

**BACHELOR OF SCIENCE IN BIOTECHNOLOGY**

**COURSE SPECIFICATION**

**SH02002: BIOLOGY OF HUMAN AND ANIMAL**

**I. Information about the course**

- Semester: 3
- Number of credits: 03 (Theoretical: 3 – Practice: 0 – Self-studying: 9)
- Credit hours for learning activities
  - + Theoretical lessons in the class: 40 periods
  - + Presentation and class discussion: 05 periods
- Self-studying: 135 periods (according to individual plans, and based on the lecturer's instructions)
- Department conducting the course:
  - Department: Animal Biotechnology
  - Faculty: Biotechnology
- The course belongs to the following knowledge group:

General knowledge <input type="checkbox"/>		Foundation knowledge <input checked="" type="checkbox"/>		Specialized knowledge <input type="checkbox"/>	
Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>

- Parallel course: none
- Prerequisite course: none.
- Language used for teaching: English  Vietnamese

**II. Course objectives and course expected learning outcome**

**\* The objectives of the course:**

The course aims to provide students with the following knowledge:

- + Structure and function of organelles in cells
- + Physiological processes of the human and animal body (circulation, respiration, excretion, digestion, hormones, reproductive physiology, nervous system activity)
- + Scientific basis of fertilization, zygote formation
- + The relationship between physiological processes in the body and health protection, human nutrition, and nutritional composition for livestock.

The course aims to provide students with the following skills:

- + Apply physiological knowledge to explain biological and medical phenomena on humans and animals, specialized articles on animal biotechnology.

+ Group work and group organization;

The course helps students develop the following qualities:

- + Proactiveness in learning activities
- + Contributing to the lesson

**\* The Expected Learning Outcomes for the *Bachelor of Biotechnology* program**

<b>Expected learning outcomes (ELOs) of the Bachelor of Science in Biotechnology program</b>		<b>Cognitive level</b>
Upon graduation, graduates would be able to:		
General Knowledge	ELO1: <b>Apply</b> knowledge of mathematics, social sciences, natural sciences, laws, and contemporary issues into the field of biotechnology.	<b>Apply</b>
	ELO 2: <b>Analyze</b> the needs and requirements of stakeholders for the purposes of management, production, and sales of biotechnology products.	<b>Analyze</b>
Professional Knowledge	ELO3: <b>Evaluate</b> the quality of biotechnology products with regard to biosafety standards, environmental protection, legal, and ethical standards.	<b>Evaluate</b>
	ELO4: <b>Develop</b> ideas for biotechnology products based on personal knowledge of natural sciences, life sciences, and analysis of social needs.	<b>Create</b>
	ELO5: <b>Design</b> production models for biotechnology products	<b>Create</b>
General Skills	ELO6: <b>Apply</b> critical and creative thinking skills to effectively solve issues related to research, technology transfer, and production in the field of biotechnology.	<b>Adaptation</b>
	ELO7: <b>Coordinate</b> with team members to achieve set goals, either as a team member or team leader.	<b>Origination</b>
	ELO8: <b>Communicate</b> effectively through various channels in the diverse contexts of the workplace; satisfy English proficiency levels as required by the Ministry of Education and Training.	<b>Origination</b>
Professional Skills	ELO9: <b>Utilize</b> information technology and equipment effectively for management, production, and sales in the field of biotechnology.	<b>Adaptation</b>
	ELO10: <b>Use</b> appropriate methods and skills to collect, analyze, interpret data in scientific research, and examine practical issues at the workplace.	<b>Adaptation</b>
	ELO11: <b>Perform</b> basic and intensive technical procedures fluently in the field of biotechnology	<b>Adaptation</b>
	ELO12: <b>Advise</b> customers and partners on biotechnology	<b>Adaptation</b>

Expected learning outcomes (ELOs) of the Bachelor of Science in Biotechnology program		Cognitive level
Upon graduation, graduates would be able to:		
	products with a positive business perspective.	
Attitude	ELO13: <b>Comply</b> with the laws of the biotechnology industry, and conform to occupational safety principles at the workplace.	<b>Valuing</b>
	ELO14: <b>Maintain</b> professional ethics, fulfill one's duty to improve the well-being of the society, and protect the environment.	<b>Valuing</b>
	ELO15: <b>Perform the habits</b> of updating knowledge and experiences to improve one's professional qualifications	<b>Characterizing</b>

