	Universitas Negeri Surabaya Faculty of Sports and Health Sciences Bachelor of Sports Science Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Physics	8920102052		T=2	P=0	ECTS=3.18	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Heri Wahyudi, S.Or., M.Pd.

Learning model	**Case Studies**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

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

Short Course Description	Study of kinematics, dynamics, work and energy, impulse and momentum, as well as static fluids and dynamic fluids in the form of theory and practice through mechanical analysis activities of various sports activities. Assessment in this course places more emphasis on performance assessment, namely assessing students‘ mastery of material and communication skills when presenting material that is their duty and responsibility.
References	**Main :**

1. Cameron, J. R., Skofronick, J. G., and Grant, R. M. 2006. Fisika Tubuh Manusia (Judul asli: Physics of The Body). Jakarta: Sagung Seto. Giancoli, Douglas C. 2005. Physics: Principles with Applications. Sixth Edition. New Jersey: Prentice Hall. Hamill, J. & Knutzen, K. M. 2003. Biomechanical Basis of Human Movement. Second Edition. Philadelphia: Lippincott Williams & Wilkins. McGinnis, Peter M. 2005. Biomechanics of Sport and Exercise. Second Edition . New York: Human Kinetics. Zitzewitz, Paul W. 1999. Physics Principles and Problems . New York: Glencoe McGraw-Hill.

	Supporters:
Supporting lecturer	Dr. Roy Januardi Irawan, S.Or., M.Kes. Dr. Abdul Aziz Hakim, S.Or., M.Or. Awang Firmansyah, S.Or., M.Kes. Fajar Eka Samudra, S.Or., M.Kes.

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	Utilize ICT-based learning resources and learning media to understand science process skills (KPS).	Formulate the problem Formulate a hypothesis Design and carry out experiments	**Criteria:** 1. There are 2 examples of problem formulation and the problem formulation is correct, so the score is 4. 2. If one problem formulation is correct, then the score is 2. 3. These criteria also apply to the formulation of hypotheses 4. Experimental design, including: 5. Identify variables (manipulation, response, and control) 6. If all variable identification is correct, score 6	Discussion 2 X 50 Experiment			0%

2	Utilizing ICT-based learning resources and learning media to understand physics and its relationship with other sciences (sports), models, theories, laws, physical quantities, standards and units, unit systems, unit changes, measurement and uncertainty, significant figures and order of magnitude.	Distinguish between models, theories, and laws. Distinguish between basic quantities and derived quantities. Take measurements using significant figures.	**Criteria:** 1.No 2.Answer key 3.Score 4.1 5.a. Write down the appropriate measuring instrument 6.1 7.b. Explain how to use measuring instruments correctly 8.2 9.c. Write down the formula or method for determining the area according to the shape of the area. For example: L = pl (if the shape of the yard is rectangular) 10.2 11.d. Write down the area measurement results in SI units 12.1 13.2 14.a. Write down the appropriate measuring instrument 15.1 16.b. Explain how to use measuring instruments correctly 17.3 18.c. Write down the formula or method for determining volume according to the shape of the space. For example: V = plt (if the shape of the bath is a block) 19.3 20.d. Write down the volume measurement results in SI units 21.1 22.Maximum Score 23.14	Discussion Questions and answers 2 X 50			0%
3	Understand reference frames and coordinate systems, speed, displacement, average speed, instantaneous speed, acceleration, one-dimensional motion with changing speed, one-dimensional motion with changing acceleration, one-dimensional motion with constant acceleration, free fall motion, linear motion graphic analysis .	Explain reference frames and coordinate systems. Calculates the speed, displacement, average speed, instantaneous speed, and acceleration of an object moving in a straight line	**Criteria:** 1.Maximum score: 10 2.The opinion is correct (logical), score 5 3.The argument is correct, score 5	Group I Presentation 2 X 50			0%

