



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Bachelor of Science Education Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Anatomy and Physiology of Living Creatures	8420103197		T=2	P=1	ECTS=4.77	3	July 18, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
			Prof. Dr. Erman, M.Pd.	

Learning model	Project Based Learning																																																																																																				
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																																																				
	PLO-5 Demonstrate scientific, critical, and innovative attitudes in integrated science learning, laboratory activities, and professional-related tasks																																																																																																				
	PLO-8 Make decisions based on data/information in order to complete tasks and evaluate the performance that has been done																																																																																																				
	PLO-11 Design and conduct research about learning of integrated science, and acquire, analyze, and interpret the research data																																																																																																				
	PLO-13 Demonstrate knowledge of integrated science (physics, chemistry, and biology)																																																																																																				
	Program Objectives (PO)																																																																																																				
	PO - 1 Utilize ICT-assisted learning resources and learning media to explore data, collect information and solve problems to support learning implementation.																																																																																																				
	PO - 2 Mastering theoretical concepts (facts, concepts, principles, theories) and being able to formulate several alternative solutions to procedural problems regarding the anatomy and physiology of the development of living creatures (plants and animals) in terms of their morphological and anatomical characteristics.																																																																																																				
	PO - 3 Make strategic decisions based on data and information analysis, and provide ideas for choosing various alternative problem solutions.																																																																																																				
	PO - 4 Responsible for the assignments and final results of the anatomy and physiology practical development of living creatures regarding self-learning, assignments, and agreements with colleagues.																																																																																																				
	PLO-PO Matrix																																																																																																				
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<table border="1" style="margin: auto;"> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-2</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-3</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-4</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																	PO-2																	PO-3																	PO-4																
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Short Course Description This course examines the structure and function of the parts that make up the body of living creatures in terms of their morphological and anatomical characteristics. Studies include the structure and function of plant and animal cells and tissues, respiration, photosynthesis, plant and animal reproduction, the cardiovascular system, the digestive system, and the coordination system. The topic of discussion regarding animals will be elaborated on the human system and will end with learning about efforts to maintain health.

References	<p>Main :</p> <ol style="list-style-type: none"> 1. Beck, Charles B. (2010). <i>An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book</i>. New York: Cambridge University Press. 2. Adam, Jennifer W. Mac. (2008). <i>Structure and Function of Plants</i>. New Delhi: Willey Blackwell. 3. Taiz, L. and Zeiger E. 2010. <i>Plant Physiology, Fifth Edition</i>. Sinauer Associates. California: Sunderland. 4. Kay, I. (1998). <i>Introduction to Animal Physiology</i>. Manchester: Bios Scientific Publisher. 5. Sherwood, Klandorf, & Yancey. (2013). <i>Animal Physiology: from Genes to Organisms</i>. Belmont, USA: Brooks/Cole. 6. Tortora & Derrickson. (2012). <i>Principles of Anatomy and Physiology</i>. 13th Edition. USA: John Wiley & Sons, Inc. <p>Supporters:</p>
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Supporting lecturer		Dr. Dyah Astriani, S.Pd., M.Pd. Enny Susiyawati, S.Si., M.Sc., M.Pd., Ph.D. Dhita Ayu Permata Sari, S.Pd., M.Pd. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc. Dr. Syarif Prasetyo, S.Si., M.Si. Fasih Bintang Ilhami, S.Kep., M.T., Ph.D. Dr. Sapti Puspitarini, S.Si., M.Si.					
Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (offline)	Online (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	<p>1.Understand the general structure of plant body morphology.</p> <p>2.Understand the anatomical structure of the plant body</p> <p>3.Understand the relationship between plant body parts</p> <p>4.Understand how to make fresh preparations of plant body parts.</p>	<p>1.Describe the general structure of plant morphology</p> <p>2.Describe the anatomy of the plant body</p> <p>3.Describe the relationship between plant parts</p> <p>4.Make fresh preparations of plant parts</p> <p>5.Observe plant anatomy from the preparations made</p> <p>6.Prepare a report on observations of plant anatomy from the preparations made</p>	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>- Learning is carried out by utilizing problems related to human cells, as discussion material.</p> <p>- Continued discussion regarding cell structure in plants and animals 3 X 50</p>	<p>-Learning is carried out with the help of Gmeet, and utilizes videos from You Tube as learning media.</p> <p>-Video used as motivation and to orient students to problems related to cells in living things 1 x 60</p>	<p>Material: 1. Components of plant and animal cells and the function of each plant cell component</p> <p>References: 1. Beck, Charles B. (2010). <i>An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book.</i> New York: Cambridge University Press.2. Adam, Jennifer W. Mac. (2008). <i>Structure and Function of Plants.</i> New Delhi: Willey Blackwell.3. Taiz, L. and Zeiger E. 2010 . <i>Plant Physiology, Fifth Edition.</i> Sinauer Associates. California: Sunderland.4. Kay, I. (1998). <i>Introduction to Animal Physiology.</i> Manchester: Bios Scientific Publishers. 5. Sherwood, Klandorf, & Yancey. (2013). <i>Animal Physiology: from Genes to Organisms.</i> Belmont, USA: Brooks/Cole.6. Tortora & Derrickson. (2012). <i>Principles of Anatomy and Physiology.</i> 13th Edition. USA: John Wiley & Sons, Inc.</p> <p>Material: animal cell structure</p> <p>References: 3. Kardong, KV (2012). <i>Vertebrates: Comparative Anatomy, Function, and Evolution.</i> New York: McGraw Hill.</p>	5%

2	<ol style="list-style-type: none"> 1. Understand the parts of plant and animal cell protoplasts 2. Understand the function of the parts of plant and animal cell protoplasts 3. Understand the differences between plant and animal cells 4. Identify the types of movement of plant cell organelles 5. Identify the parts of a plant cell that can be seen under a light microscope 6. Understand the diffusion process in plants. 7. Understand the process of osmosis in plants. 8. Understand the concepts of water potential, osmotic potential, and turgor potential. 9. Explain the processes of plasmolysis and deplasmolysis 	<ol style="list-style-type: none"> 1.1. Understand the parts of plant and animal cell protoplasts 2.2. Understand the anatomical structure of the plant body 3.3. Understand the relationship between plant body parts 4.4. Understand how to make fresh preparations of plant body parts 5.5. Identify the parts of plant cells that can be seen under a light microscope. 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. The assessment is carried out based on the process of making fresh preparations of plant body parts and the results of incisions produced by students. 2. The incision is thin and neat, so that the parts of the plant body can be seen to get maximum value 3. Thick incisions, so that parts of the plant body are not clearly visible, get a minimum value <p>Form of Assessment : Participatory Activities, Practice/Performance</p>	<p>-Learning is carried out using pictures of plant components</p> <p>-Used pictures of abnormal plants as discussion material, linked to the function of plant components</p> <p>3 X 50</p>	<p>-Learning is carried out by utilizing GMeet, and utilizing videos from YouTube as learning media</p> <p>1 x 60</p>	<p>Material: anatomical structure of plants</p> <p>References: 2. Adam, Jennifer W. Mac, 2008. <i>Structure and Function of Plants</i>. New Delhi: Willey Blackwell.</p>	5%
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3	<p>1.Understand the morphological structure of stems and leaves and the function of each part of the stem.</p> <p>2.Explain morphological variations in stems and leaves</p> <p>3.Describe the differences in primary and secondary stem anatomical structures in dicot and monocot plants</p> <p>4.Explain the differences in thickening growth in dicot and monocot stems.</p>	<p>1.Students are able to describe the morphological structure of stems and leaves and the function of each part of the stem as well as variations in stem and leaf morphology.</p> <p>2.Students describe the differences in primary and secondary stem anatomical structures</p> <p>3.Students are able to prepare reports related to solving problems related to the relationship between leaf structure and habitat</p>	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Students find reading ideas, discuss, and communicate the results of discussions about cases in scientific articles related to the relationship between leaf structure and habitat; Observe the morphological structure of stems and leaves; Observe the anatomical structure of stems and leaves; Make fresh stem preparations using a hand microtome. 