



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
Chemistry of the Main Group Elements	8420402304	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	April 29, 2023
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Dr. Kusumawati Dwiningsih, S.Pd.,M.Pd.		Prof. Dr. Achmad Lutfi, M.Pd.			Prof. Dr. Utiya Azizah, M.Pd.	

Learning model	Case Studies
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Program Learning Outcomes (PLO)	PLO study program which is charged to the course	
	PLO-5	Able to make decisions based on data/information in order to complete tasks that are their responsibility and evaluate performance that has been carried out both individually and in groups, has an entrepreneurial spirit with an environmental perspective (CPL 7)
	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-9	Mastering the principles of K3 (Work Safety and Security), managing the laboratory and using its equipment as well as how to operate chemical instruments (CPL 3)
	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	CPMK1: Mastering theoretical concepts about the structure, dynamics and energy of chemicals, as well as the basic principles of separation, analysis, synthesis and characterization of main group elements
	PO - 2	CPMK2: Able to produce appropriate conclusions based on the results of identification, analysis, isolation, transformation and synthesis of chemicals that have been carried out
	PO - 3	CPMK3: Able to solve scientific, technological and artistic problems in the general field of chemistry and in a simple scope including identification, analysis, isolation, transformation and synthesis of micromolecules through the application of knowledge about structure, dynamics and energy, as well as the application of relevant technology
	PO - 4	CPMK4: Have a sense of majesty towards God's creation in the form of main group elements
	PO - 5	CPMK5
	PO - 6	CPMK6
	PO - 7	CPMK7
	PO - 8	CPMK8
	PO - 9	CPMK9
PO - 10	CPMK10	
PLO-PO Matrix		

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Short Course Description	Study of abundance, nature, how to obtain, benefits and how to identify, as well as being able to utilize the main group elements through discussions, presentations, project assignments, conveying ideas orally and in writing.																																																																																																																																																																																																																									
References	Main : 1. Lee, J. D. 1991. Concise Inorganic Chemistry. Four Edition. London: Chapman & Hall. 2. Madan, R. D. 1997. Modern Inorganic Chemistry. New Delhi: S. Chand and Company LDT. 3. Sugiarto, B. dkk. 1997. Kimia Anorganik. Surabaya: Unipress IKIP Surabaya. 4. Handbook of Inorganic Compounds, Second Edition (Hardcover) 13 May 18, 2011. ISBN-13: 000-1439814619 ISBN-10: 14398146 Supporters: 1. Achmad Lutfi, dkk. 2018. Kimia Anorganik Unsur-Unsur Golongan Utama. Yogyakarta: Absolute Media																																																																																																																																																																																																																									
Supporting lecturer	Dr. Muchlis, S.Pd., M.Pd. Dr. Kusumawati Dwiningsih, S.Pd., M.Pd. Rusly Hidayah, S.Si., M.Pd. Dr. Dina Kartika Maharani, S.Si., M.Sc. Amalia Putri Purnamasari, S.Si., 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)																																																																																																																																																																																																																					
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1	Students understand the discussion of inorganic chemistry and the role of theory in inorganic chemistry as well as the basis for classifying elements	1.Understand the basic classification of elements 2.Explain the role of chemical theory in inorganic chemistry	Criteria: 1.1. Participation during lectures (weight 2) 2.2. Assignment value for working on questions and writing papers (weight 2) Form of Assessment : Participatory Activities, Portfolio Assessment	Presentation, discussion. 2 X 50		Material: Introduction to Elemental Chemistry Bibliography: <i>Lee, JD 1991. Concise Inorganic Chemistry, Four Edition. London: Chapman & Hall.</i>	7%
2	Students understand the position, physico-chemical properties, laboratory production of hydrogen compounds and their benefits	1.Understand the position, properties, uses of hydrogen and its compounds. 2.Understand how to make hydrogen and its compounds in laboratories and industrially	Criteria: 1.1. Participation during lectures (weight 2) 2.2. Assignment value for working on questions and writing papers (weight 2) Form of Assessment : Participatory Activities	Discussions, presentations, assignments. 2 X 50		Material: Hydrogen and its compounds a. Position in the periodic table b. Physical and chemical properties c. Hydrogen isotope d. Elemental hybrids e. Position in the periodic table f. Physical and chemical properties g. Hydrogen isotope h. Hybrids of the element Water and related matters References: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	8%
3	Students understand the position, physico-chemical properties, laboratory preparation of alkaline compounds and their benefits.	1.Understand the position, properties, methods of obtaining alkali metals. 2.Explain the uses of alkaline compounds based on their properties.	Criteria: 1.1. Participation during lectures (weight 2) 2.2. Assignment value for working on questions and writing papers (weight 2) Form of Assessment : Participatory Activities, Portfolio Assessment	Presentations, discussions and assignments. 2 X 50		Material: Alkali Metal a. Source and extraction b. Physico-chemical properties and uses. Preparation, properties and uses of hydroxides, carbonates, cyanides and their salts. Reference: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	5%

