

		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																																																					
Organic Chemistry II: Polyfunctional Compounds and Macromolecules		8420403162			T=3	P=0	ECTS=4.77	4 July 18, 2024																																																					
AUTHORIZATION		SP Developer		Course Cluster Coordinator		Study Program Coordinator																																																							
			Prof. Dr. Utiya Azizah, M.Pd.																																																							
Learning model	Project Based Learning																																																												
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																												
	Program Objectives (PO)																																																												
	PLO-PO Matrix																																																												
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 100px; height: 20px;"></td> <td colspan="16" style="text-align: center;">P.O</td> </tr> </table>									P.O																																																		
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	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">PO Matrix at the end of each learning stage (Sub-PO)</td> </tr> <tr> <td style="width: 100px; height: 20px;"></td> <td colspan="16" style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 30px; height: 20px;"></td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 30px; height: 20px;"></td> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> <td style="width: 20px; text-align: center;">5</td> <td style="width: 20px; text-align: center;">6</td> <td style="width: 20px; text-align: center;">7</td> <td style="width: 20px; text-align: center;">8</td> <td style="width: 20px; text-align: center;">9</td> <td style="width: 20px; text-align: center;">10</td> <td style="width: 20px; text-align: center;">11</td> <td style="width: 20px; text-align: center;">12</td> <td style="width: 20px; text-align: center;">13</td> <td style="width: 20px; text-align: center;">14</td> <td style="width: 20px; text-align: center;">15</td> <td style="width: 20px; text-align: center;">16</td> </tr> </table> </td> </tr> </table>								PO Matrix at the end of each learning stage (Sub-PO)			<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 30px; height: 20px;"></td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 30px; height: 20px;"></td> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> <td style="width: 20px; text-align: center;">5</td> <td style="width: 20px; text-align: center;">6</td> <td style="width: 20px; text-align: center;">7</td> <td style="width: 20px; text-align: center;">8</td> <td style="width: 20px; text-align: center;">9</td> <td style="width: 20px; text-align: center;">10</td> <td style="width: 20px; text-align: center;">11</td> <td style="width: 20px; text-align: center;">12</td> <td style="width: 20px; text-align: center;">13</td> <td style="width: 20px; text-align: center;">14</td> <td style="width: 20px; text-align: center;">15</td> <td style="width: 20px; text-align: center;">16</td> </tr> </table>																	Week																	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Short Course Description	Study of polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids, and biological organic compounds																																																												
References	Main :																																																												
	<ol style="list-style-type: none"> 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. 7. Jurnal-jurnal lain (online/offline) terbaru (2010 ke atas) yang berkaitan dengan materi kimia organik 2 																																																												
	Supporters:																																																												
Supporting lecturer	NURUL HIDAJATI ISMONO Dr. Mitarlis, S.Pd., M.Si. Dr.Hj. Rinaningsih, S.Pd., M.Pd.																																																												
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	<p>Explain the various types of structures, properties and basic reactions that are characteristic of organic compounds with more than one functional group (polyfunction).</p>	<p>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</p>	<p>Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 via written exams, and are given a weighting of (2) 4.3. Structured task assessments are averaged, then given a weight (3) 5.4. The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. 6. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10</p>	<p>Approach: Constructivist Method: Discussion Strategy: making a 2 X 50 mind map</p>			0%
2	<p>Explain the various types of structures, properties and basic reactions that are characteristic of organic compounds with more than one functional group (polyfunction).</p>	<p>1. Explain the chemical reactions of dicarboxylic acids 2. Explain the formation of lactones and lactides from hydroxy carboxylic acids 3. Explain the decarboxylation reaction in oxocarboxylic acid 4. Explain the Diels Alder reaction</p>	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10</p>	<p>Questions and answers Presentation and discussion 3 X 50</p>			0%

3	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	<ol style="list-style-type: none"> 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: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Presentation and Discussion Questions and Answers 3 X 50			0%
4	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	<ol style="list-style-type: none"> 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: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Presentation and Discussion Questions and Answers 3 X 50			0%

