



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
Nutrition and Biomolecular	1321102022	Study Program Elective Courses	T=0	P=0	ECTS=0	4	February 1, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Cleonara Yanuar Dini, S.Gz., M.Sc., RD		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	Students understand knowledge about nutrition and biomolecular science, omics science (genomic, epigenomic, transcriptomics, proteomics, metabolomics) and genetic variations related to diet
PO - 2	Students are able to mention the structure and function of cells, nucleus, genes, genome, central dogma, concepts of replication, transcription and translation
PO - 3	Students mentioned things that could cause DNA damage, gene mutations and polymorphism
PO - 4	Students are able to explain the role of diet in cell proliferation and apoptosis
PO - 5	Students are able to explain the concepts of nutrigenomics, metabolomics and personal nutrition
PO - 6	Students are able to explain the technology and methods used in the field of molecular nutrition
PO - 7	Students are able to explain the relationship between nutrition in physiological and biochemical processes in the human body which influence gene expression
PO - 8	Students are able to analyze the role of functional food in nutritional therapy and disease prevention
PO - 9	Students are able to explain gut microbiota, diet and health in molecular studies
PO - 10	Students are able to explain cancer in the study of molecular nutrition
PO - 11	Students are able to explain the relationship between obesity in molecular nutritional studies
PO - 12	Students are able to explain fermented foods in the study of molecular nutrition
PO - 13	Students are able to explain the relationship between fetal programming and non-communicable diseases in molecular studies
PO - 14	Students are able to explain the incidence of Diabetes Mellitus in Molecular Nutrition Studies

PLO-PO Matrix

--

P.O	PLO-8	PLO-9	PLO-11
PO-1			
PO-2			
PO-3			
PO-4			
PO-5			
PO-6			
PO-7			
PO-8			
PO-9			
PO-10			
PO-11			
PO-12			
PO-13			
PO-14			

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																
PO-2																
PO-3																
PO-4																
PO-5																
PO-6																
PO-7																
PO-8																
PO-9																
PO-10																
PO-11																
PO-12																
PO-13																
PO-14																

Short Course Description

Lectures that study interactions between nutrients and various intracellular and extracellular molecules, organism responses to nutrients at the molecular level such as signal transduction gene expression and protein modification

References

Main :

1. Smith, J. L., Gropper, S. S., Carr, T. P . 2016.. Advanced Nutrition and Human Metabolism . Amerika Serikat: Cengage Learning.
2. Stansfield, WD, Colome JS, Cano RJ . 2006. Biologi Molekuler dan Sel . Jakarta: Erlangga
3. Swanson, T.A. Kim, S.I, & Glucksman, M.J . 2012. Essential Biokimia disertai Biologi Molekuler dan Genetik . Alih Bahasa: Winarsi Rudiarto dan Andry Hartono. Tangerang Selatan: Binarupa Aksara Publisher.
4. Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Gizi Molekuler. Malang:UB Press
5. Muhammad , H.F.L., Sulistyoningrum , D.C., Kusuma , R.J. , Dewi , A.L., Permatasari , I.K. 2021. Buku Ajar Nutrigenomik dan Nutrigenetik Bagi Mahasiswa Gizi . Yogyakarta: UGM Press
6. Martinez, J.A., Kohlmeier, M., De Caterina , R. 2019, Principles of Nutrigenetics and Nutrigenomics: Fundamentals of Individualized Nutrition . London: Elsevier Science.

Supporters:

1. Alberts, Bruce. 2017. Molecular Biology of the Cell . Amerika Serikat: W.W. Norton.
2. Fatchiyah . 2018. Kajian Nutrigenomik dan Kesehatan: Nutrisi Berbasis Genomik dan Proteomik . Malang: Universitas Brawijaya Press.
3. Swanson, T.A. Kim, S.I. & Glucksman, M.J . 2012. Essential Biokimia disertai Biologi Molekular dan Genetik . Alih Bahasa: Winarsi Rudiarmo dan Andry Hartono. Tangerang Selatan: Binarupa Aksara Publisher.
4. Widyanto RM, Dini CY, Rahmawati IS, Putri SR, Rozana AN, Abida SH, Yunimar Y. Uji Deteksi Adulterasi Daging Babi (*Sus scrofa domestica*) pada Bakso Metode Loop-Mediated Isothermal Amplification. Indonesian Journal of Human Nutrition. 2021;8(1):76-87.
5. CY Dini, RM Widiyanto, AR Cempaka, AR Maulidiana, I Sarita. Dietary Intake of Fat, Cholesterol, Vitamin A and E Increase Gen Expression of Firmicutes and Bacteroidetes in Elderly with Hypertension. Malaysian Journal of Medical Sciences (Under Review)

Supporting lecturer
 Cleonara Yanuar Dini, S.Gz., Dietisien, M.Sc.
 Lini Anisfatus Sholihah, S.Gz., M.Sc.
 Raisya, S.TP., M.TP., M.Sc.
 Wildan Alfira Gusrianto, M.Gz.
 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	1.Understand the contents of course RPS and lecture contracts 2.Explain the meaning of molecular nutrition 3.Explain the principles and differences in omics science (genomics, epigenomics, transcriptomics, proteomics, metabolomics) 4.Explains diet-related genetic variations	1.Students can explain the relationship between nutrition and molecular processes in the body in the post test given at the end of the course 2.Students can explain the principles and differences in genomics, epigenomics, transcriptomics, proteomics, metabolomics in the post test given at the end of the course 3.Students can explain how diet can influence human genetic variation in the post test given at the end of the course	Criteria: 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions Form of Assessment : Participatory Activities, Tests	Lecture, discussion, question and answer, post test 2 X 50		Material: Introduction to Molecular Nutrition Readers: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i>	7%

2	<p>1.Explain cell structure 2.Explain the meaning, structure and function of the nucleus 3.Explain the concept of genes and genomes</p>	<p>1.Students can explain the relationship between nutrition and molecular processes in the body in the post test given at the end of the course 2.Students can explain the principles and differences in genomics, epigenomics, transcriptomics, proteomics, metabolomics in the post test given at the end of the course 3.Students can explain how diet can influence human genetic variation in the post test given at the end of the course</p>	<p>Criteria: 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50		<p>Material: Nucleus, genes and genome Bibliography: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	7%
3	<p>1.Explain the definition of DNA damage 2.Explain factors that can damage DNA 3.Explain the definition of DNA mutation 4.Explain the difference between point mutations and chromosomal mutations 5.Explain the meaning of DNA repair 6.Explain the difference between proofreading and mismatch repair 7.Explain the concept of genetic polymorphism</p>	<p>1.Students can explain DNA damage and the factors that contribute to DNA damage in the post test given at the end of the course 2.Students can explain DNA mutations and the differences between point mutations and chromosomal mutations in the post test given at the end of the course 3.Students can explain DNA repair, proofreading mechanisms and mismatch repair in the post test given at the end of the course 4.Students can explain the concept of genetic polymorphism</p>	<p>Criteria: 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50		<p>Material: DNA damage, gene mutations and polymorphism References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p> <hr/> <p>Material: DNA mutation and repair References: <i>Stansfield, WD, Colome JS, Cano R.J . 2006. Molecular and Cell Biology. Jakarta: Erlangga</i></p>	7%

4	<ol style="list-style-type: none"> 1.Explain the meaning of cell proliferation 2.Explain the difference between interphase and mitosis 3.Explain the relationship between diet and cell proliferation 4.Explain the relationship between diet and the cell cycle 5.Explain the relationship between growth hormone and cell proliferation 6.Explain the meaning of apoptosis 7.Explain the reasons why cells undergo apoptosis 8.Explain the role of diet in the apoptosis process 	<ol style="list-style-type: none"> 1.Students can explain the process of cell proliferation 2.Students can explain the differences between interphase and mitosis 3.Students can explain the relationship between diet and cell proliferation 4.Students can explain the relationship between diet and the cell cycle 5.Students can explain the relationship between growth hormone and cell proliferation 6.Explain the meaning of apoptosis 7.Explain the reasons why cells undergo apoptosis 8.Explain the role of diet in the apoptosis process 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50		<p>Material: The role of diet in cell proliferation and apoptosis References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	7%
---	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