**\* Course expected learning outcomes (CELOs):**

The course contributes to the expected learning outcomes of the program at the following levels: *I - Introduction*); *P -Practice*; *R - Reinforce*; *M –Master*

Course code	Course name	Contribution level towards the expected learning outcomes of the program							
		ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7	ELO8
SH02003	Cell Technology				P			P	
		ELO9	ELO10	ELO11	ELO12	ELO13	ELO14	ELO15	
								P	

Code	Course expected learning outcomes Upon completion of this course, students are able to:	ELOs of the program
Knowledge		
K1	Analyze the relationship between the structure, position and functions of the organs and system of organs in the body	ELO4
K2	Applying knowledge of human and animal physiology to explain the scientific basis of a number of related issues in the fields of biotechnology, biomedical, animal husbandry and veterinary medicine	ELO4
Skills		
K3	Work in groups and organize working groups to discuss, analyze, write and present scientific reports	ELO7
K4	Using document synthesis skills, information technology in document analysis, presentations	ELO7
Attitude		

Attitude	Proactively propose and implement scientific research issues, apply advances in biotechnology into practice	ELO15
	Implement the habit of updating knowledge, learning and raising awareness of self-study, humility, serious working style, high sense of responsibility	ELO15

### III. Course description

#### SH02003. Cell Biology (3 credits: 3 – 0 - 9).

The course consists of the following chapters:

- Chapter 1: Cell
- Chapter 2: Blood
- Chapter 3: Circulatory
- Chapter 4 Respiratory
- Chapter 5: Physiology of digestion
- Chapter 6: Metabolism of matter and energy
- Chapter 7: Physiological of excretion
- Chapter 8: Endocrine
- Chapter 9: Genital physiology and reproduction
- Chapter 10: Physiology of muscles and nerves
- Chapter 11: Neurophysiology
- Chapter 12: High-level neural activity

### IV. Teaching and learning methods

#### 1. Teaching methods

- Lecturers will teach theoretical lessons using presentations, oral communication and illustration methods; guide students to discuss in groups; guide students to make essays in groups and make a report.
- Blended learning: Teaching through the E-learning system

#### 2. Learning methods

- Students read class materials by themselves, prepare for the lessons based on the learning plan given by the lecturers before going to class, listen to lectures and make contributions, learn through the E-learning system.
- Students participate in learning activities in class: presenting, answering questions, doing exercises, discussing in groups.

### V. Requirements for students

- Attendance: Students are required to attend at least 2/3 of the total theory lectures of the course.
- Preparation for the lecture: Students are required to read lecture notes, text books and references before attending the class.
- Group discussion and presentation: Students are required to engage in group discussion.
- Mid-term exam: Students miss a mid-term will be given a mark of zero.
- Final exam: Students must take the final exam and meet requirements.

- For online learning: Students need to install online learning software and fulfill the requirements for online learning.

## VI. Scoring and assessment

### 1. Scale: 10

2. The average score of the course is score of each rubric multiplying with the corresponding weight of each rubric

- Attendance: 10 %
- Formative assessment: 40%
- Final exam: 50%

### 3. Assessment methods

Rubrics and assessment method	CELOs to be assessed	Weight (%)	Time / Studying week
<i>Progress assessment</i>		<b>40</b>	
Class participation (Rubric 1)	K5, K6	10	Week 1-15
Discussion (Rubric 2)	K3, K4	20	Week 1-15
Mid-term exams (Table 1)	K1, K2	20	Week 8
<i>End-of-course assessment</i>		<b>50</b>	
Final exam (Table 2)	K1, K2	50	At least 2 weeks after the end of the course

#### Rubric 1: Class participation

Criteria	Weight (%)	Excellent 8.5 – 10 (A)	Good 6.5 – 8.4 (C+, B, B+)	Average 4.0 – 6.4 (D, D+, C)	Poor 0 – 3.9 (F)
Attendance time	50%	Attends more than 19 sessions <b>(4.5 - 5.0d)</b>	Attends from 14-18 sessions <b>(3.5 - 4.0d)</b>	Attends from 9 to 13 sessions <b>(2.0 - 3.0d)</b>	Attends less than 09 sessions <b>(0 - 1.5d)</b>
Attitude	50%	Contributes to the lessons enthusiastically <b>(4.5 - 5.0d)</b>	Contributes to the lessons, but not enthusiastically <b>(3.5 - 4.0d)</b>	Contributes to the lessons sometimes <b>(2.0 - 3.0d)</b>	Contributes very little to the lessons <b>(0- 1.5d)</b>