4	Students understand the position, physico-chemical properties, laboratory preparation of alkaline compounds and their benefits.	Explain the uses of alkaline compounds based on their properties	<p>Criteria:</p> <p>1.1. Participation during lectures (weight 2)</p> <p>2.2. Assignment value for working on questions and writing papers (weight 2)</p> <p>Form of Assessment :</p> <p>Participatory Activities</p>	Presentations, discussions and assignments. 2 X 50		<p>Material:</p> <p>Alkali Metal a. Source and extraction b. Physico-chemical properties and uses c. Preparation, properties and uses of hydroxides, carbonates, cyanides and their salts.</p> <p>Reference:</p> <p><i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i></p>	5%
5	Students understand the position, physico-chemical properties, laboratory preparation of alkaline earth compounds and their benefits.	<p>1.Understand the position, properties, methods of obtaining alkaline earth metals</p> <p>2.Explain the uses of alkaline earth compounds.</p>	<p>Criteria:</p> <p>1. Participation during lectures, carried out through observation (weight 2)</p> <p>Form of Assessment :</p> <p>Participatory Activities</p>	Presentation, discussion and assignment 2 X 50		<p>Material:</p> <p>Alkaline Earth Metals a. Source and extraction b. Physico-chemical properties and uses</p> <p>References:</p> <p><i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i></p> <hr/> <p>Material:</p> <p>Alkaline Earth Metals:</p> <p>Preparation, properties and uses of oxides, hydroxides, sulfur, nitrates, halides and carbides.</p> <p>Reference:</p> <p><i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i></p>	5%

6	Students understand the position of physico-chemical properties, laboratory production of boron and aluminum compounds and their benefits.	1.Understand the position, nature, and method of obtaining group IIIA. 2.Explain the uses of Aluminum and Boron compounds. 3. Understand how to make Boron and Aluminum compounds in a laboratory	Criteria: Participation during lectures is carried out through observation (weight 2)	Presentation, discussion and assignment 2 X 50		Material: Boron family a. Location in the periodic table, physico-chemical properties of boron and uses Source and extraction b. Preparation of boron compounds, their properties and uses c. Aluminum extraction Reference: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	7%
7	Students understand the position of physico-chemical properties, laboratory production of boron and aluminum compounds and their benefits.	Understand how to make Boron and Aluminum compounds in the laboratory	Criteria: 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. Report/paper product assessment, as an assignment, with weight (3) Form of Assessment : Participatory Activities	Presentation, discussion and assignment 2 X 50		Material: Preparation of aluminum compounds and their properties and uses Reference: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	8%
8	Midterm exam	Midterm exam	Criteria: The Mid-Semester Examination (UTS) is carried out assessing all relevant indicators through a written exam, with a weight of (2)	Midterm Exam 2 X 50			0%
9	Students understand the position, physico-chemical properties, laboratory production of carbon compounds and their benefits	Understand the position, properties, and methods of obtaining carbon groups.	Criteria: 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. Report/paper product assessment, as an assignment, with weight (3) Form of Assessment : Participatory Activities	Presentation, discussion and assignment 2 X 50		Material: Carbon Family a. Periodicity b. Forms of allotropy of elements References: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	5%