3 X 50</p>		<p>Material: Anatomical structure and morphology of plants</p> <p>References: <i>Beck, Charles B. (2010). An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book. New York: Cambridge University Press.</i></p> <p>Material: Anatomical structure and morphology of plants</p> <p>References: <i>Adam, Jennifer W. Mac. (2008). Structure and Function of Plants. New Delhi: Willey Blackwell.</i></p> <p>Material: Anatomical structure of stems and leaves</p> <p>References: 3. <i>Pratiwi, RH. 2019. Study of anatomical plant adaptation to extreme environmental conditions. Proceedings of Symbion (Symposium on Biology Education), 30 August 2019. Ahmad Dahlan University.</i></p> <p>Material: Anatomical structure of stems and leaves</p> <p>References: 4. <i>Rindyastuti, R. and Hapsari, L. 2017. Ecophysiological Adaptation to Dry Tropical Climate: Study of Leaf Anatomy of Ten Types of Woody Plants (Ecophysiology adaptation to dry tropical climate: a study of foliar anatomical structure of ten woody plant species). Indonesian Journal of Biology Vol. 13, no. 1, pp. 1-14.</i></p>	10%
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4	<p>1.Understand the processes of photosynthesis and respiration in plants</p> <p>2.Explain the Calvin cycle in photosynthesis</p> <p>3.Understanding variations in photosynthesis processes in C3, C4 and CAM plants</p>	<p>1.Describe the process of photosynthesis in plants correctly</p> <p>2.Distinguish between photosynthesis processes in C3, C4, and CAM plants</p> <p>3.Conduct experiments related to respiration in plants</p>	<p>Criteria: Assessment according to the assessment rubric</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment, Practical / Performance</p>	<p>Find reading ideas, discuss, and communicate the results of discussions about hormones and their effects on growth and abiotic stress; Read and interpret charts; Carrying out projects related to the role of hormones in environmental or abiotic stress conditions. 3 X 50</p>		<p>Material: Plant photosynthesis and respiration References: <i>Taiz, L. and Zeiger E. 2010. Plant Physiology, Fifth Edition. Sinauer Associates. California: Sunderland.</i></p> <p>Material: Plant photosynthesis and respiration References: <i>Adam, Jennifer W. Mac. (2008). Structure and Function of Plants. New Delhi: Willey Blackwell.</i></p>	5%
5	<p>1.Explain the characteristics of the hormone auxin, gibberellin, abscisic acid.</p> <p>2.Explain the function of each hormone in plants.</p> <p>3.Understand the role of hormones in the process of plant growth and development.</p>	<p>1.Describe the solution to the productivity problem of chili plants by utilizing homron experienced by farmers through a literature review</p> <p>2.Describe the characteristics of various hormones and the functions of plant hormones</p> <p>3.Conduct experiments on the influence of hormones on the leaf abscission process</p> <p>4.Make an experimental report on the influence of hormones on the leaf abscission process</p>	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Participatory Activities</p>	<p>Find reading ideas, discuss and communicate the results of discussions about problems related to chili productivity problems and their resolution by applying the use of plant hormones; Conduct experiments on the influence of hormones on the leaf abscission process; Conduct experiments on growth and development in plants. 3 X 50</p>		<p>Material: Plant Hormones References: <i>Taiz, L. and Zeiger E. 2010. Plant Physiology, Fifth Edition. Sinauer Associates. California: Sunderland.</i></p> <p>Material: Plant Hormones (Auxin) References: <i>Sari, RP, Melsandi, M., Fransiska, N., and Fauzi, A. 2018. Auxin hormone and its effect on the growth of cayenne pepper (Capsicum frutescens) and curly chili (Capsicum annum). Proceedings of National Seminar IV The Role of Biology and Biological Education in the Industrial Revolution 4.0 and Supporting the Achievement of Sustainibility Development Goals (SDGs) 2018 pp. 155-162</i></p>	5%

6	<p>1.Explain the characteristics of the hormone auxin, gibberellin, abscisic acid.</p> <p>2.Explain the function of each hormone in plants.</p> <p>3.Understand the role of hormones in the process of plant growth and development.</p>	<p>1.Describe the solution to the productivity problem of chili plants by utilizing homron experienced by farmers through a literature review</p> <p>2.Describe the characteristics of various hormones and the functions of plant hormones</p> <p>3.Conduct experiments on the influence of hormones on the leaf abscission process</p> <p>4.Make an experimental report on the influence of hormones on the leaf abscission process</p>	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Participatory Activities</p>	<p>Find reading ideas, discuss and communicate the results of discussions about problems related to chili productivity problems and their resolution by applying the use of plant hormones; Conduct experiments on the influence of hormones on the leaf abscission process; Conduct experiments on growth and development in plants. 