

RHQ01005: Biology

1. General information

- Term: 1
- Credits: **Total credits 2 (Lecture: 1.5 – Practice: 0.5)**
- Self-study: **4** credits
- Credit hours for teaching and learning activities: 22 hours
- Self-study: 60 hrs.
- Department conducting the course:
 - Department: Biology Department
 - Faculty: Faculty of Biotechnology

Kind of the course:

Foundation <input type="checkbox"/>		Fundamental <input type="checkbox"/>		Option 1 <input type="checkbox"/>		Option 2 <input type="checkbox"/>	
Compulsory	Elective	Compulsory	Elective	Compulsory	Elective	Compulsory	Elective
v	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Prerequisite course(s): none

2. Course objectives and expected learning outcomes

* *Course objectives:*

- Knowledge: The course provides for students with knowledge in general biology
 - Structure and the function of each organelle in a cell; compare the differences between plant cell and animal cell, prokaryotic cell and eukaryotic cell.
 - The specific biological processes of cells and the body such as metabolism, catabolism, regulation, and adaptation.
 - The relationship between importance processes and plant, animal breeding, agricultural product preserving and processing, animal food processing, the environment protection.
- Skills: Course provide students with skills in
 - Ability/ Proficiently using microscope and other equipment in practice basic biology;
 - Making proficient microscope slide and observation skills
 - Teamwork.
- Attitude: Course provide students with attitudes as
 - Active in the perceived knowledge in whole life.
 - Strictly implement the rules of the lecture and practice room.

* *Course expected learning outcomes*

Notation	Course expected learning outcomes After successfully completing this course, students are able to	PLO performance criteria
Knowledge		
CELO1	Analysis of the relationship among the structures, positions and functions of organelles in cells; Distinguish the characteristic of biological processes; stages in the biological evolution in the world.	1.1
CELO2	Apply biological knowledge in explanation of the scientific foundation/background of several topics related to biotechnology, cultivation, animal husbandry, veterinary medicine, food technology, environment.	2.1
Skills		
CELO3	Work in groups and organize working groups to discuss, analyze, write and present scientific reports	6.3
CELO4	Proficiently use of microscopes and fundamental equipment in biological practice, proficiently in prepare microscope specimens/slides	6.4
Attitude		
CELO5	Compliance with rules in practice and theory; Be honest in reporting, taking exams	ELO13

3. Course description

Brief description of the course: This course consists of 5 chapters and practice lesson

- Chapters

Chapter 1: An overview of the organism's organization.

Chapter 2: The metabolism and energy processes of cells

Chapter 3: The cell division and reproduction in organisms

Chapter 4: The regulation and adaptability of organisms

Chapter 5: The biological evolution.

- Practice lesson

Lesson 1: Microscope - how to use and observe cells.

Lesson 2: Observing the plasmolysis and the de- plasmolysis of the cell.

Lesson 3: Observing the phases of mitosis and meiosis of cells

4. Teaching and learning & assessment methods

CELOs	CELO1	CELO2	CELO3	CELO4	CELO5	...
Teaching and learning						
Lecturing	x	x			x	
Teaching through practical work			x	x	x	
Dissusion	x	x				
Group-based learning	x	x	x			
Assessment						
Rubric 1. Class attention (10%)					x	
Rubric 2. Practical (10%)			x	x	x	
Rubric 3. Midterm test (20%)	x	x				
Rubric... Final exam (50 %)	x	x		x		

5. Student tasks

- Attendance: All students must attend at least 2/3 of the total theoretical hours of the module and 100% of the practical hours.
- Preparation for the lecture: All students must prepare the lesson according to the study plan of the course which was agreed by the instructor.
- Assignment: All students must .do as requirement of the teacher in the lessons and experiments
- Mid-term exam: Students who do not take the midterm exam will be marked as 0.
- Final exam: All students must take the final exam.

6. Textbooks and references

* *Textbooks/Lecture Notes:*

- 1) Dang Thai Hai, Ngo Thi Thuy, Bui Huy Doanh (2017). Textbook of Animal Biochemistry. Agricultural University Publishing House
- 2) Nguyen Xuan Viet (2017). Evolutionary curriculum. Vietnam Education Publishing House
- 3) Dong Huy Gioi, Nguyen Thi Thuy Hanh, Bui Thi Thu Huong, Phi Thi Cam Mien (20202022). General Biology Lecture. Vietnam Academy of Agriculture.

