines					Not follow
2. Introduction, literature review	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology choice	10	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	30	right, sufficient, clear					More than 50% of calculations are wrong.
5. Drawing	30	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Meeting with advisor, planning for project and management of time	5	Plan well and complete project on time					Without plan, manage time
7. Self-reading, reviewing and enhancing knowledge	5	Selecting appropriate references, expanding the reading with various related references for unclear issues, apply effectively the knowledge of the references into the project					Selecting inappropriate/ unreliable references, no expanding the reading with various related references for unclear issues, apply ineffectively/do not apply the knowledge of the references into the project
Total	100						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Project 4
(Đồ án 4)
Course Code: ENEE3113IU

1. General information

Course designation	This course is designed for students pursuing a degree in environmental engineering and provides knowledge about solid waste and hazardous waste management (SWM), focusing on the biological treatment methods for organic solid wastes.	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Tran Thanh Tu, tttu@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis	☐ Compulsory ☒ Elective
Teaching methods	Lecture, Discussion, lab works	
Workload	<table><tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internshi</td><td>Thesis</td></tr><tr><td>Credit</td><td>2</td><td></td><td></td><td>2</td><td></td><td></td></tr><tr><td>ECTS</td><td>4.91</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Contact hours</td><td>75</td><td></td><td></td><td>75</td><td></td><td></td></tr><tr><td>Self-Study hou</td><td>60</td><td></td><td></td><td>60</td><td></td><td></td></tr><tr><td>Total workload</td><td>135</td><td></td><td></td><td>135</td><td></td><td></td></tr></table>	
Credits/ECTS	2 credits/ 4.91ECTS	
Required and recommended	☐ None ☐ Prerequisite course	

<table>
<tr><td>prerequisites for joining the course</td><td>☐ Parallel course
☒ Previous course: ENEE3018IU - Solid Waste and Hazardous Waste Management; ENEE3019IU - Solid Waste and Hazardous Waste Management Lab</td></tr>
<tr><td>Course objectives</td><td>Students will be provided with the knowledge about urban solid waste management and treatment methods as well as skills to conduct composting/biogas or black soldier fly models. Through this unit, students will become aware of the importance of biological methods in organic solid wastes treatment.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Discover physiochemical and biological characteristics of organic solid wastes. [3-Applying]
CLO2. Analyze the effectiveness and efficiency of biological methods for organic solid wastes treatment. [4-Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO3. Proceed the steps in choosing and preparing the substrates for the organic solid wastes treatment model(s). [2-Set]
CLO4. Follow instructions to build model(s) for organic solid wastes treatment by biological methods. [3-Guided Response]</td></tr>
<tr><td>Attitude</td><td>CLO5. Recognize factors affecting the effectiveness and efficiency of the model(s) for organic solid wastes treatment by biological methods. [4-Organization]</td></tr>
</table></td></tr>
</table>

[1]Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

<table>
<tr><td>Content</td><td colspan="2">The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (6.25 hours/week)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1.</td><td>Sample preparation</td><td>1</td><td>T, U</td></tr>
<tr><td>2.</td><td>Set up SW treatment models:
- Composting
- Biogas
- Black soldier flies (BSF)</td><td>1</td><td>T, U</td></tr>
<tr><td>3.</td><td>Monitor SW treatment models</td><td>9</td><td>U</td></tr>
<tr><td>4.</td><td>Report and Presentation</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☒ Report
☒ Presentation
☐ Assignments</td><td>☐ Oral examination
☐ Written examination
☐ Others, please specify: Advisor’s assessment, reviewer’s assessment</td></tr>
<tr><td>Other requirements</td><td colspan="2">Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.
In order to have reviewer assessment, the project’s grade of student evaluated by advisor must be equal or higher than 50 points.</td></tr>
<tr><td>Reading list</td><td colspan="2">[1] John Pichtel, Waste Management Practices: Municipal, Hazardous, and Industrial. Taylor & Fracis Group, New York, 2016.
[2] William A. Worrell and P. Aarne Vesilind, Solid Waste Engineering 2nd edition. CENGAGE learning. USA, 2012.
[3] Sudha Goel, Advances in Solid and Hazardous Waste Management. Springer. New York, 2017.
[4] L.F. Diaz, M. de Bertoldi, W. Bidlingmaier, Compost Science and Technology Vol.8. Elsevier. UK, 2007.
[5] Domenico Caruso, Emilie Devic, I Wayan Subamia, Pascale Talamond, Etienne Baras, Technical handbook of domestication and production of diptera Black Soldier Fly (BFS) Hermetia illucens, Stratiomyidae. PT Penerbit IPB Press. Bogor, 2013.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	4									
Skill (Level: 1-7)	3			2							
	4				3						
Attitudes (Level: 1-5)	5									4	4
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.5	0.0	2.0	3.0	0.0	0.0	0.0	0.0	4.0	4.0
L,M,H conversion *		M		L	M					H	H

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Sample preparation	1,2,5	Report	Discussion, Draft report	[1] Chapter 4,11 [2] Chapter 2 [3] Chapter 4,5 [4] Chapter 8
2.	2	Set up SW treatment models: - Composting - Biogas - Black soldier fly platform	1,2,3	Report	Discussion, Set up models, Update report	[1] Chapter 8 [4] Chapter 19 [5] Chapter 2,3,4,5,8
3.	3-11	Monitor SW treatment models	3,4	Report	Discussion, Monitoring, Update report	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
4.	12	Report and Presentation	3,4,5	Final report and Presentation	Finalize report, Presentation	[4] Chapter 3,4,5 [5] Chapter 2,3,4,5,8
5.		Process assessment		Advisor assessment		
6.		Reviewer assessment		Reviewer assessment		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Process assessment	R1(1,2,3)	R1(1,2,3)	R1(4,5,6)	R1(4,5,6)	R2(7,8,9)
Reviewer assessment	R2(1,2,3)	R2(1,2,3)	R2(4,5,6)	R2(4,5,6)	R2(7,8)

Note: %Pass: Target that 60 % of students having scores greater than 50 out of 100. R1,2,3 is the forms of rubrics.

5. Rubrics

5.1 Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to project guidelines)	10	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable); Literature review (sufficient literature)	15	sufficient, clear					Insufficient, unclear, irrelevant,
3. Methodology (clear, appropriate methods, materials and equipment)	15	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
4. Results and discussion (evaluated based on the specific objectives of the study)	30	Sufficient, clear, complete the contents of study, support for objectives of study					Insufficient, unclear, incomplete more than 50% contents of study; results are less relevant to the specific objectives of study
5. Data analysis (figure, table, interpretation)	10	Sufficient, logic, effectively visual representations of the data					Insufficient, illogic, ineffectively visual representations of the data
6. Critical and creative thinking in solving problems (significant/ moderate/ insignificant)	5	Significant					Insignificant
7. Meeting with advisor, planning for the project and management of time	5	Frequently, plan well and complete project on time					Less contact (<50% of number of meeting), Without plan, manage time
8. Level of commitment and independence in work, perseverance, flexibility	5	High responsible to complete tasks; Stick to the task and keep working confidently until the task is complete; Being open-minded for comments and discussion					Irresponsible; Little persistence on the tasks; Give up early; Closed-minded for comments and discussion

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
9. Self-reading, reviewing and enhancing knowledge	5	Selecting appropriate references, expanding the reading with various related references for unclear issues, apply effectively the knowledge of the references into the project					Selecting inappropriate/ unreliable references, no expanding the reading with various related references for unclear issues, apply ineffectively/do not apply the knowledge of the references into the project
Total	**100**						

