	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Undergraduate Chemistry Education Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Biomolecule Structure & Function	8420402314	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	June 20, 2022

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Prof. Dr. Rudiana Agustini, M.Pd.	Prof. Dr. Nuniek Herdyastuti, M.Si.	Prof. Dr. Utiya Azizah, M.Pd.

Learning model	**Case Studies**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-7	Applying logical, critical, systematic and innovative thinking in the context of the development or implementation of science, technology and art that pays attention to and applies humanities values appropriate to the field of chemistry education in solving problems (CPL 5)
	PLO-11	Able to demonstrate knowledge related to theoretical concepts about structure, dynamics and energy, as well as basic principles of separation, analysis, synthesis and characterization of chemicals (CPL 1)
	Program Objectives (PO)	
	PO - 1	Students have knowledge of the structure of macro molecules: carbohydrates, proteins, fats, nucleic acids; function or role of macromolecules and vitamins, minerals, hormones in organisms
	PO - 2	Students master the concept of structure and function of macromolecules of carbohydrates, proteins, fats, nucleic acids; as well as vitamins, minerals and hormones in the organism
	PO - 3	Students have the ability to utilize learning resources and ICT to support mastery of Biochemical concepts and theories
	PO - 4	Students have the ability to solve science and technology problems in biochemistry and in a simple scope through the application of knowledge of the structure and function of macromolecules, and relevant technology.
	PO - 5	Students have responsibility and an independent attitude in their field of expertise
	PLO-PO Matrix	

P.O	PLO-7	PLO-11
PO-1		
PO-2		
PO-3		
PO-4		
PO-5		

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																

Short Course Description	Study of the structure and function of protein macromolecules, enzymes, carbohydrates, lipids, nucleic acids, and membranes; as well as studies on the function of vitamins and minerals carried out through lecture, discussion and presentation methods.	
References	**Main :**	

	1. Lehninger. 1988. Dasar-dasar Biokimia ,jilid 1, Terjemahan Maggi Thenawidjaya. Penerbit Erlangga, Jakarta 2. Color Atlas of Biochemistry, 2005,Koolman, J and Roehm K. H. , 2ndedition. Stutgard New York 3. Mathews,C. K and Van Holde K. E, 2000, Biochemistry ,second ed. , The Benjamin Cumming company, Inc. 4. Nelson D. L. , and Cox M. M. , 2003, LehningerPrinciple of Biochemistry , 4th edition, University ofWinconsin-Madison 5. Stryer, L. , 1988, Biochemistry , thirded. , New York : W. H. Freeman and company
	Supporters:
Supporting lecturer	Prof. Dr. Leny Yuanita, M.Kes. Prof. Dr. Hj. Rudiana Agustini, M.Pd. Dr. Prima Retno Wikandari, M.Si. Prof. Dr. Nuniek Herdyastuti, M.Si. Mirwa Adiprahara Anggarani, S.Si., M.Si. Muhammad Nurrohman Sidiq, S.Si., M.Sc., Ph.D. dr. Shod Abdurrachman Dzulkarnain, M.Biomed

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	Explain the molecules of living organisms (biomolecules) and their composition	1.1. Explain the characteristics of living substances 2.2. Explain the chemical processes in living substances 3.3. Explain that cells are the smallest part of life. 4.4. Explain the parts of a living cell. 5.5. Explain the function of each organelle 6.6. Explain the organization of molecules in cells	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, discussion, reflection 2 X 50		**Material:** Basics of Biochemistry **Bibliography:** *Nelson DL and Cox MM, 2021, Lehninger Principle of Biochemistry, 8th ed., University of Wisconsin-Madison*	5%

2	Show the structure and function of Carbohydrates	1.1. Classify carbohydrates based on the number of constituent monomers, functional groups and constituents. 2.2. Explain the center of asymmetry, ring structure, hawort, mutarotation, and anomer. 3.3. Explain the functions of monosaccharides, disaccharides and polysaccharides in biological systems.	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, discussion, reflection 2 X 50		**Material:** 1. Structure of carbohydrates 2. Function of carbohydrates in biological systems **References:** *Nelson DL and Cox MM, 2021, Lehninger Principle of Biochemistry, 8th ed., University of Wisconsin-Madison*	6%
3	Show the structure and function of Carbohydrates	1.1. Classify carbohydrates based on the number of constituent monomers, functional groups and constituents. 2.2. Explain the center of asymmetry, ring structure, hawort, mutarotation, and anomer. 3.3. Explain the functions of monosaccharides, disaccharides and polysaccharides in biological systems.	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, discussion, reflection 2 X 50		**Material:** 1. Structure of carbohydrates 2. Function of carbohydrates in biological systems **References:** *Mathews,C. K and Van Holde K. E, 2000, Biochemistry, second ed. , The Benjamin Cumming company, Inc.*	6%

