HCMC UNIV.OF TECHNOLOGY AND EDUCATION
Faculty of Chemical and Food Technology

Programme : Environmental Engineering Technology
Level : Undergraduate

Course Syllabus

1. **Course title :** Environmental Microbiology
2. **Course code:** ENMI233910
3. **Credit units:** 3 (3/0/6) (3 units of theory/ 0 units of practice, experiment/ 6 units of self- study)
   Duration: 9 weeks (5 hours of theory + 0 hour of practice + 10 hours of self-study per week)
4. **Course intructors:**
   1/ Dr. Nguyen My Linh
   2/ Dr.Trinh Khanh Son
5. **Course requirements :**
   Preresiquisite courses : None
   Previous course : None
   Parallel course : None
6. **Course Description :**
   Principles of environmental microbiology; water-borne pathogens; microorganisms and air pollution; microorganisms in soil; water pollution microbiology; biodegradation of hazardous chemicals.
7. **Course Goals**

Goals	Goal description	Programme Expect learning outcomes ELOs
G1	Fudamental knowledge about microbiology to apply in environmental engineering technology.	ELO2
G2	Analyze, explain and solve problems concern to the environmental microbiology, then choose the appropriate technology for the design.	ELO4
G3	The skills of teamwork, communication, reading and understanding the document of environmental microbiology	ELO9 ELO10

8. Course learning outcomes: (CLOs)

CLOs		CLOs description (After accomplishing this course, students are able to:)	Programme ELOs
G1	**CLO1**	List the principal of basic microbiology	ELO2
	CLO2	Analyze the definition, basical principal of microbiology in environmental engineering technilogy.	
	CLO3	Explain the specific knowledge of environmental microorganism to apply and solve the related problems.	
G2	**CLO4**	Identify and apply microrganism in environmental engineering techology	ELO4
G3	**CLO5**	Work in team	ELO9
	CLO 6	Communicate through report and presentation	ELO10

9. Learning Resources

- Text book :

1. Gabriel Bilton,Wastewater Microbiology, Third Edition, Wiley.

- References :

1.Duncan Mara, Nigel Horan, The Handbook of water and waste water microbiology,Elsiver.

2. Nguyen Lan Dung, Nguyen Dinh Quyen, Pham Van Ty, Microbiology, Education Publisher, Ha Noi, 2002

3. Do Hong Lan Chi, Lam Minh Triet, Environmental Microbiology; National University Publisher.

10. Student Assesement :

- Grading scale : 10
- Assesement plan :

Type	Content	Timeline	Assessement Method	ELOs	Rate (%)
Assignments					**20**
BT# 1	Decribe the Krebs cycle	Week 3	Result evaluation	CLO1 CLO2 CLO3	**10**

BT#2	Calculate the kinetic of Activated slugde	Week 6	Result evaluation	CLO4	**10**
Essay - Report					**25**
BL#1	Student will pick up one topic inside The Handbook of water and waste water microbiology to report and present in group	Week 7	Rubrics	CLO4 CLO5 CLO6	
Final test					**50**
	The content covers all of course outcomes. - 70 minutes duration. .	School calendar	Multiple Choice Test	CLO1 CLO2 CLO3 CLO4	

11. Course content

Week	Content	CELOs
1	**Chapter 1: Fundamentals of microbiology (5/0/10)**	
	***A/* Teaching content in classroom (5)** **Part I: Introduction** 1.1 The distribution of microorganisms in nature 1.2 General characteristics of microorganism 1.3 Roles of microorganism. **Part II: Structure and Morphology** 2.1 Bacteria 2.2 Virus 2.3 Other microorganisms **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO1 CLO2 CLO5
	***B/* The contents of home self-study (10)** All the contents of Chapter 1	CLO1 CLO2 CLO5
2 -3	**Chapter 2: Microbial metabolism and Growth (10/0/20)**	

	***A/* Teaching content in classroom (10)** **Part I: Enzymes and Enzymes kinetic** 1.1 Introduction 1.2 Enzymes kinetic 1.3 Effect of Inhibitors on Enzyme Activity **Part II: Microbial metabolism** 2.1 Introduction 2.2 Catabolism 2.3 Anabolism 2.4 Photosynthesis **Part III: Microbial growth kinetics** 3.1 Batch Cultures 3.2 Continuous Culture of Microorganisms 3.3 Other Kinetic Parameters 3.4 Physical and Chemical Factors Affecting Microbial Growth **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO1 CLO2 CLO5
	***B/* The contents of home self-study (20)** All the contents of Chapter 2	CLO1 CLO2 CLO5
4	**Chapter 3: Role of Microorganisms in Biogeochemical Cycles (5/0/10)**	
	***A/* Teaching content in classroom (5)** 3.1 Nitrogen cycle 3.2 Phosphorus cycle 3.3 The sulfur cycle 3.4 Carbon cycle **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO1 CLO2 CLO3 CLO5
	***B/* The contents of home self-study (10)** All the contents of Chapter 3	CLO1 CLO2 CLO3 CLO5
5	**Chapter 4: Microorganism Pollution & Disinfection. (5/0/10)**	

	***A/* Teaching content in classroom (5)** 4.1 Bacterial Pathogens 4.2 Viral Pathogens 4.3 Protozoan Parasites 4.4 Disinfection methods **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO2 CLO3 CLO4 CLO5
	***B/* The contents of home self-study (10)** All the contents of Chapter 4	CLO2 CLO3 CLO4 CLO5
6-7	**Chapter 5: Microbiology of Wastewater treatment.(10/0/20)**	
	***A/* Teaching content in classroom (10)** 5.1 Introduction 5.2 Activated Sludge 5.3 Fix-film processes **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO2 CLO3 CLO4 CLO5
	***B/* The contents of home self-study (20)** All the contents of Chapter 5	CLO2 CLO3 CLO4 CLO5
8	**Chapter 6: Anaerobic Digestion (5/0/10)**	
	***A/* Teaching content in classroom (5)** 6.1 Introduction 6.2 Factors controlling anaerobic digestion 6.3 Anaerobic treatment of wastewater **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO2 CLO3 CLO4 CLO5
	***B/* The contents of home self-study (10)** All the contents of Chapter 6	CLO2 CLO3

		CLO4 CLO5
9	**Chapter 7 : Microbiology in Soil and Solid waste Treatment (5/0/10)**	
	***A/* Teaching content in classroom (5)** 7.1 Introduction 7.2 Microbiology in soil 7.3 Bioremediation of Soil and Solid Waste treatment **Summary of teaching methodology:** – Speech – Group discussion – Slide presentation (Powerpoint)	CLO2 CLO3 CLO4 CLO5
	***B/* The contents of home self-study (10)** All the contents of Chapter 7	CLO2 CLO3 CLO4 CLO5

12. Learning ethics:

The homework and projects must be implemented by the students themselves. If the copy is detected, the students will be evaluated with the zero of the processing grade and final exam.

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

14. Approved by:

Dean	**Head of Department**	**Compiler**
A/Prof. Nguyen Van Suc	**MSc Nguyen Thi Minh Nguyet**	**Dr. Nguyen My Linh**

15. Date and Up-to-date content

1st time: Date: 2015 - Update content and structure of the programme adjusted in: Updated content of Environmental Microbiology	Instructor: Head of Department: