



**Universitas Negeri Surabaya
Faculty of Sports and Health Sciences,
Undergraduate Nutrition Study Program**

Document
Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Cellular biology	1321102078	Clinical Nutrition	T=2 P=0 ECTS=3.18	1	July 17, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator		Study Program Coordinator
	Dra. Siti Sulandjari, M.Si.		Cleonara Yanuar Dini, S.Gz, M.Sc., RD		Amalia Ruhana, S.P., M.P.H.

Learning model	Case Studies																																																																																																																					
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																																																																					
	PLO-8 Able to master the scientific basis of nutrition, food, biomedicine, humanities and public health sciences.																																																																																																																					
	PLO-9 Able to have an attitude of belief in the Almighty God, be ethical, disciplined, aware of the law, have a social and cultural insight, and behave professionally.																																																																																																																					
	PLO-11 Able to solve problems in the field of nutrition by applying scientific thinking concepts and cutting-edge approaches through research, scientific literacy and publications.																																																																																																																					
	Program Objectives (PO)																																																																																																																					
	PO - 1 Understand cell theory																																																																																																																					
	PO - 2 Understanding cell organelles																																																																																																																					
	PO - 3 Understanding the Structure and Role of Membranes																																																																																																																					
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	PLO-PO Matrix																																																																																																																					
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Short Course Description Discussion of student learning experiences through discussion activities and problem solving assignments (PBL) related to cell biology which are divided into:. This course also explores the function of nutrients in relation to components in cells as well as the stages of cellular energy formation by nutrients.

References	Main :
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1. Campbell, N.A., J.B. Reece, L.A. Urry, M.L. Cain, S.A. Wasserman, P.V. Minorsky dan R.B. Jackson. 2002. Biologi Edisi Kedelapan Jilid 1, Jakarta: Penerbit Erlangga
2. O'Connor, C. M. & Adams, J. U. 2010. Essentials of Cell Biology. Cambridge, MA: NPG Education
3. Tan, M.I., A. Berlian dan E. A. Giri-Rachman. 2016. Biologi Sel Dan terapannya. Bandung: ITB Press

Supporters:

Supporting lecturer
 Dra. Hj. Siti Sulandjari, M.Si.
 Cleonara Yanuar Dini, S.Gz., Dietisien, M.Sc.
 Lini Anisfatus Sholihah, S.Gz., M.Sc.
 Satwika Arya Pratama, S.Gz., M.Sc.

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 understand the Cell Biology Semester Lecture Plan	Describes the contents of the Semester Lecture Plan for the Cell Biology course	<p>Criteria: Correctly explain the course description, lecture achievements, scope, lecture rules, and the importance of Cell Biology</p> <p>Form of Assessment : Participatory Activities</p>	Discussion Questions and answers 2 X 50			0%
2	Students master the concept of cells, cell development, cell changes	<ol style="list-style-type: none"> 1.Explain the concept of cells 2.Describe the evolution of cells 3.Describe cell components 	<p>Criteria: Explain the concept of cells, the history of cell development and cell components completely and correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<ul style="list-style-type: none"> - Cooperative Learning: - Giving discussion assignments - Group discussion Assignments - Presentation of discussion results - Drawing up conclusions 2 X 50		<p>Material: Cell theory</p> <p>Bibliography: O'Connor, CM & Adams, JU 2010. Essentials of Cell Biology. Cambridge, MA: NPG Education</p>	4%
3	Students master prokaryotic and eukaryotic cells	<ol style="list-style-type: none"> 1.Compare prokaryotic cells with eukaryotic cells 2.Analyzing differences in activity related to differences in prokaryotic and eukaryotic cell structures 	<p>Criteria: Compare prokaryotic cells, animal cells and plant cells completely and correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Case Base Learning Learning Model: <ul style="list-style-type: none"> - Studying related cases that differentiate between prokaryotic and eukaryotic cells given by the lecturer - Discussing solving the case - Presenting the results of the discussion - Questions and answers related to the results of problem solving - Preparing a result report 2 X 50		<p>Material: Prokaryotic and eukaryotic cells</p> <p>References: O'Connor, CM & Adams, JU 2010. Essentials of Cell Biology. Cambridge, MA: NPG Education</p>	4%

