



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Biology Undergraduate Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Animal physiology	4620104074	Animal physiology	T=4 P=0 ECTS=6.36	4	July 17, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator		Study Program Coordinator
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Learning model Project Based Learning

Program Learning Outcomes (PLO) PLO study program which is charged to the course

PLO-5	Able to communicate scientific ideas, both orally and in writing using appropriate communication media according to the target, as a means of lifelong learning for academic self-development.
PLO-7	Able to work independently and collaboratively, as well as responsibly, in completing various tasks in class, in the laboratory and in the field.
PLO-11	Able to apply transferable skills in biology to develop ecopreneurship (eco-innovation, eco-opportunity, eco-commitment)
PLO-12	Able to demonstrate basic knowledge of biology relevant to science and mathematics to understand current scientific phenomena and issues and apply them in problem solving

Program Objectives (PO)

PO - 1	Able to master the concept of Animal Physiology which is related to the processes that occur in the animal body
PO - 2	Able to design research in the field of animal physiology as a form of caring for the environment
PO - 3	Able to communicate the results of studies/research on animal physiology
PO - 4	Manage research/study data as a source of evidence/characters related to Animal Physiology studies

PLO-PO Matrix

	P.O	PLO-5	PLO-7	PLO-11	PLO-12
	PO-1				
	PO-2				
	PO-3				
	PO-4				

PO Matrix at the end of each learning stage (Sub-PO)

	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																

Short Course Description This course examines theory and relates it to processes in everyday life that occur in animal bodies related to the flow of matter and energy, membrane transport, nerves, senses, hormones, locomotion, transportation, respiration, digestion, thermoregulation, excretion, and osmoregulation. This course is presented through lecture, discussion, practicum and assignment methods in the form of papers and/or presentations.

References **Main :**

1. Eckert, R. 1991. Animal Physiology. New York: W.H Freeman Co.
2. Hill, R.W., Wyse, G.A., and Andreson, M. 2017. Animal Physiology. Edisi Ketiga. Massachusetts: Sinauer Associate.
3. Rastogi, S.C. 2007. Essential of Animal Physiology. Edisi Keempat. New Delhi: New Age International Ltd, Pub.
4. Schmidt-Nielsen, K. 1997. Animal Physiology: Adaptation and Environment. 4th Edition. Cambridge: Cambridge University Press.
5. Moyes, C. D., & Schulte, P. M. 2005. Animal Physiology (p. 21). San Francisco, CA: Benjamin Cummings.

Supporters:

1. Wang, L., Karpac, J., & Jasper, H. (2014). Promoting longevity by maintaining metabolic and proliferative homeostasis. *Journal of Experimental Biology*, 217(1), 109-118.
2. Atkinson, S., Crocker, D., Houser, D., & Mashburn, K. (2015). Stress physiology in marine mammals: how well do they fit the terrestrial model? *Journal of Comparative Physiology B*, 185(5), 463-486.
3. Ringø, E., Zhou, Z., Vecino, J. G., Wadsworth, S., Romero, J., Krogdahl, Å., & Owen, M. (2016). Effect of dietary components on the gut microbiota of aquatic animals. A never-ending story? *Aquaculture nutrition*, 22(2), 219-282.
4. Brownlee, I. A. (2011). The physiological roles of dietary fibre. *Food hydrocolloids*, 25(2), 238-250.

