



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

Document Code

**SEMESTER LEARNING PLAN**

<b>Courses</b>	<b>CODE</b>	<b>Course Family</b>	<b>Credit Weight</b>	<b>SEMESTER</b>	<b>Compilation Date</b>		
General biology	4520103026	Compulsory Study Program Subjects	T=2   P=1   ECTS=4.77	1	July 17, 2024		
<b>AUTHORIZATION</b>		<b>SP Developer</b>	<b>Course Cluster Coordinator</b>	<b>Study Program Coordinator</b>			
		Dr. Novita Kartika Indah, S.Pd., M.Si.	Dr. Yuliani, M.Si.	Prof. Dr. Munasir, S.Si., M.Si.			
<b>Learning model</b>	Project Based Learning						
<b>Program Learning Outcomes (PLO)</b>	PLO study program which is charged to the course						
	Program Objectives (PO)						
	PLO-PO Matrix						
		P.O					
<b>Short Course Description</b>	Understand the basic concepts of Biology as a science, structure and function of cells, metabolism which includes transport, photosynthesis and respiration, genetics, diversity of living things and nomenclature, origins of life, evolution, structure and function of plant and animal organ tissues, ecology, organism behavior and biotechnology, and practice solving problems using scientific methods. General Biology studies are accompanied by various process skills (minds on activity and hands on activity) which will be used to solve problems in the field of Biology and its applications. Learning is delivered through presentations, discussions and practicums.						
	<b>References</b>	<b>Main :</b> 1. Campbell, Neil A, Jane B.Reece dan Lawrence G.Mitchell. 2003. Biologi . California: Benjamin Cummings. 2. Kimball, J.W. 1989. Biologi Jilid I, II, III . Edisi Kelima. Cetakan Kedua. Jakarta: Penerbit Erlangga. 3. Rachmadiarti, F.,Yuliani, Widowati B , Rinie P, Mahanani T.A, Dyah H.,Herlina F.2007. Biologi Umum . Surabaya: UNESA Press. 4. Luria. 1981. A View of Life . California: Benyamin Cumming.					
	<b>Supporters:</b>						
<b>Supporting lecturer</b>	Dr. Tarzan Purnomo, M.Si. Dr. Novita Kartika Indah, S.Pd., M.Si. Dr. H. Sunu Kuntjoro, S.Si., M.Si. Rofiza Yolanda, S.Si, M.Si, Ph.D.						
<b>Week-</b>	<b>Final abilities of each learning stage (Sub-PO)</b>	<b>Evaluation</b>		<b>Help Learning, Learning methods, Student Assignments, [ Estimated time ]</b>		<b>Learning materials [ References ]</b>	<b>Assessment Weight (%)</b>
		<b>Indicator</b>	<b>Criteria &amp; Form</b>	<b>Offline ( offline )</b>	<b>Online ( online )</b>		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Understand the steps of the scientific method in experimental research independently and honestly	<ol style="list-style-type: none"> <li>1.Explain the steps of the scientific method i • M</li> <li>2.Apply the steps of the scientific method in a simple experiment</li> <li>3.Skilled in applying biological concepts in solving biologist problems</li> <li>4.Demonstrate an honest and independent attitude during the learning process using observation instruments</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2.Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3.Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>4.USS weight 20%</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	Practical Assignment Discussion Lecture		<p><b>Material:</b> Biology as a science: Scientific method Problem formulation, hypothesis, research variables, operational definition of research variables, research design, research steps, <b>Library:</b> <i>Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. General biology . Surabaya: UNESA Press.</i></p>	0%
2	Explain the structure of an organism's cells and relate it to its function independently and honestly 2. Understand the concept of gene and chromosome structure, DNA, RNA, protein synthesis independently and honestly	<ol style="list-style-type: none"> <li>1. Describe the structure of cells</li> <li>2. Explain the chemistry of life</li> <li>3. Demonstrate an honest and independent attitude during the learning process using observation instruments</li> <li>4. Describe the structure of genes and chromosomes and relate it to the mutation process in organisms</li> <li>5. Differentiate the structures of DNA and RNA, and link them</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2.Student activities and responses during learning activities are assessed as PARTICIPATION with a weight of 20%,</li> <li>3.USS weight 20%</li> <li>4.US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	<ol style="list-style-type: none"> <li>1. Discuss the differences between plant and animal cells based on PPT-02 and source books 1,2,3,4</li> <li>2. Carry out activities <ol style="list-style-type: none"> <li>a. Introduction to the microscope</li> <li>b. Observation of plant and animal cells</li> </ol> </li> <li>3. Make an activity report</li> <li>4. Discussion and questions and answers about genes, chromosomes, nucleic acids and protein synthesis</li> <li>5. Video Observation</li> </ol>		<p><b>Material:</b> • Cells: structure and function • Genes and chromosomes • Structure of genes and chromosomes in prokaryotes and eukaryotes • Genetic expression • Nucleic acids • Protein synthesis <b>References:</b> <i>Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. General biology . Surabaya: UNESA Press.</i></p>	0%
3	Understand the structure of tissues and organs and relate to their function independently and honestly	Describe the structure of tissues and organs (plants and animals) and relate their functions	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2.Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3.USS weight 20%</li> <li>4.US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<ol style="list-style-type: none"> <li>1. Discussion and questions and answers regarding the structure of plant/animal tissues and organs</li> <li>2. Observing the structure of plants and animals</li> <li>3. Making a report on the structure of plants and animals</li> </ol>		<p><b>Material:</b> Structure and function 1. Structure and function of animal tissues and organs 2. Structure and function of plant tissues and organs <b>References:</b> <i>Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. General biology . Surabaya: UNESA Press.</i></p>	10%