10	Students understand the position, physico-chemical properties, laboratory production of carbon compounds and their benefits	<ol style="list-style-type: none"> 1.Explain the uses of carbon compounds 2.Understand how to make carbide compounds in the laboratory 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. Report/paper product assessment, as an assignment, with weight (3) <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Presentation, discussion and assignment 2 X 50		<p>Material: Uses of elements and compounds d. Carbon compounds Library: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i></p> <hr/> <p>Material: Carbon carbides f. The nature of the compound is carbide. Reference: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i></p>	10%
11	Students understand the position, physico-chemical properties, laboratory production of nitrogen compounds and their benefits	<ol style="list-style-type: none"> 1.Understand the position, properties, and methods of obtaining the nitrogen group. 2.Explain the uses of nitrogen compounds. 3.Understand how to make nitrogen, antimony and arsenic compounds in the laboratory. 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. Report/paper product assessment, as an assignment, with weight (3) <p>Form of Assessment : Participatory Activities</p>	Presentation, discussion and assignment 2 X 50		<p>Material: a. General characteristics b. the nature of the elements c. Compounds and their properties d. Library Allotropy :</p> <hr/> <p>Material: Uses of elements and compounds Library:</p> <hr/> <p>Material: Making: a. Nitrogen compounds Arsenic and antimony compounds Nitrogen analytical reactions References:</p>	10%

12	Students understand the position, physico-chemical properties, laboratory production of oxygen and sulfur compounds and their benefits	1. Understand the position, properties and methods of obtaining oxygen and sulfur. 2. Explain the benefits of oxygen and sulfur compounds based on their properties	Criteria: 1.1. Participation during lectures, carried out through observation (weight 2) 2.4. Product assessment Report/paper, as an assignment, with weight (3) Form of Assessment : Participatory Activities	Presentation, discussion and assignment 2 X 50		Material: Oxygen Family a. Location in the periodic table b. Oxygen group elements How to make oxygen and sulfur compounds Reference: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i> Material: Uses of oxygen and sulfur compounds References:	8%
13	Students understand the position, physico-chemical properties, laboratory production and the benefits of halogen compounds	1.1. Understand the position, properties and methods of obtaining oxygen group elements. 2.2. Explain the benefits of fluor and iodine compounds based on their properties	Criteria: 1.1. Participation during lectures, carried out through observation (weight 2) 2.2. Report/paper product assessment, as an assignment, with weight (3) Form of Assessment : Participatory Activities, Portfolio Assessment	Presentation, discussion and assignment 2 X 50		Material: Halogen Family a. Location of halogens in the periodic table b. Separation of Library elements : <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i> Material: Halogen Family a. Location of halogens in the periodic table b. Separation of Library elements : <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	8%
14	Students understand the position, physico-chemical properties, and laboratory production of noble gases	Understand the characteristics of the noble gas group	Criteria: 1.1. Participation during lectures (weight 2) 2.2. Assignment value for working on questions and writing papers (weight 2) Form of Assessment : Participatory Activities	Presentation, discussion and assignment 2 X 50		Material: Noble gas family a. Position in the periodic table. References: <i>Achmad Lutfi, et al. 2018. Inorganic Chemistry of Main Group Elements. Yogyakarta: Absolute Media</i>	7%

15	Students understand the position, physico-chemical properties, and laboratory production of noble gases.	Understand the characteristics of the noble gas group	Criteria: 2. Participation during lectures (weight 2) Form of Assessment : Participatory Activities	Presentation, discussion and assignment 2 X 50			7%
16	According to final abilities at meetings 9-15	In line with indicators at meeting 9-15	Criteria: The Final Semester Examination (UAS) is carried out assessing all relevant indicators through a written examination, with a weight of (3))	Final Exam Semester 2 X 50			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	78%
2.	Portfolio Assessment	15%
		93%

Notes

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.