Supporting lecturer	Dr. Nur Kuswanti, M.Sc.St. Dr. Raharjo, M.Si. Nur Qomariyah, S.Pd., M.Sc. Erlis Rakhmad Purnama, S.Si., M.Si. Firas Khaleyra, S.Si., M.Si.
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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	Students are able to explain the meaning, scope of Animal Physiology material, and the principles of homeostasis. Students are able to identify and analyze the processes of using matter and energy in animal bodies.	<ol style="list-style-type: none"> 1.Explain the meaning of physiology and human experience and scope 2.Explain the principles of homeostasis, acclimation and acclimatization 3.Explain the metabolic processes of fats, carbohydrates, proteins and cellular respiration 4.Analyze the pathways carbohydrates and proteins enter cellular respiration 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation 20% 2.Duty 30% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities</p>	<p>Lectures (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on literature reviews regarding basic concepts in animal physiology: (homeostasis, metabolism, cellular respiration, acclimation/acclimatization and the relationship between the field of physiology and other sciences. Independent study (3x60'): Discussion in solving daily problems related to animal physiology. The results of the discussion are written and reported. Practicum (3x50'): Analyzing instrumentation tools in the health sector that apply physiological concepts.</p> <p>Structured assignment (3x50'): Writing a results report. 4 X 50 practicum</p>	Lectures using LMS 4 x 50	<p>Material: Understanding physiology and human experience References:</p> <p>Material: Scope of animal physiology material Literature:</p> <p>Material: Principles of homeostasis, acclimation, acclimatization Literature:</p> <p>Material: Metabolism and Cell Respiration References:</p> <p>Material: Metabolism of fats, carbohydrates and proteins References:</p> <p>Material: Pathways for carbohydrates and proteins to enter cellular respiration References:</p>	5%
2	Students are able to identify and analyze transport processes through membranes	<ol style="list-style-type: none"> 1. Identify the structure of cell membranes 3. Identify the type of transport 3. Analyze the role of passive and active transport 4. Understand the ways in which materials are transported to and from cells 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation 20% 2.Duty 30% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lectures (3x50'): Lecturers facilitate Student Centered Learning through group discussion activities to discover concepts based on case studies about diarrhea, dehydration which require analysis of cell membrane structure, types of membrane transport and their role in the process of transporting materials for physiological purposes.</p> <p>Independent learning (3x60'): Looking for additional information about other types of membrane transport for several physiological processes in the respiratory process or other processes</p> <p>Structured assignment (3x50'): Analyzing the appropriate types of membrane transport for several minerals or ions needed in physiological processes 4 50</p>	Lectures using LMS 4 x 50	<p>Material: Cell Membrane Structure References:</p> <p>Material: Types of material transport through cell membranes References:</p> <p>Material: The role of active and passive transport in animal cells References:</p> <p>Material: Ways of transporting material from and into animal cells or vice versa. References:</p>	6%

3	Students are able to identify and analyze digestive processes in the animal body	<ol style="list-style-type: none"> 1. Identify digestive processes in the animal body 2. Explain each function of the digestive tract in the animal body 3. Identify the enzymes and glands that play a role in the digestive process in the animal body 4. Analyze the control of the digestive system and its relationship with the nervous system 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. Duty 30% 2. Participation 20% 3. UTS 20% 4. UAS 30% <p>Forms of Assessment : Participatory Activities, Practical Assessment, Tests</p>	<p>Lectures (3x50'): Lecturers facilitate Student Centered Learning through group discussion activities and to discover concepts based on Project Based Learning regarding basic concepts in the digestive system. At the initial meeting on the digestive system, PjBL introduced the topic of looking for intestinal extracts from animals that are easily found in everyday life to replace enzyme ingredients used in digestive enzyme activity tests.</p> <p>Independent learning (3x60'): Discussion in solving daily problems related to the digestive system. The results of the discussion are written and reported.</p> <p>Practicum (3x50'): At meeting 3, a practicum was carried out to design an experiment to find a replacement source for digestive enzymes from various types of animals.</p> <p>Structured assignment (3x50'): Write a report on the results of the experimental design 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Hydrolysis of organic matter, feeding strategies and nutritional needs</p> <p>References:</p> <hr/> <p>Material: Digestive tract system, movements in the digestive tract</p> <p>References:</p> <hr/> <p>Material: Control of the digestive system and its relationship with the nerves.</p> <p>References:</p>	4%
4	Students are able to identify and analyze digestive processes in the animal body	<ol style="list-style-type: none"> 1. Identify the enzymes and glands that play a role in the digestive process in the animal body 2. Analyzing nervous and hormonal control of enzyme secretion or gastrointestinal secretion 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. Duty 30% 2. Participation 20% 3. UTS 20% 4. UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lectures (3x50'): Lecturers facilitate Student Centered Learning through group discussion activities and to discover concepts based on Project Based Learning regarding secretion, the work of digestive enzymes and their regulation by hormones and nerves. At the second meeting of the digestive system, this digestive system also presented the results of PjBL regarding intestinal extracts from animals that are easily found in everyday life as substitutes for enzyme ingredients used in digestive enzyme activity tests.</p> <p>Independent study (3x60'): Looking for material about enzyme secretion mechanisms /digestive fluids and food absorption mechanisms</p> <p>Practicum (3x50'): At meeting 4, a practicum was carried out to test the experimental design to find a replacement source for digestive enzymes from various types of animals 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Gastrointestinal secretions and digestive exocrine glands</p> <p>References:</p> <hr/> <p>Material: Nervous and hormonal control of enzyme secretion or gastrointestinal secretions</p> <p>References:</p>	4%