4	Understand the concept of cell division	<ol style="list-style-type: none"> <li>1. Explain the stages of cell division</li> <li>2. Differentiate between mitotic and meiotic cell division</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>4. USS weight 20%</li> <li>5. US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<ol style="list-style-type: none"> <li>1. Discussion and questions and answers on cell division</li> <li>2. Carrying out video observation activities on cell division</li> </ol>		<p><b>Material:</b> Cell Division: Mitosis and Meiosis <b>References:</b> Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. <i>General biology</i> . Surabaya: UNESA Press.</p>	10%
5	Distinguish between various types of cell transport used in everyday life independently and honestly	<ol style="list-style-type: none"> <li>1. Explain the concept of cell transport</li> <li>2. Differentiate between passive and active transport</li> <li>3. Skilled in carrying out practical activities observing cell plasmolysis</li> <li>4. Explain the role of physics (fluids) in the human circulatory system</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. USS weight 20%</li> <li>4. US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	<ol style="list-style-type: none"> <li>1. Discussion and answers regarding cell transport</li> <li>2. Video Observation</li> <li>3. Carrying out Plasmolysis and deplasmolysis Practicum</li> <li>4. Making a practical report independently and honestly</li> </ol>		<p><b>Material:</b> Metabolism: Cell Transport,; Implementation of physics (fluids) in the blood transport system (circulatory system) <b>References:</b> Kimball, JW 1989. <i>Biology Volumes I, II, III. Fifth Edition. Second printing.</i> Jakarta: Erlangga Publishers.</p>	0%
6	Understand the concept of photosynthesis and relate it to the physiological processes of plants and their benefits to other organisms independently and honestly	<ol style="list-style-type: none"> <li>1. Explain the concept of photosynthesis and relate it to the physiological processes of plants and its benefits for other organisms</li> <li>2. Skilled in carrying out photosynthesis experimental activities</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. USS weight 20%</li> <li>4. US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Practical Assessment</p>	<ol style="list-style-type: none"> <li>1. Discuss the concept of photosynthesis and its benefits for other organisms based on PPT 05 and textbook no. 1.3</li> <li>2. Observe photosynthesis videos</li> <li>3. Carry out Photosynthesis Practicum activities responsibly</li> <li>4. Make practicum reports independently and honestly</li> </ol>		<p><b>Material:</b> Metabolism: Photosynthesis <b>Bibliography:</b> Campbell, Neil A, Jane B. Reece and Lawrence G. Mitchell. 2003. <i>Biology. California: Benjamin Cummings.</i></p>	5%

7	Understand the concept of respiration and relate it to physiological processes and its benefits for other organisms independently and honestly	<ol style="list-style-type: none"> <li>1. Explain the concept of respiration and relate it to physiological processes and its benefits for other organisms</li> <li>2. Skilled in carrying out respiration rate experimental activities</li> <li>3. Demonstrate an honest and independent attitude during the learning process using observation instrument sheets</li> </ol>	<b>Form of Assessment :</b> Project Results Assessment / Product Assessment	<ol style="list-style-type: none"> <li>1. Discussion and questions and answers regarding the concept of respiration and its role in organism metabolism based on PPT 06 sources</li> <li>2. Video observations of the stages of respiration</li> <li>3. Carrying out practical activities on the speed of respiration in crickets</li> <li>4. Making a report</li> </ol>			5%
8			<b>Form of Assessment :</b> Project Results Assessment / Product Assessment, Test	Midterm exam			10%
9	Classify various living things based on a classification system independently and honestly	<ol style="list-style-type: none"> <li>1. Classify various living things based on classification systems</li> <li>2. Explain the occurrence of variations</li> <li>3. Skilled in creating dichotomous keys</li> <li>4. Demonstrate an honest and independent attitude during the learning process using observation instrument sheets</li> </ol>	<b>Criteria:</b> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. USS weight 20%</li> </ol> <b>Forms of Assessment :</b> Project Results Assessment / Product Assessment, Practical Assessment	<ol style="list-style-type: none"> <li>1. Discussion and questions and answers regarding classification, variation and dichotomy keys</li> <li>2. Create a key to identify living things based on the morphology of various types of plants</li> </ol>	<b>Material:</b> Diversity and Nomenclature - Classification Systems - Variations of Living Things - Dichotomy Key - Nomenclature: a. Binary system b. Rules <b>Bibliography:</b> <i>Campbell, Neil A, Jane B. Reece and Lawrence G. Mitchell. 2003. Biology. California: Benjamin Cummings.</i>		10%
10	Distinguish between the theories of abiogenesis and biogenesis and understand genetic populations independently and honestly	<ol style="list-style-type: none"> <li>1. Distinguish between the theories of abiogenesis and biogenesis and understand population genetics</li> <li>2. Demonstrate an honest and independent attitude during the learning process using observation instrument sheets</li> </ol>	<b>Criteria:</b> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. USS weight 20%</li> <li>4. US weight 30%</li> </ol> <b>Forms of Assessment :</b> Project Results Assessment / Product Assessment, Practical Assessment	Discuss the concept of evolution and the origin of life		<b>Material:</b> - Evolution - Origin of life - Population - Genetics <b>References:</b> <i>Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. General biology. Surabaya: UNESA Press.</i>	10%