3 X 50</p>		<p>Material: Plant Hormones References: Taiz, L. and Zeiger E. 2010. <i>Plant Physiology, Fifth Edition</i>. Sinauer Associates. California: Sunderland.</p> <hr/> <p>Material: Plant Hormones (Auxin) References: Sari, RP, Melsandi, M., Fransiska, N., and Fauzi, A. 2018. <i>Auxin hormone and its effect on the growth of cayenne pepper (Capsicum frutescens) and curly chili (Capsicum annum)</i>. <i>Proceedings of National Seminar IV The Role of Biology and Biological Education in the Industrial Revolution 4.0 and Supporting the Achievement of Sutainability Development Goals (SDGs) 2018 pp. 155-162</i></p>	5%
7	<p>1.Explain the general morphological structure of flowers, fruit, and seeds.</p> <p>2.Understand the general anatomical structure of flowers, fruit, and seeds.</p> <p>3.Explain the process of fertilization in plants.</p> <p>4.Understand the process of embryonic development in plants.</p>	<p>1.Describe the relationship between the structure and function of flowers, fruit and seeds.</p> <p>2.Describe the fertilization process in plants</p> <p>3.Describe the process of embryonic development in plants</p> <p>4.Observe the anatomical structure of flowers, fruit and seeds.</p> <p>5.Prepare reports on observations of the anatomical structure of flowers, fruit and seeds.</p>	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Participatory Activities</p>	<p>Find reading ideas, discuss and communicate the results of discussions about flower, fruit and seed organs in plants; Read and interpret charts; Observe the morphological structure of flowers, fruit and seeds; Observe the anatomical structure of flowers, fruit and seeds. 3 X 50</p>		<p>Material: Flowers, fruit and seeds in plants References: Beck, Charles B. (2010). <i>An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book</i>. New York: Cambridge University Press.</p> <hr/> <p>Material: Flowers, fruit and seeds in plants References: Adam, Jennifer W. Mac. (2008). <i>Structure and Function of Plants</i>. New Delhi: Willey Blackwell.</p>	5%
8	Sub-CPMK 1-13	SubCPMK Meetings 1 to 7	<p>Criteria: The assessment criteria are in accordance with the assessment rubric</p> <p>Form of Assessment : Test</p>	3 X 50		<p>Material: All materials from meetings 1 to 7 References: Beck, Charles B. (2010). <i>An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book</i>. New York: Cambridge University Press.</p>	0%

9	<p>Analyze the structure and function of the blood circulation system and its disorders to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks and agreements with the team, by utilizing science and technology in solving problems</p>	<ol style="list-style-type: none"> 1. Describe the structure of tissues and organs in the circulatory system 2. Explain the process of blood clotting 3. Explain the process of blood circulation in vertebrates 4. Analyze the effect of activity on heart function 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Form of Assessment : Participatory Activities, Practical Assessment</p>	<p>Discuss and carry out question and answer activities about the circulatory system material in animals and humans using various media, for example torsos and charts. Do practice questions about the circulatory system material in animals and humans; carry out activities to identify blood vessels; record the results of observations on activities to identify blood vessels; prepare practicum reports related to blood vessel identification activities; present reports on the results of activities that have been carried out in front of the class; and utilizing science and technology in solving examples of circulation system problems. 3 X 50</p>	<p>Discuss and conduct question and answer activities regarding circulatory system material in animals and humans using a virtual laboratory; working on practice questions about the circulatory system in animals and humans; presented a report on the results of virtual laboratory observations that had been carried out via the Zoom Meeting 2 X 50 application</p>	<p>Material: Blood circulation system in animals References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p> <hr/> <p>Material: Circulatory system in humans Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p>	5%