4	Understand the structure and function of the endoplasmic reticulum, golgi bodies, microbodies, microtubules, microfilaments	<ol style="list-style-type: none"> 1. Describe the structure and function of the reticulum 2. Describe the structure and function of the Golgi apparatus 3. Describe the structure and function of micro bodies 4. Describe the structure and function of microtubules 5. Describe the structure and function of microfilaments 	<p>Criteria: Analyze the structure and function of the endoplasmic reticulum, Golgi bodies, microbodies, microtubules, microfilaments correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Case Base Learning Model: - Students study cases of health disorders related to disorders of the function of the reticulum, Golgi body, microtubules or microfilaments - Discuss in groups to solve cases - Collect information/data to solve problems - Present results - Prepare reports 2 X 50		<p>Material: Cell organelles References: O'Connor, CM & Adams, JU 2010. <i>Essentials of Cell Biology.</i> Cambridge, MA: NPG Education</p>	4%
5	Understand the structure and function of lysosomes, plastids, centrosomes, ribosomes, mitochondria, and chloroplasts	<ol style="list-style-type: none"> 1. Describe the structure and function of lysosomes 2. Describe the structure and function of the centrosome 3. Describe the structure and function of ribosomes 	<p>Criteria: Describe the structure and function of lysosomes, plastids and ribosomes correctly according to the answer key or rubric to get the maximum score</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Case Base Learning Model: - Students study cases of health disorders related to the function of lysosomes, centrosomes and ribosomes - Discuss in groups to discuss solving cases - Present the results of solving cases - Prepare results reports after receiving input 2 X 50		<p>Material: Cell Organelles Bibliography: Campbell, NA, JB Reece, LA Urry, ML Cain, SA Wasserman, PV Minorsky and RB Jackson. 2002. <i>Biology Eighth Edition Volume 1,</i> Jakarta: Erlangga Publishers</p>	5%
6	Understand the structure and function of the cell nucleus	<ol style="list-style-type: none"> 1.1. Describe the structure of the nucleus 2. Describe the function of the nucleolus 	<p>Criteria: Students get the maximum score from answering the structure of the cell nucleus and function of the cell nucleus correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Cooperative learning: - Studying assignments from the lecturer - Discussing in groups discussing assignments - Presenting the results of assignment discussions - Carrying out questions and answers - Making conclusions 2 X 50		<p>Material: Cell structure and function References: Campbell, NA, JB Reece, LA Urry, ML Cain, SA Wasserman, PV Minorsky and RB Jackson. 2002. <i>Biology Eighth Edition Volume 1,</i> Jakarta: Erlangga Publishers</p>	5%
7	Understand the structure and function of the cell nucleus	<ol style="list-style-type: none"> 1. Describe DNA replication 4. 5. 2. Deciphering transcription 3. Describe translation 	<p>Criteria: Describe replication, transcription and translation correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Case Base Learning Model: - Students study cases related to deviations in replication, transcription and translation given by the lecturer - Have discussions in groups to solve cases - Collect information/data to solve cases - Present the results of group discussions 2 X 50		<p>Material: Core structure and function: Replication, Transcription, Translation References: O'Connor, CM & Adams, JU 2010. <i>Essentials of Cell Biology.</i> Cambridge, MA: NPG Education</p>	5%

