	Universitas Negeri Surabaya Faculty of Sports and Health Sciences S1 Sports Coaching Education Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Exercise Physiology	8520202065	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	2	January 1, 2022

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model: Case Studies

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

Program Objectives (PO)

PO - 1	Able to be responsible for the application of sports physiology to individual and group performance
PO - 2	Able to master the concepts, theory and practice of sports physiology in the field of coaching and sports education
PO - 3	Able to use basic physiological thinking in the application of logical, critical, systematic and innovative thinking in the development or implementation of technology
PO - 4	Able to train technically, physically, tactically and mentally in the field of sports by applying basic physiological thinking

PLO-PO Matrix

P.O
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 exercise physiology which includes cells, metabolism and cell division, nervous system, muscular system, circulation, respiration, digestion, nutrition, body temperature, energy systems and metabolism in relation to exercise. This lecture is carried out with presentations, discussions, project assignments and reflections.

References

Main :

1. Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;
2. Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;
3. Nining WK, Hartono S, Nasution J, 2011: Dasar-Dasar Fisiologi Olahraga, Unesa Unipress
4. Nining WK, dkk, 2015: Fisiologi olahraga, Unesa Unipress

Supporters:

1. Modul Pembelajaran Dosen
2. Youtube

Supporting lecturer	Prof. Dr. Nining Widyah Kusnanik, S.Pd., M.Appl.Sc. Dr. Or. Muhammad, S.Pd., M.Pd. Dr. Kunjung Ashadi, S.Pd., M.Fis., AIFO. Bayu Agung Pramono, S.Pd., M.Kes. Dr. Donny Ardy Kusuma, S.Pd., M.Kes. Resti Nurpratiwi, S.Ft., M.Fis.

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	Understand and master cells including shape, size, function and components of cells, cell metabolism, such as anabolism and catabolism, and cell division	1.Students are able to explain and identify the shape and function of cells 2.Students are able to explain the mechanism of metabolism in cells and the process of cell division	**Criteria:** 1.Test 2.Live question and answer test **Form of Assessment** : Participatory Activities, Tests	Lectures, Discussions and Questions and Answers 3 X 50		**Material:** Cell form and function **References:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;*	5%
2	Understand and master cells including shape, size, function and components of cells, cell metabolism, such as anabolism and catabolism, and cell division	1.Students are able to explain and identify the shape and function of cells 2.Students are able to explain the mechanism of metabolism in cells and the process of cell division	**Criteria:** 1.Test 2.Live question and answer test **Form of Assessment** : Participatory Activities, Tests	Lectures, Discussions and Questions and Answers 3 X 50		**Material:** Cell form and function **References:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;*	5%

3	Analyze the muscular system, structure and function of skeletal muscles such as myofibrils, filaments, sliding filaments, types of muscle fibers and muscle contraction	1. Students are able to give at least 3 examples of sports problems related to muscle performance 2. Students are able to identify the sources of muscle-related problems 3. Identifying muscle problems based on the source and the impact they will have on society 4. Students are able to explain the impact of muscle problems and then design patterns to solve these problems	**Criteria:** Analytical rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Lectures, Discussions and Questions and Answers. 3 X 50		**Material:** Muscle performance in sports activities **References:** *Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;* **Material:** Anatomy and function of muscles **References:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress* **Material:** Cases of muscle activity in physical activities **References:** *Lecturer Learning Module* **Material:** the problem of failure in the cultivation of early childhood athletes which is related to muscle performance. **Reference:** *YouTube*	5%