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10	Understand the structure and function of the digestive system and its disorders to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks, and agreements with the team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Describe the types of digestive systems in animals 2. Identify the structure and function of the digestive organs of vertebrates and humans 3. Describe the digestive process in humans 4. Explain the digestive process in vertebrate animals 5. Identify abnormalities/diseases in the human digestive system 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Forms of Assessment : Participatory Activities, Practical Assessment, Tests</p>	Discuss and conduct question and answer activities regarding the digestive system in animals and humans using various media, for example torsos and charts; working on practice questions about the digestive system in animals and humans; carry out activities to identify wet preservation; record the results of observations on identifying activities a; wet wettan; preparing practical reports; present a report on the results of activities that have been carried out in front of the class; and utilizing science and technology in solving examples of digestive system problems 3 X 50	Discuss and conduct question and answer activities regarding the digestive system in animals and humans using a virtual laboratory; working on practice questions about the digestive system in animals and humans; presented a report on the results of virtual laboratory observations that had been carried out via the Zoom Meeting 2 X 50 application	<p>Material: Human digestive system</p> <p>Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <hr/> <p>Material: Digestive system in animals</p> <p>References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	5%
11	Understand the structure and function of the respiratory system and its disorders to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks, and agreements with the team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Identify the structure and function of animal respiratory organs 2. Describe the respiratory mechanism in vertebrate animals 3. Describe the structure and function of the human respiratory organs 4. Explain the mechanism of breathing in humans 5. Explain the volume and capacity of the lungs 6. Identify disorders/diseases related to the respiratory system of animals and humans 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Form of Assessment : Practical Assessment, Test</p>	Discuss and conduct question and answer activities regarding the respiratory system in animals and humans using various media, for example torsos and charts; working on practice questions about the respiratory system in animals and humans; carry out tests on types of breathing air; record test results; preparing practical reports; present a report on the results of activities that have been carried out in front of the class; and utilizing science and technology in solving examples of 3 X 50 respiratory system problems	Discuss and conduct question and answer activities regarding the respiratory system in animals and humans using a virtual laboratory; working on practice questions about the respiratory system in animals and humans; create appropriate tool models to describe the respiratory system; presented a report on the results of activities (virtual laboratory and modeling) that had been carried out via the Zoom Meeting 2 X 50 application	<p>Material: Respiratory system in humans</p> <p>Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <hr/> <p>Material: Respiratory system in animals</p> <p>References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	10%

12	Understanding the structure and function of the osmoregulation system and its disorders for solving relevant problems, making strategic decisions based on data and information, being responsible for self-learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Describe the concept of osmotic balance in living things 2. Describe the structure and function of osmoregulatory organs in invertebrate and vertebrate animals 3. Identify the structure and organs of the excretory system in humans 4. Explain the excretion process in humans 5. Describe the hormones that influence the human excretory system 6. Identify disorders/diseases related to the human excretory system. 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment, Tests</p>	Discuss and conduct question and answer activities regarding the osmoregulation system in animals and humans using various media, for example torso and charta; work on practice questions on the osmoregulation system in animals and humans; perform urine tests; preparing practical reports; present a report on the results of activities that have been carried out in front of the class; and utilizing science and technology in solving examples of 3 X 50 osmoregulation system problems	Discuss and conduct question and answer activities regarding the osmoregulation system material in animals and humans using a virtual laboratory; work on practice questions on the osmoregulation system in animals and humans; create appropriate tool models to describe the osmoregulation system; presented a report on the results of activities (virtual laboratory and modeling) that had been carried out via the Zoom Meeting 2 X 50 application	<p>Material: Osmoregulation system in humans Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <hr/> <p>Material: Osmoregulation system in animals References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	10%
