



**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
Space Physics	8420302061		T=2	P=0	ECTS=3.18	5	July 17, 2024

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

Learning model	Case Studies
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Program Learning Outcomes (PLO)	PLO study program which is charged to the course																																	
	Program Objectives (PO)																																	
	PLO-PO Matrix																																	
	<table border="1" style="margin: auto;"> <tr> <td style="width: 100px; height: 30px;">P.O</td> </tr> </table>	P.O																																
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	PO Matrix at the end of each learning stage (Sub-PO)																																	
	<table border="1" style="margin: auto;"> <tr> <td rowspan="2" style="width: 30px; height: 30px;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 20px;">1</td> <td style="width: 20px;">2</td> <td style="width: 20px;">3</td> <td style="width: 20px;">4</td> <td style="width: 20px;">5</td> <td style="width: 20px;">6</td> <td style="width: 20px;">7</td> <td style="width: 20px;">8</td> <td style="width: 20px;">9</td> <td style="width: 20px;">10</td> <td style="width: 20px;">11</td> <td style="width: 20px;">12</td> <td style="width: 20px;">13</td> <td style="width: 20px;">14</td> <td style="width: 20px;">15</td> <td style="width: 20px;">16</td> </tr> </table>	P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																		

Short Course Description	Space Physics studies the universe and all its contents (astronomical objects) in a unitary prime-causal understanding that everything that exists must have come from nothing. The lecture approach is phenomenological with the focus of the discussion emphasizing physical aspects which rely on relevant physical laws and observations (mechanics, thermodynamics, electromagnetic wave radiation) to describe the universe. Discussion topics in lectures include the history of astronomy, the big bang and the beginning of the universe, the solar system, stars and star constellations, the Milky Way galaxy, measurements of activity and physical processes in the life cycle of stars.
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References	<b>Main :</b> 1. Prastowo, T. 2012. Sains Kebumihan. Unpublished work. pp.1-25. 2. 2. Karttunen, H. et al. 2007. Fundamental Astronomy. Berlin, Germany: Springer-Verlag. pp.1-510. 3. Gibson, C..2005. 3. The Astronomy Handbook. Devon, UK: D&S Books Ltd. pp.1-256. 4. Gribbin, J. 1998. A Brief History of Science. Sussex, UK: The Ivy Press Limited. pp.1-224. 5. Anugraha, R. 2012. Mekanika Benda Langit. Jurusan Fisika, FMIPA UGM. E-book. pp.1-200.
	<b>Supporters:</b>

Supporting lecturer	Dr. Eko Hariyono, S.Pd., M.Pd. Mita Anggaryani, M.Pd., Ph.D. Nurita Apriana Lestari, S.Pd., M.Pd.
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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	Able to understand the historical overview of the science of Astronomy from time to time from the time of Ptolemy to modern astronomy, including the contributions of Islamic thinkers	Students are able to explain the historical overview of the science of Astronomy from time to time from the time of Ptolemy to modern astronomy, including the contributions of Islamic thinkers		• Lecture• Discussion• Question and answer 2 X 50			0%
2	Able to understand the big bang that marked the birth of the universe, understand the red shift of star emissions that marks the expanding universe, understand the contribution of Islam to the theory of the formation and death of the universe	Students are able to explain the theory of the big bang which marked the birth of the universe, explain the red shift of star emissions which marks the expanding universe, explain the contribution of Islam to the theory of the formation and death of the universe		• Lecture• Discussion• Question and answer 2 X 50			0%
3	Able to understand the solar system based on the Copernican model and the laws of planetary orbital motion according to Kepler's theory, understand the discovery of new astronomical objects based on modern astronomical observations	Students are able to explain the solar system based on the Copernican model and the laws of planetary orbital motion according to Kepler's theory, explain the discovery of new astronomical objects based on modern astronomical observations		• Lecture• Discussion• Question and answer 2 X 50			0%
4	Able to understand the solar system based on the Copernican model and the laws of planetary orbital motion according to Kepler's theory, understand the discovery of new astronomical objects based on modern astronomical observations	Students are able to explain the solar system based on the Copernican model and the laws of planetary orbital motion according to Kepler's theory, explain the discovery of new astronomical objects based on modern astronomical observations		• Lecture• Discussion• Question and answer 2 X 50			0%
5	Able to understand the movement of the earth and moon relative to the sun as the center of the solar system, understand the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), understand the influence of the tilt of the earth's axis on seasonal shifts	Students are able to explain the dynamics of the movement of the earth and moon relative to the sun as the center of the solar system, explain the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), explain the influence of the tilt of the earth's axis on seasonal shifts		• Lecture• Discussion• Question and answer 2 X 50			0%