#### Rubric 2: Discussion

Criteria	Weight (%)	Excellent 8.5 – 10 (A)	Good 6.5 – 8.4 (C+, B, B+)	Average 4.0 – 6.4 (D, D+, C)	Poor 0 – 3.9 (F)
Content	40%	Accurate, complete, scientific, update	On-topic, complete, not updated.	On-topic, not complete, not updated	Off-topic
Structure, design	20%	Logical, balanced, creative, aesthetic	Logical, balanced, not creative, not aesthetic	Logical, not balanced, not creative, not aesthetic)	No logic, no balance, many errors
Quality of contributions	40%	Clear presentation, appropriate language and	Clear presentation, appropriate language and	Clear presentation, appropriate language and	Speak softly, do not know how to lead the problem.

		intonation, lead the issue of scientific interest. Cover the audience, appropriate body language, within the time allowed to present	intonation, lead the issue of scientific interest. Cover the audience, use less body language, overtime (1-2 minutes)	intonation, lead the issue of scientific interest. Sometimes cover the audience, use less body language, overtime (3-5 minutes)	Not paying attention to the listener, inappropriate body language. Exceeding the time allowed by 5 minutes or more
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**Table 1: Criteria and contents for assessment of mid-term exams (Maximum score of 10/10)**

<b>CELOs that are assessed through the exam</b>	<b>Exam content</b>	<b>Performance indicator</b> (Students are required to perform and be evaluated based on these indicators)
<b>CELO1:</b> Analyze the relationship between the structure, position and function of organs and organ systems in the body.	Describe the structure and position of organs in the body.	Organs, organ systems: Circulatory, respiratory, excretory, digestive, hormones
	Present the composition, structure and function of organs and organ systems in the body	Organs, organ systems: Blood, circulation, respiration, excretion, digestion, metabolism of matter and energy, hormones.
	Presenting factors affecting the function of organs and organ systems in the body.	Factors affecting the secretion of saliva, digestive juices, hormones, cardiovascular system activity
<b>CELO2:</b> Apply knowledge of human and animal physiology to explain the scientific basis of a number of related issues in the fields of biotechnology, biomedicine, animal husbandry, and veterinary medicine.	Apply knowledge of circulation and respiration to explain relevant situations in first aid for drowning and cardiopulmonary arrest.	Select appropriate methods of artificial respiration in first aid cases.
	Applying knowledge about metabolism of matter and energy, hormones, circulation to make nutritional menus suitable for animals and patients (people with cardiovascular diabetes).	Choose suitable foods and mushrooms in nutritional menus for people and pets

**Table 2: Criteria and contents for assessment of final exams (Maximum score of 10/10)**

<b>CELOs that are assessed through the exam</b>	<b>Exam content</b>	<b>Performance indicator</b> (Students are required to perform and be evaluated based on these indicators)
<b>CELO1:</b> Analyze the relationship between the structure, position	Describe the structure and position of organs in the body.	Organs, organ systems: Circulatory, respiratory, excretory, digestive, hormones, reproductive physiology,

and function of organs and organ systems in the body.		neurology.
	Present the composition, structure and function of organs and organ systems in the body	Organs, organ systems: Blood, circulation, respiration, excretion, digestion, metabolism of matter and energy, hormones, reproductive physiology, neurology.
	Presenting factors affecting the function of organs and organ systems in the body.	Factors affecting the secretion of saliva, digestive juices, hormones, cardiovascular system, reproductive and reproductive system, nervous system.
<b>CELO2:</b> Apply knowledge of human and animal physiology to explain the scientific basis of a number of related issues in the fields of biotechnology, biomedicine, animal husbandry, and veterinary medicine.	Apply knowledge of circulation and respiration to explain relevant situations in first aid for drowning and cardiopulmonary arrest.	Select appropriate methods of artificial respiration in first aid cases.
	Applying knowledge about metabolism of matter and energy, hormones, circulation to make nutritional menus suitable for animals and patients (people with cardiovascular diabetes).	Choose suitable foods and mushrooms in nutritional menus for people and pets
	Factors affecting the secretion of saliva, digestive juices, hormones, cardiovascular system, reproductive and reproductive system, nervous system.	Choosing appropriate measures to reduce stress and depression in humans

#### **4. Requirements of the course**

- Regulations for exclusion from the final exam: students who are absent in more than 9 theoretical lessons will not be allowed to take the final exam.

