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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Organic Chemistry II: Polyfunctional Compounds and Macromolecules	4720103116		T=3	P=0	ECTS=4.77	4	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Amaria, M.Si.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

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

Short Course Description	Study of polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids and biological organic compounds.
References	**Main :**

1. Fessenden, R.J. dan Fessenden, J.S. (1998). Kimia Organik. Jilid 2. Penerjemah AH Pudjaatmaka. Jakarta: Erlangga.
2. Hart, H., Craine, L.E. & Hart, D.J. (2003). Kimia Organik. Suatu Kuliah Singkat. Edisi ke XI. Penerjemah: Achmadi, S.S., Jakarta: Erlangga.
3. Solomon, T.W.G. & Fryhle, C.B. (2011). Organic Chemistry. New York: John Wiley & Sons, Inc.
4. Carey, F.A. (2000). Organic Chemistry. 4rd Ed. New York: McGraw-Hill Companies, Inc.
5. Brewster, R.Q. (1976). Organic Chemistry. 3rd Edition. New Delhi: Prentice Hall.
6. Matsjeh, S. (1996). Kimia Organik II. Jakarta: Depdikbud Dirjendikti.

	Supporters:
Supporting lecturer	Prof. Dr. Suyatno, M.Si. Prof. Dr. Tukiran, M.Si.

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 lecture system in Organic Chemistry II2. Explain the various types of structures, properties and basic reactions that are characteristic of organic compounds with more than one functional group (polyfunctionality).	1. Explain the RPS, lecture system, assessment system, determination of graduation and lecture rules for Organic Chemistry 2 2. Explain the chemical reactions of dicarboxylic acids 3. Explain the formation of lactones and lactides from hydroxy carboxylic acids 4. Explain the decarboxylation reactions in oxocarboxylic acids 5. Explain Diels Alder reaction	**Criteria:** 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess indicators from TM 1-7, through a written test and given weight (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester examination (UAS) is used to measure the achievement of indicators from TM 9-15, through a written test and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
2	Explain the various types of structures, properties and basic reactions that are characteristic of organic compounds with more than one functional group (polyfunctionality).	1. Explain the chemical reactions of dicarboxylic acids 2. Explain the formation of lactones and lactides from hydroxy carboxylic acids 3. Explain the decarboxylation reactions in oxocarboxylic acids 4. Explain the Diels Alder reaction	**Criteria:** 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess TM indicators 1-7, through a written exam, and is given weightage (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

3	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	1. Explain electrophilic substitution reactions in polycyclic hydrocarbon compounds. 2. Write examples of oxidation and reduction reactions in polycyclic aromatic hydrocarbon compounds. 3. Explain the basicity of heterocyclic aromatics and their solubility in water in relation to hydrogen bonds. 4. Explain electrophilic substitution reactions in heterocyclic aromatic hydrocarbon compounds	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
4	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	1. Explain electrophilic substitution reactions in polycyclic hydrocarbon compounds. 2. Write examples of oxidation and reduction reactions in polycyclic aromatic hydrocarbon compounds. 3. Explain the basicity of heterocyclic aromatics and their solubility in water in relation to hydrogen bonds. 4. Explain electrophilic substitution reactions in heterocyclic aromatic hydrocarbon compounds	**Criteria:** 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

5	Understand the structure, nomenclature and chemical properties of carbohydrates	.1. Explain the structure of carbohydrates 2. Explain the cyclization process in monosaccharides 3. Explain the reactions that occur in carbohydrates 4. Explain the role of carbohydrates for living things	**Criteria:** 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
6	Understand the structure, nomenclature and chemical properties of carbohydrates	1. Explain the structure of carbohydrates 2. Explain the cyclization process in monosaccharides 3. Explain the reactions that occur in carbohydrates 4. Explain the role of carbohydrates for living things	**Criteria:** 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

7	Understand the structure, nomenclature and chemical properties of carbohydrates	1. Explain the structure of carbohydrates 2. Explain the cyclization process in monosaccharides 3. Explain the reactions that occur in carbohydrates 4. Explain the role of carbohydrates for living things	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 (1-12) indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 (14-22) indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
8	Mid-Semester Exam to assess the achievement of Final Skills from TM 1 to 7	Mid-semester exam to assess achievement of indicators from TM 1 to 7	**Criteria:** Attached to the UTS question assessment rubric	Midterm Exam 2 X 50			0%

9	Understand the structure, types and chemical properties of amino acids and proteins	1. Explain the structure of amino acids 2. Explain chemical reactions in amino acids 3. Explain the reaction to form peptides 4. Explain the structure and function of proteins 5. Explain the process of protein denaturation	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess TM 1-7 indicators through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
10	Understand the structure, types and chemical properties of amino acids and proteins	1. Explain the structure of amino acids 2. Explain chemical reactions in amino acids 3. Explain the reaction to form peptides 4. Explain the structure and function of proteins 5. Explain the process of protein denaturation	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

11	Understand the structure, nomenclature, chemical properties of lipids	.1. Explain the structure and function of lipids 2. Explain the chemical reactions of lipids 3. Explain the structure of steroids and their role as hormones	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

12	Understand the structure, nomenclature, chemical properties of lipids	.1. Explain the structure and function of lipids 2. Explain the chemical reactions of lipids 3. Explain the structure of steroids and their role as hormones	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
13	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	1. Explain the types of bioactive compounds (secondary metabolites) from plants 2. Name the types of plants native to Indonesia that have medicinal properties	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

14	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	1. Explain the types of bioactive compounds (secondary metabolites) from plants 2. Name the types of plants native to Indonesia that have medicinal properties	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%
15	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	1. Explain the types of bioactive compounds (secondary metabolites) from plants 2. Name the types of plants native to Indonesia that have medicinal properties	**Criteria:** 1.1. Participation is assessed during lectures, carried out through observation (weight 2) 2.2. The mid-semester exam (UTS) is carried out to assess the TM 1-7 indicators, through a written exam, and is given a weighting of (2) 3.3. Structured task assessments are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3. 5.5. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	Discussion, presentation and assignment 3 X 50			0%

16	Students understand the concepts, landscape and skills in MK Organic Chemistry II	Understand the concepts, landscape and skills in MK Organic Chemistry II	**Criteria:** Attached to the UAS assessment rubric	Final Exam Semester 2 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.