5.2 Evaluation of reviewer (R2)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to project guidelines)	5	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable), Literature review (sufficient literature)	10	sufficient, clear					Insufficient, unclear, irrelevant,
3. Methodology (clear, appropriate methods, materials and equipment)	20	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
4. Results and discussion (evaluated based on the specific objectives of the study)	30	Sufficient, clear, complete well the contents of study, support well for objectives of study					Insufficient, unclear, incomplete more than 50% contents of study; results are less relevant to the specific objectives of study
5. Data analysis (figure, table, interpretation)	10	Sufficient, logic, effectively visual representations of the data					Insufficient, illogic, ineffectively visual representations of the data
6. Critical and creative thinking in solving problems (significant/ moderate/ insignificant)	10	Significant					Insignificant
7. Answer the questions from reviewer	10	Relevant to questions, all					irrelevant to questions, less than

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
		answers are correct					50% answers are correct
8. Attitude	5	Professional					Unprofessional
Total	**100**						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

RECORD OF REVISIONS

No.	Session/Page	Content of revision	Date of revision	Revised by
1	All	Create new course	May 26th, 2023	Dr. Tran Thanh Tu
2	Course learning outcomes	Add detail of Bloom taxonomy	June 13th, 2023	Dr. Tran Thanh Tu
3	Learning Outcomes Matrix	Change Learning Outcomes Matrix		
4	Rubrics	Change rubrics		

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: ADVANCED ENGINEERING DRAWING
(Vẽ kỹ thuật Nâng cao)
Course Code: ENEE4017IU

1. General information

Course designation	This course aims to provide Environmental Engineering students with advanced knowledge of AutoCAD software, including engineering drawing standards (TCVN and ISO) and the use of AutoCAD software to construct engineering drawings related to Environmental Engineering field in accordance to TCVN and ISO.	
Teaching schedule	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5	
	☐ Semester 1 ☒ Semester 2 ☐ Summer	
Person In-Charge	Dr. Pham Thanh Tung, pttung@hcmiu.edu.vn	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☐ Specialization ☐ Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	☒ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify: Assignments, practice, discussion	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td>2</td><td>0</td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>25</td><td>25</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>60</td><td>60</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>85</td><td>85</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>2 credits/3.09 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☒ Previous course: ENEE1013IU Engineering Drawing</td></tr>
<tr><td>Course objectives</td><td>The aim of this course is to
- Provide the ability of effectively construct and manage the engineering drawing complied with TCVN and ISO by using AutoCAD software.
- Provide advanced knowledge for using and geometrical construction with the drawing instruments and AutoCAD software, the standard of presentation of engineering drawing.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Explain the criteria for engineering drawings and the use of AutoCAD software to meet the conventional criteria (Cognitive – Level 2 – Understanding).</td></tr>
<tr><td>Skill</td><td>CLO2. Construct AutoCAD drawings related to the field of Environmental Engineering by using AutoCAD interface, drafting tools, functions and commands (Psychomotor – Level 4 – Mechanism).</td></tr>
<tr><td>Attitude</td><td>CLO3. Show self-reliance when working independently (Affective – Level 5 – Internalizing values).</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
<u>Weight</u>: lecture session (2.5 hours)
<u>Teaching levels</u>: I (Introduce); T (Teach); U (Utilize)</td></tr>
</table>

	No.	Topic	Weight	Level
	1	Technical Drawing Overview	1	I, T
	2	Setting up and using the Drafting tools	1	T, U
	3	Organizing Objects with Blocks and Groups	1	T, U
	4	Editing and Reusing Data to Work Efficiently	1	T, U
	5	Introduce to Printing, Plotting and Layouts	1	I, T
	6	Using Field and Table	1	T, U
	7	Advanced Editing and Organising	1	T, U
	8	Laying Out your Printer Output	1	T, U
	9	Using Dynamic Blocks	1	T, U
	10	Getting and Exchanging Data from Drawings	1	I, U

Examination forms	☐ Multiple-choice questions ☐ Oral examination ☐ Report ☐ Written examination ☐ Presentation ☒ Others, please specify: Constructed-response test ☐ Assignments
Other requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**I. Textbooks** [1] George Omura, Brian C. Benton (2015), Mastering AutoCAD 2016 and AutoCAD LT 2016: Autodesk Official Press 1st Edition, Sybex Publisher 2015. **II. References** [2] Trần Hữu Quế – Nguyễn Văn Tuấn (2009), Vẽ kỹ thuật theo tiêu chuẩn quốc tế, NXB Bách Khoa Hà Nội.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
Skills (Level: 1-7)	2						4				
Attitudes (Level: 1-5)	3									5	
Contribution of ILOs to CLOs											
Bloom's Taxonomy	AVE	2	0	0	0	0	4	0	0	5	0
L, M ,H conversion*		L					H			H	

** L (Low), M (Medium), H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Technical Drawing Overview	1,3	Attendance Q&A Homework 1	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1 [2] 1,2,3
2.	2	Setting up and using the Drafting tools	1,2,3	Attendance Q&A Homework 2	Reading materials before class; Doing the lecture; Demo on the computer;	[1] 2

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
					Practicing.	
3.	3	Organizing Objects with Blocks and Groups	2,3	Attendance Q&A Homework 3	Reading materials before class; Doing the lecture; Demo on the computer; Practicing,	[1] 3
4.	4	Editing and Reusing Data to Work Efficiently	2,3	Attendance Q&A Homework 4	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 4
5.	5	Introduce to Printing, Plotting and Layouts	2,3	Attendance Q&A Homework 5	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 5
6.	6	Using Field and Table	2,3	Attendance Q&A Homework 6	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 6

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
7.	7	Advanced Editing and Organising	2,3	Attendance Q&A Homework 7	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 7
8.	8	Laying Out your Printer Output	2,3	Attendance Q&A Homework 8	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 8
9.	9-10	Midterm examination		Practice on computer		
10.	11	Using Dynamic Blocks	2,3	Attendance Q&A Homework 9	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 9
11.	12	Getting and Exchanging Data from Drawings	2,3	Attendance Q&A Homework 10	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 10

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
12.	18-19	Final examination		Practice on computer		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Class attendance (15%)			Attended 80%Pass
Home works (15%)			HW1-10, Submitted 80%Pass
Midterm exam (30%)	60%Pass	60%Pass	
Final exam (40%)	60%Pass	60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: ADVANCED ENGINEERING DRAWING LAB
(Thực Hành Vẽ kỹ thuật Nâng cao)
Course Code: ENEE4018IU

1. General information

<table>
<tr><td>Course designation</td><td colspan="2">This course aims to provide Environmental Engineering students with advanced knowledge of AutoCAD software and the use of AutoCAD software to construct engineering drawings in accordance to TCVN and ISO quickly and accurately.</td></tr>
<tr><td rowspan="2">Teaching schedule</td><td colspan="2">☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5</td></tr>
<tr><td colspan="2">☐ Semester 1 ☒ Semester 2 ☐ Summer</td></tr>
<tr><td>Person In-Charge</td><td colspan="2">Dr. Pham Thanh Tung, pttung@hcmiu.edu.vn</td></tr>
<tr><td>Language</td><td colspan="2">English</td></tr>
<tr><td>Relation to curriculum</td><td>☐ General
☐ Fundamental
☒ Specialization
☐ Project/Internship/Thesis</td><td>☒ Compulsory
☐ Elective</td></tr>
<tr><td>Teaching methods</td><td colspan="2">☒ Lecture ☐ Lesson ☐ Project ☐ Seminar
Others, please specify: Assignments, practice, discussion</td></tr>
<tr><td>Workload</td><td colspan="2">
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td>0</td><td>1</td><td></td><td></td><td></td></tr>
<tr><td>Contact hours</td><td>25</td><td>0</td><td>25</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>30</td><td>0</td><td>30</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total workload</td><td>55</td><td>0</td><td>55</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td colspan="2">1 credits/ 2 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td colspan="2">☐ None
☐ Prerequisite course: (Please specify course ID & course title, if any)
☐ Parallel course: (Please specify course ID & course title, if any)
☒ Previous course: ENEE1014IU Engineering Drawing Lab</td></tr>
</table>

