

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

Document Code

SEMESTER LEARNING PLAN

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| Case Studies | |

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| PLO-11 | Design and c
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	Supporters:						
Support lecturer	Dr. Mohammad E Tutut Nurita, S.Po Laily Rosdiana, S An Nuril Maulida	Budiyanto, S.Pd., M.Pd. d., M.Pd. EPd., M.Pd. Fauziah, S.Pd., M.Pd. Addiannur, S.Pd., M.Pd.					
Week-	Final abilities of each learning stage	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References	Assessment Weight (%)
	(Sub-PO)	Indicator	Criteria & Form	Offline (<i>offline</i>)	Online (<i>online</i>)	1	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Analyzing vibration symptoms to solve relevant problems, making strategic decisions based on data and information, being responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyze the properties of vibrations. Derive the vibration formula equation. Carrying out scientific method steps in solving examples of vibration problems Prepare practical reports related to vibration Utilizing science and technology to describe the time deviation function of vibrations 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Forms of Assessment : Participatory Activities, Practical Assessment, Tests	Case based learning and peer interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Vibrations References : Bueche, FJ (2000). Schaum's outline of college physics. Mc Graw-Hill. Material: Vibration Reader : Giancoli, Douglas. (2014). Physics: Principles with Applications Ed TE. California: Addison- Wesley.	10%
2	Analyzing the symptoms of damped vibrations to solve relevant problems, making strategic decisions based on data and information, being responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyzing damped vibrations Describe the equation for damped vibration Utilizing science and technology to describe the time deviation function of damped vibrations 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning and peer interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Vibrations References : Bueche, FJ (2000). Schaum's outline of college physics. Mc Graw-Hill Material: Vibration Reader : Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	5%

3	Analyze the symptoms of vibration resonance and vibration superposition to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyzing vibration resonance Analyzing vibration superposition Utilizing science and technology to describe the time deviation function of vibration resonance and vibration superposition 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning and peer interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Vibration Reader : Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley. Material: Vibration Reader : Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton	5%
4	Analyzing wave symptoms to solve relevant problems, making strategic decisions based on data and information, being responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyze the properties of waves Derive the wave formula equation Carry out the steps of the scientific method in solving examples of wave problems Prepare practical reports related to waves Utilizes science and technology to describe waves 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Forms of Assessment : Participatory Activities, Practical Assessment, Tests	Case based learning and peer interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Waves Bibliography: Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley. Material: Waves Literature: Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material: Bibliography Wave : Muslim Sahara. (2004). Waves and Optics. Jakarta: Depdikbud Dikti Material: Waves Literature: Bibliography Wave : Muslim Sahara. (2004). Waves and Optics. Jakarta: Depdikbud Dikti Material: Waves Literature: Bueche, FJ(2000). Schaum's outline of college physics. Mc Graw-Hill	10%

5	Analyzing the symptoms of harmonic waves to solve relevant problems, making strategic decisions based on data and information, being responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyzing harmonic waves Analyze the superposition and interference of harmonic waves Derive the formula for superposition and harmonic wave interference Utilizing science and technology to describe harmonic waves 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities	Case based learning 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Harmonic Waves References: Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material: Harmonic Waves References: Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	5%
6	Analyze the symptoms of standing waves to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with the team, by utilizing science and technology in solving problems	 Analyzing standing waves Derived the standing wave formula Leveraging science and technology to describe standing waves 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Waves Literature: Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material: Waves Bibliography: Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	5%
7	Analyze the symptoms of standing wave superposition to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyzing the superposition of standing waves Derive the standing wave superposition formula equation Leveraging science and technology to describe the superposition of standing waves 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Waves Literature: Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material: Waves Bibliography: Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	5%
8	-	Sub-CMPK 1st to 7th Meetings	Criteria: Accuracy and mastery according to the UTS assessment indicators (assessment rubric). Form of Assessment : Test	Mid-Semester Evaluation/Mid- Semester Examination (UTS) 2 X 50'		Material: - Library:	0%