5	Students are able to identify and analyze the mechanisms of muscle action and plasma membrane movement.	<ol style="list-style-type: none"> 1.Understand amoeboid movement and flagellum movement mechanisms 2.Describe the basic structure of contraction 3.Explain the sliding-filament theory 4.Understand the neuromuscular junction and the role of nerves in muscle contraction 5.Analyze the role of calcium in contraction 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Duty 30% 2.Participation 20% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on case studies of cervical dystonia conditions to discover the concept of muscle contraction mechanisms and their control as well as case studies of muscle spasms in conditions infected with tetanus bacteria and experiencing spasms associated with contractions Muscle</p> <p>Independent learning (3x60'): Discussion on the mechanism of muscle contraction in flagella Practicum (3x50'): Practicum for muscle contraction using the frog's gastrocnemius muscle by providing different stimuli and stimulation intervals</p> <p>Structured assignment (3x50'): Writing a practical report 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Amoeboid movement and flagellum movement mechanisms Literature:</p> <hr/> <p>Material: Basic structure of contractions References:</p> <hr/> <p>Material: Sliding-Filament Theory Literature:</p> <hr/> <p>Material: Neuromuscular junction and the role of nerves in contractions References:</p> <hr/> <p>Material: The role of calcium in contractions References:</p> <hr/> <p>Material: Energy sources for muscle contractions References:</p>	5%
6	Students are able to identify the respiration process in water and air for animals	<ol style="list-style-type: none"> 1.Describe the structure of the respiratory organs 2.Explain the mechanism of air ventilation in various animals 3.Analyzing the transport of oxygen and carbon dioxide in the blood 4.Compare the lungs and gills of vertebrates 5.Analyze the regulation of respiration and gas movement 6.Understand the body's pH regulation 7.Understand other gas transfer systems in animal bodies 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation 20% 2.Duty 30% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lectures (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on case studies of bronchitis conditions in smokers to discover concepts of mechanisms for regulating respiration and gas transfer.</p> <p>Independent learning (3x60'): Discussions in solving problems in disorders on the respiratory system Practical work (3x50'): Analyzing the differences and functions of lungs in vertebrates and gills in fish</p> <p>Structured assignment (3x50'): Writing a 4 X 50 practical report</p>	Lectures using LMS 4 x 50	<p>Material: Structure of respiratory organs and requirements for respiratory organs References:</p> <hr/> <p>Material: Mechanisms of air ventilation in various animals Reference:</p> <hr/> <p>Material: Transport of oxygen and carbon dioxide in the blood References:</p> <hr/> <p>Material: Lungs and gills of Vertebrates References:</p> <hr/> <p>Material: Regulation of respiration and gas movement Reference:</p> <hr/> <p>Material: Regulation of body pH References:</p> <hr/> <p>Material: Other gas transfer systems in animal bodies References:</p>	5%

