	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
Organometallic Compounds	4720102162		T=2	P=0	ECTS=3.18	7	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 concepts, properties, similarities and differences between organometallic compounds and complex compounds (coordination compounds), structures and bonds, types of reactions and synthesis of organometallic compounds, use, stability and role of organometallic compounds in the environment through providing information, reviewing journals, discussions in groups and presentations .
References	**Main :**

1. Shriver , D. F. , Atkins,P. W. and Langford, C. , 1990. Inorganic Chemistry, Oxford UniversityPress, Tokyo.
2. Crabtree, Robert H, 1988. The Organometallic Chemistry of The Transition Metals , John Wiley& Sons, Singapore.
3. Douglas, B. E. ; McDaniel, D. H. ;Alexander, J. J. , 1994. Concepts andModels of Inorganic Chemistry , Third Edition, John Wiley & Sons, Inc. NewYork.
4. Huheey, J. E. ; Keiter, E. A. ; Keiter, R. L. , 1990, Inorganic Chemistry, Prinsciples ofStructure and Reactivity , Fourth Edition, Harper Collins CollegePublishers.
5. Jurnal-jurnal Senyawa Organologam/Organometallic

Supporters:	
Supporting lecturer	Dr. Amaria, M.Si. Prof. Dr. Sari Edi Cahyaningrum, M.Si. Dr. Dina Kartika Maharani, S.Si., 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	Understand the meaning of organometallic compounds	1. Explain Werner's theory of complex compounds regarding bonds and structure 2. Write down the structure and isomers of complex compounds 3. Explain the trans effect of planar rectangular complexes 4. Predict the outcome of a planar rectangular complex reaction	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and Question and Answer 2 X 50			0%
2	Understand the general properties of organometallic compounds	.1. Determining the valence electrons of the central metal atom 2. Calculating the electrons of organometallic compounds 3. Determining the oxidation number of the central atom of an organometallic compound 4. Determining the oxidation number of the central metal atom of an organometallic compound 5. . Write the molecular formulas of organometallic compounds that have high oxidation numbers	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%
3	Understand the properties of organometallic compounds from block d	1. Explain the similarities between complex compounds and organometallic compounds 2. Explain the differences between complex compounds and organometallic compounds 4. Explain the bonds that occur in carbon monoxide using molecular orbital theory 5. Explain the nature of carbon monoxide ligands in organometallic compounds at the end and bridge positions 6. Explain the properties of phi acids carbon monoxide ligand compared to other ligands	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and Question and Answer 2 X 50			0%

4	Understand the synthesis, structure, properties and reactions of organometallic compounds	1. Explain the synthesis of organometallic compounds with carbonyl ligands 2. Explain the synthesis of organometallic compounds with carbonyl ligands via reductive carbonylation 3. Explain the synthesis of organometallic compounds via oxidative addition 4. Explain the synthesis of organometallic compounds via reductive elimination 5. Explain the synthesis of organometallic compounds via insertion and elimination.	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%
5	Understand the synthesis, structure, properties and reactions of organometallic compounds.	1. Determine the structure of organometallic compounds. 2. Determine the structure of organometallic compounds and the amount of CO based on IR3 data. Explain the properties and reactions of organometallic compounds 4. Write down the reaction equation for the production of organometallic compounds	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%
6	Understand the properties of organometallic compounds of main group elements (s and p blocks)	1. Explain the differences in bonds between main organometallic compounds and hydrogen compounds. 2. Explain the structure of organometallic compounds. 3. Write the structure of organometallic compounds. 4. Explain the synthesis of organometallic compounds from metal goals. Mainly with haloalkanes, haloarenes, transmetalation, metathesis, and EH addition	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%

7	Understand the properties of organometallic compounds from main group elements (s and p blocks).	1. Explain the relative stability of organometallic compounds in one group 2. Explain the relative stability of organometallic compounds in one period3. Explain the main target reactions of organometallic compounds and the results obtained 4. Explain organometallic compounds that lack electrons (act as Lewis acids) 5. Explain the reaction mechanism of organometallic compounds involving the elimination of b hydrogen 6. Predict the reaction outcome of a reaction	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%
8	End encounter abilities 1-7	Meeting indicators 1-7	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Test 2 X 50			0%
9	Understand the properties and reactions of organometallic compounds in the environment.	Explain the occurrence of metal methylation in the environment	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion and questions and answers 2 X 50			0%

10	Understand the properties and reactions of organometallic compounds in the environment	Explain the reaction of mercury methylation in the environment	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion, presentation and question and answer 2 X 50			0%
11	Understand the properties and reactions of organometallic compounds in the environment	Explaining arsenic methylation in the environment	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion, question and answer, Presentation 2 X 50			0%
12	Understand the types, reactions and uses of organometallic compounds	Explain the structure, properties and uses of organosilicon compounds	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion, question and answer, presentation 2 X 50			0%

13	Understand the types, reactions and uses of organometallic compounds	Explain the structure, properties and uses of organomagnesium compounds	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Presentation 2 X 50			0%
14	Understand the types, reactions and uses of organometallic compounds	Explain the structure and properties and uses of organoaluminium and organoboron compounds	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion, question and answer, presentation 2 X 50			0%
15	Understand the types, reactions and uses of organometallic compounds	Explain the structure and properties and uses of organolithium and organotin compounds	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Discussion, question and answer, presentation 2 X 50			0%

16	Final ability encounter 9-15	Meeting indicators 9-15	**Criteria:** 1.1. Participation during lectures (weight 2) 2.2. Sub-summative test, assessed all relevant indicators through a written exam, given a weight of (2) 3.3. Assignment value for working on questions and writing papers (weight 3) 4.4. 3x UAS score (3) 5.The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Written test 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.