- Students who do not prepare for the lesson at the request of lecturers will not be allowed to participate in classroom lessons and seminars.

#### **VII. Textbook and reference materials**

##### **\* Textbook /Lectures:**

1. Lecture: Biology of Human and Animal, 2020
2. Physiology, Pham Thi Minh Duc, Medicine Publishing House, 2020
3. Textbook of anatomy and physiology of humans and animals, Vo Van Toan and Le Thi Phuong, Vietnam Education Publishing House, 2014.
4. Some research results on Vietnamese genes and genome. Nong Van Hai, Natural Science and Technology Publishing House, 2019.

##### **\* Reference materials:**

1. Kleinberg, Jon, et al. "Human decisions and machine predictions." *The quarterly journal of economics* 133.1 (2018): 237-293.

<https://academic.oup.com/qje/article-abstract/133/1/237/4095198?redirectedFrom=PDF>

2. Graff Zivin, Joshua, Solomon M. Hsiang, and Matthew Neidell. "Temperature and human capital in the short and long run." *Journal of the Association of Environmental and Resource Economists* 5.1 (2018): 77-105.

<https://www.journals.uchicago.edu/doi/abs/10.1086/694177>

(Fourth Edition), Oxford University Press

### VIII. Course outline

Week	Contents	Course expected learning outcome
	<b>Chapter 1. Cell Biology</b>	
	<p><b>A/ Main contents: (03 hrs)</b></p> <p><b>Theory:</b></p> <p>2.1. Cell membrane</p> <p style="padding-left: 20px;">2.1.1. Chemical composition of cell membrane</p> <p style="padding-left: 20px;">2.1.2. Model of membrane structure</p> <p style="padding-left: 20px;">2.1.3. Function of cell membrane</p> <p>2.2. Nucleus</p> <p style="padding-left: 20px;">2.2.1. Nuclear membrane</p> <p style="padding-left: 20px;">2.2.2. Nucleolus</p> <p style="padding-left: 20px;">2.2.3. Chromosome</p> <p>2.3. The superstructure of the cytoplasm</p> <p style="padding-left: 20px;">2.3.1. Endoplasmic Reticulum</p> <p style="padding-left: 20px;">2.3.2. Ribosome</p> <p style="padding-left: 20px;">2.3.3. Golgi vesicles</p> <p style="padding-left: 20px;">2.3.4. Mitochondrion</p> <p style="padding-left: 20px;">2.3.5. Lysosome</p> <p style="padding-left: 20px;">2.3.6. Mitochondria</p>	K1-K6
	<p><b>B/ Self-study contents: (09 hrs)</b></p> <p>Reading text book and information concerning chapter.</p>	K1, K2, K6
	<b>Chapter 2. Blood physiology</b>	
	<p><b>A/ Main contents: (03 hrs)</b></p> <p><b>Theory:</b></p> <p>3.1. Biological importance and function of blood</p> <p style="padding-left: 20px;">3.1.1. Transport function</p> <p style="padding-left: 20px;">3.1.2. Water and mineral balance function</p> <p style="padding-left: 20px;">3.1.3. Regulation of body temperature</p> <p style="padding-left: 20px;">3.1.4. Protection function</p> <p style="padding-left: 20px;">3.1.5. Unified body functions</p> <p>3.2. Volume, composition and physical and chemical characteristics</p>	K1-K6

