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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Basic Physics Practicum I	4520101221	Compulsory Study Program Subjects	T=0	P=1	ECTS=1.59	1	August 24, 2023

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-9	Able to work as an individual or team effectively, have entrepreneurial skills, and care about environmental issues.
	PLO-11	Design and conduct experiments in physics learning by applying scientific methods
	PLO-13	Demonstrate knowledge of Classical Physics and Modern Physics
	Program Objectives (PO)	
	PO - 1	Students are able to correlate physics knowledge with the problems of a simple physical system to design and conduct basic physics experiments using scientific methods.
	PO - 2	Students are able to communicate thoughts, ideas, and results of basic physics practice effectively, both orally and in writing.
	PLO-PO Matrix	

P.O	PLO-9	PLO-11	PLO-13
PO-1			
PO-2			

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																

Short Course Description	The Basic Physics Practicum 1 course is intended to introduce practical activities consisting of data collection, data processing and preparing practical reports. In this practicum, students will examine uncertainty in measurements, density of solids, moment of inertia of pulleys, Newton's Second Law, mathematical pendulum, spring constant, pulley system, viscosity of liquids, resonance of sound waves, sensing of thermometers, heat capacity of calorimeters, and heat melting ice. Practical activities are expected to strengthen students' understanding of physical phenomena related to kinematics, dynamics, waves and thermophysics. After taking this practicum course, students can understand the limitations of measurement tools and calculate measurement errors that occur, and can understand the concepts of mechanics and thermophysics through the teaching aids used during the practicum. Students are also expected to be able to see the relationship between theory and practice in general.
References	**Main :**

1. Darmawan B.D, 1984. *Teori Ketidakpastian Menggunakan S* , Penerbit ITB , Bandung.
   Tim Fisika Dasar. 2018. *Buku panduan Praktikum Fisika Dasar 1* . Surabaya.
   D. Halliday, R. Resnick, J. Walker. 2013. *Fundamental of Physics.* 10th ed.
   D. C. Giancoli. 2010. *Physics: Principles with Application.* 6th Edition. Addison-Wesley
2. Panduan Praktikum Fisika Dasar 1, 2019, Penerbit JDS, Surabaya.

Supporters:

	1. Panduan Natural Laboratory, 2021.
Supporting lecturer	Nugrahani Primary Putri, S.Si., M.Si. Nurita Apridiana Lestari, 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	Students are able to correlate physics knowledge about mechanics and thermodynamics with the problems of a simple physical system to design basic physics experiments using scientific methods.	Students are able to explain the concept and application of uncertainty theory, basic measurement and uncertainty in measurement and the basics of using measuring instruments	**Criteria:** Accuracy in explaining measurement concepts **Form of Assessment** : Participatory Activities	Discussion on the introduction of measuring instruments 3 x 50 minutes	Discussion on the introduction of measuring instruments 3 x 50 minutes	**Material:** Measurement uncertainty theory **References:** *Darmawan BD, 1984. Uncertainty Theory Using S , ITB Publishers, Bandung.* *Basic Physics Team. 2018. Basic Physics Practical Guidebook 1 . Surabaya.* *D. Halliday, R. Resnick, J. Walker. 2013. Fundamentals of Physics. 10th ed.* *DC Giancoli. 2010. Physics: Principles with Application. 6th Edition. Addison-Wesley*	5%
2	Students are able to correlate physics knowledge about mechanics and thermodynamics with the problems of a simple physical system to design basic physics experiments using scientific methods.						0%
3							0%
4							0%
5							0%
6							0%
7							0%
8							0%
9							0%
10							0%
11							0%

12							0%
13							0%
14							0%
15							0%
16							0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	5%
		5%

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.