4	Analyze the muscular system, structure and function of skeletal muscles such as myofibrils, filaments, sliding filaments, types of muscle fibers and muscle contraction	1. Students are able to give at least 3 examples of sports problems related to muscle performance 2. Students are able to identify the sources of muscle-related problems 3. Identifying muscle problems based on the source and the impact they will have on society 4. Students are able to explain the impact of muscle problems and then design patterns to solve these problems	**Criteria:** Analytical rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Lectures, Discussions and Questions and Answers. 3 X 50		**Material:** Muscle performance in sports activities **References:** *Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;* **Material:** Anatomy and function of muscles **References:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress* **Material:** Cases of muscle activity in physical activities **References:** *Lecturer Learning Module* **Material:** the problem of failure in the cultivation of early childhood athletes which is related to muscle performance. **Reference:** *YouTube*	5%
5	Mastering circulatory systems such as blood, heart and blood vessels	1. Able to explain the anatomy of the heart, lungs and blood vessels sequentially and correctly 2. Able to identify the differences in these organs in normal people and athletes 3. Able to explain the relationship between changes in these organs due to physical activity	**Criteria:** It is considered correct if it can explain 80% correctly **Form of Assessment** : Participatory Activities	Lectures, Discussions, Analysis and Questions and Answers 3 X 50		**Material:** anatomy of the heart **Bibliography:** *Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;* **Material:** physiological activities of the heart. **Reference:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress*	5%

6	Understand and master the respiratory system such as expiration, inspiration, pulmonary diffusion, exchange of oxygen and carbon dioxide, gas exchange in muscles, and regulation of lung ventilation	1. Be able to explain the meaning of single blood circulation 2. Able to explain double blood circulation 3. Be able to explain the process of pulmonary respiration	**Criteria:** Correct if you can explain 80% correctly **Form of Assessment** : Participatory Activities	Lectures, Discussions, Analysis and Questions and Answers 3 X 50		**Material:** Heart and lung performance **References:** *Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;*	5%
7	Understand and master the structure and function of the digestive system. Mastering the regulator of metabolism, nutrition and body temperature	1. Students are able to give at least 3 examples of sports problems related to VO2max d 2. Students are able to identify the sources of problems related to this matter 3. Identify the problem based on the source and the impact it will have on society 4. Students are able to explain the impact of the problem and then design a pattern to solve the problem	**Criteria:** It is considered correct if it is able to explain 80% correctly **Form of Assessment** : Participatory Activities, Practice/Performance	Lectures, Discussions, Analysis and Questions and Answers 3 X 50		**Material:** VO2max in athletes **References:** *Powers SK, Howley ET, 2009: Exercise Physiology, McGraw Hill;* **Material:** Analysis of Vo2max achievement in athletes. **Reference:** *Lecturer Learning Module* **Material:** understanding athlete's Vo2max **Reference:** *Youtube*	5%
8	Understand and master the structure and function of the digestive system. Mastering the regulator of metabolism, nutrition and body temperature	Demonstrate an intelligent and honest attitude in linking the digestive system. Demonstrate a tough and caring attitude in simulating the process of the digestive system. Demonstrate an honest and tough attitude in linking the processes that regulate metabolism, nutrition and body temperature. Demonstrate perseverance and cooperation	**Criteria:** It is considered correct if it is able to explain 80% correctly **Form of Assessment** : Participatory Activities	Lectures, Discussions, Analysis and Questions and Answers 3 X 50		**Material:** metabolism **References:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress*	15%

9	UTS	1. Students are able to give at least 3 examples of sports problems related to endurance 2. Students are able to identify the sources of problems related to this matter 3. Identify the problem based on the source and the impact it will have on society 4. Students are able to explain the impact of the problem and then design a pattern to solve the problem	**Criteria:** UTS **Form of Assessment** : Participatory Activities, Tests	presentations, lectures and discussions 3 X 50		**Material:** Components of athlete's endurance **Reference:** *Nining WK, et al, 2015: Sports physiology, Unesa Unipress* **Material:** management problems of endurance components in athletes. **Reference:** *Lecturer Learning Module*	5%
10	Master and understand energy systems such as energy sources, basic energy systems (phosphagen/ATP PC system, glycolysis system, and oxidative system). Understand and master the Kreb's cycle and the electron transport chain	1. Be able to explain the structure of the digestive organs 2. explain the concept of energy metabolism 3. explain the body's nutritional needs 4. explain the effects of energy metabolism mechanisms	**Criteria:** It is considered correct if the answer is 80% correct **Form of Assessment** : Participatory Activities, Tests	Lectures, Analysis Discussions, and Questions and Answers 3 X 50		**Material:** concept of energy metabolism **References:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;* **Material:** structure of digestive organs **References:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress* **Material:** nutritional needs of the body **References:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;*	5%