4	Show the structure and function of Carbohydrates	1. Classify carbohydrates based on the number of constituent monomers, functional groups and constituents. 2. Explain asymmetry centers, ring structures, hawort, mutarotation and anomers. 3. Explain the functions of monosaccharides, disaccharides and polysaccharides in biological systems.	**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, discussion, reflection 2 X 50		**Material:** 1. Structure of carbohydrates 2. Function of carbohydrates in biological systems **References:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University ofWinconsin-Madison*	5%

5	Describe the structure and function of Proteins	1. Explain the structure of amino acids and the classification of amino acids 2. Explain the nature of acids and bases, amphoteries, isoelectric points, separation of amino acids (electrophoresis and chromatography), special reactions of amino acids 3. Explain the reaction of peptide bond formation 4. Explain the function of peptides in living systems 5. Explain the separation process by dialysis, gel filtration, electrophoresis 6. Explain the determination of amino acid series by hydrolysis and amino acid reactions with FDNB, dansyl chloride, Edman reagents 7. Explain the definition of homologous proteins 8. Explain fixed residues, non-fixed residues, series homology and examples of the importance of series homology from various species9. Explain the classification of proteins based on function, constituent elements and shape10. Explain configuration and conformation 11. Explain the structure of -helices, the types of amino acids that make up them, their properties and structure as constituents of keratin 12. Explain the structure of silk fibroin, and the differences in its properties from -helices 13. Explain the structure of the helix that makes up collagen, the properties of collagen in tendons and bone matrix 14. Explain the helical structure that makes up elastin and the properties of elastin in joints 15. Types and functions of globular proteins 16. Characteristics of the tertiary structure of globular proteins in myoglobin 17. Types of amino acids that make up globular proteins 18. tertiary structures in myoglobin 19. Differences in tertiary structures in several globular proteins 20. Types of bonds that stabilize tertiary structures 21. Definition of oligomeric proteins and examples of oligomeric proteins 22. Quaternary structures make up oligomeric proteins 23. Explain the function of hemoglobin and myoglobin. 24. Explain sickle cell anemia and other disorders caused by gene mutations	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Discussion Presentation 2 X 50		**Material:** Structure and properties of amino acids, peptide bonds and their function in living systems, separation and purification of amino acids and understanding homologous proteins, covalent structure and function of proteins (primary, secondary, tertiary proteins), characteristics of fiber and globular proteins, quaternary proteins and disorders protein genetics **Bibliography:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University ofWinconsin-Madison*	6%

6	Describe the structure and function of Proteins	1. Explain the structure of amino acids and the classification of amino acids 2. Explain the nature of acids and bases, amphoteries, isoelectric points, separation of amino acids (electrophoresis and chromatography), special reactions of amino acids 3. Explain the reaction of peptide bond formation 4. Explain the function of peptides in living systems 5. Explain the separation process by dialysis, gel filtration, electrophoresis 6. Explain the determination of amino acid series by hydrolysis and amino acid reactions with FDNB, dansyl chloride, Edman reagents 7. Explain the definition of homologous proteins 8. Explain fixed residues, non-fixed residues, series homology and examples of the importance of series homology from various species9. Explain the classification of proteins based on function, constituent elements and shape10. Explain configuration and conformation 11. Explain the structure of -helices, the types of amino acids that make up them, their properties and structure as constituents of keratin 12. Explain the structure of silk fibroin, and the differences in its properties from -helices 13. Explain the structure of the helix that makes up collagen, the properties of collagen in tendons and bone matrix 14. Explain the helical structure that makes up elastin and the properties of elastin in joints 15. Types and functions of globular proteins 16. Characteristics of the tertiary structure of globular proteins in myoglobin 17. Types of amino acids that make up globular proteins 18. tertiary structures in myoglobin 19. Differences in tertiary structures in several globular proteins 20. Types of bonds that stabilize tertiary structures 21. Definition of oligomeric proteins and examples of oligomeric proteins 22. Quaternary structures make up oligomeric proteins 23. Explain the function of hemoglobin and myoglobin. 24. Explain sickle cell anemia and other disorders caused by gene mutations	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Discussion Presentation 2 X 50		**Material:** Structure and properties of amino acids, peptide bonds and their function in living systems, separation and purification of amino acids and understanding homologous proteins, covalent structure and function of proteins (primary, secondary, tertiary proteins), characteristics of fiber and globular proteins, quaternary proteins and disorders protein genetics **Bibliography:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University ofWinconsin-Madison*	6%