5	<p>1.Explain the concept of nutritional genomics</p> <p>2.Explain the concept and differences between nutrigenomics and nutrigenetics</p> <p>3.Explain the influence of nutrigenetics on health and disease</p> <p>4.Explain the influence of nutrigenomics on health and disease</p> <p>5.Explain the relationship between the concept of nutritional genomics in various diseases</p> <p>6.Explain the ethical, legal and social aspects of nutrigenomics and nutrigenetics</p>	<p>1.Students can explain the concept of nutritional genomics</p> <p>2.Students can explain the concepts and differences between nutrigenomics and nutrigenetics</p> <p>3.Students can explain the influence of nutrigenetics on health and disease</p> <p>4.Students can explain the influence of nutrigenomics on health and disease</p> <p>5.Students can explain the relationship between the concept of nutritional genomics in various diseases</p> <p>6.Explain the ethical, legal and social aspects of nutrigenomics and nutrigenetics</p>	<p>Criteria:</p> <p>1.Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50		<p>Material: Nutrigenomics, metabolomics and personal nutrition</p> <p>Readers: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p> <hr/> <p>Material: The concept of nutrigenomics and nutrigenetics.</p> <p>References: <i>Muhammad, HFL, Sulistyoningrum, DC, Kusuma, RJ, Dewi, AL, Permatasari, IK 2021. Textbook of Nutrigenomics and Nutrigenetics for Nutrition Students. Yogyakarta: UGM Press</i></p> <hr/> <p>Material: Nutrigenomics, proteomics and health concepts.</p> <p>Reference: <i>Fatchiyah. 2018. Nutrigenomics and Health Studies: Genomic and Proteomic Based Nutrition. Malang: Brawijaya University Press.</i></p>	7%
---	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

6	<p>1.Explain the basic principles of the PCR method and how it works</p> <p>2.Explain the DNA electrophoresis method and its use</p> <p>3.Explains the SDS-PAGE method and how it works</p> <p>4.Explain the ELISA method and how it works</p> <p>5.Explains the use of the latest technology and methods in molecular nutrition: halal food studies</p>	<p>1.Students can explain the basic principles of the PCR method and how it works</p> <p>2.Students can explain the DNA electrophoresis method and its use</p> <p>3.Students can explain the SDS-PAGE method and how it works</p> <p>4.Students can explain ELISA and how it works</p> <p>5.Students can explain the use of the latest technology and methods in molecular nutrition: halal food studies</p>	<p>Criteria:</p> <p>1.Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	<p>Lecture, discussion, question and answer, post test 2 X 50</p>		<p>Material: Technology and methods used in the field of molecular nutrition.</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p> <hr/> <p>Material: Latest technology and methods in molecular nutrition: halal food studies</p> <p>References: <i>Widyanto RM, Dini CY, Rahmawati IS, Putri SR, Rozana AN, Abida SH, Yunimar Y. Pork (Sus scrofa domestica) Adulteration Detection Test in Meatballs with the Loop Method - Mediated Isothermal Amplification. Indonesian Journal of Human Nutrition. 2021;8(1):76-87.</i></p>	7%
---	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------	--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