	<p>of blood</p> <ul style="list-style-type: none"> <li>3.2.1. Blood volume</li> <li>3.2.2. Composition of blood</li> <li>3.2.3. Physical and chemical characteristics of blood</li> </ul> <p>3.3. Blood Plasma</p> <ul style="list-style-type: none"> <li>3.3.1. Protein</li> <li>3.3.2. Other organic compounds</li> <li>3.3.3. The inorganic components</li> </ul> <p>3.4. Erythrocytes (Red blood cells)</p> <ul style="list-style-type: none"> <li>3.4.1. Structure and compositions</li> <li>3.4.2. Volume of red blood cells</li> <li>3.4.3. Hemoglobin (Hb)</li> <li>3.4.4. The life cycle of red blood cells</li> </ul> <p>3.5. Leucocytes (White blood cells) and Trombocytes (platelets)</p> <ul style="list-style-type: none"> <li>3.5.1. Leucocytes (White blood cells)</li> <li>3.5.2. Trombocytes (Platelets)</li> </ul> <p>3.6. Coagulation</p> <ul style="list-style-type: none"> <li>3.6.1. General concept</li> <li>3.6.2. Factors involving in the blood coagulation process</li> <li>3.6.3. The stages of the coagulation process</li> <li>3.6.4. Natural anticoagulant in the body</li> <li>3.6.5. The hemophilia</li> </ul> <p>3.7. Blood groups</p> <ul style="list-style-type: none"> <li>3.7.1. The ABO blood group system</li> <li>3.7.2. Rh blood group system</li> <li>3.7.3. Other blood group systems</li> </ul>	
	<p><b>B/ Self-study contents:</b> (09 hrs) Reading text book and information concerning chapter.</p>	K1, K2, K6
	<p><b>Chapter 3. Circulatory Physiology</b></p> <p><b>A/ Main contents:</b> (03 hrs)</p> <p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>4.1. The evolution of the circulatory system</li> <li>4.2. Heart Structure and Function <ul style="list-style-type: none"> <li>4.2.1. Heart structure</li> <li>4.2.2. Heart function</li> </ul> </li> <li>4.3. Structure and function of the vascular system <ul style="list-style-type: none"> <li>4.3.1. Structure</li> <li>4.3.2. The rule of blood transport in the circuit</li> </ul> </li> <li>4.4. Cardiovascular Regulation <ul style="list-style-type: none"> <li>4.4.1. Regulation of the heart</li> <li>4.4.2. Regulation of arterial circulation</li> <li>4.4.3. Regulation of venous and capillaries circulation</li> </ul> </li> </ul>	K1-K6

	4.5. Lymphatic circulation	
	<b>B/ Self-study contents: (09 hrs)</b> Reading text book and information concerning chapter.	K1, K2, K6
	<b>Chapter 4. Respiratory Physiology</b>	
	<b>A/ Main contents: (03 hrs)</b> <b>Theory:</b> 5.1. Importance and development process 5.1.1. General importance 5.1.2. For aquatic animals 5.1.3. For terrestrial animals and human 5.2. Respiratory function of the lung 5.2.1. Thoracic volume change in respiratory movements 5.2.2. The association between lung and chest - negative pressure 5.2.3. The ventilation of the lungs 5.3. Gas Exchange in the Lung and Tissues 5.3.1. Gas exchange in the lung 5.3.2. Gas exchange in tissues 5.3.3. The transport of O <sub>2</sub> and CO <sub>2</sub> in the blood 5.4. Regulation of respiratory 5.4.1. The neural regulation 5.4.2. The humoral regulation	K1-K6
	<b>B/ Self-study contents: (09 hrs)</b> Reading text book and information concerning chapter.	K1, K2, K6
	<b>Chapter 5. Digestive physiology</b>	
6	<b>A/ Main contents: (06 hrs)</b> <b>Theory:</b> 6.1. Importance and development process 6.1.1. Importance 6.1.2. Development process 6.2. Digestion in the mouth cavity and esophagus 6.2.1. Structure 6.2.2. Digestion in the mouth cavity 6.3. Digestion in the stomach 6.3.1. Structure 6.3.2. Digestive function of stomach 6.4. Digestion in the small intestine 6.4.1. Structure 6.4.2. Mechanical movements of the small intestine 6.4.3. Pancreatic 6.4.4. Bile	K1-K6

