UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM
Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kentingan Surakarta 57126 Indonesia
E-mail: biologi@fkip.uns.ac.id; Website: https://biologi.fkip.uns.ac.id/en/

Animal Physiology

Undergraduate Programme in Biology Education **Module Handbook**

Module Name	Animal Physiology (Fisiologi Hewan)
Module level	Undergraduate Programme
Course Code	02013143008
Abbreviation, if applicable	-
Courses included in the module, if applicable	Laboratory Activity
Semester/Term	5th
Module coordinator (s)	Dr. Harlita, S.Si., M.Si
Lecturer (s)	Dr. Meti Indrowati, S.Si., M.Si Dewi Puspita Sari, S.Pd M.Si Dr. Harlita, S.Si., M.Si
Language	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum	Compulsory
Teaching format/class hours per week during the semester	**Direct instruction/face to face/blended learning:** 26.7 hours / Week / semester: lecture, discussion **Structured Activity:** 32 hours / Week / semester (Through the case method with analysis of journal articles, students learn physiology of animal, through observation and literature study, students learn the component of biology as a science. **Self-study Activity:** 32 hours / Week / semester (Students learn Animal Physiology topic) **Practicum in laboratory:** 28,3 hours /week/semester
Workload	

Type	**CSU**	**Face to Face**	**Structured Activities**	**Self-study**
T	2	26.7h (1.0 ECTS)	32h (1.21 ECTS)	32h (1.21 ECTS)
P	1	28.3 h (1.07 ECTS)		
Total	TS	119 hours (4.5 EC)		

Credit Points	3 CSU (4.5 ECTS)
Requirements	General Biology, Cell Biology, Biochemistry, Diversity and Classification of Invertebrate, Diversity and Classification of Vertebrate,

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<td>Learning Goals/competencies</td>
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PLO 2
They are able to apply the basic advance knowledge in biology to solve the problem in biology.
PLO 6
They are able to demonstrate laboratory works, design and implement the experiment based on laboratory knowledge, skills, safety, environmental issue, and social ethics problem.
PLO 8
They are able to communicate verbal dan nonverbal effectively using the proper media.

CLO 1
Applying the concept of animal physiology and behavior from various taxa, and coordination system in practicum activities.
CLO 2
Applying physiological studies of the motion system, digestive system and circulatory system, and reproductive system in animals of various strokes in practicum activities.
CLO 3
Applying physiological studies of respiration, excretion, osmoregulation and thermoregulation systems in animals of various strokes in practicum activities.
CLO 4
Communicating the results of the study of animal physiological problems argumentatively.

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Content	The materials of Animal Physiology: 1. Animal Ethic 2. Functional organization of nervous system,hormone and cell signalling 3. Sensory system 4. Sistem Cellular movement, muscle and locomotion 5. Digestion system 6. Circulatory system 7. Respiratory System 8. Ion and Water Balance I/ Excretory System 9. Ion and water balance II/ Osmoregulation 10. Physiology of animal behaviour 11. Thermal Physiology 12. Animal Reproduction
	The practicum is designed to give students the opportunity to prove for themselves some of the basic concepts in Animal Physiology learning that have been obtained in theoretical lectures. The practicum activity consists of 9 events, namely: 1. Muscles and movement systems (extensibility and elasticity of the frog's striated and smooth muscles) 2. Animal circulation system (counting erythrocytes, leucocytes; hemogram, observation of fish tail circulation and frog swim membranes) 3. Respiration System (oxygen consumption, observation and measurement of fish respiration rate) 4. Excretory system (characteristic of urine) 5. Thermoregulation (heat production of frogs and mice) 6. Phototaxis and Rheotaxis Dugesia sp 7. Feeding Behavior Dugesia sp 8. Observation of the Reproductive Cycle of Mice 9. Animal Physiology mini project
Attribute Soft skill	1. Able to think conceptually, analitically, and logically 2. Have good communication skills 3. Able to demonstrate laboratory works, design and implement the experiment based on laboratory knowledge
Study/exam achievements	Student is required to attend the face-to-face lecture

minimum 75% to be able to take Mid and Final exam. It considered to complete the course and pass if student obtain at least 60% of maximum final score. The final score (FS) is calculated based on the following ratio:

Aspect	(%)
Task/quiz/presentation / laboratory activity	30
Participation	10
Mid-Term Test	30
Final Exam	30
Final Score	100

Learning Methods	Lecture, discussion, workshop and lab activity
Form of Media	Power point slide, specimen and lab equipment
Literature (primary references)	1. Bennett, S,. Duarte, C. M,. Marba, N & WernBERG, t. (2019). Integrating Within-Species Variation in Thermal Physiology into Climate Change Ecology. *The Royal Society Publishing, 374*, 1-10 https://doi.org/10.1098/rstb.2018.0550 2. Burggren, W. W. (2014). Epigenetics as A Source of Variation in Comparative Animal Physiology – Or – Lamarck Is Lookin' Pretty Good These Days. *Journal of Experimental Biology, 217*(5), 682-689 https://doi.org/10.1242/jeb.086132 3. Collier, R. J,. Baumgard, L.H.,Zimbelman R. B,. Xiao, Y. (2019). Heat Stress: Physiology of Acclimation And Adaptation. *Animal Frontiers, 9*(1): 12-19 https://doi.org/10.1093/af/vfy031 4. Meti Indrowati dan Sumanto. (2017). *Buku Ajar Fisiologi Hewan*. Surakarta: PBiologi FKIP UNS 5. Pusparini, F., Riandi, R & Sriyati, S. (2017). Developing Technological Pedagogical Content Knowledge (TPACK) in Animal Physiology. *Journal of Physics: Conference Series,* doi :10.1088/1742- 6596/895/1/012059

6. Ratnakaran, A. P,. Sejian, V., Jose, S et al. (2017). Behavioral Responses to Livestock Adaptation to Heat Stress Challenges. *Asian Journal of Animal Sciences, 11*, 1-13 DOI: 10.3923/ajas.2017.1.13
7. Tim Fisiologi Hewan. (2019). *Petunjuk Praktikum*
8. *Fisiologi Hewan*. Surakarta : PBiologi FKIP UNS.

EXAM QUESTIONS ASSESMENT

No.	Questions	Answer Indicator	Score
1.	One way to get rid of toxins in the body is by excretion. A. Explain how is the mechanism of releasing metabolic waste through malpighian vessels! B. Explain the regulation of H2O and NaCl in kidney nephrons!		20
2.	Various animals in the Invertebrate and Vertebrata groups have different osmoregulation mechanisms. Explain with examples the differences in this mechanism in marine and freshwater invertebrates and vertebrates		10
3.	The human circulatory system is an organ system that is mainly concerned with the transportation of nutrients, gases, blood cells and hormones throughout the body, through a network of blood vessels, besides that humans also have a lymphatic system. Explain the relationship between the circulatory system and the lymphatic system!		10
4.	A. Explain the specific respiratory mechanism in birds while it was flying! B. Explain the different respiratory mechanisms based on the type of gills in fish!		20
5.	The mechanism of temperature regulation in the body in animals can be divided into physical processes and chemical processes. The transfer of body heat balance is carried out in 4 ways, namely conduction, convection, radiation, and evaporation. Explain how animals, including humans,		15

	maintain body temperature (homeostasis) against environmental changes!		
6.	An amazing pattern of reproduction in animals is sequential hermaphroditism, where an individual changes sex during his lifetime. Explain how the mechanism and the factors that cause this to happen with examples!		10
7.	Behavior is the activity of an organism due to a stimulus, divided into two, namely natural behavior and learning behavior. Explain with examples of 2 animals that have both of these behaviors at the same time!		15
Total			100