7	<ol style="list-style-type: none"> 1.Explain the composition of organs and functions of the digestive tract 2.Explain the process of digestion, absorption and excretion of nutrients 3.Explain the work of digestive enzymes 4.Explain the role of the nervous system and hormones in the regulation of the digestive process 5.Explain the digestive process in each organ of the digestive tract 6.Explain the process of absorption and transportation of nutrients 7.Explain the process of digestion and absorption of macro and micro nutrients 	<ol style="list-style-type: none"> 1.Students can explain the composition of organs and function of the digestive tract 2.Students can explain the processes of digestion, absorption and excretion of nutrients 3.Students can explain the work of digestive enzymes 4.Students can explain the role of the nervous system and hormones in the regulation of the digestive process 5.Students can explain the digestive process in each organ of the digestive tract 6.Explain the process of absorption and transportation of nutrients 7.Explain the process of digestion and absorption of macro and micro nutrients 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50		<p>Material: Nutrition in physiological and biochemical processes in the human body that influence gene expression. References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p> <hr/> <p>Material: Metabolism and Nutrition in Humans References: <i>Smith, JL, Gropper, SS, Carr, T. P . 2016.. Advanced Nutrition and Human Metabolism. United States: Cengage Learning.</i></p>	7%
8	Students are able to explain in writing the concept of material during face-to-face meetings in weeks 1-7	Able to answer questions correctly	<p>Criteria: Students get maximum marks if they answer questions correctly</p> <p>Form of Assessment : Test</p>	Written test 2 X 50		<p>Material: TM Material 1-7 References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	20%
9	<ol style="list-style-type: none"> 1.Students are able to explain the definition of functional food 2.Students are able to explain the classification of functional foods 3.Students are able to explain the health benefits of functional foods 4.Students are able to explain the mechanism of action of functional foods and analyze their relationship to cardiovascular disease, T2DM and cancer 	<ol style="list-style-type: none"> 1.Students can explain the definition of functional food 2.Students can explain the classification of functional foods 3.Students can explain the health benefits of functional foods 4.Students can explain the mechanism of action of functional foods and analyze their relationship to cardiovascular disease, T2DM, and cancer 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: The role of functional food in nutritional therapy and disease prevention References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%

10	<p>1. Students are able to explain the factors that influence the diversity of gut microbiota</p> <p>2. Students are able to explain the influence of nutrients and diet on the diversity of gut microbiota</p> <p>3. Students are able to explain the mechanisms of gut microbiota on health</p> <p>4. Students are able to explain the mechanism of gut microbiota on the incidence of cardiovascular disease, T2DM and cancer</p>	<p>1. Students can explain the factors that influence the diversity of gut microbiota</p> <p>2. Students can explain the influence of nutrients and diet on the diversity of gut microbiota</p> <p>3. Students can explain the mechanisms of gut microbiota on health</p> <p>4. Students can explain the mechanism of gut microbiota on the incidence of cardiovascular disease, T2DM and cancer</p>	<p>Criteria:</p> <p>1. Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2. The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Gut microbiota, diet and health in molecular studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%
11	<p>1. Students are able to explain the meaning of cancer</p> <p>2. Students are able to analyze the differences between normal cells and cancer cells</p> <p>3. Students are able to explain the process of normal cells becoming cancerous</p> <p>4. Students are able to explain the relationship between diet and cancer in the DNA methylation process</p> <p>5. Students are able to explain the relationship between diet and cancer in the histone modification process</p> <p>6. Students are able to explain the relationship between diet and cancer using the MiRNA process</p>	<p>1. Students can explain the meaning of cancer</p> <p>2. Students can analyze the differences between normal cells and cancer cells</p> <p>3. Students can explain the process of normal cells becoming cancerous</p> <p>4. Students can explain the relationship between diet and cancer in the DNA methylation process</p> <p>5. Students can explain the relationship between diet and cancer in the histone modification process</p> <p>6. Students are able to explain the relationship between diet and cancer using the MiRNA process</p>	<p>Criteria:</p> <p>1. Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2. The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Cancer in molecular nutrition studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%