7	Describe the structure and function of Proteins	1. Explain the structure of amino acids and the classification of amino acids 2. Explain the nature of acids and bases, amphoteries, isoelectric points, separation of amino acids (electrophoresis and chromatography), special reactions of amino acids 3. Explain the reaction of peptide bond formation 4. Explain the function of peptides in living systems 5. Explain the separation process by dialysis, gel filtration, electrophoresis 6. Explain the determination of amino acid series by hydrolysis and amino acid reactions with FDNB, dansyl chloride, Edman reagents 7. Explain the definition of homologous proteins 8. Explain fixed residues, non-fixed residues, series homology and examples of the importance of series homology from various species9. Explain the classification of proteins based on function, constituent elements and shape10. Explain configuration and conformation 11. Explain the structure of -helices, the types of amino acids that make up them, their properties and structure as constituents of keratin 12. Explain the structure of silk fibroin, and the differences in its properties from -helices 13. Explain the structure of the helix that makes up collagen, the properties of collagen in tendons and bone matrix 14. Explain the helical structure that makes up elastin and the properties of elastin in joints 15. Types and functions of globular proteins 16. Characteristics of the tertiary structure of globular proteins in myoglobin 17. Types of amino acids that make up globular proteins 18. tertiary structures in myoglobin 19. Differences in tertiary structures in several globular proteins 20. Types of bonds that stabilize tertiary structures 21. Definition of oligomeric proteins and examples of oligomeric proteins 22. Quaternary structures make up oligomeric proteins 23. Explain the function of hemoglobin and myoglobin. 24. Explain sickle cell anemia and other disorders caused by gene mutations	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Discussion Presentation 2 X 50		**Material:** Structure and properties of amino acids, peptide bonds and their function in living systems, separation and purification of amino acids and understanding homologous proteins, covalent structure and function of proteins (primary, secondary, tertiary proteins), characteristics of fiber and globular proteins, quaternary proteins and disorders protein genetics **Bibliography:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University ofWinconsin-Madison*	5%

8	Midterm exam		**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Test	Giving a Subsummative written test-1 2 X 50			10%
9	Describe the structure and function of enzymes	1. Explain the structure of enzymes 2. Explain the properties of enzymes 3. Explain the function of enzymes 4. Explain the difference between trivial and systematic naming of enzymes 5. Name the six groups of enzymes along with the groups they attack 6. Explain the mechanism of enzymatic reactions 7. Explain the Michaelis-Menten equation 8. Determine the values of Vmax and KM. 9. Explain the Lineweaver-Burk equation10. Explain the factors that influence enzyme activity11. Explain the process of enzyme inhibition by inhibitors along with a binding model12. Explain multi enzyme systems with	**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Study material from mandatory books, ask questions, answer 2 X 50 practice questions		**Material:** Structure, properties and function of enzymes, Procedure for naming enzymes, Mechanism of enzymatic reactions, Kinetics of enzymatic reactions, Factors that influence enzyme activity, Enzyme inhibition, Multi-enzyme systems **References:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University of Wisconsin-Madison*	6%