8	UTS	Meetings 2 to 7	Form of Assessment : Test	2 X 50			20%
9	Understand the shape of models, structure and function of membranes	<ol style="list-style-type: none"> 1. Identify the shapes of cell membrane models 2. Describe the structure of the cell membrane 3. Describe the function of cell membranes 	<p>Criteria: Describe the types of membranes, membrane structures, and cell membrane functions correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Case Base Learning Model</p> <ul style="list-style-type: none"> - Studying cases from lecturers - Discussing in groups - Presenting discussion results - Making results reports <p>2 X 50</p>		<p>Material: Structure and Function of Cell Membranes</p> <p>References: <i>Tan, MI, A. Berlian and EA Giri-Rachman. 2016. Cell Biology and its applications. Bandung: ITB Press</i></p>	5%
10	Understand transport through membranes	<ol style="list-style-type: none"> 1. Explain the process of diffusion through a membrane 2. Describe active transport through cell membranes 3. Describe osmosis through cell membranes 	<p>Criteria: Get maximum marks if you describe transport through membranes correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	<p>Base Learning case model:</p> <ul style="list-style-type: none"> - Study cases related to transportation via membranes from the lecturer - Discuss in groups to solve cases - Collect information/data related to the function of membranes in the transportation process - Present the results of the discussion - Prepare a report on the results <p>2 X 50</p>		<p>Material: Transport through membranes</p> <p>References: <i>Tan, MI, A. Berlian and EA Giri-Rachman. 2016. Cell Biology and its applications. Bandung: ITB Press</i></p>	5%
11	Understand cell reproduction and growth	<ol style="list-style-type: none"> 1. Explain the concept of DNA 2. Explain the concept of chromosomes 3. Describe the process of mitosis and its functions 4. Describe the process of amitosis and its function 5. Describe the process of meiosis and its functions 	<p>Criteria: Describe cell reproduction correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Case Base Learning Model:</p> <ul style="list-style-type: none"> - Study cases related to cell reproduction and growth given by the lecturer - Discuss in groups to plan case solutions - Collect information/data to solve cases - Present results <p>2 X 50</p>		<p>Material: Cell reproduction</p> <p>Bibliography: <i>Campbell, NA, JB Reece, LA Urry, ML Cain, SA Wasserman, PV Minorsky and RB Jackson. 2002. Biology Eighth Edition Volume 1, Jakarta: Erlangga Publishers</i></p>	5%
12	Mastering the Cell Cycle and Cell Death	<ol style="list-style-type: none"> 1. Describe the stages and control of the cell cycle 2. Explain the meaning of apoptosis 3. Describe the factors causing apoptosis 4. Distinguish between apoptosis and necrosis 5. Provide examples of diseases related to apoptosis and necrosis 	<p>Criteria: Describe the stages of cell cycle control, the meaning and factors that cause apoptosis, and the differences between apoptosis and necrosis completely and correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Case Base Learning Model:</p> <ul style="list-style-type: none"> - Studying health cases related to apoptosis and necrosis given by the lecturer - Discussing in groups to take steps to solve the case - Presenting the results of collecting information/data to solve the problem - Making a report <p>2 X 50</p>		<p>Material: Cell cycle</p> <p>References: <i>O'Connor, CM & Adams, JU 2010. Essentials of Cell Biology. Cambridge, MA: NPG Education</i></p>	5%

13	Understanding the phenomenon of cell mutation related to Cellular Nutrition	<ol style="list-style-type: none"> 1.Explain the nutrients in cells 2.Explain the function of nutrients in relation to the structure and function of organs in cells 3.Identify the impact of lack of nutrients needed by organelles and DNA (e.g. mitochondria) 	<p>Criteria: Describe the stages of cell cycle control, the meaning and factors that cause apoptosis, and the differences between apoptosis and necrosis completely and correctly</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Cooperative Learning Model: - Studying discussion assignments - Discussing in groups - Presentation of discussion results - Question and answer 2 X 50		<p>Material: Nutrition and Cell Mutations</p> <p>References: Tan, Ml, A. <i>Berlian and EA Giri-Rachman. 2016. Cell Biology and its applications. Bandung: ITB Press</i></p>	3%
14	Understanding Signal Transduction	<ol style="list-style-type: none"> 1.Explain the meaning of signaling 2.Describes the stages of the cellular signaling process 3.Describe extracellular transduction 4.Compare endocrine, paracrine and autocrine signaling 5.Comparing 3 classes of receptor proteins: ion-channel-linked, G-protein-linked, and enzyme-linked receptorins 	<p>Criteria: Describe the various types of signals and signaling mechanisms correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Case Base Learning Model: - Studying cases - Discussion - Presentation - Question and answer 2 X 50		<p>Material: Cell Signaling</p> <p>References: Tan, Ml, A. <i>Berlian and EA Giri-Rachman. 2016. Cell Biology and its applications. Bandung: ITB Press</i></p>	5%
15	Understanding cell communication	<ol style="list-style-type: none"> 1.Explain the meaning of cell communication 2.Describe the types of direct communication 3.Describe the types of indirect communication 4.Analyze the impact of cell communication errors 	<p>Criteria: Analyze the various types of cell communication and their impacts correctly according to the answer key or rubric</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Case Base Learning Model: - Studying cases related to cell communication given by the lecturer - Discussing in groups to design case solutions - Gathering information for case solving purposes - Presenting the results of case solving - Formulating conclusions and preparing reports 2 X 50		<p>Material: Cell communication</p> <p>References: Tan, Ml, A. <i>Berlian and EA Giri-Rachman. 2016. Cell Biology and its applications. Bandung: ITB Press</i></p>	5%
16	UAS		<p>Criteria: Answers to questions are in accordance with the answer key or rubric</p> <p>Form of Assessment : Test</p>				20%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	30%
2.	Portfolio Assessment	9.5%
3.	Test	60.5%
		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** 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.