<table>
<tr><td>Course objectives</td><td>The aim of this course is to:
- Provide the ability of effectively construct and manage the engineering drawing complied with TCVN and ISO by using AutoCAD software.
- Provide advanced knowledge for using and geometrical construction with the drawing instruments and AutoCAD software, the standard of presentation of engineering drawing.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Summarize the criteria for engineering drawings and the use of AutoCAD software that meets the conventional criteria (Cognitive – Level 2 – Understanding).</td></tr>
<tr><td>Skill</td><td>CLO2. Construct AutoCAD drawings related to the field of Environmental Engineering quicky and accurately by using AutoCAD interface, drafting tools, functions and commands (Psychomotor – Level 5 – Complex Overt Response).</td></tr>
<tr><td>Attitude</td><td>CLO3. Show self-reliance when working independently (Affective – Level 5 – Internalizing values).</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: Lab session (4.2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>No.</th><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>1</td><td>Read and interpret a drawing</td><td>1</td><td>I, T</td></tr>
<tr><td>2</td><td>Analyze engineering drawings</td><td>1</td><td>I, T</td></tr>
<tr><td>3</td><td>Generate a drawing</td><td>1</td><td>T, U</td></tr>
<tr><td>4</td><td>Complete a drawing</td><td>1</td><td>T, U</td></tr>
<tr><td>5</td><td>Modify a drawing</td><td>1</td><td>T, U</td></tr>
<tr><td>6</td><td>Manage drawings</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>☐ Multiple-choice questions
☐ Report
☐ Presentation
☐ Assignments
☐ Oral examination
☐ Written examination
☒ Others, please specify: Constructed-response test</td></tr>
<tr><td>Other requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>I. Textbooks
[1] George Omura, Brian C. Benton (2015), Mastering AutoCAD 2016 and AutoCAD LT 2016: Autodesk Official Press 1st Edition, Sybex Publisher 2015.</td></tr>
</table>

	II. References [2] Trần Hữu Quế – Nguyễn Văn Tuấn (2009), Vẽ kỹ thuật theo tiêu chuẩn quốc tế, NXB Bách Khoa Hà Nội.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	2									
Skills (Level: 1-7)	2						5				
Attitudes (Level: 1-5)	3									5	
Contribution of ILOs to CLOs											
Bloom's Taxonomy	AVE	2	0	0	0	0	5	0	0	5	0
L, M ,H conversion*		L					H			H	

** L (Low), M (Medium), H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Read and interpret a drawing	1,2	Attendance Q&A Homework 1	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1-10
2.	2	Analyze engineering drawing	1,2	Attendance Q&A Homework 2	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1-10
3.	3	Generate a drawing	1,2	Attendance Q&A Homework 3	Reading materials before class;	[1] 1-10

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
					Doing the lecture; Demo on the computer; Practicing,	
4.	4	Complete a drawing	1,2	Attendance Q&A Homework 4	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1-10
5.	5	Modify a drawing	1,2	Attendance Q&A Homework 5	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1-10
6.	6	Manage drawings	1,2	Attendance Q&A Homework 6	Reading materials before class; Doing the lecture; Demo on the computer; Practicing.	[1] 1-10
7.	18-19	Final examination		Practice on computer		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Class attendance (10%)			Attended 80%Pass
Homework (60%)			HW1-6, Submitted 80%Pass

Assessment Type	CLO1	CLO2	CLO3
Final exam (30%)	60%Pass	60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional):** No
6. **Revision Date:** August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

(*) Intended Learning Outcomes

No.	Intended Learning Outcomes
	Knowledge and understanding
1	Apply the knowledge of mathematics, sciences, and engineering to solve environmental engineering problems
2	Apply a broad knowledge to consider the impact of environmental engineering solutions in a global, economic, and social context
	Skills
3	Identify, formulate, and solve environmental engineering problems systematically
4	Design and conduct classical and modern experimentations, as well as analyze and interpret data
5	Design environmental systems, components, or processes to meet desired needs within realistic constraints such as economic, environment, occupational health, and safety
6	Apply the techniques, skills, and modern technical tools necessary for technical practice in environmental engineering
7	Display the ability to communicate effectively in English, writing reports, and presenting professional topics.
8	Work effectively on multidisciplinary teams to accomplish a common goal
	Autonomy and responsibility
9	Demonstrate professional and ethical responsibilities in the practice of environmental engineering
10	Recognize the need and continue the professional development and lifelong learning.

For administrative purposes

REVISION HISTORY AND NOTES

No.	Session/Page	Content of revision	Date of revision	Revised by
1				

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **INTERNSHIP 1**

Course Code: **ENEE5004IU**

1. General information

Course designation	*This course requires students to organize field trips by School of Chemical and Environmental Engineering to learn the functional activities in environmental engineering field. Through observing and exchanging information with officials and experts at the institute, companies, students will better understand environmental engineering in practice and aggregate these understandings into a report.*
Semester(s) in which the course is taught	1
Person responsible for the course	*Lecturers from the School of Chemical and Environmental Engineering* *On-site supervisors*
Language	English
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Practice at companies Writing reports
Workload (incl. contact hours, self-study hours)	

		Lecture	Lab	Project	Internship	Thesis
Credit	**2**	0	0	0	2	0
Contact hours	**75**	0	0	0	75	0
Self-study hours	**60**	0	0	0	60	0
Total workload	**135**	0	0	0	135	0

Credit points	2 credits/ 4.91 ECTS
Required and recommended prerequisites	☐ None ☐ Prerequisite course ☐ Parallel course

<table>
<tr><td>for joining the course</td><td>☒ Previous course: ENEE2001IU_Introduction to Environmental Engineering</td></tr>
<tr><td>Course objectives</td><td>The course is aimed at helping students gain career awareness and orientation during study and research in the following academic years and after graduation. Through the course, students will develop the proactive ability to contact with businesses, meet businesspeople, and deeply study some functional activities of businesses in the field of chemical engineering or environmental engineering.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate the area of environmental engineering that the student worked in [Applying]
CLO2. Demonstrate practical experience gained in environmental treatment processing, design, operation, analysis and research. [Applying]</td></tr>
<tr><td>Skill</td><td>CLO3. Show the observation and perception skills. [Set]
CLO4. Show the ability to analyze information. [Set]
CLO5. Display effectively oral and written communication skills. [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO6. Display serious and professional attitude. [Internalizing values]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: practice session (weeks)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Background information on the company (4 trips to 4 companies)
1. Background
2. Organization
3. Related environmental engineering areas</td><td></td><td>T,U</td></tr>
<tr><td>Evaluate knowledge/skills learned and developed</td><td></td><td>T,U</td></tr>
</table></td></tr>
</table>

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

	Conclude with ongoing considerations Writing a report		
Examination forms	- Students assess the participation of each member of the group: 20% - Summary report: 80%		
Study and examination requirements	Attendance: According to the requirement of company Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	*The information and data are provided by the company.*		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2		3								
Skill (Level: 1-7)	3				2						
	4						2				
	5					4					
Attitudes (Level: 1-5)	6										
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	3.0	0.0	2.0	4.0	2.0	0.0	0.0	0.0	0.0
L,M,H conversion *		M	M		L	M	L				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Fieldtrip 1	1 → 8	Report	Observation, discussion	
2	Fieldtrip 2	1 → 8	Report	Observation, discussion	
3	Fieldtrip 3	1 → 8	Report	Observation, discussion	
4	Fieldtrip 4	1 → 8	Report	Observation, discussion	

Format for internship report

General requirement

- The internship report must be written in English using Times New Roman font, with 13-point size and 1.5-line spacing. The text should be fully justified.
- Page set-up: use A4 paper; left margin: 3.0 cm; other margins: 2.0 cm.
- No header/footer is allowed.

- Use simple but clear language.
- Take time to check the thesis for misspelled words, typographical error, mislabeled figures, tables, or photos…
- Symbol for the decimal marker shall be the point on the line (.).

Page number

- Each page of the main body must be numbered, starting with title page. Place the number in the center of the bottom of the page.
- Cover page, Acknowledgment, References and Appendix page do not require numbering.
- Keep the writing short, informative, and as concise as possible.