7	Students are able to identify and analyze transportation processes in the animal body	<ol style="list-style-type: none"> 1. Describe the transportation system in simple animals 2. Analyze the differences in the functions of open and closed transportation systems 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. Participation 20% 2. Duty 30% 3. UTS 20% 4. UAS 30% <p>Forms of Assessment : Participatory Activities, Practical Assessment, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on pictures to discover the concept of transportation systems in simple animals and the differences in the function of open and closed transportation systems</p> <p>Independent learning (3x60'): Looking for information on how the heart works in closed blood circulation Practicum (3x50'): --- Structured assignment (3x50'): Writing an independent study report 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Simple animal transportation functions (without a special transportation system) References:</p> <hr/> <p>Material: Functions of open and closed transportation systems References:</p>	5%
8	UTS	UTS	<p>Criteria: UTS</p> <p>Form of Assessment : Participatory Activities, Tests</p>	UTS 4 X 50	UTS 4 x 50		15%
9	Students are able to identify and analyze transportation processes in the animal body	<ol style="list-style-type: none"> 1. Analyzing vertebrate heart function 2. Explain the function of blood vessels 3. Explain the function of vertebrate lymph 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. Participation 20% 2. Duty 30% 3. UTS 20% 4. UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on natural phenomena in the crocodile's heart to discover concepts of heart function, blood vessels, and lymph vessel function</p> <p>Independent learning (3x60'): Looking for information about vessels lymph in the phenomenon of wounds and swelling</p> <p>Practicum (3x50'): Observation of blood flow in the tail of the tinhead fish</p> <p>Structured assignment (3x50'): Writing a report on the results of the practicum 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Functions of the vertebrate heart References:</p> <hr/> <p>Material: Function of vertebrate blood vessels References:</p> <hr/> <p>Material: Functions of vertebrate lymph Reference:</p>	5%
10	Students are able to identify, analyze processes related to thermoregulation in the animal body and apply them in everyday life.	<ol style="list-style-type: none"> 1. Understand the concept of metabolism and energy 2. Describe the metabolic rate 3. Explain body heat maps 4. Explain the production and heat transfer processes 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. Duty 30% 2. Participation 20% 3. UTS 20% 4. UAS 30% <p>Forms of Assessment : Participatory Activities, Practical Assessment, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities to discover concepts based on phenomena presented through ppt to discover concepts regarding the relationship between metabolism and energy, metabolic rate, heat maps and heat production and transfer processes</p> <p>Independent learning (3x60') : Looking for information on the process of production and transfer of heat in the animal's body</p> <p>Practicum (3x50'): --- Structured assignment (3x50'): Writing a report on the results of independent learning 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Metabolism and energy concepts References:</p> <hr/> <p>Material: Metabolic rate References:</p> <hr/> <p>Material: Body heat map References:</p> <hr/> <p>Material: Heat production and transfer References:</p>	5%

11	Students are able to identify, analyze processes related to thermoregulation in the animal body and apply them in everyday life.	<ol style="list-style-type: none"> 1.Explain the classification of animals based on source stability and body heat 2.Analyzing the relationship between body temperature, environmental temperature, and metabolic rate along with various factors involved in ectothermic and endothermic animals 3.Describe the function of the central nervous system in regulating body temperature 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Duty 30% 2.Participation 20% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities based on case studies of forms of adaptation to temperature changes in endothermic animals to find the concept of classifying animals based on heat sources and influencing factors</p> <p>Independent learning (3x60'): Looking for information about regulation nerves in regulating body temperature</p> <p>Practical (3x50'): Observation of Daphnia's heart rate in different environmental conditions</p> <p>Structured assignment (3x50'): Writing a practical report 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Classification of animals based on body temperature stability References:</p> <hr/> <p>Material: Classification of animals based on body heat sources References:</p> <hr/> <p>Material: Relationship between body temperature, environmental temperature, and metabolic rate along with various factors involved in ectothermic and endothermic animals Reference:</p> <hr/> <p>Material: Central nervous function in regulating body temperature References:</p>	5%
12	Identify osmoregulation and excretion processes in vertebrate and invertebrate animals	<ol style="list-style-type: none"> 1.Describe the meaning of osmoregulators and osmoconformers 2.Analyze osmoregulation processes in aquatic and terrestrial environments 3.Identify the organs related to osmoregulators 4.Analyzing types of nitrogen waste in various animals 5.Identify excretory systems in invertebrates 6.Analyze the excretory system in vertebrates 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Duty 30% 2.Participation 20% 3.UTS 20% 4.UAS 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities based on case studies on the condition of salmon that are able to live in environments with different salt levels to discover the concept of the role of the kidneys in excretion and osmoregulation</p> <p>Independent learning (3x60'): Looking for information about osmoregulation adaptation and metabolic waste management</p> <p>Structured assignment (3x50'): writing an independent learning report 4 X 50</p>	Lectures using LMS 4 x 50	<p>Material: Osmoregulators and osmoconformers Library:</p> <hr/> <p>Material: Osmoregulation in water and land environments References:</p> <hr/> <p>Material: Osmoregulator organs References:</p> <hr/> <p>Material: Types of nitrogen waste in various animals. Reference:</p> <hr/> <p>Material: Excretory systems in invertebrates References:</p> <hr/> <p>Material: Excretory system in vertebrates, especially mammals Reference:</p>	5%
13	Students are able to identify, analyze symptoms and processes related to the regulation of the animal body by the work of the nervous system.	<ol style="list-style-type: none"> 1.Identify the functions and parts of the nervous system 2.Analyze the process of impulse occurrence and impulse propagation 3.Analyze the occurrence of reflex movements. 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.UAS 30% 2.Duty 30% 3.Participation 20% 4.UTS 20% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities based on Case studies of difficulty remembering in old age to discover the concept of neural function</p> <p>Independent learning (3x60'): Search for information about impulse propagation and factors that influence</p> <p>Practicum (3x50') : Testing the work of the cerebrum and cerebellum as well as the effect of stimulants on nervous performance. Structured assignment (3x50') : writing a 4 X 50 practical report</p>	Lectures using LMS 4 x 50	<p>Material: Functions and parts of the nervous system References:</p> <hr/> <p>Material: The process of impulse occurrence and impulse propagation References:</p> <hr/> <p>Material: Reflex movements Reference:</p>	5%