11		<ol style="list-style-type: none"> <li>Identify receptors found in an organism</li> <li>Explain the mechanism of stimulation/stimulus and the response given</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>USS weight 20%</li> </ol> <p><b>Form of Assessment :</b> Practical Assessment</p>	Discuss the concept of video observation receptors		<p><b>Material:</b></p> <ul style="list-style-type: none"> <li>Receptors in Organisms</li> <li>Response mechanisms</li> </ul> <p><b>References:</b> Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. <i>General biology</i>. Surabaya: UNESA Press.</p>	5%
12		Discuss the concepts of movement and muscles	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>USS weight 20%</li> </ol> <p><b>Forms of Assessment :</b> Project Results Assessment / Product Assessment, Practical Assessment</p>	Discuss the concepts of movement and muscles		<p><b>Material:</b> The human movement system and its relationship to Newton's law.</p> <p><b>Reference:</b> Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. <i>General biology</i>. Surabaya: UNESA Press.</p>	10%
13	Understand ecological concepts and apply them in daily life independently and honestly	<ol style="list-style-type: none"> <li>Explain ecology</li> <li>carry out research related to ecosystems,</li> <li>communicate the results of investigations and apply them in everyday life.</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>USS weight 20%</li> <li>US weight 30%</li> </ol> <p><b>Form of Assessment :</b> Practical Assessment</p>	<ol style="list-style-type: none"> <li>Discussion and questions and answers about ecology and ecosystem components</li> <li>Carrying out vegetation analysis practicum activities</li> <li>Making a vegetation analysis report</li> </ol>		<p><b>Material:</b> Ecology</p> <ol style="list-style-type: none"> <li>Individuals to ecosystems</li> <li>Energy Flow</li> <li>Interaction Patterns</li> </ol> <p><b>References:</b> Rachmadiarti, F., Yuliani, Widowati B., Rinie P, Mahanani TA, Dyah H., Herlina F. 2007. <i>General biology</i>. Surabaya: UNESA Press.</p>	5%
14		<ol style="list-style-type: none"> <li>Explain the meaning and scope of eco-friendly bionanotechnology</li> <li>Provide examples of applications of bionanotechnology concepts</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>USS weight 20%</li> </ol> <p><b>Forms of Assessment :</b> Project Results Assessment / Product Assessment, Practical Assessment</p>	<ol style="list-style-type: none"> <li>Discussion of the concept of bionanotechnology</li> <li>Examining articles that apply the concept of bionanotechnology</li> </ol>		<p><b>Material:</b> Eco-friendly Bionanotechnology</p> <p><b>Library:</b> Luria. 1981. <i>A View of Life</i>. California: Benjamin Cumming.</p>	10%

15	Understand various implementations of bionanotechnology that are beneficial to human life	<ol style="list-style-type: none"> <li>1. Analyze the role of bionanotechnology for organisms in the future</li> <li>2. Communicate applications of bionanotechnology</li> </ol>	<b>Criteria:</b> <ol style="list-style-type: none"> <li>1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30%,</li> <li>2. Student activities and responses during learning activities, especially practicums, are assessed as PARTICIPATION with a weight of 20%</li> <li>3. USS weight 20%</li> <li>4. US weight 30%</li> </ol> <b>Form of Assessment :</b> Practical Assessment	Presentation on Bionanotechnology applications		<b>Material:</b> Application of Bionanotechnology (relationship of biology and physics in the application of nanorechnology. <b>Reference:</b> <i>Campbell, Neil A, Jane B. Reece and Lawrence G. Mitchell. 2003. Biology. California: Benjamin Cummings.</i>	5%
16			<b>Form of Assessment :</b> Test				5%

#### Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Project Results Assessment / Product Assessment	50%
2.	Practical Assessment	40%
3.	Test	10%
		100%

#### 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.