6	Able to understand the movement of the earth and moon relative to the sun as the center of the solar system, understand the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), understand the influence of the tilt of the earth's axis on seasonal shifts	Students are able to explain the dynamics of the movement of the earth and moon relative to the sun as the center of the solar system, explain the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), explain the influence of the tilt of the earth's axis on seasonal shifts		• Lecture• Discussion• Question and answer 2 X 50			0%
7	Able to understand the movement of the earth and moon relative to the sun as the center of the solar system, understand the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), understand the influence of the tilt of the earth's axis on seasonal shifts	Students are able to explain the dynamics of the movement of the earth and moon relative to the sun as the center of the solar system, explain the influence of the earth's rotation and revolution on life on earth (day-night phenomena and seasonal shifts), explain the influence of the tilt of the earth's axis on seasonal shifts		• Lecture• Discussion• Question and answer 2 X 50			0%
8	Able to understand USS questions well	Students are able to solve USS questions well	<b>Criteria:</b> 100 marks if the USS questions are answered well and correctly	• Written test, open book • Discussion on USS 2 X 50 questions			0%
9	Able to understand the sun-earth-moon as a physical system that influences several phenomena on the earth's surface (sea tides, solar eclipses, lunar eclipses, navigation disturbances due to electromagnetic radiation)	Students are able to explain the sun-earth-moon as a physical system that influences several phenomena on the earth's surface (sea tides, solar eclipses, lunar eclipses, navigation disturbances due to electromagnetic radiation)	<b>Criteria:</b> Full marks if articles are collected	• Lecture• Discussion• Question and answer 2 X 50			0%
10	Able to understand the sun-earth-moon as a physical system that influences several phenomena on the earth's surface (sea tides, solar eclipses, lunar eclipses, navigation disturbances due to electromagnetic radiation)	Students are able to explain the sun-earth-moon as a physical system that influences several phenomena on the earth's surface (sea tides, solar eclipses, lunar eclipses, navigation disturbances due to electromagnetic radiation)	<b>Criteria:</b> Full marks if articles are collected	• Lecture• Discussion• Question and answer 2 X 50			0%

11	Able to understand the evolution of stars and galaxies in the universe, understand the activity and physical processes in the life cycle of a star, understand the HR diagram which describes the main sequence of stars, white dwarf stars and supernova explosions	Students are able to explain the evolution of stars and galaxies in the universe, explain the activity and physical processes in the life cycle of a star, explain the HR diagram which describes the main sequence of stars, white dwarf stars, and supernova explosions		• Lecture• Discussion• Question and answer 2 X 50			0%
12	Able to understand the evolution of stars and galaxies in the universe, understand the activity and physical processes in the life cycle of a star, understand the HR diagram which describes the main sequence of stars, white dwarf stars and supernova explosions	Students are able to explain the evolution of stars and galaxies in the universe, explain the activity and physical processes in the life cycle of a star, explain the HR diagram which describes the main sequence of stars, white dwarf stars, and supernova explosions		• Lecture• Discussion• Question and answer 2 X 50			0%
13	Able to understand various important issues of space physics, including efforts to utilize knowledge about the science of astronomy for human life	Students are able to explain various posters related to important issues of space physics, including efforts to utilize knowledge about astronomy science for human life	<b>Criteria:</b> Full marks if the poster is presented at the end of the semester	• Poster Presentation • Discussion • Questions and Answers 2 X 50			0%
14	Able to understand various important issues of space physics, including efforts to utilize knowledge about the science of astronomy for human life	Students are able to explain various posters related to important issues of space physics, including efforts to utilize knowledge about astronomy science for human life	<b>Criteria:</b> Full marks if the poster is presented at the end of the semester	• Poster Presentation • Discussion • Questions and Answers 2 X 50			0%
15	Able to understand various important issues of space physics, including efforts to utilize knowledge about the science of astronomy for human life	Students are able to explain various posters related to important issues of space physics, including efforts to utilize knowledge about astronomy science for human life	<b>Criteria:</b> Full marks if the poster is presented at the end of the semester	• Poster Presentation • Discussion • Questions and Answers 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.