	<p>6.4.5. Intestine</p> <p>6.5. Absorption in the small intestine</p> <p>6.5.1. Composition of intestinal</p> <p>6.5.2. Protein absorption</p> <p>6.5.3. Glucid Absorption</p> <p>6.5.4. Lipid uptake</p> <p>6.5.5. Vitamin absorption</p> <p>6.5.6. Minerals absorption</p> <p>6.5.7. Water absorption</p> <p>6.5.8. The regulation of absorption</p> <p>6.6. Digested in the large intestine</p> <p>6.6.1. Structure</p> <p>6.6.2. The contractions of the large intestine</p> <p>6.6.3. Microorganisms of the large intestine</p> <p>6.6.4. Colon</p> <p>6.6.5. The absorption of large intestine</p> <p>6.7. Excrement and emission</p>	
	<p><b>B/ Self-study contents: (18 hrs)</b></p> <p>Reading text book and information concerning chapter.</p>	
	<p><b>Chapter 6. Matter and energy metabolism regulate body temperature</b></p>	
	<p><b>A/ Main contents: (03 hrs)</b></p> <p><b>Theory:</b></p> <p>7.1. The importance of metabolic</p> <p>7.2. Transformation of matter</p> <p>7.2.1. Glucide metabolism</p> <p>7.2.2. Lipid metabolism</p> <p>7.2.3. Protein metabolism</p> <p>7.2.4. Vitamins and their role in the metabolism of matter</p> <p>7.2.5. Mineral and water metabolism</p> <p>7.2.6. Water metabolism</p> <p>7.2.7. Regulation of water-salt metabolism</p> <p>7.3. Energy metabolism</p> <p>7.3.1. The methods studied in the energy metabolism</p> <p>7.4. Regulation of body temperature</p> <p>7.4.1. Body temperature and the normal range of body temperature</p> <p>7.4.2. Regulation of body temperature</p> <p>7.4.3. The role of the nervous system and the endocrine system in the regulation of body temperature</p>	<p>K1-K6</p>
	<p><b>B/ Self-study contents: (09 hrs)</b></p> <p>Reading text book and information concerning chapter.</p>	<p>K1, K2, K6</p>

<b>Chapter 7. Endocrine Physiology</b>	
<p><b>A/ Main contents: (09 hrs)</b></p> <p><b>Theory:</b></p> <p>9.1. Importance and development process</p> <p>    9.1.1. Importance</p> <p>    9.1.2. Development process</p> <p>9.2. Hormones and their effects</p> <p>    9.2.1. The hormones</p> <p>    9.2.2. The effects of hormone</p> <p>    9.2.3. Mechanism action of the hormone</p> <p>    9.2.4. Regulation of the secretion of hormones and the endocrine glands</p> <p>    9.2.5. The main endocrine glands and their hormones in the body</p> <p>    9.2.6. Research Methodology</p> <p>9.3. Pituitary gland</p> <p>    9.3.1. Anterior pituitary gland</p> <p>    9.3.2. Intermediate lobe</p> <p>    9.3.3. Posterior pituitary</p> <p>9.4. Thyroid gland</p> <p>    9.4.1. Structure</p> <p>    9.4.2. Advantages</p> <p>    9.4.3. Disadvantages</p> <p>    9.4.4. Thyroid hormones</p> <p>9.5. Parathyroid</p> <p>    9.5.1. Parathyroid hormone</p> <p>    9.5.2. Advantages</p> <p>    9.5.3. Disadvantages</p> <p>    9.5.4. Mechanism of action of parathormon</p> <p>9.6. Endocrine pancreas</p> <p>    9.6.1. Pancreatic hormones</p> <p>    9.6.2. The effect of insulin</p> <p>    9.6.3. Effects of glucagons</p> <p>    9.6.4. The other hormones</p> <p>    9.6.5. Regulation of hormone</p> <p>9.7. Adrenal gland</p> <p>    9.7.1. The outer adrenal cortex</p> <p>    9.7.2. The inner medulla</p> <p>9.8. Gonad</p> <p>    9.8.1. Testes</p> <p>    9.8.2. Ovarie</p>	K1-K6