Heading

Each section can be numbered as 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. Example of the structure and headings of the thesis is given as follows:

Cover page
Title page
Acknowledgement
Table of contents
1. Background information on the company
   1.1. Background
   1.2. Organization
   1.3. Related environmental engineering areas
2. Evaluate knowledge/skills learned and developed
3. Conclusion and recommendation

References
Appendix

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**	**CLO7**	**CLO8**
Attendance and activities (A1) (20%)	R1.1	R1.2	R1.3	R1.4	R1.2	R1.5	R1.6, R1.7	R1.8
Report (A2) (80%)	R2.2	R2.3	R2.4,5		R2.3	R2.1		

*Note: %Pass: Target that **70** % of students having scores greater than 50 out of 100.*

5. Rubrics

Rubric for field trip report assessment

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skills and format	5	Compliance well to guidelines					Not follow
2. Background information on visiting site	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Description of production process,	80	relevant, sufficient, clear					Irrelevant, insufficient, unclear

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
treatment process/ unit description							
4. Follow the guide, be active	10	Strictly follow, active					Not follow, inactive
Total	100						

5. **Date revised: August 14, 2023**

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: Internship 2

Course Code: ENEE5005IU

1. General information

Course designation	Internships are opportunities for the students to learn about and apply environmental engineering principles outside the classroom in the laboratory, work place and/or field. Before the internship, the faculty mentor assign the student responsibilities that have been previously agreed upon and approved by the department/school chair. These duties will vary depending on the particular discipline. The student will work accordingly under the guidance and direction of an on-site supervisor . In the end, students will submit to the department/school a written report and give an oral presentation of works done, together with a report card including remarks and recommendations from the on-site supervisor.	
Teaching schedule	☒ Summer	
Person In-Charge	*Lecturers from the School of Chemical and Environmental Engineering* *On-site supervisors*	
Language	English	
Relation to curriculum	☐ General ☐ Fundamental ☐ Specialization ☒ Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	☐ Lecture ☐ Lesson ☐ Project ☐ Seminar Others, please specify: internship	

<table>
<tr><td>Workload</td><td>
<table>
<tr><td></td><td></td><td>Lecture</td><td>Lab</td><td>Project</td><td>Internship</td><td>Thesis</td></tr>
<tr><td></td><td>Credit</td><td></td><td></td><td></td><td>3</td><td></td></tr>
<tr><td>Contact hours</td><td>112.5</td><td>0</td><td>0</td><td>0</td><td>112.5</td><td>0</td></tr>
<tr><td>Self-Study hours</td><td>90</td><td>0</td><td>0</td><td>0</td><td>90</td><td>0</td></tr>
<tr><td>Total workload</td><td>202.5</td><td>0</td><td>0</td><td>0</td><td>202.5</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>3 credits/ 7.35 ECTS</td></tr>
<tr><td>Requirements for taking the course</td><td>☐ None
☐ Prerequisite course:
☐ Parallel course: (Please specify course ID & course title, if any)
☐ Previous course: ENEE5004IU - Internship 1</td></tr>
<tr><td>Course objectives</td><td>To get practical experience, students spend at least for 8 weeks at factories, R&D divisions, research institutes, or technical sales departments in Vietnam or overseas. This course aims to provide students with opportunities to explore their career options as well as opportunities to relate their academic preparation to the reality of conducting professional practice, interact with others in practice effectively, develop professional skills, and communicate effectively in the workplace. It also aims to provide opportunities for students to gain real-world experience that will be essential for their future practice as engineers in their particular discipline after graduation.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level[1]</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply the theoretical knowledge gained in their academic coursework to real-world engineering problems. [Apply]</td></tr>
<tr><td>Skill</td><td>CLO2. Function effectively in multidisciplinary teams and individuals to accomplish planned tasks and goals. [Adaptation]
CLO3. Communicate effectively in a professional environment, both orally and in writing, including technical report writing and presentation skills. [Set]
CLO4. Design and conduct classical and modern experimentations, as well as analyze and interpret data</td></tr>
</table>
</td></tr>
</table>

	Attitude	CLO5. Evaluate various engineering situations and judgments on the basis of ethical codes and professional responsibilities. [Organization]

[1] Level of competence according to Bloom's Taxonomy:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Knowledge	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	x
Skills	Perception	Set	Guided Response	Mechanism	Complex Overt Response	Adaptation	Origination
Attitudes	Receiving Phenomena	Responding to Phenomena	Valuing	Organization	Internalizing values	x	x

Content

Weight: lecture session (2.5 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

No.	Topic	Weight	Level
1	Orientation and Training: Introduction to the internship program and its objectives. Familiarization with the workplace, safety protocols, and ethical guidelines. Training on specific tools, equipment, and software relevant to the internship.	1	I
2	Project Assignment and Planning: Assignment of specific project(s) based on student's interests and host organization's requirements. Development of a project plan, including objectives, timeline, and deliverables. Identification of resources needed for project execution.	2	T, U
3	Project Execution and Technical Skills Development: Active involvement in chemical engineering projects under the guidance of a mentor. Application of engineering principles to solve practical problems and optimize processes. Hands-on experience in operating and troubleshooting equipment and processes. Data collection, analysis, and interpretation using appropriate tools and techniques. Collaboration with colleagues to achieve project milestones.	1	U

		Regular progress reporting and documentation of work.		
	4	Professional Development and Communication: Workshop on effective communication and presentation skills. Preparation of a final report summarizing the internship experience and project outcomes. Presentation of the internship project to a panel of industry professionals and peers. Reflection on the ethical and professional responsibilities associated with the chemical engineering field. Networking opportunities, including interaction with professionals from the host organization and industry.		U

Examination forms	☐ Multiple-choice questions	☐ Oral examination
	☒ Report	☐ Written examination
	☒ Presentation	☐ Others, please specify: ……
	☐ Assignments	
Other requirements	Attendance: Following the company's policy Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
Reading list	Internal documents from company	

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-10) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3					3				
Skill (Level: 1-7)	2								6		
	3							2			
	4				4						
Attitudes (Level: 1-5)	5									4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	0.0	0.0	4.0	0.0	3.0	2.0	6.0	4.0	0.0
L,M,H conversion *		M			M		M	L	H	H	

**L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

No.	Week	Topic	CLO	Assessments	Learning activities	Resources
1.	1	Orientation and Training				
2.	2	Project Assignment and Planning	1			
3.	3	Project Execution and Technical Skills Development	2,4			
4.	4	Project Execution and Technical Skills Development	2,4			
5.	5	Project Execution and Technical Skills Development	2,4			
6.	6	Project Execution and Technical Skills Development	2,4			
7.	7	Project Execution and Technical Skills Development	2,4			
8.	8	Professional Development and Communication	3			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Evaluation of the one-site supervisor (50%)	R1(1,2)	R1(5)	R1(4)	R1(3)	R1(6,7)
Evaluation of faculty mentor (50%)	R2(1,2)		R2(4)	R2(3)	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional):

5.1. Rubrics for onsite supervisor assessment (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Level of understanding the area of environmental engineering that the student worked in	5	Excellent					Weak
2. Ability in applying knowledge and skills learned in the university in a work setting.	40	Excellent					Weak
3. Level of gaining practical experience within the company environment	35	Excellent					Weak
4. Level of effectively oral and written communication skills	5	Display effectively oral and written communication skills					No/little oral and written communication skills are displayed
5. Level of teamwork skills	5						
6. Level of professional behavior that student shows in organization	5	Treating managers, colleagues and clients with respect;					Treating managers, colleagues and clients without respect

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
		Projecting a positive attitude; Being polite; Showing good judgment; Dressing appropriately					Projecting a negative attitude Being impolite Showing strongly bias judgment; Dressing inappropriately
7. Student shows ethics, integrity and responsibility in company environment	5	Being ethical, Integrity and high responsible to the assigned works					Being unethical Dishonesty, Irresponsible for the assigned works
Total	100						

