

COURSE OUTLINE DETAILS

1. Course: General Aquatic Microorganisms (Vi sinh thủy sản)

- **Code number:** AQ205C

- **Credits:** 3

- **Hours:** 30 theory hours, 30 practice hours, 60 self-study hours

2. Management Unit:

- **Department:** Aquatic Pathology

- **Faculty:** College of Aquaculture and Fisheries

3. Requisites:

- **Prerequisites:** No

- **Corequisites:** No

4. Course objectives:

Objectives	Descriptions	Program Outcomes
4.1	To provide students knowledge on history of microbiology; roles of microorganisms in nature and human life, prokaryotes, eukaryotes, virus, microbial nutrition and growth, microbial genetics and aquatic microorganisms and pathogens of aquatic organisms; and principle techniques in analysing these microorganisms.	2.1.2a, b
4.2	To train students to isolate, identify and characterize microorganisms from fish/shrimp, sediment and water samples as well as to analyse and evaluate test results related to microbiology	2.2.1a
4.3	To develop rational thinking skills, confidence (through group discussions and laboratory practices)	2.2.2
4.4	Strengthen habits of self-study and positive attitude for research	2.3

5. Course learning outcomes:

COs	Descriptions	Objectives	POs
	Knowledge		
CO1	Generalize the process of generation and development of microbiology, achievements and prospects for life and production	4.1	2.1.2a
CO2	Describe the structures, functions and activities of microbial cells	4.1	2.1.2a
CO3	Explain the process of nutrition and development, metabolism and energy, growth, genetics and relationship between microorganisms and aquatic and aquatic environments	4.1	2.1.2a, b

	Skills		
CO4	Proficiency in (i) basic microbiological techniques; (ii) analyse microbiological samples from aquatic, mud and water samples; (3) evaluating results in microbiological analysis	4.2	2.2.1a
CO5	Organize group working or collaboration in the field of microbiological analysis or research	4.3	2.2.2
	Attitudes/Autonomy/Responsibilities		
CO6	Display self-responsibility and objective awareness in research and application of microorganisms to the reality of the aquaculture industry	4.4	2.3

6 Brief description of the course:

The course will provide students knowledge on generation and development of microbiology, achievements and prospects for life and production; the structures, functions and activities of microbial cells; the process of nutrition and development, metabolism and energy, growth, genetics and relationship between microorganisms and aquatic and aquatic environments.

7. Course structure:

7.1. Theory

	Content	Hours	COs
Chapter 1.	Introduction to microbiology	6	
1.1.	Microorganisms and microbiology		CO1; CO6
1.2.	Historical roots of microbiology		
1.3.	Role of microorganisms in nature and to human life		
Chapter 2.	Prokaryotic microorganisms	6	
2.1.	Eubacteria		CO2; CO6
2.2.	Archaeobacteria		
Chapter 3	Eukaryotic microorganisms	3	
3.1	Fungi		CO2; CO6
3.2	Protozoa		
3.3	Algae		
Chapter 4	Virus	3	
4.1	General characteristics of virus		CO2; CO6
4.2	Viral structures		
4.3	General features of virus reproduction		
Chapter 5	Microbial nutrition and growth	6	
5.1	Microbial nutrition - Carbon and nitrogen - Other macronutrients - Micronutrients - Culture media		CO3; CO6

5.2	Microbial growth - Growth cycle of microbial populations - Measurement of microbial growth - Factors effects microbial growth		
Chapter 6	Microbial genetics	3	
6.1	General features of microbial genetics		CO3; CO6
6.2	Viral genetics		
6.3	Genetics in Prokaryotic microorganisms		
6.4	Genetics in Eukaryotic microorganisms		
6.5	Mutations and mutants in microorganisms		
Chapter 7	Aquatic microorganisms and pathogens of aquatic organisms	3	
7.1	Distribution of microorganisms in aquatic environments		CO3; CO6
7.2	Role of microorganisms in the aquatic environments		
7.3	Microbial as pathogens of aquatic organisms		

7.2. Practice

	Content	Hours	COs
Part 1	Bacteriological smear	5	CO4; CO5; CO6
Part 2	Aseptic technique and transfer of microorganisms	5	
Part 3	Gram stain protocol (Hucker's Modification)	5	
Part 4	Bacterial shapes and arrangements	5	
Part 5	Obtaining pure cultures from a mixed population: streak plate method of isolation	5	
Part 6	Enumeration of microorganisms: Plate count	5	

8. Teaching method:

- Class hours
- Practical hours
- Questions and discussions

9. Duties of student:

Students have to do the following duties:

- Lecture/Class attendance: 80% of lectures
- Practical attendance 100% of practical hours
- Attend mid and final exams

10. Assessment of student learning outcomes:

10.1. Assessment

No.	Point components	Rules and Requirement	Weights	COs
1	Attendance, participation, diligence and professionalism	- Participate in 80% of theory, exams, and laboratory exercises - The instructor should be notified in advance of known absence.	30%	CO4; CO5; CO6
2	Scores of mid exam	- Mid-term exams	20%	CO1; CO2; CO6
3	Scores of final exam	- Final exam	50%	CO3; CO6

9.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

10. Materials:

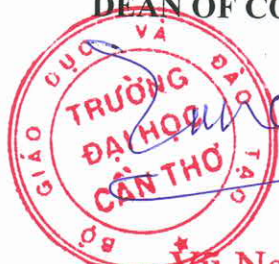
Materials information	Code number
[1] Kenneth Todar, 2003. Major groups of prokaryotes. Department of Bacteriology. University of Wisconsin-Madison.	
[2] Madigan, M.T., Martinko, J.M. and Parker, J., 2002. Biology of Microorganisms. Tenth edition, Prenhall.	
[3] Kenneth Todar, 2001. Nutrient and growth of bacteria. Department of Bacteriology. University of Wisconsin-Madison.	
[4] Ford. T. E., 1994. Aquatic Microbiology.	
[5] Brock biology of microorganisms / Madigan, Michael T.	MOL.088198; MON.061417

11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	Chapter 1: Introduction to microbiology	6	10	Reading lecture notes and introduction chapter in textbooks [5]
2	Chapter 2: Prokaryotic microorganisms	6	10	Reading lecture notes and material [1]
3	Chapter 3: Eukaryotic microorganisms	3	0	Reading lecture notes and material [2]

4	Chapter 4: Virus	3	0	Reading lecture notes and material [2]
5	Chapter 5: Microbial nutrition and growth	6	10	Reading lecture notes and material [3]
6	Chapter 6: Microbial genetics	3	0	Reading lecture notes and material [2]
7	Chapter 7: Aquatic microorganisms and pathogens of aquatic organisms	3	0	Reading lecture notes and material [4]

ON BEHALF OF RECTOR
DEAN OF COLLEGE



Vũ Ngọc Út

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HEAD OF DEPARTMENT



Trần Thị Tuyết Hoa