



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																
Science and Technology Development	8420102120		T=2	P=0	ECTS=3.18	8	July 18, 2024																																
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																	
			Prof. Dr. Erman, M.Pd.																																	
Learning model	Project Based Learning																																						
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																						
	Program Objectives (PO)																																						
	PLO-PO Matrix																																						
		P.O																																					
Short Course Description	Understand the process of making syrup from aloe vera to be used as food, the process of converting light energy to electricity, how to obtain it and its benefits, the process of making pn junction solar cells by diffusion, the solar cell energy storage system and the application of these cells in everyday life, and able to create learning media.																																						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="width: 10%; text-align: center;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 5%; text-align: center;">1</td> <td style="width: 5%; text-align: center;">2</td> <td style="width: 5%; text-align: center;">3</td> <td style="width: 5%; text-align: center;">4</td> <td style="width: 5%; text-align: center;">5</td> <td style="width: 5%; text-align: center;">6</td> <td style="width: 5%; text-align: center;">7</td> <td style="width: 5%; text-align: center;">8</td> <td style="width: 5%; text-align: center;">9</td> <td style="width: 5%; text-align: center;">10</td> <td style="width: 5%; text-align: center;">11</td> <td style="width: 5%; text-align: center;">12</td> <td style="width: 5%; text-align: center;">13</td> <td style="width: 5%; text-align: center;">14</td> <td style="width: 5%; text-align: center;">15</td> <td style="width: 5%; text-align: center;">16</td> </tr> </table>							P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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References	Main :																																						
	<ol style="list-style-type: none"> 1. Arsyad, Azhar. 2016. Media Pembelajaran Edisi Revisi . Jakarta: PT. Raja Grafindo. 2. Furnawanthi I.2007. Khasiat dan manfaat lidah buaya si tanaman ajaib Edisi 8 . Jakarta selatan: PT. AgroMedia Pustaka 3. Green, MA. 1982. Solar Cells . London: Prentice-Hall, Inc. 4. Takahashi, K., and Konagai, M. 1986. Amorphous Silicon Solar Cells. London: Nort Oxford Academic Publishers Ltd. 5. Wolf, Stanley, and Tauber, Richard N. 1986. Silicon Processing for the VLSI Era . California: Lattice Press. 																																						
Supporting lecturer	Supporters:																																						
	Prof. Dr. Budi Jatmiko, M.Pd. Tutut Nurita, S.Pd., M.Pd. An Nuril Maulida Fauziah, 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	Able to utilize science and technology, namely making syrup from aloe vera to situations faced in solving problems in the field of science	<ol style="list-style-type: none"> 1.Explain the benefits of aloe vera on the body 2.Explain the process of making syrup from aloe vera 	Criteria: <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	Discussion, assignment 2 X 50		0%
2	Able to utilize science and technology, namely making syrup from aloe vera, to situations faced in solving problems in the field of natural sciences. Mastering the process of making syrup from aloe vera which reflects the ability to formalize procedural problem solving in science and technology development. Able to make strategic decisions based on analysis of information and data in practicum making syrup from aloe vera and provide guidance in selecting various alternative solutions. Responsible for assignments and final results of practicum	Conduct an experiment in making syrup from aloe vera	Criteria: <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	Discussion, 2 X 50 cooperative learning model		0%
3	Mastering the process of making syrup from aloe vera which reflects the ability to formalize procedural problem solving in the development of science and technology. Able to make strategic decisions based on analysis of information and data in the practicum on making syrup from aloe vera and provide guidance in choosing various alternative solutions. Responsible for the tasks and final results of the practicum	<ol style="list-style-type: none"> 1.Presenting the results of experiments on making syrup from aloe vera 2.Explain the differences between syrup made from aloe vera and other plants 	Criteria: <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	Discussion, 2 X 50 cooperative learning model		0%

