

Course Syllabus

1. Course title: Process and Equipment in Environmental Engineering Technology

2. Course code: PREE233410

3. Credit units: 3 (3/0/6) (3 units of theory/ 0 unit of practice/ 6 units of self-study)

Duration: 15 weeks (3 hours of theory+0 hours of practice, and 6 hours of self-study per week)

4. Course instructors:

1/ Dr. Nguyen Thai Anh

2/ Dr. Bui Tan Nghia

5. Course requirements:

Prerequisite courses : None

Previous courses : None

Parallel courses : None

6. Course description:

This course is designed to equip students with concepts, definitions, knowledge, basic knowledge of hydraulic processes, pneumatic and mechanical processes, mass transfer occurring in environmental treatment technology. After the course, students can apply and operate equipment systems for environmental treatment in a rational manner and at the same time as the basis for the implementation of the project work, graduation thesis.

7. Course goals

Goals	Goal description	Programme Expected learning outcome (ELOs)
G1	Have general knowledge the knowledge of mathematics, sciences and society in the process of equipment.	ELO1, ELO2
G2	Ability to analyse, solve the solution, calculate the design issues of process equipment in EET.	ELO4
G3	Communicate effectively in English for the process of equipment in EET.	ELO11
G4	The ability to operate equipment in the field of environmental remediation.	ELO13

8. Course learning outcomes (CLOs)

CLOs		CLOs description (After accomplishing this course, students are able to:)	Programme ELOs
G1	CLO1	Point out the subject, concepts, definitions, knowledge, basic knowledge of mechanical processes - hydraulics - compressed air, heat transfer and mass transfer in EET.	ELO1
	CLO2	Explain principles of operation of mechanical equipment - hydraulic - compressed air, heat transfer and mass transfer in EET.	ELO2
	CLO3	Use mechanical processes - hydraulics - compressed air, heat and mass transfer in environmental problems.	ELO4
G2	CLO4	Reading English materials of equipment processes.	ELO11
G4	CLO5	Select the equipment processes applied to a specific environmental problem.	ELO13

9. Learning resources

- Text books:

1. Phạm Văn Bôn, Hoàng Minh Nam, Vũ Bá Minh - Quá trình và thiết bị công nghệ hóa học - Ví dụ và bài tập - Trường đại học bách khoa thành phố Hồ Chí Minh.

- References:

1. Nguyễn Văn Lụa - Các quá trình và thiết bị cơ học - Trường đại học Bách khoa thành phố Hồ Chí Minh.
2. Sổ tay quá trình và thiết bị công nghệ hóa học, Tập 1 - Nhà xuất bản khoa học và kỹ thuật. Hà nội 1992.
3. Nguyễn Bin - Tính toán quá trình, thiết bị trong công nghệ hóa chất và thực phẩm - NXB khoa học và kỹ thuật 1999.
4. Trần Hùng Dũng, Nguyễn Văn Lụa, Hoàng Minh Nam, Vũ Bá Minh - Phân riêng bằng khí động, lực ly tâm, bơm quạt, máy nén, tính hệ thống đường ống - NXB đại học quốc gia thành phố HCM. 1997.
5. Hoàng Minh Nam, Vũ Bá Minh - Cơ học vật liệu rời - Trường đại học Bách khoa thành phố Hồ Chí Minh.
6. Đỗ Trọng Đài, Nguyễn Trọng Khuông, Trần Quang Thảo, Võ Thị Ngọc Tươi, Trần Xoa - Cơ sở quá trình và thiết bị công nghệ hóa học. Tập1,2 - NXB đại học và trung học chuyên nghiệp. Hà Nội 1974.

7. Hoàng Đình Tín, Lê Chí Hiệp – Nhiệt Động Lực Học Kỹ Thuật – NXB Khoa học và Kỹ thuật, 1997.
8. Vũ Bá Minh, Võ Văn Bang, Truyền Khối, ĐHBK Tp.HCM 2009.