10	Describe the structure and function of enzymes	1. Explain the structure of enzymes 2. Explain the properties of enzymes 3. Explain the function of enzymes 4. Explain the difference between trivial and systematic naming of enzymes 5. Name the six groups of enzymes along with the groups they attack 6. Explain the mechanism of enzymatic reactions 7. Explain the Michaelis-Menten equation 8. Determine the values of Vmax and KM. 9. Explain the Lineweaver-Burk equation10. Explain the factors that influence enzyme activity11. Explain the process of enzyme inhibition by inhibitors along with a binding model12. Explain multi enzyme systems with	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Study material from mandatory books, ask questions, answer 2 X 50 practice questions		**Material:** Structure, properties and function of enzymes, Procedures for naming enzymes, Mechanisms of enzymatic reactions, Kinetics of enzymatic reactions, Factors that influence enzyme activity, Enzyme inhibition, Multi-enzyme systems. **Reference:** *Color Atlas of Biochemistry, 2005, Koolman, J and Roehm KH, 2nd edition. Stutgard New York*	6%
11	Describe the structure and function of vitamins and minerals	1. Name water-soluble vitamins 2. Name fat-soluble vitamins 3. Describe the structure of water-soluble vitamins 4. Describe the structure of fat-soluble vitamins. 5. Explain the role of vitamins in biological systems6. Mention the minerals needed in nutrition, both plants and animals. 7. Explain the role of minerals in enzyme function.	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Study material from mandatory books, ask questions, answer 2 X 50 practice questions		**Material:** 1. Types of vitamins, their structure and role in enzyme function. 2. Inorganic elements (minerals) required in nutrition and their role in enzyme function. **Reference:** *Stryer, L., 1988, Biochemistry, thirded. , New York : WH Freeman and company*	6%

12	Describe the structure and function of vitamins and minerals	1. Name water-soluble vitamins 2. Name fat-soluble vitamins 3. Describe the structure of water-soluble vitamins 4. Describe the structure of fat-soluble vitamins. 5. Explain the role of vitamins in biological systems6. Mention the minerals needed in nutrition, both plants and animals. 7. Explain the role of minerals in enzyme function.	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Study material from mandatory books, ask questions, answer 2 X 50 practice questions		**Material:** 1. Types of vitamins, their structure and role in enzyme function. 2. Inorganic elements (minerals) required in nutrition and their role in enzyme function. **Reference:** *Stryer, L., 1988, Biochemistry, thirded. , New York : WH Freeman and company*	6%
13	Describe the structure and function of nucleic acids	1. Explain the components of nucleosides, nucleotides 2. Explain the main components of DNA and RNA nucleic acids; free nucleotides 3. Describe the structure of DNA and RNA nucleic acids; free nucleotides 4. Explain the nature of nucleic acids DNA, RNA 5. Explain the nature of tRNA, rRNA, mRNA 6. Explain the relationship between transcription, translation, protein synthesis	**Criteria:** 1.The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4.3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5.4. Summative test as UAS score, given weight (3) 6.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, discussion, reflection 2 X 50		**Material:** Nucleoside components, nucletides, nucleic acids, structure of nucleic acids, free nucleotides, role of nucleic acids in protein synthesis. **References:** *Nelson DL, and Cox MM, 2003, LehningerPrinciple of Biochemistry, 4th edition, University of Wisconsin-Madison*	5%

14	Describe the structure and function of lipids and bio-membranes	1. Explain the structure of lipids. 2. Explain the function of lipids in biological systems 3. Explain the main components of membranes 4. Describe the fluid structure of the membrane mosaic 5. Explain the nature of the lipid bilayer in the membrane 6. Explain the function of the membrane	**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, answering 2 X 50 practice questions		**Material:** Structure and Function of Lipids **Reference:** *Lehninger. 1988. Basics of Biochemistry, volume 1, Maggi Thenawidjaya Translation. Erlangga Publishers, Jakarta*	6%
15	Explain the structure and function of Hormones	Describe the role of each hormone in primary and secondary target hormones	**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Participatory Activities	Questions and answers, answering 2 X 50 practice questions		**Material:** Types of hormones, Mechanism of action of hormones, Function of hormones in metabolism. **Reference:** *Stryer, L., 1988, Biochemistry, thirded. , New York : WH Freeman and company*	6%

16	UAS		**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures is carried out through observation (weight 2) 3. 2. Subsummative test, carried out twice assessing all relevant indicators through written exams, averaged and weighted (2) 4. 3. Structured assignment assessment from each teacher and the scores are averaged, then given a weight (3) 5. 4. Summative test as UAS score, given weight (3) 6. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 **Form of Assessment** : Test	2 X 50			10%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	80%
2.	Test	20%
		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.