5.1. Rubrics for instructor assessment (R2)

Rubrics is filled via internship report assessment and/or oral examination

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Level of understanding the area of environmental engineering that the student worked in	5	Excellent					Weak
2. Ability in applying knowledge and skills learned in the university in a work setting.	45	Excellent					Weak
3. Level of gaining practical experience within the company environment	45	Excellent					Weak

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
4. Level of effectively oral and written communication skills	5	Display effectively oral and written communication skills					No/little oral and written communication skills are displayed
Total	100						

6. **Date revised: August 14, 2023**

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **INTERNSHIP 3**

Course Code: **ENEE5006IU**

1. General information

Course designation	*This course is designed for students pursuing a degree in environmental engineering and provides the students an opportunity to study, observe, and operate a complete air/water/wastewater or solid waste treatment system as well as collect the data for their thesis and opportunities for seeking their jobs in the future.*
Semester(s) in which the course is taught	Summer semester
Person responsible for the course	*Lecturers from the School of Chemical and Environmental Engineering* *On-site supervisors*
Language	English
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	Practice at companies Writing reports

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**3**				3	
Contact hours	**112,5**	0	0	0	112,5	0
Self-Study hours	**90,0**	0	0	0	90	0
Total workload	**202,5**	0	0	0	202,5	0

Credit points	3 credits/7.35 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course ☒ Previous course: ENEE3110IU-Project 1; ENEE3111IU-Project 2; CHE2082IU - Occupational Health Safety and Environment (HSE)
Course objectives	*This course provides the students with essential skills and experiences for an engineer, including technical analysis and problem solving, ability to think creatively, ability to evaluate the environmental problem in the "real world". In*

<table>
<tr><td></td><td>addition, students have chance to know the social context and business environment, to form an idea and build the system, to design environment treatment processes in a specific condition of the company.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Demonstrate the area of environmental engineering that the student worked in [Applying]

CLO2. Apply the classroom knowledge for solving tasks during the internship [Applying]

CLO3. Demonstrate practical experience gained in environmental treatment processing, design, operation, analysis and research [Applying]</td></tr>
<tr><td>Skill</td><td>CLO4. Display the problem-solving skills with confidence and proficiency [Mechanism]

CLO5. Use the necessarily techniques, skills, and tools for performing tasks in environmental engineering [Mechanism]

CLO6. Display effectively oral and written communication skills [Mechanism]</td></tr>
<tr><td>Attitude</td><td>CLO7 Accept and work successfully different enterprise cultures; Form professional behavior in organization [Organization]

CLO8. Show ethics, integrity and responsibility for assigned works in company environment [Valuing]

CLO9. Recognize one's abilities and limitations [Organization]
CLO10. Form proactive vision and intention in environmental career options while more clearly defining personal career goals [Valuing]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: practice session (weeks)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Background information on the company
1. Background
2. Organization
3. Related environmental engineering areas</td><td>1</td><td>T,U</td></tr>
<tr><td>Your position and responsibilities in the internship
1. Task
2. Achievement
3. Strengths
4. Weakness</td><td>5.5</td><td>T,U</td></tr>
<tr><td>Evaluate knowledge/skills learned and developed</td><td>1,5</td><td>T,U</td></tr>
</table></td></tr>
</table>

	Conclude with ongoing considerations Writing a report		
Examination forms	Assessment from supervisor Assessment from instructor		
Study and examination requirements	Attendance: According to the requirement of company Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	*The information and data are provided by the company.*		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	3									
	2	3									
	3	3									
Skill (Level: 1-7)	4			4							
	5						4				
	6							4			
Attitudes (Level: 1-5)	7		4							4	
	8									3	
	9										4
	10										3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	3.0	4.0	4.0	0.0	0.0	4.0	4.0	0.0	3.5	3.5
L,M,H conversion *		M	M	M			M	M		M	M

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Background information on the company 1. Background 2. Organization 3. Related environmenta	1		Practice at company	

Week	Topic	CLO	Assessments	Learning activities	Resources
	l engineering areas				
2-7	Your position and responsibilities in the internship 1. Task 2. Achievement 3. Strengths 4. Weakness	2,3,4,5,6,7,8,9		Practice at company	
7-8	Evaluate in overall the knowledge/skills learned and developed; Conclusion and recommendation; Writing report	3,6,9		Practice at company	
	Company assessment		A1		
	Advisor assessment		A2	Presentation	

Format for internship report

General requirement

- The internship report must be written in English using Times New Roman font, with 13-point size and 1.5-line spacing. The text should be fully justified.
- Page set-up: use A4 paper; left margin: 3.0 cm; other margins: 2.0 cm.
- No header/footer is allowed.
- Use simple but clear language.
- Take time to check the thesis for misspelled words, typographical error, mislabeled figures, tables, or photos…
- Symbol for the decimal marker shall be the point on the line (.).

Page number

- Each page of the main body must be numbered, starting with title page. Place the number in the center of the bottom of the page.
- Cover page, Acknowledgment, References and Appendix page do not require numbering.
- Keep the writing short, informative, and as concise as possible.

Heading

Each section can be numbered as 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. Example of the structure and headings of the thesis is given as follows:

Cover page
Title page
Acknowledgement
Table of contents

1. Background information on the company
   1.1. Background
   1.2. Organization
   1.3. Related environmental engineering areas
2. Student position and responsibilities in the internship
   2.1. Task 1
      2.1.1. Description of task
      2.1.2. Achievement
      2.1.3. Strengths
      2.1.4. Weakness
   2.2. Task 2
      2.2.1. Description of task
      2.2.2. Achievement
      2.2.3. Strengths
      2.2.4. Weakness
   …
3. Evaluate knowledge/skills learned and developed
4. Conclusion and recommendation

References

Appendix

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**	**CLO7**	**CLO8**	**CLO9**	**CLO10**
Onsite supervisor's assessment (A1) (50%)	R1.1	R1.2	R1.3	R1.4	R1.2	R1.5	R1.6, R1.7	R1.8	R1.9	R1.10
Instructor's assessment (A2) (50%)	R2.2	R2.3	R2.4,5		R2.3	R2.1			R2.3,4	

*Note: %Pass: Target that **70** % of students having scores greater than 50 out of 100.*

5. Rubrics

5.1. Rubrics for onsite supervisor assessment (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Level of understanding the area of environmental engineering that the student worked in	5	Excellent					Weak
2. Ability in applying knowledge and skills learned in the university in a work setting.	30	Excellent					Weak
3. Level of gaining practical experience within the company environment	30	Excellent					Weak

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
4. Level of problem-solving skills	5	Demonstrates complete understanding of the problem. All requirements of task are included in response					Demonstrates little understanding of the problem. More than 50% requirements of task are missing.
5. Level of effectively oral and written communication skills	5	Display effectively oral and written communication skills					No/little oral and written communication skills are displayed
6. Level of appreciating different enterprise cultures and working successfully in company environment	5	Adapt well different enterprise cultures and working successfully in company environment					Cannot adapt different enterprise cultures and cannot working in company environment
7. Level of professional behavior that student shows in organization	5	Treating managers, colleagues and clients with respect; Projecting a positive attitude; Being polite; Showing good judgment; Dressing appropriately					Treating managers, colleagues and clients without respect Projecting a negative attitude Being impolite Showing strongly bias judgment; Dressing inappropriately
8. Student shows ethics, integrity and responsibility in company environment	5	Being ethical, Integrity and high responsible to the assigned works					Being unethical Dishonesty, Irresponsible for the assigned works
9. Ability of student in self-identifying their strength, weakness	5	Identifying accurately strength, weakness					Cannot identifying strength, weakness
10. Level of proactive vision and intention in career	5	Proactive					Inactive
Total	100						

5.1. Rubrics for instructor assessment (R2)

Rubrics is filled via internship report assessment and/or oral examination

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skills and format	5	Compliance well to guidelines					Not follow
2. Background information on the company	5	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Student position and responsibilities in the internship - Task	80	Present clearly the tasks, and the achievement; sufficient					Tasks and achievement are unclear; insufficient weight for an internship;