<p><b>B/ Self-study contents: (27 hrs)</b> Reading text book and information concerning chapter.</p>	K1, K2, K6
<p><b>Chapter 8. Sexual and reproductive physiology</b></p>	
<p><b>A/ Main contents: (03 hrs)</b> <b>Theory:</b> 10.1. Importance and development process     10.1.1. The importance of the reproduction     10.1.2. Development process 10.2. Male reproductive physiology     10.2.1. Structure of the male reproductive system     10.2.2. Reproductive physiology 10.3. Structure of the female reproductive system     10.3.1. Structure of the female reproductive system     10.3.2. Reproductive physiology 10.4. Contraception and birth control method     10.4.1. The population development of human society     10.4.2. The specific methods</p>	K1-K6
<p><b>B/ Self-study contents: (09 hrs)</b> Reading text book and information concerning chapter.</p>	K1, K2, K6
<p><b>Chapter 9. Physiology of sensory organs</b></p>	
<p><b>A/ Main contents: (03 hrs)</b> <b>Theory:</b> 11.1. Importance and development process     11.1.1. Importance     11.1.2. The evolution     11.1.3. Classification of sensory organs     11.1.4. The nature of the receptor 11.2. Skin sensory and viscera     11.2.1. The general structure and function of the skin     11.2.2. Sense of touch     11.2.3. Temperature sensation     11.2.4. Pain     11.2.5. Visceral sensation     11.2.6. Sense of nature 11.3. Structure of the sense of smell     11.3.1. Structure     11.3.2. The development process     11.3.3. Sense of smell     11.3.4. Sensitivity 11.4. The sensory taste     11.4.1. Structure and development of taste buds</p>	K1-K6

	<p>11.4.2. Sense of taste</p> <p>11.5. Sensory organs of hearing and balance</p> <p>11.5.1. The development of the sensory organs of hearing-balance</p> <p>11.5.2. Structure and function of the ear</p> <p>11.5.3. Sense of hearing</p> <p>11.5.4. Sense of balance (vestibular sense)</p> <p>11.6. Visual sensory organs</p> <p>11.6.1. Development process</p> <p>11.6.2. Eye Anatomy</p> <p>11.6.3. Optical system of the eye</p> <p>11.6.4. Visual sensation</p>	
	<p><b>B/ Self-study contents: (09 hrs)</b></p> <p>Reading text book and information concerning chapter.</p>	K1, K2, K6
	<p><b>Chapter 10. Nerve physiology</b></p>	
	<p><b>A/ Main contents: (03 hrs)</b></p> <p><b>Theory:</b></p> <p>12.1. Muscle Physiology</p> <p>12.1.1. Evolution of muscle function</p> <p>12.1.2. Different forms of movement of animals</p> <p>12.1.3. Structure and function of Skeletal muscle</p> <p>12.1.4. Structure and function of smooth muscle</p> <p>12.2. Nerve physiology</p> <p>12.2.1. The structure and characteristics of nerve fibers</p> <p>12.2.2. Excited conduction in nerve fibers</p> <p>12.2.3. Excited conduction of nerve fibers to muscle fibers</p> <p>12.2.4. Pain</p>	K1-K6
	<p><b>B/ Self-study contents: (09 hrs)</b></p> <p>Reading text book and information concerning chapter.</p>	K1, K2, K6
	<p><b>Chapter 11. Neurophysiology</b></p>	
	<p><b>A/ Main contents: (05 hrs)</b></p> <p><b>Theory:</b></p> <p>13.1. The evolution of the central nervous system</p> <p>13.2. Neurons and synapse</p> <p>13.2.1. Neurons</p> <p>13.2.2. The synapses in the central nervous system</p> <p>13.3. The nerve-centre and their properties</p> <p>13.3.1. The nerve-centre</p> <p>13.3.2. The nature of the nerve-centre</p> <p>13.4. The principle activity of the central nervous system</p> <p>13.4.1. The concept of reflection</p> <p>13.4.2. Regulation of reflection</p>	K1-K6

