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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
General Physics	8420202004		T=2	P=0	ECTS=3.18	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Endah Budi Rahaju, M.Pd.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program which 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	This course discusses Vectors, Particle Kinematics, Particle Dynamics, Fluids, Thermophysics, Optics, Static and Dynamic Electricity, and Magnetism, through active learning with a combination of discussion methods, question and answer and carrying out laboratory activities.
References	**Main :**

1. Bueche, F.J., 2000, Schaum 19s Outline of College Physics, McGraw-Hill.
2. Sarojo, A.G., 2014, Seri Fisika Dasar Mekanika, edisi 5, Salemba Teknika.
3. Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers withModern Physics, Salemba Teknika.

	Supporters:
Supporting lecturer	Dr. Titin Sunarti, M.Si. Drs. Imam Sucahyo, M.Si. Diah Hari Kusumawati, S.Si., M.Si. Nugrahani Primary Putri, S.Si., M.Si. Setyo Admoko, S.Pd., M.Pd. Abd. Kholiq, S.Pd., M.T. Abu Zainuddin, S.Pd., M.Pd. Mita Anggaryani, M.Pd., Ph.D. Meta Yantidewi, S.Si., M.Si. Mukhayyarotin Niswati Rodliyatul Jauhariyah, S.Pd., M.Pd. Utama Alan Deta, S.Pd., M.Pd., M.Si. Dr. Binar Kurnia Prahani, S.Pd., M.Pd.

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	Master the concept of measurement and sources of measurement uncertainty, apply it in measuring an object using appropriate measuring tools, and solve measurement problems using procedural problem solving formulations in everyday life.	1. Explain the concept of measurement using certain tools according to the object being measured. 2. Determine the sources of measurement uncertainty. 3. Use the concept of significant figures in the measurement process. 4. Explain the use of tools to measure length, mass and time. 5. Determine the appropriate measuring instrument for the object to be measured. 6. Carry out the steps of the scientific method in solving examples of measurement problems. 7. Prepare practical reports related to measurement activities. 8. Utilize science and technology in solving examples of measurement problems.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Guided inquiry and DI 3 X 50			0%
2	Master basic knowledge about quantities and units, as well as vectors in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher physics knowledge in accordance with developments in science and technology	1. Identify and classify quantities and units. 2. Explain the unit system and convert units. 3. Explain vector quantities and scalar quantities. 4. Describe equations and describe addition and subtraction of vectors using triangular and parallelogram methods. 5. Utilize science and technology in solving examples of quantity problems.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Inquiry, discussion 3 X 50			0%
3	Master the basic knowledge of motion in one dimension and two dimensions in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Describe and apply the equations of position, displacement, speed and acceleration in one-dimensional motion. 2. Differentiate between radial acceleration and tangential acceleration.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, Practical 3 X 50			0%

4	Master the basic knowledge of motion in one dimension and two dimensions in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Describe and apply the gmb, gmbb equations. 2. Describe two-dimensional motion in projectile motion	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, Practical 3 X 50			0%
5	Master the basic knowledge of movement in one dimension and two dimensions in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Create and interpret graphs of position, velocity and acceleration of time functions for gmb, gmbb and projectile motion.2. Solve motion problems in one and two dimensions.3. Utilizing science and technology in solving examples of straight and curved motion problems.	**Criteria:** 4: the description is correct 3: the description is generally correct, there is one aspect where the explanation is incorrect 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 1: the description is incorrect	Discussion, Practical 3 X 50			0%
6	Master basic knowledge of dynamics, comprehensively, steadily and in depth and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain and apply Newton‘s first law. 2. Explain and apply Newton‘s second law.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Inquiry, Practical 3 X 50			0%

7	Master basic knowledge of dynamics, comprehensively, steadily and in depth and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Distinguish between mass and weight. 2. Explain and apply Newton's third law. 3. Formulate the centripetal forces on gmb and gmbb. 4. Solve dynamics questions. 5. Utilizing science and technology to solve examples of problems with the dynamics of object motion.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Inquiry, Practical 3 X 50			0%
8	Mastering the concepts of units and measurement systems, basic quantities and derived quantities, particle kinematics, force and motion and solving problems in everyday life	1. Explain the system of units and measurements 2. Explain basic quantities and derived quantities 3. Analyzing particle kinematics in solving problems in everyday life4. Analyzing forces and movements in solving problems in everyday life	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	UTS 3 X 50			0%
9	Master the basic knowledge of work and energy, comprehensively, steadily and in depth and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain and formulate work caused by constant forces and changing forces. 2. Explain and formulate kinetic energy and the 13 energy work theorem. 3. Explain conservative forces and formulate efforts by conservative forces. 4. Explain and formulate potential energy and the work-energy theorem.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and Practicum 3 X 50			0%

10	Master the basic knowledge of work and energy, comprehensively, steadily and in depth and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain non-conservative forces and formulate efforts made by non-conservative forces. 2. Explain and apply the law of conservation of energy. 3. Solve relevant problems. 4. Utilize science and technology in solving examples of business and energy problems.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and Practicum 3 X 50			0%
11	Master basic knowledge of vibrations in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Describe harmonic vibrations. 2. Describe and apply the harmonic vibration equation. 3. Create and interpret vibration deviation graphs as a function of time	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Inquiry and DI 3 X 50			0%
12	Master basic knowledge of vibrations in a comprehensive, stable and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain and formulate recovery force and vibration energy. 2. Draw a graph and explain the vibrational superposition equation. 3. Utilizing science and technology to solve examples of vibration problems.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Inquiry and DI 3 X 50			0%

13	Master basic knowledge of temperature and heat in a comprehensive, solid and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain the concept of temperature and its relationship to the concept of thermal balance. 2. Explain the thermometric properties of materials, thermometers, fixed points and temperature scales	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	DI, Practical 3 X 50			0%
14	Master basic knowledge of temperature and heat in a comprehensive, solid and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain the concepts of specific heat and latent heat, as well as their relationship to the state of matter and the PT diagram. 2. Explain the expansion of solids, liquids, gases.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	DI, Practical 3 X 50			0%
15	Master basic knowledge of temperature and heat in a comprehensive, solid and in-depth manner and be able to develop and apply it to study higher knowledge of physics in accordance with developments in science and technology	1. Explain the types of heat transfer 2. Solve relevant questions 3. Utilize science and technology in solving examples of thermodynamics problems.	**Criteria:** 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	DI, Practical 3 X 50			0%
16							0%

Evaluation Percentage Recap: Project Based Learning

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** 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.