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
- Achievement - Strengths - Weakness		weight for an internship; Identifying accurately strength, weakness					Cannot identifying strength, weakness
4. Evaluate knowledge/skills learned and developed	5	Evaluate accurately the skills learned and developed					Cannot evaluate accurately the skills learned and developed
5. Conclude with ongoing considerations	5	Conclusion and recommendation are precise and accurate					Conclusion and recommendation are ambiguous and inaccurate
Total	100						

6. **Date revised: August 14, 2023**

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Pre-thesis**

Course Code: **ENEE5007IU**

1. General information

Course designation	*The primary goal of this 2-credit class is to let students develop skills on writing a proposal.*
Semester(s) in which the course is taught	2
Person responsible for the course	*Lecturers from the School of Chemical and Environmental Engineering*
Language	English
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis ☒ Compulsory ☐ Elective
Teaching methods	*Meeting; discussion; practice*
Workload (incl. contact hours, self-study hours)	
Credit points	2 credits/4.91 ECTS
Required and recommended prerequisites for joining the course	☐ None ☐ Prerequisite course ☐ Parallel course ☒ Previous course: ENEE5006IU: Internship 3
Course objectives	Student learns to determine the issues and the scope of technical issues; conclude about the environmental problems, review and propose

		Lecture	Lab	Project	Internship	Pre-Thesis
Credit	**2**					2
Contact hours	**75.0**	0	0	0	0	75
Self-Study hours	**60.0**	0	0	0	0	60
Total workload	**135.0**	0	0	0	0	135

<table>
<tr><td></td><td>solutions/methods. Also, student practices with skills of self-reading, reviewing, writing and defense their proposals.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify basically the issues and the scope of technical issues, identify the important factors [Analyzing]
CLO2. Describe basically environmental problems by parameters and calculations, then defend a conclusion about the environmental problem [Evaluating]
CLO3. Analyze current applied solutions, their advantages/disadvantages and propose solutions for a practical environmental problem [Analyzing]</td></tr>
<tr><td>Skill</td><td>CLO4. Develop basically the skills to review and write a thesis proposal [Adaptation]</td></tr>
<tr><td>Attitude</td><td>CLO5. Recognize scientific misconduct and plagiarism; displays a professional commitment to scientific ethics [Organization]</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: Practice session (weeks)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
For design topic
<table>
<tr><td>Topic</td><td>Week</td><td>Level</td></tr>
<tr><td>Introduction</td><td>2</td><td>T,U</td></tr>
<tr><td>Overview of pollution source</td><td>2</td><td>T,U</td></tr>
<tr><td>Review treatment technologies</td><td>4</td><td>T,U</td></tr>
<tr><td>Technical proposal</td><td>4</td><td></td></tr>
</table>
For Research topic
<table>
<tr><td>Topic</td><td>Week</td><td>Level</td></tr>
<tr><td>Introduction</td><td>2</td><td>T,U</td></tr>
<tr><td>Literature review</td><td>5</td><td>T,U</td></tr>
<tr><td>Material and method
Preliminary results</td><td>5</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Advisor assessment, committee assessment</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	References related to different topics Guideline for thesis (internal use)

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4		4			4				
	2	5		5		5	5				
	3	4		4	4	4	4				
Skill (Level: 1-7)	4					6		6			
Attitudes (Level: 1-5)	5									4	
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	4.3	0.0	4.3	4.0	5.0	4.3	6.0	0.0	4.0	0.0
L,M,H conversion *		H		H	M	H	H	H		H	

3. Planned learning activities and teaching methods

For Design topic

Week	Design topic	CLO	Assessments	Learning activities
1-2	Plan for doing pre-thesis Introduction	1,4,5		Meeting and practicing
3-4	Overview of pollution source	2,4,5		Meeting and practicing
5-8	Review treatment technologies	3,4,5		Meeting and practicing
9-12	Technical proposal	3,4,5		
	Process assessment		Advisor assessment	-
	Committee assessment		Committee assessment	

For research topic

Week	Research topic	CLO	Assessments	Learning activities
1-2	Plan for doing pre-thesis Introduction	1,4,5		Meeting and practicing
3-7	Literature review (1)	2,4,5		Meeting and practicing
8-12	Material and method Preliminary results	3,4,5		Meeting and practicing
	Process assessment		Advisor assessment	-
	Committee assessment		Committee assessment	

Format of pre-thesis report for design topic

COVER PAGE

TITLE PAGE

TABLE OF CONTENTS

LIST OF ABBREVIATIONS (OPTIONAL)

0. INTRODUCTION
1. OVERVIEW OF POLLUTION SOURCE
    1.1. Overview of …
        1.1.1…
        1.1.2….
    1.2….
        1.2.1…
        1.2.2…
    …
    1.n. …
2. REVIEW TREATMENT TECHNOLOGIES AND TECHNICAL PROPOSAL
    2.1. Review …
        2.1.1…
        2.1.2….
        …
3. STRUCTURE OF THESIS REPORT

REFERENCES

APPENDICES

Appendix A. Title of Appendix A

Appendix B. Title of Appendix B

Format of pre-thesis report for research topic

COVER PAGE

TITLE PAGE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS (OPTIONAL)

CHAPTER 1. INTRODUCTION

CHAPTER 2. LITERATURE REVIEW

2.1. Key term 1 or concept 1

2.1.1. …

2.1.2. …

2.2. Key term 2 or concept 2

2.2.1. …

2.2.2. …

…

2.n. …

CHAPTER 3. MATERIALS AND METHODS

CHAPTER 4. PRELIMINARY RESULTS (OPTIONAL)

CHAPTER 5. STRUCTURE OF THESIS REPORT

REFERENCES

APPENDICES

Appendix A. Title of Appendix A

Appendix B. Title of Appendix B

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Process assessment	R1-2	R1-3	R1-4	R1-1,2,3,5	R1-6
Committee members' assessment	R2-2	R2-3	R2-4	R2-1,2,3,5	R2-6

Note: %Pass: Target that 70 % of students having scores greater than 50 out of 100. R1,2,3 is the forms of rubrics.

The final grade of the thesis is the average grade (without decimal place) from the advisor, and committee members.

5. Rubrics (optional)

5.1. Rubrics for design topic

Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	10	Compliance well to guidelines					Not follow
2. Introduction	10	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. literature review	30	relevant, sufficient, clear					Irrelevant, insufficient, unclear
4. Technology choice	30	suitable and practical technology					Unsuitable; inapplicable
5. Holistic level	10	Demonstrates complete understanding of the problem. All requirements of task are included in response					Demonstrates little understanding of the problem. Many requirements of task are missing (missing more than 50%)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
6. Level of professional commitment to scientific ethics	10	Follow well the requirement about scientific ethics in terms of plagiarism, integrity in data collection and analysis					Do not follow the requirement, commit plagiarism at % higher than allowable value; having clear signal of data manipulation or data fabrication
Total	100						

Evaluation of Committee members (R2)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	10	Compliance well to guidelines					Not follow
2. Introduction,	10	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Literature review	30	relevant, sufficient, clear					Irrelevant, insufficient, unclear
4. Technology proposal	30	suitable and practical technology					Unsuitable; inapplicable
5. Holistic level	10	Demonstrates complete understanding of the problem. All requirements of task are included in response					Demonstrates little understanding of the problem. Many requirements of task are missing (missing more than 50%)
6. Level of professional commitment to scientific ethics	10	Follow well the requirement about scientific ethics in terms of plagiarism, integrity in data collection and analysis					Do not follow the requirement, commit plagiarism at % higher than allowable value*; having clear signal of data manipulation or data fabrication
Total	100						