14	Students are able to describe symptoms and body processes related to the sense organs in animals	<ol style="list-style-type: none"> 1. Identify receptor cells 2. Explain the senses in animals 3. Analyze various types of receptors 4. Understanding sensory processes in animals and humans 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. UAS 30% 2. Participation 20% 3. UTS 20% 4. Duty 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities based on Case studies as a result of using earphones to discover the concept of the working mechanisms of the senses</p> <p>Independent learning (3x60'): Looking for information about the working mechanisms of the sense organs and their relationship to the nerves</p> <p>Practicum (3x50'))': Testing the performance of sensory organs Structured assignment (3x50'): writing a 4 X 50 practical report</p>	Lectures using LMS 4 x 50	<p>Material: Receptor cells as sensory transducers. References:</p> <hr/> <p>Material: Sensory systems in animals References:</p> <hr/> <p>Material: Various types of receptors References:</p> <hr/> <p>Material: Mechanisms of hearing and seeing References:</p>	5%
15	Students are able to identify, analyze symptoms and processes related to the regulation of the animal body by the work of the hormonal system.	<ol style="list-style-type: none"> 1. Explain the meaning of the hormonal system. 2. Understand the relationship between the nervous system and hormones 3. Describe the action of hormones on target cells 4. Analyzing hormones in vertebrate animals 5. Understanding hormones in invertebrates 6. Analyzing hormone regulation in vertebrates 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. UAS 30% 2. Participation 20% 3. UTS 20% 4. Duty 30% <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture (3x50'): Lecturer facilitates Student Centered Learning through group discussion activities based on Case study: menstrual cycle that is longer than other people to discover the concept of how hormones work</p> <p>Independent study (3x60'): Discussion about abnormalities and their causes as well as mechanisms in the glands other hormones Structured assignment (3x50'): write a 4 X 50 independent study report</p>	Lectures using LMS 4 x 50	<p>Material: Understanding the hormonal system References:</p> <hr/> <p>Material: The relationship between the nervous system and hormones References:</p> <hr/> <p>Material: Mechanism of action of hormones on target cells References:</p> <hr/> <p>Material: Hormones in vertebrate animals Reference:</p> <hr/> <p>Material: Hormones in invertebrates References:</p> <hr/> <p>Material: Hormonal regulation in vertebrates References:</p>	5%
16		UAS	<p>Criteria: UAS</p> <p>Form of Assessment : Participatory Activities, Tests</p>	UAS	UAS		15%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	52.17%
2.	Practical Assessment	4.67%
3.	Test	42.17%
		99.01%

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.