	<p>13.5. Partial function of the central nervous system</p> <p>13.5.1. Spinal cord</p> <p>13.5.2. Brains</p> <p>13.5.3. Vegetative nervous system</p>	
	<p><b>B/ Self-study contents:</b> (15 hrs)</p> <p>Reading text book and information concerning chapter.</p>	K1, K2, K6
	<p><b>Chapter 12. Physiological high-level neural activity</b></p>	
	<p><b>A/ Main contents:</b> (3 hrs)</p> <p><b>Theory:</b></p> <p>14.1. The concept of high-level neural activity and the importance of studying physiological high-level neural activity</p> <p>14.2. Classification of unconditional and conditioned reflexes</p> <p>14.3. Partial function of the central nervous system</p> <p>14.3.1. Formation and development of conditioned reflexes</p> <p>14.3.2. Temporary nervous system</p> <p>14.3.3. Mechanism of formation of conditioned reflexes</p> <p>14.4. Inhibitory processes in high-level neural activity</p> <p>14.4.1. Unconditional inhibition</p> <p>14.4.2. Conditional inhibition</p> <p>14.5. Sleep</p> <p>14.5.1. The types of sleep</p> <p>14.5.2. The expression during sleep</p> <p>14.5.3. Sleep cycle and the importance of sleep</p> <p>14.6. Features of high-level neural activity in human</p> <p>14.6.1. The presence of signal systems in high-level neural activity in human</p> <p>14.6.2. Characteristics, the physiological effects of voice</p> <p>14.6.3. The formation of human speech</p> <p>14.7. The type of nerve</p> <p>14.7.1. The classification criteria and characteristics of the nervous</p> <p>14.8. Nervous disorder</p> <p>14.8.1. Several neurosis</p> <p>14.8.2. Methodologies to restore troubled functions</p> <p>14.9. Emotions</p> <p>14.9.1. The concept of emotion</p> <p>14.9.2. The types of emotions</p> <p>14.9.3. Physiological basis of emotion</p> <p>14.10. Memory</p> <p>14.10.1. The concept of memory</p> <p>14.10.2. Types of memory</p> <p>14.10.3. The brain structures associated with memory</p>	K1-K6

	14.10.4. Mechanism of formation of memory	
	<b>B/ Self-study contents:</b> (09 hrs) Reading text book and information concerning chapter.	K1, K2, K6

**IX. Facility and other requirements:**

- Classrooms: required to have enough tables, chairs, boards, chalks, adequate lighting, good soundproofing, ventilation, orderliness, neatness and cleanliness.
- Teaching facilities: have internet connection, projector, microphone, speaker.
- E-learning/MS Teams system works well

**X. Revisions (The course specification is revised annually according to the regulations of the University)**

- 1<sup>st</sup> revision: 7/2018
- 2nd revision: 7/2019
- 3rd revision: 7/2020

*Hanoi, July 29<sup>th</sup>, 2020*

**HEAD OF DEPARTMENT**

*(Name and signature)*

**LECTURER**

*(Name and signature)*

**DEAN**

*(Name and signature)*

**Tran Thi Binh Nguyen**

**ON BEHALF OF THE PRESIDENT  
VICE PRESIDENT**

## APPENDIX

### LIST OF LECTURERS AND ASSISTANTS FOR THE COURSE

#### Lecturer in charge of the course

Full name: Nguyễn Hữu Đức	Title / Degree: PhD
Workplace address: Department of Animal Biotechnology, Faculty of Biotechnology, Vietnam Agricultural Students, Trau Quy, Gia Lam, Hanoi.	Phone no.: 01699606099
Email: <a href="mailto:nhduc@vnua.edu.vn">nhduc@vnua.edu.vn</a>	Website <a href="https://cnsh.vnua.edu.vn/">https://cnsh.vnua.edu.vn/</a>
How to contact the lecturer: Students can contact the lecturer by phone, email address. Students can also meet the lecturer during office hours (informed by the lecturer), or they can arrange a meeting to see the lecturer directly.	

#### Supporting lecturer

Full name: Tran Thi Binh Nguyen	Title / Degree: PhD
Workplace address: Department of Animal Biotechnology, Faculty of Biotechnology, Vietnam Agricultural Students, Trau Quy, Gia Lam, Hanoi.	Phone no.: 0944661010
Email: <a href="mailto:ttbnguyen@vnua.edu.vn">ttbnguyen@vnua.edu.vn</a>	Website <a href="https://cnsh.vnua.edu.vn/">https://cnsh.vnua.edu.vn/</a>
How to contact the lecturer: Students can contact the lecturer by phone, email address. Students can also meet the lecturer during office hours (informed by the lecturer), or they can arrange a meeting to see the lecturer directly.	