PRESENTATION RUBRIC ASSESMENT

Category	Scoring Criteria	Total Points
Organization (15 points)	The type of presentation is appropriate for the topic and audience.	5
	Information is presented in a logical sequence.	5
	Presentation appropriately cites requisite number of references.	5
Content (45 points)	Introduction is attention-getting, lays out the problem well, and establishes a framework for the rest of the presentation.	5
	Technical terms are well-defined in language appropriate for the target audience.	5
	Presentation contains accurate information.	10
	Material included is relevant to the overall message/purpose.	10
	Appropriate amount of material is prepared, and points made reflect well their relative importance.	10
	There is an obvious conclusion summarizing the presentation.	5
Presentation (40 points)	Speaker maintains good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.).	5
	Speaker uses a clear, audible voice.	5
	Delivery is poised, controlled, and smooth.	5
	Good language skills and pronunciation are used.	5
	Visual aids are well prepared, informative, effective, and not distracting.	5
	Length of presentation is within the assigned time limits.	5

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	Information was well communicated.	10
Score	**Total Points**	**100**

Adopted by : https://assessment.illinoisstate.edu/about/workshops/2018_Rubric_Presentation.doc

PRACTICUM PERFORMANCE ASSESSMENT

Practicum Performance Observation Sheet

No	Name	Aspects of Performance Assessment										Total Score	Note
		1	2	3	4	5	6	7	8	9	10		
1													
2													
3													
4													
5													
Dst													

Information:
1 = Practical equipment
2 = Physical appearance readiness
3 = Interpret
4 = Predict
5 = Applying the concept
6 = Planning an experiment
7= Doing an experiment
8 = Communicate

Practicum Performance Assessment Rubric

No	Aspect	Criteria	Score
Preparation			
1	**Practical equipment**	Bring/prepare all (100%) tools and materials.	4
		Not bringing 25% of the total tools/materials or 25% of the total tools/materials not in accordance with the provisions.	3
		Not bringing 50% of the total tools/materials or 50% of the total tools/materials not in accordance with the provisions	2
		Not bringing 75% of the total tools/materials or 75% of the total tools/materials not in accordance with the provisions	1
2	**Physical appearance readiness**	Lab coat worn and neat appearance.	4
		Wearing a lab coat and looking untidy (wearing t-shirts, shorts, or not wearing shoes)	3
		Do not wear a lab coat and look presentable.	2
		Not wearing a lab coat and looking untidy (wearing t-shirts, shorts, or not wearing shoes).	1
Using tools and materials			
3	**Discipline of practical tools/materials**	All tools/materials are taken neatly and not scattered.	4
		25% of the total tools/materials were taken untidy and scattered.	3
		50% of the total tools/materials were taken untidy and scattered.	2
		75% of the total tools/materials were taken untidy and scattered.	1

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4	**Appropriateness of practical tools/materials**	All tools/materials are taken as needed.	4
		Take 25% of the total tools/materials that are not as needed.	3
		Take 50% of the total tools/materials that are not as needed.	2
		Taking 75% of the total tools/materials that are not as needed.	1
5	**Correct operation of the tool**	All tools are operated properly.	4
		25% of the total tools are operated incorrectly.	3
		50% of the total tools are operated incorrectly.	2
		75% of the total tools are operated incorrectly.	1
6	**Practicum Procedure**	Do 100% of the practical steps correctly.	4
		Do 75% of the practical steps correctly.	3
		Do 50% of the practical steps correctly.	2
		Do 25% of the practical steps correctly.	1
Result			
7	**Practical result**	Using as many senses as possible in making observations and doing it carefully according to procedures	4
		Using few senses in making observations and doing it according to procedures	3
		Using as many senses as possible in making observations but not being thorough	2
		Observing the practical results at a glance	1
8	**Practical data**	Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (3 aspects are all fulfilled)	4
		Complete the table according to the results of observations, accompanied by pictures, or accompanied by additional data (information) on the results of the practicum (2 aspects are well fulfilled)	3
		Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (1 aspect is well fulfilled)	2
		Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (no aspect is fulfilled properly)	1
Closing			
9	**Cleanliness of tools that have been used**	All tools that have been used are cleaned properly and returned	4
		Clean all tools that have been used but are not completely clean and return them	3
		Only clean half of used tools and return them	2
		Only clean one or two tools and don't restore all tools	1
10	**Practice table cleaning**	Clean the table until it's really clean	4
		Cleaning the table but still leaving dirt or trash	3
		Only clean part of the side of the table	2
		The table is still dirty, but throw away the dirt or trash	1