13	Understand the structure and function of the coordination system and its disturbances to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks, and agreements with the team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Explain the working mechanisms of the coordination system (hormones, nerves) and the movement system 2. Describe disorders/diseases in the coordination system and movement system 3. Explain the mechanism of hormonal and nervous control in influencing body conditions 4. Describe the mechanism of muscle contraction and its relationship to the skeleton 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Forms of Assessment : Participatory Activities, Practical Assessment, Tests</p>	Discuss and conduct question and answer activities regarding the material on coordination systems in animals and humans using various media, for example torsos and charts; working on practice questions about coordination systems in animals and humans; make observations on reflex movements, prepare practical reports; present a report on the results of activities that have been carried out in front of the class; and utilizing science and technology in solving examples of 3 X 50 coordination system problems	Discuss and conduct question and answer activities regarding coordination system material in animals and humans using a virtual laboratory; working on practice questions on the material of coordination systems in animals and humans; presented a report on the results of activities (virtual laboratory and modeling) that had been carried out via the Zoom Meeting 2 X 50 application	<p>Material: Coordination system in humans Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <hr/> <p>Material: Coordination systems in animals References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	10%

14	Analyze the structure and function of the reproductive system and its disorders to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks, and agreements with the team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Formulate problems related to infertility cases 2. Find relevant references related to infertility cases (five references from scientific articles) 3. Make a mind-mapping of the relationship between infertility cases and the factors that influence them 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment</p>	Determining the problem regarding the increasing number of infertility cases in humans (case-based); explore additional information about infertility cases; discuss in groups the results of information searches. 3 X 50	Determine the problem regarding the increase in the number of infertility cases in humans (case-based); explore additional information about infertility cases; discuss in groups the results of information searches. 2 X 50	<p>Material: Reproductive system in humans Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <p>Material: Circulatory system in animals References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	10%
15	Analyze the structure and function of the reproductive system and its disorders to solve relevant problems, make strategic decisions based on data and information, be responsible for self-learning, tasks and agreements with the team, by utilizing science and technology in solving problems	<ol style="list-style-type: none"> 1. Formulate a solution to the problem of infertility cases in humans 2. Explain the effectiveness of the solution found 3. Present the results of discussions with "experts" during learning sessions 	<p>Criteria: Accuracy and mastery according to assessment indicators (assessment rubric)</p> <p>Form of Assessment : Participatory Activities</p>	Formulate solutions to infertility cases; forming expert groups on a solution found; providing peer tutoring about reproductive health and solutions to infertility cases, presenting the results of discussions with experts. 3 X 50	Formulate solutions to infertility cases; forming expert groups on a solution found; providing peer tutoring about reproductive health and solutions to infertility cases, presenting the results of discussions with experts. This activity is carried out via the Zoom Meeting application. 2 X 50	<p>Material: Reproductive system in humans Reference: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p> <p>Material: Reproductive systems in animals References: <i>Sherwood, Klandorf, & Yancey. (2013). Animal Physiology: from Genes to Organisms. Belmont, USA: Brooks/Cole.</i></p>	10%
16	Sub-CMPK 15th to 21st	Assessment indicators for meetings 1 to 15	<p>Criteria: Accuracy and mastery according to the UAS assessment indicators (assessment rubric).</p>	Final Exam Semester 2 X 50		<p>Material: All meeting materials 1 to 15 Reader: <i>Tortora & Derrickson. (2012). Principles of Anatomy and Physiology. 13th Edition. USA: John Wiley & Sons, Inc.</i></p>	0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	51.25%
2.	Project Results Assessment / Product Assessment	8.75%
3.	Practical Assessment	16.25%
4.	Practice / Performance	3.75%
5.	Test	20%
		100%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.

5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.