4	Understand vectors and scalars, vector addition-graphic methods, vector subtraction, scalar multiplication of vectors, analytical methods for vector addition, relative speed, projectile motion, and uniform circular motion.	Give examples of vector quantities and scalar quantities. Adding and subtracting vectors with graphical and analytical methods. Calculate quantities in projectile motion (parabolic motion), and uniform circular motion	**Criteria:** 1. Answer for the length of time it takes for the ball to touch the floor, (Max score 10) 2. Answer for ball distance, (Max. score 10)	Group II Presentation 2 X 50			0%
5	Understanding Newton's Law I about motion, force, mass, Newton's II law about motion, Newton's III law about motion, gravity-gravitational force, friction and normal force, free body diagrams, several applications of Newton's laws about motion.	Provide examples of the application of Newton's First Law to sports. Provide examples of the application of Newton's Second Law to sports. Provide examples of the application of Newton's Third Law to sports. Draw a free body diagram to solve a problem.	**Criteria:** 1. Answers to questions related to external forces, (Max score 10) 2. Answers to questions related to skateboarding, (Max score 20)	Group III Presentation 2 X 50			0%
6	Utilizing ICT-based learning resources and learning media to apply kinematics and dynamics in analyzing sports branches	Analyze sports branches according to the specialization of each student's sports branch	**Criteria:** 1. The truth in determining the steps for analyzing sports 2. The correctness of the concepts used in conducting sports studies 3. The breadth and depth of concepts or laws in physics used in analyzing sports	Context-based learning 2 X 50			0%
7	Understand friction force, dynamics of uniform circular motion, irregular circular motion, and centrifugation	Explain friction, uniform circular motion, irregular circular motion, and centrifugal forces. Calculate centripetal acceleration in uniform circular motion. Calculating the maximum speed in uniform circular motion Explaining Kepler's laws and Newton's synthesis	**Criteria:** Correct answer to average angular speed of rotation, (Max score 10)	Group IV Presentation 2 X 50			0%

8	Understand work and energy to solve practical problems related to the translational motion of an object.	Calculating the kinetic energy and potential energy of an object (an athlete performing a movement). Distinguish between conservative styles and non-conservative styles. Explain the law of conservation of mechanical energy.	**Criteria:** Correct answer to the question to analyze the results of hitting a golf ball between using a long club and using a short club, (Max score 10)	Group V 2 X 50 Presentation			0%
9	Utilizing ICT-based learning resources and learning media to apply kinematics and dynamics in analyzing sports branches	Analyze sports branches according to the specialization of each student's sports branch	**Criteria:** 1. The correct stages in carrying out sports branch analysis 2. The truth of the concepts or physical laws being studied 3. The breadth and depth of the concepts or physical laws studied	Context-based learningProject-based learning 2 X 50			0%
10	Understand linear momentum and its conservation to analyze the motion of objects interacting with each other in a collision event.	Explain the relationship between momentum and style. Solving a problem related to collision events by applying the law of conservation of momentum. Distinguish between types of collisions. Determine the location of the center of mass of an object and its influence on the translational motion of an object	**Criteria:** If the answer is correct, the maximum score is 10	Group VI Presentation 2 X 50			0%
11	Understand the magnitudes of rotational motion and the relationships between quantities to solve rotational dynamics problems in sports and in everyday life	Mention the quantities in rotational motion. Determines the magnitude of the moment acting on a rotating object. Solving problems in rotational dynamics. Determine the quantities related to angular momentum and its conservation	**Criteria:** 1. Correct answer to Jay's angular velocity about the transverse axis, (Max score 10) 2. Correct answer to Jay's angular velocity when Jay folds his body, (Max score 10)	Group VII Presentation 2 X 50			0%

12	Understand the forces in equilibrium and the conditions for an object to be in equilibrium	Explain equilibrium forces and equilibrium conditions. Solve problems related to statics, especially when applied to human muscles and joints. Distinguish between stability and equilibrium. Explain elasticity, stress, strain, and fracture	**Criteria:** 1. Correct answers to these four questions each have a maximum score of 5. 2. So if each question is answered correctly, you will get a maximum score of 20.	Group VIII Presentation 2 X 50			0%
13	Utilizing ICT-based learning resources and learning media to apply kinematics and dynamics in analyzing sports branches	Analyze sports branches according to the specialization of each student's sports branch	**Criteria:** 1. The correct stages in carrying out sports branch analysis 2. The truth of the concepts and laws of physics studied 3. Breadth and depth of concepts and physical laws studied	Context-based learningProject-based learning 2 X 50			0%
14	Understand the concepts and laws in fluid statics so that students are able to apply them in sports and everyday life.	Density and specific gravity, pressure in fluids, atmospheric pressure and measured pressure, Pascal's principle, pressure measurement, buoyancy and Archimedes' principle, viscosity, surface tension and capillarity.	**Criteria:** If the explanation is correct based on Archimedes' law, then the maximum score is 10	Group IX 2 X 50 Presentation			0%
15	Understand the concepts and laws in fluid dynamics so that students are able to apply them in sports and everyday life	Analyzing ideal fluid dynamics (flow rate and continuity equation) Applying Bernoulli's equation in everyday life	**Criteria:** Correctness in conducting analysis, maximum score 20	Group Presentation X 2 X 50			0%
16	Utilizing ICT-based learning resources and learning media to apply kinematics and dynamics in analyzing sports branches.	Analyze sports branches according to the specialization of each student's sports branch	**Criteria:** 1. The correct stages in analyzing sports branch mechanics 2. The correctness of the concepts and laws of physics used in conducting studies 3. The breadth and depth of concepts and physical laws used in conducting studies	Context-based learningProject-based learning 2 X 50			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
		0%

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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.