5	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> 1.Explain the definition and structure of carbohydrates 2.Explain the cyclization process in monosaccharides 3.Explain the reactions that occur in carbohydrates 4.Explain the role of carbohydrates in living things 	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-term exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score%) (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10</p>	Presentation and Discussion of the 3 X 50 Assignment			0%
6	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> 1.Explain the definition and structure of carbohydrates 2.Explain the cyclization process in monosaccharides 3.Explain the reactions that occur in carbohydrates 4.Explain the role of carbohydrates in living things 	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-term exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score%) (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10</p>	Presentation and Discussion of the 3 X 50 Assignment			0%
7	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> 1.Explain the definition and structure of carbohydrates 2.Explain the cyclization process in monosaccharides 3.Explain the reactions that occur in carbohydrates 4.Explain the role of carbohydrates in living things 	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-term exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score%) (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10</p>	Presentation and Discussion of the 3 X 50 Assignment			0%

8	<p>UTS questions achieve the following final abilities: Explain various types of structures, properties and basic reactions which are characteristic of organic compounds with more than one functional group (polyfunction) Explain the structure, nomenclature and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons Understand structure, nomenclature and chemical properties of carbohydrates</p>	<p>The indicators in the UTS questions are adjusted to the indicators of final ability achievement.</p>	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score²) (Assignment score² 3) (UTS score² 2) UAS score (3) divided by 10</p>	<p>Written Test 3 X 50</p>			0%
9	<p>Understand the structure, types and chemical properties of amino acids and proteins</p>	<ol style="list-style-type: none"> 1.Explain the structure of amino acids 2.Explain chemical reactions in amino acids 3.Explain the reaction of peptide formation 4.Explain the structure and function of proteins 5.Explain the process of protein denaturation 	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-term exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score²) (Assignment score² 3) (UTS score² 2) UAS score (3) divided by 10</p>	<p>Presentation and Discussion of the 3 X 50 Assignment</p>			0%
10	<p>Understand the structure, types and chemical properties of amino acids and proteins</p>	<ol style="list-style-type: none"> 1.Explain the structure of amino acids 2.Explain chemical reactions in amino acids 3.Explain the reaction of peptide formation 4.Explain the structure and function of proteins 5.Explain the process of protein denaturation 	<p>Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-term exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3) The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score²) (Assignment score² 3) (UTS score² 2) UAS score (3) divided by 10</p>	<p>Presentation and Discussion of the 3 X 50 Assignment</p>			0%

11	Understand the structure, nomenclature, chemical properties of lipids	<ol style="list-style-type: none"> 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 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation during lectures is carried out through observation (weight 2) 2.The sub-summative test or mid-semester exam (UTS) is carried out to assess indicators 1-12 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 examination (UAS) is used to measure the achievement of indicators 14-22, through a written examination, and the results are given a weight of 5. The final NA is (participation value") (Assignment value%2 3) (UTS value%2 2) value UAS (3) divided by 10 	Presentation and Discussion of the 3 X 50 Assignment			0%
12	Understand the structure, nomenclature, chemical properties of lipids	<ol style="list-style-type: none"> 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 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Participation during lectures is carried out through observation (weight 2) 2.The sub-summative test or mid-semester exam (UTS) is carried out to assess indicators 1-12 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 examination (UAS) is used to measure the achievement of indicators 14-22, through a written examination, and the results are given a weight of 5. The final NA is (participation value") (Assignment value%2 3) (UTS value%2 2) value UAS (3) divided by 10 	Presentation and Discussion of the 3 X 50 Assignment			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.Mention the types of plants native to Indonesia that have medicinal properties	Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3)The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Presentation and Discussion of the 3 X 50 Assignment			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.Mention the types of plants native to Indonesia that have medicinal properties	Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3)The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Presentation and Discussion of the 3 X 50 Assignment			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.Mention the types of plants native to Indonesia that have medicinal properties	Criteria: Participation during lectures is carried out through observation (weight 2). Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-12 through written exams, and are given a weight of (2). Structured assignment assessments are averaged, then given a weight of (3)The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 5. The final NA is (participation score") (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Presentation and Discussion of the 3 X 50 Assignment			0%

16	UAS	UAS	Criteria: The final semester exam (UAS) is used to measure the achievement of indicators 14-22, through a written exam, and the results are given a weight of 3. The final NA is (participation score%) (Assignment score%2 3) (UTS score%2 2) UAS score (3) divided by 10	Written Test 3 X 50			0%
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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.