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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Astronomy	8420302262		T=2	P=0	ECTS=3.18	7	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Mita Anggaryani, M.Pd., Ph.D.

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	This course discusses how to observe celestial bodies with the eye or with binoculars, makes theoretical measurements of the observer's position and the position of a star using various systems, discusses the mechanics of celestial bodies, optical limitations of observers, and various types of binoculars used. for observers. The study of astronomy topics is carried out using discussion, question-and-answer and assignment methods.
References	**Main :**
	1. Valdez, J.D. 2020. *Astronomy* . Camiling, Tarlac: Tarlac Agriculture University
	Supporters:
Supporting lecturer	Mukhayyarotin Niswati Rodliyatul Jauhariyah, 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 master astronomical knowledge to identify natural phenomena.	Students master astronomical knowledge about ancient ways of observing celestial objects.	**Criteria:** 1.4 = Very Good 2.3 = Good 3.2 = Fairly Good 4.1. = Not Good	Discussion, questions and answers, assignments. 2 X 50			0%

2	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the measurements of previous astronomers. 2. Students are able to master spherical geometry.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Discussion, questions and answers, assignments. 2 X 50			0%
3	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the horizon coordinate system and its functions. 2. Students are able to formulate physical systems using horizon coordinates.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Discussion, Q&A, Assignments. 4 X 50			0%
4	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the horizon coordinate system and its functions. 2. Students are able to formulate physical systems using horizon coordinates.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Discussion, Q&A, Assignments. 4 X 50			0%
5	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the phenomenon of observer reduction in the field of astronomy. 2. Students are able to formulate mathematically the phenomenon of observer reduction and explain it physically.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Discussion, Q&A, assignments. 4 X 50			0%
6	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the phenomenon of observer reduction in the field of astronomy. 2. Students are able to formulate mathematically the phenomenon of observer reduction and explain it physically.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Discussion, Q&A, assignments. 4 X 50			0%
7	Students master physics knowledge about astronomy to identify natural phenomena.	Students are able to describe astronomical coordinates.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class Discussion and assignment 2 X 50			0%

8	UTS	UTS		UTS 2 X 50			0%
9	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to physically describe the mechanics of celestial bodies (2 objects). 2. Students are able to formulate a physical system regarding the mechanics of celestial bodies (2 objects) using mathematics.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class discussion and assignment 2 X 50			0%
10	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to describe the mechanics of celestial bodies (many objects). 2. Students are able to formulate physical systems regarding the mechanics of celestial bodies (many objects) using mathematics.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class discussion and assignment 2 X 50			0%
11	Students master physics knowledge about astronomy to identify natural phenomena.	Students are able to describe the ecliptic and celestial equator	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class discussion 2 X 50			0%
12	Students master physics knowledge about astronomy to identify natural phenomena.	Students are able to describe the position of the Sun and its relationship to seasonal changes	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Assignment and Observation 2 X 50			0%
13	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics.	1. Students are able to explain the Laws of Radiation. 2. Students are able to formulate physical systems based on the laws of radiation.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class discussion and assignment 2 X 50			0%

14	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics. Communicate ideas/ideas for understanding astronomy based on observational data.	1. Students are able to describe the working principles of telescopes and their relationship to star observations. 2. Students are able to identify the characteristics of telescopes based on their type and function. 3. Students are able to formulate mathematical equations to explain the working principles of telescopes. 4. students are able to analyze and communicate ideas related to observation results based on star observation data using a telescope.	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Good	Class discussion and assignment 2 X 50			0%
15	Students master physics knowledge about astronomy to identify natural phenomena. Students are able to formulate physical systems as a physics model using mathematics. Communicate ideas/ideas for understanding astronomy based on observational data.	1. Students are able to demonstrate astronomical measurements. 2. Students are able to formulate measurement results using astronomical measurement methods. 3. Students are able to communicate ideas related to other experimental data from astrophysics	**Criteria:** 1. 4 = Very Good 2. 3 = Good 3. 2 = Fairly Good 4. 1 = Not Good	Class discussion and assignment 2 X 50			0%
16							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** 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.