***** Plagiarism at % higher than allowable value:

5.2. Rubrics for research topic

Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Ave rage	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to thesis guidelines)	10	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable);	10	sufficient, clear					Insufficient, unclear, irrelevant,
3. Literature review (sufficient literature)	30	relevant, sufficient, clear					Irrelevant, insufficient, unclear
4. Methodology (clear, appropriate methods, materials and equipment)	30	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
5. Holistic level	10	Demonstrates complete understanding of the problem. All requirements of task are included in response					Demonstrates little understanding of the problem. Many requirements of task are missing (missing more than 50%)
6. Level of professional commitment to scientific ethics	10	Follow well the requirement about scientific ethics in terms of plagiarism, integrity in data collection and analysis					Do not follow the requirement, commit plagiarism at % higher than allowable value; having clear signal of data manipulation or data fabrication
Total	100						

Evaluation of Committee members (R2)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Averag e	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to thesis guidelines)	10	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable),	10	sufficient, clear					Insufficient, unclear, irrelevant,
3. Literature review (sufficient literature)	30	relevant, sufficient, clear					Irrelevant, insufficient, unclear
4. Methodology (clear, appropriate methods, materials and equipment)	30	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
5. Holistic level	10	Demonstrates complete understanding of the problem. All requirements of task are included in response					Demonstrates little understanding of the problem. Many requirements of task are missing (missing more than 50%)
6. Level of professional commitment to scientific ethics	10	Follow well the requirement about scientific ethics in terms of plagiarism, integrity in data					Do not follow the requirement, commit plagiarism at % higher than allowable value; having clear signal of

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
		collection and analysis					data manipulation or data fabrication
Total	100						

6.Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Chemical and Environmental Engineering

COURSE SYLLABUS

Course Name: **Thesis**

Course Code: **ENEE5003IU**

1. General information

Course designation	The thesis works are implemented under the instruction of one or more teachers. The topic, including design, research, or real application orientations, will be proposed by the teacher or students and must be approved by the Head of Department. Students apply obtained knowledge systematically to solve environmental problems.	
Semester(s) in which the course is taught	1, 2	
Person responsible for the course	Associate Prof. Tran Tien Khoi Dr. Nguyen Thi Thuy Dr. Tran Thanh Tu Dr. Ngo Thi Thuan Dr. Nguyen Thi Hoang Hai	
Language	English	
Relation to curriculum	☐General ☐Fundamental ☐Specialization ☒Project/Internship/Thesis	☒ Compulsory ☐ Elective
Teaching methods	Meeting; discussion; practice	

Workload (incl. contact hours, self-study hours)

		Lecture	Lab	Project	Internship	Thesis
Credit	**10**					10
Contact hours	**375.0**	0	0	0	0	375
Self-Study hours	**300.0**	0	0	0	0	300
Total workload	**675.0**	0	0	0	0	675

Credit points	10 credits/24.55 ECTS
Required and recommended	☐ None

<table>
<tr><td>prerequisites for joining the course</td><td>☐ Prerequisite course
☐ Parallel course
☒ Previous course: ENEE5000IU- Pre-thesis
Accumulated credits: 90% of total credits required from the program</td></tr>
<tr><td>Course objectives</td><td>Solve environmental problems by application of systematic knowledge</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify the issues and the scope of technical issues, and the important factors [analyzing]
CLO2. Describe environmental problems by parameters and calculations, then defend a conclusion about the environmental problem [evaluating]
CLO3. Compares current applied solutions, their advantages/disadvantages and propose solutions for a practical environmental problem [evaluating]
CLO4. Calculate and design treatment systems on drawings (for design thesis) or to conduct research in laboratory/pilot/industrial scales and analyze data and discuss (for research topic) [creating]</td></tr>
<tr><td>Skill</td><td>CLO5. Arrange and design the professional works (the purpose, requirement, functions, structures of each treatment units in the system) or research [origination]
CLO6. Display effectively communication through oral, written, graphical and electronic forms [Complex Overt Response]
CLO7. Organize time and resource following a plan [Complex Overt Response]
CLO8. Display critical and creative thinking in solving environmental problems [Complex Overt Response]</td></tr>
<tr><td>Attitude</td><td>CLO9. Formulate the perseverance, and flexibility in solving the problem [organization]
CLO10. Form proactive vision and intention in career [valuing]</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (week)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
For design topic
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Introduction</td><td>1</td><td>T,U</td></tr>
<tr><td>Overview of pollution source</td><td>1</td><td>T,U</td></tr>
<tr><td>Review treatment technologies and technical proposal</td><td>1</td><td>T,U</td></tr>
<tr><td>Technical calculation and Design for treatment works</td><td>3</td><td>T,U</td></tr>
<tr><td>Auxiliaries and equipment</td><td>0.5</td><td>T,U</td></tr>
<tr><td>Technical drawings</td><td>3</td><td>T,U</td></tr>
<tr><td>Cost estimating/Construction measurement</td><td>0.5</td><td>T,U</td></tr>
</table>
For Research topic
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Introduction</td><td>1</td><td>T,U</td></tr>
<tr><td>Literature review</td><td>1</td><td>T,U</td></tr>
<tr><td>Material and method</td><td>2</td><td>T,U</td></tr>
<tr><td>Experiments</td><td>3</td><td>T,U</td></tr>
<tr><td>Result and discussion</td><td>2</td><td>T,U</td></tr>
<tr><td>Conclusion</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Advisor assessment, reviewer assessment, committee assessment</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the advisor meeting.
Students must have more than 50/100 points overall to pass this course.
In order to have an oral examination, the thesis’s grade of student evaluated by both advisor and reviewer must be equal or higher than 50 points.</td></tr>
<tr><td>Reading list</td><td>References related to different topics
Guideline for thesis (internal use)</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-10) and Intended Learning Outcomes (ILO) is shown in the following table:

CLOs		ILOs									
		Knowledge		Skills						Attitudes	
		1	2	3	4	5	6	7	8	9	10
Knowledge (Level: 1-6)	1	4		4			4				
	2	5		5		5	5				
	3	5		5	5	5	5				
	4	6				6					
Skill (Level: 1-7)	5					7					
	6							5			
	7					5				5	
	8			5						5	
Attitudes (Level: 1-5)	9									4	
	10						3				3
Contribution of CLOs to ILOs											
Bloom's Taxonomy	AVE	5.0	0.0	4.8	5.0	5.6	4.3	5.0	0.0	4.7	3.0
L,M,H conversion *		H		H	H	H	H	H		H	M

** L (Low); M (Medium); H (High)*

3. Planned learning activities and teaching methods

For Design topic

Week	Design topic	CLO	Assessments	Learning activities
1	Plan for doing thesis Introduction	1, 7, 10		Meeting and practicing
2	Overview of pollution source	2		Meeting and practicing
3	Review treatment technologies and technical proposal	3, 8		Meeting and practicing
4	Technical calculation and Design for treatment works (1)	4, 8		Meeting and practicing
5	Technical calculation and Design for treatment works (2)	4, 8		Meeting and practicing
6	Technical calculation and Design for treatment works (3)	4, 8		Meeting and practicing
7	Auxiliaries and equipment Cost estimating/Construction measurement	4		Meeting and practicing
8	Technical drawings (1)	4, 6, 8		Meeting and practicing
9	Technical drawings (2)	4, 6, 8		Meeting and practicing
10	Technical drawings (3)	4, 6, 8		Meeting and practicing
	Process assessment		Advisor assessment	-
	Reviewer assessment		Reviewer assessment	
	Final defense		Committee assessment	Oral presentation; answer questions

For research topic

Week	Research topic	CLO	Assessments	Learning activities
1	Plan for doing thesis Introduction	1, 7, 10		Meeting and practicing
2	Literature review (1)	2		Meeting and practicing
3	Material and method	3		Meeting and practicing
4	Material and method	3		Meeting and practicing
5	Experiments and result (1)	4, 8		Meeting and practicing
6	Experiments and result (2)	4, 8		Meeting and practicing
7	Experiments and result (3)	4, 8		Meeting and practicing
8	Experiments and result (4)	4, 8		Meeting and practicing
9	Experiments and result (5)	4, 8		Meeting and practicing
10	Data analysis	4, 6, 8		Meeting and practicing
	Process assessment		Advisor assessment	-
	Reviewer assessment		Reviewer assessment	
	Final defense		Committee assessment	Oral presentation; answer questions

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9	CLO10
Process assessment	R1-2	R1-2	R1-3	R1-4,5		R1-1,5	R1-7	R1-6	R1-8	R1-9
Reviewer assessment	R2-2	R2-2	R2-3	R2-4,5		R2-1,5		R2-6		
Committee assessment	R3-2	R3-2	R3-3	R3-4,5	R3-8	R3-1,5,7		R3-6		

Note: %Pass: Target that 70 % of students having scores greater than 50 out of 100. R1,2,3 is the forms of rubrics.