12	<p>1.Students are able to explain the definition and etiology of obesity</p> <p>2.Students are able to explain the types of obesity</p> <p>3.Students are able to explain the molecular mechanisms of leptin hormone regulation</p> <p>4.Students are able to explain the types and how genes work that influence obesity</p> <p>5.Students are able to explain the management of obesity in a review of molecular nutrition</p>	<p>1.Students can explain the definition and etiology of obesity</p> <p>2.Students can explain the types of obesity</p> <p>3.Students can explain the molecular mechanisms of leptin hormone regulation</p> <p>4.Students can explain the types and how genes work that influence obesity</p> <p>5.Students can explain the management of obesity in a review of molecular nutrition</p>	<p>Criteria:</p> <p>1.Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Obesity in molecular nutrition studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%
13	<p>1.Students are able to explain the meaning of food, objectives, principles, requirements and types of fermented food</p> <p>2.Students are able to explain the factors and types of microbes that influence the fermentation process</p> <p>3.Students are able to explain the effect of food fermentation on nutrients, sensory substances, spoilage microorganisms and pathogens</p> <p>4.Students are able to explain the advantages of fermented products in nutritional and molecular terms</p> <p>5.Students are able to explain the meaning of bioactive peptides and their benefits in molecular studies</p> <p>6.Students are able to explain the potential of local Indonesian fermented food and its benefits in molecular studies</p>	<p>1.Students can explain the meaning of food, objectives, principles, requirements and types of fermented food</p> <p>2.Students can explain the factors and types of microbes that influence the fermentation process</p> <p>3.Students can explain the effect of food fermentation on nutrients, sensory substances, spoilage microorganisms and pathogens</p> <p>4.Students can explain the advantages of fermented products in nutritional and molecular terms</p> <p>5.Students can explain the meaning of bioactive peptides and their benefits in molecular studies</p> <p>6.Students can explain the potential of local Indonesian fermented food and its benefits in molecular studies</p>	<p>Criteria:</p> <p>1.Participation activities are seen from student attendance and student participation in discussions and questions and answers</p> <p>2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Fermented foods in molecular nutrition studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%

14	<ol style="list-style-type: none"> 1.Students are able to explain the concept of fetal programming 2.Students are able to explain the factors that influence fetal programming 3.Students are able to explain hypotheses on the topic of fetal programming 4.Students are able to explain the mechanism of fetal programming on obesity, DM and cardiovascular events in adulthood 5.Students are able to explain various molecular mechanisms and fetal programming 	<ol style="list-style-type: none"> 1.Students can explain the concept of fetal programming 2.Students can explain the factors that influence fetal programming 3.Students can explain hypotheses on the topic of fetal programming 4.Students can explain the mechanism of fetal programming on obesity, DM and cardiovascular events in adulthood 5.Students can explain various molecular mechanisms and fetal programming 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Fetal programming and non-communicable diseases in molecular studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%
15	<ol style="list-style-type: none"> 1.Students are able to explain the definition and etiology of DM 2.Students are able to explain the different types of DM 3.Students are able to explain the molecular mechanism of action of the insulin hormone 4.Students are able to explain the genes that influence DMT1 and DMT2 5.Students are able to explain the management of DM in molecular nutrition studies 	<ol style="list-style-type: none"> 1.Students can explain the definition and etiology of DM 2.Students can explain the different types of DM 3.Students can explain the genes that influence DMT1 and DMT2 4.Students can explain the molecular mechanism of action of the insulin hormone 5.Students can explain the management of DM in molecular nutrition studies 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation activities are seen from student attendance and student participation in discussions and questions and answers 2.The test at the end of the course is in the form of a written test. Students get the maximum score if they can answer the test questions <p>Form of Assessment : Participatory Activities, Tests</p>	Lecture, discussion, question and answer, post test 2 X 50	2 X 50	<p>Material: Fetal programming and non-communicable diseases in molecular studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p> <p>Material: Diabetes Mellitus in Molecular Nutrition Studies</p> <p>References: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	5%
16	Students are able to explain in writing the concept of material during face-to-face meetings weeks 9-15	Able to answer questions correctly	<p>Criteria: Students get maximum marks if they answer questions correctly</p> <p>Form of Assessment : Test</p>	Written test 2 X 50		<p>Material: TM 9-15 Material</p> <p>Reader: <i>Widyanto RM, Muslihah N, Raras Tri YM, Rahmawati IS, Dini Cleonara Y, Maulidiana AR. 2021. Molecular Nutrition. Malang: UB Press</i></p>	30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	42%
2.	Test	92%

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.