* *Additional references:*

- 1) Philip Meneely and Rachel Dawes Hoang.Genetics: Genes, genomes, and evolution, 2017. Oxford University Press

- 2) Bui Thi Thu Huong, Duong Xuan Anh, Nguyen Huu Cuong, Ngo The An, Chu Duc Ha, Ho Manh Tuong, Chu Hoang Ha, Dong Huy Gioi, Tran Dang Khanh. (2021). Morphological characters and DNA barcode of *Lilium Poilainei* Gagnep in Vietnam. Australia Journal of Crop Science.
- 3) Dong Huy Gioi, Nguyen Thi Men, Ha Viet Cuong, Bui Thi Thu Huong, 2021. Application of nanoparticles for the control of *Colletotrichum gloeosporioides* causing anthracnose disease of chili (*Capsicum frutescens* L.). Journal of forestry science and technology, Vol 13.
- 4) Vietnam journal of Agriculture Science. online: <https://vjas.vnua.edu.vn>

7. Course outline

Week	Content	Course expected learning outcomes
	<i>Chapter 1: Overview of the organization of living organisms</i>	
1,2	<p>A/ Main contents: (10 periods)</p> <p>*Theoretical content: (5 hours)</p> <p>1.1 Characteristics of life.</p> <p>1.2. Cell structure of prokaryotes</p> <p>1.3 Cell structure of the eukaryotic organism</p> <p style="padding-left: 20px;"><i>1.3.1 Biofilm</i></p> <p style="padding-left: 20px;"><i>1.3.2 Membrane system inside the cell (endoplasmic reticulum, Golgy complex)</i></p> <p style="padding-left: 20px;"><i>1.3.3 Cell nucleus</i></p> <p style="padding-left: 20px;"><i>1.3.4 Mitochondria</i></p> <p style="padding-left: 20px;"><i>1.3.5 Chloroplasts, centrosomes</i></p> <p style="padding-left: 20px;"><i>1.3.6 Ribosomes, cilia and flagella</i></p> <p style="padding-left: 20px;"><i>1.3.7 Lysosomes, Glyoysomes, Peroxysomes</i></p> <p style="padding-left: 20px;"><i>1.3.8 Plant cell wall</i></p> <p>* Practice: (4 standard periods are equivalent to 8 practice periods)</p> <p>1. Microscope</p> <p><i>1.1. Microscope</i></p> <p style="padding-left: 20px;"><i>1.1.1 Structure</i></p> <p style="padding-left: 20px;"><i>1.1.2 Functions</i></p> <p style="padding-left: 20px;"><i>1.1.3 How to use the microscope</i></p>	CELO1, CELO 2, CELO 3, CELO 4, CELO 5

	<p>1.1.2. Method of making temporary specimen</p> <p>1.1.2.1 Method of making temporary specimen</p> <p>1.1.2.1 Observation of leaf hairy of pickled, squash, apple</p> <p>2. Observation of some prokaryotic and eukaryotic cell types</p> <p>2.1. Observing prokaryotic cells</p> <p>Observation of cyanobacteria (<i>Anabaena azollae</i>) living symbiotically with <i>Azolla anabaena</i></p> <p>2.2. Observe eukaryotic cells</p> <ul style="list-style-type: none"> - Making samples to observe protozoa - Making a specimen to observe onion squamous epidermal cells - Making specimens to observe red blood cells of fish and chickens. <p>*. Discussion content: (1 hour)</p> <p>1.4. Tissue structure of multicellular organisms</p> <p>1.4.1 Types of tissues in plants</p> <p>1.4.2 Types of animal tissues.</p>	
	<p>B/ Self-study contents: (30 hours)...</p> <p>Prepare in advance section 1.3 and practice contents</p>	<p>CELO1, CELO 2, CELO 5</p>
	<p>Chapter 2. The energy processes and metabolism of cells</p>	
3,4	<p>A/ Main contents: (7.5 hours)</p> <p>*Theoretical content: (5 hours)</p> <p>2.1 Metabolism and information across the cell membrane.</p> <p>2.1.1. Transport of substances across membranes by diffusion.</p> <p>2.1.2. Active (active) transport of substances across membranes</p> <p>2.1.3. Transmission of information across cell membranes</p> <p>2.2 Concepts of cellular energy.</p> <p>2.2.1. Free energy, activation energy</p> <p>2.2.2. Enzymes</p> <p>2.2.3. ATP</p> <p>2.2.4. Redox and redox reaction</p> <p>2.3 Cellular Respiration</p> <p>2.3.1. Glycolysis</p> <p>2.3.2. Fermentation processes</p>	<p>CELO1, CELO 2, CELO 3, CELO 4, CELO 5</p>