9	Analyze sounds to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems	 Analyze the characteristics of sound (properties of sound) associated with waves. Analyze sound sources (strings and air columns) 	mastery according to assessment indicators (assessment h trubric) 3 x 50' (synchronous) via Zoom/Google Meet Asynchronous via LM: Unesa 3 X 60' Forms of Assessment : Participatory Activities, Practical		and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa	Material: Bibliography : Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material:	10%
		3.Describe the mechanisms of human hearing 4.Carry out the steps of the scientific method in solving sound sample	Assessment, Tests			Bibliography : Bueche, FJ(2000). Schaum's outline of college physics. Mc Graw-Hill Material:	ms
		5.Prepare practical reports related to sound 6.Utilizing science and technology to solve problems related to sound				Bibliography : Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	
10	Analyze sound quality, interference and Doppler effects to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks and agreements with the team, by utilizing science and technology in solving problems.	 Analyze sound quality Analyzing sound interference Analyzing the Doppler effect. Utilizing science and technology to describe the occurrence of the doppler effect 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Bibliography : Crowell, Benjamin. (2003). Vibrations and Waves. California: Fullerton Material: Bibliography : Giancoli, Douglas. (2014). Physics: Principles with Applications Ed 7E. California: Addison- Wesley.	5%
						Material: Bibliography : Sahara Muslim. (2004). Waves and Optics. Jakarta: Depdikbud Dikti	
11	Analyze light as electromagnetic waves to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with the team, by utilizing science and technology in solving problems.	 Analyze light as electromagnetic waves and the electromagnetic spectrum Calculating the speed of light Carry out the steps of the scientific method in solving examples of light problems Compile a practical report related to light Leveraging science and technology to solve problems 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Forms of Assessment : Participatory Activities, Practical Assessment, Tests	Case based learning and peer-interaction 3 x 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 X 60'	Material: Light Literature: Giancoli, Douglas. (2010). Physics II. Jakarta: Erlangga. Material: Light Library: Bueche, FJ (2000). Schaum's outline of college physics. Mc Graw-Hill	10%

12	Analyzing light as geometric optics for solving relevant problems, making strategic decisions based on data and information, being responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems.	 Analyze the formation of images due to the reflection of light in the mirror Analyze the formation of images due to refraction of light in the lens Carry out the steps of the scientific method in completing the reflection of light in mirrors and the refraction of light in lenses Compile a practical report related to the reflection and refraction of light Utilizes science and technology to describe the reflection and refraction of light 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Forms of Assessment : Participatory Activities, Practical Assessment, Tests	Case based learning and peer-interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Light Light Literature: Giancoli, Douglas. (2010). Physics II. Jakarta: Erlangga. Material: Light Library: Bueche, FJ (2000). Schaum's outline of college physics. Mc Graw-Hill	10%
13	Analyze the nature of waves in light to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with the team, by utilizing science and technology in solving problems.	 Analyze the wave properties of light (diffraction, interference and polarization) Utilizing science and technology to describe the wave nature of light 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning and peer-interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Light Literature: Giancoli, Douglas. (2010). Physics II. Jakarta: Erlangga. Material: Light Library: Bueche, FJ (2000). Schaum's outline of college physics. Mc Graw-Hill	5%
14	Analyze optical tools (camera and human eye) to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems.	 Analyzing image formation and its properties in equipment that utilizes light, including cameras and the human eye Utilizing science and technology to describe image formation in cameras and the human eye 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning and peer-interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Optics Reader: Bass, Michael. (1995). Hand Book Of Optics. United States: McGraw-Hill Office Material: Optics Library: Sahara Muslim. (2004). Waves and Optics. Jakarta: Depdikbud Dikti Material: Optics Bibliography: Bueche, FJ(2000). Schaum's outline of college physics. Mc Graw-Hill	5%

15	Analyze optical tools (glasses, scopes, microscopes and binoculars) to solve relevant problems, make strategic decisions based on data and information, be responsible for self- learning, tasks, and agreements with his team, by utilizing science and technology in solving problems.	 Analyze the formation of images and their properties in equipment that uses light, including glasses, louvers, microscopes and binoculars Make decisions about the use of optical equipment and the power of the lenses selected for a particular application Utilizing science and technology to describe the formation of images in glasses, loupes, microscopes and binoculars 	Criteria: Accuracy and mastery according to assessment indicators (assessment rubric) Form of Assessment : Participatory Activities, Tests	Case based learning and peer-interaction 3 X 50'	Case based learning and peer-interaction (synchronous) via Zoom/Google Meet Asynchronous via LMS Unesa 3 x 60'	Material: Optics Reader: Bass, Michael. (1995). Hand Book Of Optics. United States: McGraw-Hill Office Material: Optics Bibliography: Giancoli, Douglas. (2010). Physics II. Jakarta: Erlangga. Material: Optics Bibliography: Bueche, FJ(2000). Schaum's outline of college physics. Mc Graw-Hill	10%
16	-	Sub-CMPK 1 to 15	Criteria: Accuracy and mastery according to the UAS assessment indicators (assessment rubric). Form of Assessment : Test	Final Semester Evaluation/Final Semester Exam 2 x 50'		Material: - Library:	0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	44.15%
2.	Practical Assessment	16.65%
3.	Test	39.15%
		99.95%

Notes

- 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.