The final grade of the thesis is the average grade (without decimal place) from the advisor, reviewer, and committee members.

5. Rubrics

5.1. Rubrics for design topic

Process evaluation (for academic advisor)(R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	**5**	Compliance well to guidelines					Not follow
2. Introduction, literature review	**5**	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology choice	**10**	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	**30**	right, sufficient, clear					More than 50% of

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
							calculations are wrong.
5. Design drawing	**30**	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	**5**	Significant					Insignificant
7. Meeting with advisor, planning for the thesis and management of time	**5**	Frequently, plan well and complete project on time					Less contact (<50% of number of meeting), without plan, manage time
8. Level of commitment and independence in work, perseverance, flexibility	**5**	High responsible to complete tasks; Stick to the task and keep working confidently until the task is complete; Being open-minded for comments and discussion					Irresponsible; Little persistence on the tasks; Give up early; Closed-minded for comments and discussion
9. Proactive vision and intention in career	**5**	Proactive and with high intention					Inactive and with low intention
Total	**100**						

Evaluation of reviewer (R2)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	**5**	Compliance well to guidelines					Not follow
2. Introduction, literature review	**10**	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology proposal	**10**	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	**40**	right, sufficient, clear					More than 50% of calculations are wrong.
5. Design drawing	**30**	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in	**5**	Significant					Insignificant

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
solving problems							
Total	**100**						

Evaluation of Committee member(R3)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format	**5**	Compliance well to guidelines					Not follow
2. Introduction, literature review	**5**	relevant, sufficient, clear					Irrelevant, insufficient, unclear
3. Technology proposal	**5**	suitable and practical technology					Unsuitable; inapplicable
4. Calculation	**25**	right, sufficient, clear					More than 50% of calculations are wrong.
5. Drawings	**20**	Sufficient, follow the technical drawing standard, describe properly the structure of the unit					Insufficient, do not follow the technical drawing standard, do not describe properly the structure of the unit
6. Critical and creative thinking in solving problems	**5**	Significant					Insignificant
7. Presentation	**15**	Follow the rule of PPT Making, clear, attractive					Dull, small word, a lot of spelling and grammar mistakes
8. Answer the questions from reviewer and committee members	**15**	Relevant to questions, all answers are correct					Irrelevant to questions, less than 50% answers are correct
9. Attitude and behavior	**5**	Professional					Unprofessional
Total	**100**						

5.2. Rubrics for research topic

Process evaluation (for academic advisor) (R1)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to thesis guidelines)	**10**	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable); Literature review (sufficient literature)	**15**	sufficient, clear					Insufficient, unclear, irrelevant,
3. Methodology (clear, appropriate methods, materials and equipment)	**15**	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
4. Results and discussion (evaluated based on the specific objectives of the study)	**30**	Sufficient, clear, complete the contents of study, support for objectives of study					Insufficient, unclear, incomplete more than 50% contents of study; results are less relevant to the specific objectives of study
5. Data analysis (figure, table, interpretation)	**10**	Sufficient, logic, effectively visual representations of the data					Insufficient, illogic, ineffectively visual representations of the data
6. Critical and creative thinking in solving problems (significant/ moderate/ insignificant)	**5**	Significant					Insignificant
7. Meeting with advisor, planning for the thesis and management of time	**5**	Frequently, plan well and complete project on time					Less contact (<50% of number of meeting), Without plan, manage time
8. Level of commitment and independence in work, perseverance, flexibility	**5**	High responsible to complete tasks; Stick to the task and keep working confidently until the task is complete; Being open-minded for comments and discussion					Irresponsible; Little persistence on the tasks; Give up early; Closed-minded for comments and discussion
9. Proactive vision and intention in career	**5**	Proactive and with high intention					Inactive and with low intention
Total	**100**						

Evaluation of reviewer (R2)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to thesis guidelines)	10	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable), Literature review (sufficient literature)	20	sufficient, clear					Insufficient, unclear, irrelevant,
3. Methodology (clear, appropriate methods, materials and equipment)	20	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
4. Results and discussion (evaluated based on the specific objectives of the study)	30	Sufficient, clear, complete well the contents of study, support well for objectives of study					Insufficient, unclear, incomplete more than 50% contents of study; results are less relevant to the specific objectives of study
5. Data analysis (figure, table, interpretation)	10	Sufficient, logic, effectively visual representations of the data					Insufficient, illogic, ineffectively visual representations of the data
6. Critical and creative thinking in solving problems (significant/ moderate/ insignificant)	10	Significant					Insignificant
Total							

Evaluation of Committee member (R3)

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
1. Writing skill and format (compliance to thesis guidelines)	**5**	Compliance well to guidelines					Not follow
2. Study goal and objectives (clear, achievable); Literature review (sufficient literature)	**10**	sufficient, clear					Insufficient, unclear, irrelevant,
3. Methodology (clear, appropriate methods, materials and equipment)	**10**	Appropriate, applicable, reliable					Inappropriate, inapplicable, unreliable
4. Results and discussion (evaluated based on the specific objectives of the study)	**30**	Sufficient, clear, complete the contents of study, support for objectives of					Insufficient, unclear, incomplete more than 50% contents of study; results

Criteria	%	Level					
		Excellent	Very good	Good	Fair	Average	Weak
		90≤ ≤100	80≤ <90	70≤ <80	60≤ <70	50≤ <60	<50
		study					are less relevant to the specific objectives of study
5. Data analysis (figure, table, interpretation)	**10**	Sufficient, logic, effectively visual representations of the data					Insufficient, illogic, ineffectively visual representations of the data
6. Critical and creative thinking in solving problems (significant/ moderate/ insignificant)	**5**	Significant					Insignificant
7. Presentation (quality of slides, speaking skills, timing)	**15**	Follow the rule of PPT Making, clear, attractive					Dull, small word, a lot of spelling and grammar mistakes
8. Answer the questions from reviewer and committee members (relevant to questions, satisfiable)	**15**	Relevant to questions, all answers are correct					Irrelevant to questions, less than 50% answers are correct
9. Attitude and behavior	**5**	Professional					Unprofessional
Total	**100**						

6. Date revised: August 14, 2023

Ho Chi Minh City, 14/8/2023

Dean of School of Chemical and Environmental Engineering

Huỳnh Kim Lâm

ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

Phụ lục 3
BẢNG MÔ TẢ SỐ TÍN CHỈ THỰC TẬP CỦA CTĐT ĐƯỢC THỂ HIỆN CỤ THỂ THEO MÔN HỌC ĐỂ ĐẢM BẢO 8TC THỰC TẬP THEO QUY ĐỊNH TẠI THÔNG TƯ 17/2021/TT-BGDĐT

(Kèm theo Quyết định số 1001/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

TT.	Mã MH	Tên môn học		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực tập	
1	ENEE5004IU	Thực tập 1	Internship 1	Bắt buộc	2	0	2	HT: ENEE2001IU
2	ENEE5005IU	Thực tập 2	Internship 2	Bắt buộc	3	0	3	HT: ENEE5004IU
3	ENEE5006IU	Thực tập 3	Internship 3	Bắt buộc	3	0	3	HT: ENEE3010IU; ENEE3111IU; CHE2082IU
	Tổng				**8**			