	<p>2.3.4. <i>Aerobic respiration - Krebs cycle</i></p> <p>2.4 Photosynthesis</p> <p>2.4.1. <i>Introduction to Photosynthesis</i></p> <p>2.4.2. <i>Light Phase Photosynthesis</i></p> <p>2.4.3. <i>Dark Phase Photosynthesis (C3 and C4 Cycles)</i></p> <p>* Practical: (1.5 hours are equivalent to 3 practice hours)</p> <p>Make a specimen to observe plasmolysis and deplasmolysis of onion squamous epidermal cells.</p> <p>Discussion content: (1 hour)</p> <p>Discuss the content of the chapter at the request of the teacher</p>	
	<p>B/ Self-study contents: (22.5 hours)</p> <p>Learn at home all the main content of the lesson in advance</p>	<p>CELO1, CELO 2, CELO 5</p>
	<p>Chapter 3. The cell division and reproduction in organisms</p>	
5	<p>A/ Main contents: (5.5 hours)</p> <p>* Theories: ... (2.5 hours)</p> <p>3.1. Cell division</p> <p>3.1.1 <i>Cell cycle and mitosis</i></p> <p>3.1.2 <i>Meiosis.</i></p> <p>3.2 Methods of reproduction of organisms.</p> <p>3.2.1 <i>Asexual reproduction.</i></p> <p>(Features, illustrative examples, meaning)</p> <p>3.2.2 <i>Sexual reproduction.</i></p> <p>(Features, illustrative examples, meaning)</p> <p>*Practical content: (2.5 hours is equivalent to 5 practical hours)</p> <p>Practice making specimens to observe the process of cell division</p> <ul style="list-style-type: none"> - Observe the process of mitosis in onion root cells - Observing the meiotic process of spermatogenic cells in male grasshoppers. <p>* Discussion content: (0.5 hours)</p> <p>3.3. Gametogenesis and double fertilization in angiosperms</p> <p>3.4. Gametogenesis and fertilization in animals</p>	<p>CELO1, CELO 2, CELO 5</p>
	<p>B/ Self-study contents</p>	<p>CELO1, CELO 2,</p>

		CELO 5
	: (16.5 hours) <i>The main content of the chapter</i>	
	Chapter 4. The regulation and adaptation to environment of organism	
6,7	<p>A/ Main contents: (4 hours)</p> <p>* Theories: (3 hours)</p> <p>4.1 Inducibility of plants</p> <p style="padding-left: 40px;">4.1.1. <i>Plant responses to environmental stimuli</i></p> <p style="padding-left: 40px;">4.1.2. <i>Phytohormones</i></p> <p style="padding-left: 40px;">4.1.2. <i>Phytochrome and photoperiodism</i></p> <p>4.2 Animal sensitization</p> <p style="padding-left: 40px;">4.2.1. <i>Endocrine system in animals</i></p> <p style="padding-left: 40px;">4.2.2. <i>Nervous activity</i></p> <p style="padding-left: 80px;">4.2.2.1. <i>Nerve impulse</i></p> <p style="padding-left: 80px;">4.2.2.2 <i>Animal behavior</i></p> <p>* Discussion content: (1 hour)</p> <p><i>Teacher asks questions according to the content of the lesson</i></p>	CELO1, CELO 2, CELO 5
	<p>B/ Self-study contents: (12 hours)</p> <p><i>The main content of the chapter</i></p>	
	Chapter 5: The biological evolution.	
7,8	<p>A/ Main contents: (3 hours)</p> <p>* Theories: (2.5 hours)</p> <p>5.1 Origin of life</p> <p>5.2 Biological kingdoms,</p> <p>5.3 Evolutionary Theories</p> <p style="padding-left: 40px;">5.3.1 <i>Lamac's Theory of Evolution: Materials, Dynamics, Evolutionary Context</i></p> <p style="padding-left: 40px;">5.3.2 <i>Dacuyn-Walax Theory: materials, dynamics, evolutionary Contexts.</i></p> <p style="padding-left: 40px;">5.3.3. <i>Modern evolutionary perspective</i></p> <p style="padding-left: 80px;">5.3.3.1. <i>Materials of evolution</i></p> <p style="padding-left: 120px;">+ <i>Types of Mutants</i></p> <p style="padding-left: 120px;">+ <i>Mutation with the formation of adaptive traits</i></p> <p style="padding-left: 80px;">5.3.3.2. <i>Populations and the laws of population evolution.</i></p>	CELO1, CELO 2, CELO 5

	<p>* Discussion content: (0.5 hours) <i>Teacher asks questions according to the content of the lesson</i></p>	
	<p>B/ Self-study contents: (12 hours) <i>The main content of the chapter</i></p>	<p>CELO1, CELO 2, CELO 5</p>