11	Master and understand hormonal control in the body. Understand the chemical classification of hormones, hormone action, endocrine glands and hormones	1. Students are able to give at least 3 examples of sports problems related to energy sources 2. Students are able to identify the sources of problems related to this matter 3. Identify the problem based on the source and the impact it will have on society 4. Students are able to explain the impact of the problem and then design a pattern to solve the problem	**Criteria:** It is considered correct if the answer is 80% correct **Form of Assessment** : Participatory Activities	Lectures, Discussions and Questions and Answers 3 X 50		**Material:** examples of sports problems related to energy sources. **Reference:** *Lecturer Learning Module*	5%
12	Master and understand hormonal control in the body. Understand the chemical classification of hormones, hormone action, endocrine glands and hormones	1. Students are able to give at least 3 examples of sports problems related to energy sources 2. Students are able to identify the sources of problems related to this matter 3. Identify the problem based on the source and the impact it will have on society 4. Students are able to explain the impact of the problem and then design a pattern to solve the problem	**Criteria:** It is considered correct if the answer is 80% correct **Form of Assessment** : Participatory Activities, Tests	Lectures, Discussions and Questions and Answers 3 X 50		**Material:** examples of sports problems related to energy sources. **Reference:** *Lecturer Learning Module*	6%

13	Understand and master energy supply and fatigue Understand energy expenditure during rest and exercise Understand and master metabolism during sub-maximal exercise Master and understand maximum aeobic and maximum anaerobic capacity	1. Demonstrate an intelligent and honest attitude in analyzing the occurrence of energy supply and fatigue Demonstrate a tough and caring attitude in analyzing the occurrence of energy expenditure during rest and exercise Demonstrate an honest and tough attitude in analyzing the process of metabolism during sub-maximal exercise Demonstrate an intelligent and caring attitude in linking aerobic capacity and maximal anaerobic 2. able to relate the chemical classification of hormones, hormone action, endocrine glands and hormones	**Criteria:** It is considered correct if the answer is 80% correct **Form of Assessment** : Participatory Activities	Lectures, Analysis Discussions, and Questions and Answers 3 X 50		**Material:** Definition of Hormones **Bibliography:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;* **Material:** chemical classification of hormones, hormone action, endocrine glands and hormones **Reference:** *Nining WK, Hartono S, Nasution J, 2011: Basics of Sports Physiology, Unesa Unipress*	5%
14	Understand and master energy supply and fatigue Understand energy expenditure during rest and exercise Understand and master metabolism during sub-maximal exercise Master and understand maximum aeobic and maximum anaerobic capacity	1. able to explain the structure of nerves and their function 2. Able to analyze the structure and function of the nervous system. 3. Able to link the relationship between the nervous system and the autonomic nervous system	**Criteria:** Test **Form of Assessment** : Participatory Activities	Lectures, Analysis Discussions, and Questions and Answers 3 X 50		**Material:** Structure and function of the nervous system and the relationship between the nervous system and the autonomic nervous system **References:** *Katch VL, McArdle WD, Katch FI, 2011: Essentials of Exercise Physiology 4th Edition, Lippincott Williams & Wilkins;*	5%

15	Able to find problems that occur due to errors in identifying the ability of athletes or the community to master a sports movement both independently and in groups and be responsible	1. Students are able to give at least 3 examples of sports problems related to movement control 2. Students are able to identify the sources of problems related to this matter 3. Identify the problem based on the source and the impact it will have on society 4. Students are able to explain the impact of the problem and then design a pattern to solve the problem	**Criteria:** It is considered correct if the answer is 80% correct **Form of Assessment** : Participatory Activities, Tests	Lectures, Practical Discussions, Analysis, and Questions and Answers 3 X 50		**Material:** Development of body movements based on age **Reference:** *Lecturer Learning Module*	4%
16	UAS	22	**Criteria:** Maximum score if you can answer the question correctly **Form of Assessment** : Participatory Activities, Tests	UAS		**Material:** Sports physiology **Reference:** *Lecturer Learning Module*	15%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	70%
2.	Practice / Performance	7.5%
3.	Test	22.5%
		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.