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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
General Physics	8420403069	General Physics	T=3	P=0	ECTS=4.77	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Nugrahani Primary Putri, M.Si.	Nugrahani Primary Putri, M.Si.	Prof. Dr. Utiya Azizah, M.Pd.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-5	Able to make decisions based on data/information in order to complete tasks that are their responsibility and evaluate performance that has been carried out both individually and in groups, has an entrepreneurial spirit with an environmental perspective (CPL 7)
	PLO-8	Mastering the basics of scientific methods, designing and carrying out research, compiling scientific reports and communicating them both orally and in writing by utilizing information and communication technology in the field of education (CPL 6)
	Program Objectives (PO)	
	PO - 1	Have the ability to think critically and use appropriate concepts to qualitatively analyze problems or situations involving physics
	PO - 2	Have the ability to use physics concepts and appropriate mathematical/computational methods to obtain solutions to quantitative problems in physics
	PO - 3	Has the ability to collect and analyze data and prepare coherent reports on his abilities
	PO - 4	Have the ability to communicate the results of their findings both in writing and orally
	PLO-PO Matrix	

P.O	PLO-5	PLO-8
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 discusses Vectors, Particle Kinematics, Particle Dynamics, Fluids, Thermophysics, Modern Physics, 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. Dzulkiflih, S.Si., M.T. Abd. Kholiq, S.Pd., M.T. Meta Yantidewi, S.Si., M.Si. Dr. Rohim Aminullah Firdaus, S.Pd, M.Si Dr. Eng. Evi Suaebah, M.Si., M.Sc. Mukhayyarotin Niswati Rodliyatul Jauhariyah, S.Pd., M.Pd. Muhammad Habibbulloh, M.Pd. Dr. Oka Saputra, 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	Students are able to understand and apply vector concepts and particle kinematics	1.Students are able to classify basic quantities, derived quantities and their units 2.Students are able to apply basic vector operations 3.Students can solve particle kinematics problems	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities	Lectures, discussions, assignments 3 X 50	Simulation in a virtual lab with the topic "Measuring Instruments" 3 x 50	**Material:** Ch 1 and Ch 3 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	7%
2	Students are able to understand and apply the concept of particle dynamics	1.Explain the concept of particle dynamics 2.Solving particle dynamics problems	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities	Lectures, discussions and assignments 3 X 50	Lectures, discussions and online practicum 3 x 50	**Material:** ch 1 **References:** *Bueche, FJ, 2000, Schaum 19s Outline of College Physics, McGraw-Hill.* **Material:** Chapter 2 **Bibliography:** *Bueche, FJ, 2000, Schaum 19s Outline of College Physics, McGraw-Hill.* **Material:** Ch 5, 6 and 7 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	5%
3	Students are able to understand and apply the concept of particle dynamics	1.Explain the concepts of work and energy 2.Apply the concepts of work and energy	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Test	Discussion and assignments related to the concept of business and energy 3 X 50	Discussion and assignments related to the concept of work and energy 3 x 50	**Material:** Ch 5, 6 and 7 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	5%

4	Students are able to understand the concepts of static and dynamic fluids	1. Analyze variables that influence fluid conditions 2. Solving problems related to static and dynamic fluid concepts	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities	Discussion and assignments related to static and dynamic fluids 3 X 50	Discussion and assignments related to static and dynamic fluids 3 x 50	**Material:** Ch 2 **Bibliography:** *Bueche, FJ, 2000, Schaum 19s Outline of College Physics, McGraw-Hill.* **Material:** Ch 14 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	5%
5	Students are able to understand the concepts of static and dynamic fluids	1. Analyze variables that influence fluid conditions 2. Solving problems related to static and dynamic fluid concepts	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities	Discussion and assignments related to static and dynamic fluids 3 X 50	Discussion and assignments related to static and dynamic fluids 3 x 50	**Material:** Ch 2 **Bibliography:** *Bueche, FJ, 2000, Schaum 19s Outline of College Physics, McGraw-Hill.* **Material:** Ch 14 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	5%
6	Students are able to understand the concept of oscillations	Solving problems related to the concept of oscillation	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities, Practical Assessment	Lectures, discussions, experiments on the topic masses and springs 3 X 50	Lectures, discussions, experiments on the topic masses and springs 3 x 50	**Material:** Ch 13 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	7%
7	Students are able to understand the concept of waves	Solve problems related to the wave concept	**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Participatory Activities	Discussion and assignment 3 X 50	Discussion and assignment 3 x 50	**Material:** Ch 13 **References:** *Serway, RA, and Jewett, JW, 2010, Physics for Scientists and Engineers with Modern Physics, Salemba Teknika.*	5%
8	UTS		**Criteria:** Get full marks if you can solve all the questions given **Form of Assessment** : Test	Offline 2 X 50			10%
9	Students are able to understand the concept of thermophysics	1. Explain the heat transfer process 2. Apply the laws of thermodynamics to physics problems	**Criteria:** Able to explain the heat transfer process and apply the laws of thermodynamics to physics problems **Form of Assessment** : Participatory Activities	Offline 3x50			5%

10	Students are able to understand the concept of thermophysics	1.Explain the heat transfer process 2.Apply the laws of thermodynamics to physics problems	**Criteria:** Able to explain the heat transfer process and apply the laws of thermodynamics to physics problems **Form of Assessment** : Participatory Activities	Offline 3x50			5%
11	Students are able to understand the concepts of Modern Physics	1.Understand the concept of relativity 2.Understand the concept of black body radiation	**Criteria:** Students are able to complete practice questions related to modern physics concepts **Form of Assessment** : Participatory Activities	• Lecture • Discussion 3x50			5%
12	Students are able to understand the concepts of Modern Physics	1.Understand the concept of relativity 2.Understand the concept of black body radiation	**Criteria:** Students are able to complete practice questions related to modern physics concepts **Form of Assessment** : Participatory Activities, Practical Assessment	• Lecture • Discussion 3x50	Simulation in the virtual lab with the topic "Photoelectric effect" 3x50		7%
13	Students are able to understand the concepts of atomic physics	1.Explain the theories of the atomic model 2.Explain Bohr's theory 3.Calculate the ionization energy of hydrogen atoms	**Form of Assessment** : Participatory Activities	• Lecture • Discussion • Assignment 3x50			5%
14	Students are able to understand the concepts of static and dynamic electricity	1.Students are able to carry out calculations using the concepts of Coulomb's Law and electric fields 2.Students can explain the differences between various types of electrical circuits	**Form of Assessment** : Participatory Activities	• Lecture • Discussion 3x50	• Practicum in the virtual lab with the topic "Circuit construction kit :DC" 3x50		7%
15	Students are able to understand the concept of magnetic fields	1.Students can explain the concepts of magnetic fields, magnetic forces, Lorentz forces, and electromagnetic induction 2.Students can solve questions related to the concept of magnetic fields	**Form of Assessment** : Participatory Activities	• Discussion • Question and answer • Assignment 3x50			5%
16	Final exams	Get full marks if you can solve all the questions given	**Form of Assessment** : Test	Offline 100 minutes			12%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	66%
2.	Practical Assessment	7%
3.	Test	27%
		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** 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.