10. Student assessment:

- Grading scale: 10
- Assessment plan:

Content	Timeline	Assessment method	CLOs	Rate (%)
Mid-term test 1				25
Chapter 1-4	Week 6	Writing test	CLO1, CLO2,	
Mid-term test 2				25
Chapter 5-9	Week 13	Writing test	CLO3, CLO4, CLO5	
Final exam				50
Chapter 1-11	Week 16	Writing test	CLO1, CLO2, CLO3, CLO4, CLO5	

11. Course content:

Week	Content	CLOs
1-2	Chapter 1: Hydraulic processes applied in environmental engineering technology (EET) (6/0/12)	
	A/ Content and pedagogical methods in class (6) Content: 1.1 Some basic concepts, technical parameters used in mechanical and hydraulic processes 1.2 Hydrostatic processes 1.3 Hydrodynamic processes Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study content (12) Review the content of chapter 1	
3-4	Chapter 2: Fluid Transport Processes in EET (6/0/12)	

	A/ Content and pedagogical methods in class (6) Content: 2.1 Some basic concepts 2.2 The structure and operation principle of the fluid transport pump 2.3 Calculation, installation of liquid transport pumps Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (12) Do the exercises in chapter 2	
	Chapter 3: Gas Transportation Processes in EET (3/0/6)	
5	A/ Content and pedagogical methods in class (3) Content: 3.1 Some basic concepts 3.2 Piston compressors 3.3 Centrifugal compressors 3.4 Fans 3.5 Vacuum pumps Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 3	
	Chapter 4: Synchronization of liquid systems by agitation (3/0/6)	
6	A/ Content and pedagogical methods in class (3) Content: 4.1 Mechanical stirrer 4.2 Mechanical stirring capacity 4.3 Stirring by compressed-air 4.4 Stirring by grinding 4.5 Stirring by circulation pump Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 4	

	Chapter 5: Separation Techniques by Sedimentation (3/0/6)	
7	A/ Content and pedagogical methods in class (3) Content: 5.1 Overview 5.2 Sedimentation in gravity field 5.3 Sedimentation in centrifugal field Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 5	
	Chapter 6: Separation Techniques by Filtration (6/0/12)	
8-9	A/ Content and pedagogical methods in class (6) Content: 6.1 Overview 6.2 Material balance 6.3 Filter equation 6.4 Filtration in the centrifugal field 6.5 Filter cake washing, filter cloths, filter aid Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (12) Do the exercises in chapter 6	
	Chapter 7: Fundamentals of Mass Transfer (3/0/6)	
10	A/ Content and pedagogical methods in class (3) Content: 8.1 Definition and classification 8.2 Representation of phase components 8.3 Phase balance 8.4 Diffusion process 8.5 Method of calculating the mass transfer device Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5

	B/ Self-study contents (6) Do the exercises in chapter 7	
	Chapter 8: Adsorption process in EET (3/0/6)	
11	A/ Content and pedagogical methods in class (3) Content: 8.1 Some basic concepts 8.2 Thermodynamic adsorption 8.3 Isotherm adsorption 8.4 Langmuir, Freundlich, BET equations Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 8	
	Chapter 9: Absorption process in EET (3/0/6)	
12	A/ Content and pedagogical methods in class (3) Content: 9.1 Some basic concepts 9.2 Physical basis of absorption 9.3 Calculate absorption devices Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 9	
	Chapter 10: Extraction process in EET (3/0/6)	
13	A/ Content and pedagogical methods in class (3) Content: 10.1 Some basic concepts 10.2 Liquid – liquid extraction 10.3 Solid – liquid extraction Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 10	

	Chapter 11: Drying process in EET (3/0/6)	
14	A/ Content and pedagogical methods in class (3) Content: 11.1 Some basic concepts 11.2 Kinetic drying 11.3 Dynamic drying 11.4 Classification and calculation of drying equipment Pedagogical methods: + Presentation of lecture + Group discussion	CLO1, CLO2, CLO3, CLO4, CLO5
	B/ Self-study contents (6) Do the exercises in chapter 11	

12. Learning ethics:

- If the exercises and translations from the internet are detected to be copied, the course score will be deducted 100%. If it is so serious, both the author and the copier are banned at the final exam.
- Students who do not complete the task (section 10), will be banned from the final exam and be offered the disciplinary which is showed in front of the campus.
- Student and the other who is hired for the taking the test, will be suspended or expelled.

13. **Date of first approval:** August 1st, 2012

14. **Approval by:**

Dean

Head of Department

Compiler

Prof. Nguyen Van Suc

MSc Nguyen Thi Minh Nguyet

Dr. Nguyen Thai Anh

15. Date and Up-to-date content

1st time: Date: August 25 th , 2015 - Update content and structure of the programme adjusted in: Course title, teaching content and assessment method	Instructor: Head of Department: Dr. Tran Thi Kim Anh
--	--