4	Able to utilize science and technology, namely solar cells and able to adapt to situations faced in solving problems in the science field	<ol style="list-style-type: none"> 1.Explain the distribution of black-body radiation 2.Explain the features of the sun 3.Explain the spectral distribution of sunlight 	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, giving assignments, TPS 2 X 50 learning model			0%
5	Able to utilize science and technology, namely solar cells and able to adapt to situations faced in solving problems in the field of science. Mastering the process of converting light energy to electricity, how to obtain it and its benefits, the process of making p-n connection solar cells by diffusion, solar cell energy storage systems and applications these cells in everyday life, as well as being able to design solar cells that reflect the ability to formalize problem solving in the field of science	<ol style="list-style-type: none"> 1.Explain the process of converting light energy to electricity using pictures. 2.Explain the structure of solar cell modules using pictures. 3.Explain the characteristics of solar cell modules. 	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, assignment 2 X 50			0%
6	Mastering the process of converting light energy to electricity, how to obtain it and its benefits, the process of making pn connection solar cells by diffusion, the solar cell energy storage system and the application of these cells in everyday life, and being able to design solar cells and carry out measurements of their output parameters which reflects the ability to formalize procedural problem solving in the field of science	Explain the influence of crystal defects on the properties of semiconductor devices.	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, assignment 2 X 50			0%

7	<p>Able to utilize science and technology, namely solar cells and able to adapt to situations faced in solving problems in the science field. Mastering the process of converting light energy to electricity, how to obtain it and its benefits, the process of making p-n connection solar cells by diffusion, solar cell energy storage systems and cell applications in everyday life, as well as being able to design solar cells and carry out measurements of their output parameters which reflects the ability to formalize procedural problem solving in the field of science</p>	<ol style="list-style-type: none"> 1.Explain with pictures the process by which a pn connection semiconductor is connected to an n-type semiconductor. 2.Calculate the magnitude of the electrostatic voltage that occurs at the p-junction. 3.Calculate the maximum electric field magnitude in the discharge area, and the width of the discharge region. 4.Calculate the amount of capacitance in the discharge area 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	<p>Discussion, assignment 2 X 50</p>		<p>0%</p>
8	<p>Able to utilize science and technology, namely making syrup from aloe vera and solar cells to situations faced in solving problems in the science field</p>	<ol style="list-style-type: none"> 1.Explains the benefits of plants for the body, the process of making syrup from aloe vera 2.Explain the concept of solar cells 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	<p>Midterm Exam (UTS) 2 X 50</p>		<p>0%</p>
9	<p>Able to utilize science and technology, namely creating learning media and being able to adapt to situations faced in solving problems in the science field</p>	<p>Explain audio, visual and audio-visual media</p>	<p>Criteria:</p> <ol style="list-style-type: none"> 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong 	<p>Discussion and assignment 2 X 50</p>		<p>0%</p>

10	Able to utilize science and technology, namely creating learning media and being able to adapt to situations faced in solving problems in the science field	Explain multimedia	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and assignment 2 X 50			0%
11	Able to utilize science and technology, namely creating learning media and being able to adapt to situations faced in solving problems in the science field	Develop a utilization and production plan for learning media	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and assignment 2 X 50			0%
12	Able to utilize science and technology, namely creating learning media and being able to adapt to situations faced in solving problems in the science field	Explain the use of learning media	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and assignment 2 X 50			0%

13	Able to utilize science and technology, namely making learning media and being able to adapt to situations faced in solving problems in the field of science. Able to make strategic decisions based on analysis of information and data in making learning media and providing guidance in choosing various alternative solutions. Responsible for tasks and final results	Create learning media in the form of products, namely puzzles	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and cooperative learning model 2 X 50			0%
14	Mastering the process of creating learning media which reflects the ability to formalize procedural problem solving in science and technology development. Able to make strategic decisions based on analysis of information and data in making learning media and providing guidance in selecting various alternative solutions. Responsible for the tasks and final results of creating learning media	Presenting the results of making learning media, namely puzzles	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion, 2 X 50 cooperative learning model			0%
15	Able to utilize science and technology, namely making learning media and being able to adapt to situations faced in solving problems in the field of science. Able to make strategic decisions based on analysis of information and data in making learning media and providing guidance in choosing various alternative solutions. Responsible for tasks and final results	Create learning media in the form of flash media games	Criteria: 1.4: correct description 2.3: the description is generally correct, there is one aspect where the explanation is incorrect 3.2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4.1: the description is wrong	Discussion and cooperative learning model 2 X 50			0%
16							0%

Evaluation Percentage Recap: Project Based Learning

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.