

SUBJECT OUTLINE DETAILS

1. Subject: Introductory Microbiology

- **Code:** MI 301 C
- **Credits:** 3
- **Hours:** 45 theory hours and 90 self-study hours.

2. Management Unit:

- **Department:** Microbial Biotechnology
- **Institute:** Biotechnology Research and Development Institute

3. Prerequisites: General Biology, Biochemistry.

4. Subject objectives: The course is designed to introduce the student to basic concepts of microbiology and related techniques in the study of microorganisms with emphasis on bacteria. The course will discuss the following topics: (1) overview of microbiology, (2) microbial cellular structure and function, (3) eukaryotic microorganisms (protozoa, fungi, algae), (4) nutrition, enrichment medium and growth, (5) control of microbial growth, (6) bioenergetics, (7) microbial genetics: genomics, gene expression and regulation, (8) genetic engineering, (9) interactions between microbes and human (human disease), microbes and plants, microbes and animal, (10) microbial ecology.

4.1. Knowledge:

- 4.1.1. Review of microbiology
- 4.1.2. Microbial cell structure and function.
- 4.1.3. Eukaryotic microorganisms: protozoa, fungi, algae.
- 4.1.4. Nutrition, enrichment medium and growth.
- 4.1.5. Microbial growth.
- 4.1.6. Microbial genetics.
- 4.1.7. Interactions between microbes and plants.

4.2. Skill:

- 4.2.1. Core skill: Students know well the microbial world in nature
- 4.2.2. Flexible skill: Recognition of prokaryotes and eukaryotes. The microbial growth and environmental factors affect on the growth of microorganisms. Application of microorganisms in production large scale for human consumption. Besides, students can control the harmful microorganisms and protect their health.

4.3. Attitude:

- 4.3.1. Students understand the microbial activity in nature and the relationship between microorganisms and human health. Then, they can exploit the good potential of microorganisms for the human being such as application of microorganisms in agriculture, environmental treating, and protect human health.
- 4.3.2. The provided knowledge is a good background for further subjects such as food biotechnology, environmental microbiology.

5. Brief description of subject content:

Students are provided knowledge of structure and function of prokaryotes and eukaryotes. Microbial growth and the effects of environmental factors on the growth of microorganisms. Microbial genetics and genetic engineering. Microbial metabolism . The relationship between microorganisms and their hosts.

6. Subject content structure:

6.1. Theory

Content	Hours	Objectives
Chapter 1. Introduction of microbiology	3	4.1.1; 4.2.1; 4.2.2; 4.3.1; 4.3.2
1.1. Definition		
1.2. History of microbiology		
Chapter 2. Microscopy and morphology of microorganisms	3	4.1.1; 4.1.2; 4.2.1; 4.2.2; 4.3.1; 4.3.2
2.1. Microscopy		
2.2. Staining methods		
2.3. Methods of sterilization		
Chapter 3. Bacterial cell structure	6	4.1.2; 4.2.1; 4.2.2; 4.3.1; 4.3.2
3.1. Chemical structure		
3.2. Microbial structure and function		
Chapter 4. Microbial growth	8	4.1.5; 4.2.1; 4.2.2; 4.3.1; 4.3.2
4.1. Definition		
4.2. Microbial growth		
4.3. Measurement of bacterial growth		
4.4. Environmental factors affect the growth of microorganisms		
Chapter 5. Eukaryotes	5	4.1.3 4.2.1; 4.2.2; 4.3.1; 4.3.2
5.1. Chemical structure		
5.2. Cell structure and function		
Chapter 6. Microbial genetics	5	4.1.6; 4.2.1; 4.2.2; 4.3.1; 4.3.2
6.2. Genetic materials (DNA, RNA)		
6.3. Bacterial genetics		
6.4. Eukaryotic genetics		
6.5. Mutation		
Chapter 7. Microbial symbiosis	9	4.1.7; 4.2.1; 4.2.2; 4.3.1; 4.3.2

- 7.1. The legume - root nodule symbiosis
- 7.2. Agrobacterium and crown gall disease
- 7.3. Mycorrhizae

Chapter 8. Commercial products and biotechnology

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4.1.4;
4.2.1; 4.2.2;
4.3.1; 4.3.2

- 8.1. Antibiotics, vitamins and enzymes
- 8.2. Alcoholic beverages
- 8.3. Biofuels

6. Teaching method:

Teachers give lectures in class using powerpoint, video, handouts

7. Duties of student:

- Students have to do the following duties:
- Students present seminars related to the subjects.
 - Self study at home and in the library

8. Assessment of student learning outcomes:

8.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Presence in class	Follow all lectures	10	4.3.1; 4.3.2
2	Seminars	Good presentation in front of class	10	4.3.1; 4.3.2
3	Mid-term exam	30 minutes exam	30	4.2.1; 4.2.2
4.	Final exam	60 minutes exam	50	4.2.1; 4.2.2

8.2. 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.

9. Materials:

Materials information	Code number
[1] Madigan M T, J M Martinco, D Stahl and D Clark 2012 Brock Biology of microorganisms. Prentice Hall International, Inc. Tái bản lần thứ 11. USA.	BIRDI library
[2] Jeffrey C. Pommerville 2006 Alcamo's Fundamentals of Microbiology: Study Guide	BIRDI library
[3] Brenner D. J., N. R Krieg and J. T. Staley 2005 Bergey's Manual of Systemmatic Bacteriology. Vol 2. The Proteobacteria. Springer.	BIRDI library
[4] Cao Ngọc Diệp và Nguyễn Hữu Hiệp 2002 Giáo trình Thực tập Vi sinh vật đại cương	BIRDI library

10. Self-study Guide:

Week	Content	Theory (hours)	Students' duties
1	Chapter 1: Introduction of microbiology	10	-Reading: [1] -Understanding of microbial world in nature. Spontaneous generation.
2	Chapter 2: Microscopy and equipments used in microbiology laboratory 2.1. Microscopy 2.2. Other equipments	10	-Reading: [1] [4] -Know how to use microscopy and other equipments in microbiology laboratory
3	Chapter 3: Bacterial cell structure	16	-Reading: [1] [2] -Know the structure of bacteria
4	Chapter 4: Microbial growth	16	-Reading: [1] [4] -Know the microbial growth and the environmental factors affect microbial growth
5	Chapter 5: Eukaryotes	10	-Reading: [1] [2] -Know the structure of eukaryotes
6	Chapter 6: Microbial genetics	10	-Reading: [1] [2] [3] -Know the genetics of microorganisms
7	Chapter 7: Microbial symbiosis	10	-Reading: [1] -Know the mutual relationship between the host and its partner
8	Chapter 8: Commercial products and biotechnology	8	-Reading: [1] -Application of biotechnology in producing commercial products in large scale
15	Total	90	...

**ON BEHALF OF RECTOR
DEAN/ DIRECTOR**

Can Tho,/...../20...

HEAD OF DEPARTMENT