SEMESTER LEARNING PLAN

BASIC CHEMISTRY COURSES
(23H03112702)

TEACHING TEAM

STUDI PROGRAM OF MATHEMATICS - S1
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
HASANUDDIN UNIVERSITY
MAKASSAR
2025

STUDY PROGRAM OF MATEMATIKA - S1
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
HASANUDDIN UNIVERSITY

Vision

The scientific vision is to become a study program with an international reputation in the development of mathematics based on the Indonesian maritime continent by 2030

Vision Strategy

Misson

To fulfill the above vision, the Undergraduate Mathematics Study Program has four missions, namely:

- Organizing innovative and effective mathematics learning to improve the quality and creativity of students in order to compete nationally and internationally.
- Improving a research culture that produces internationally reputable publications.
- Playing an active role in community service activities and collaborating with other academic institutions, government, business, media and society.
- Carry out governance in the Mathematics Study Program that is effective, efficient and transparent based on IT and ISO 9001:2015 standards to achieve the tridharma goals.

Graduate Profiles

Gagal diterjemahkan

PLO charged to courses

CPL-8 (S1) - The students have integrity that highly values the supreme divinity, social responsibility, and professional ethics

CPL-1 (ILO 1) - Students are able to demonstrate an advanced understanding of basic pure and simple applied mathematics.

Course Learning Outcomes (CLO)

CPMK-1: The ability to decipher comprehensively atomic structure material, elemental periodic system, chemical bonds, chemical equilibrium, hydrocarbon compounds, functional groups of organic compounds, and biomolecuker bases. (CPL8 dan CPL1)

CPMK-2: The ability to analyze problems or cases critically related to stoichiometric material, solution, acid -base equilibrium, chemical thermodynamics, chemical kinetics, and electrochemistry. (CPL8 dan CPL1)

Sub-CLO

Sub CPMK-1: Students are able to explain the atomic structure. (CPMK-1)

Sub CPMK-2: Students are able to determine the periodic system of elements. (CPMK-1)

Sub CPMK-3: Students are able to explain chemical bonds (CPMK-1)

Sub CPMK-4: Students are able to conceptualize chemical equilibrium (CPMK-1)

Sub CPMK-5: Students are able to show hydrocarbon compounds (CPMK-1)

Sub CPMK-6: Students are able to separate the functional group of organic compounds. (CPMK-1)

Sub CPMK-7: Students are able to describe the basis of biomolecular. (CPMK-1)

Sub CPMK-8: Students are able to solve problems related to stoichiometry material. (CPMK-2)

Sub CPMK-9: Students are able to examine cases related to the solution material. (CPMK-2)

Sub CPMK-10: Students are able to diagnose cases related to acid -base equilibrium material. (CPMK-2)

Sub CPMK-11: Students are able to resolve cases related to chemical thermodynamics material. (CPMK-2)

Sub CPMK-12: Students are able to detect cases related to chemical kinetics material. (CPMK-2)

Sub CPMK-13: Able to analyze cases related to electrochemical material. (CPMK-2)

Learning Analytics

Basic Chemistry

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Able to analyze cases related to electrochemical material. (CPMK-2)

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Students are able to detect cases related to chemical kinetics material. (CPMK-2)

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Students are able to resolve cases related to chemical thermodynamics material. (CPMK-2)

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Students are able to diagnose cases related to acid -base equilibrium material. (CPMK-2)

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Students are able to examine cases related to the solution material. (CPMK-2)

↑

Students are able to solve problems related to stoichiometry material. (CPMK-2)

↑

Students are able to describe the basis of biomolecular. (CPMK-1)

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Students are able to separate the functional group of organic compounds. (CPMK-1)

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Students are able to show hydrocarbon compounds (CPMK-1)

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Students are able to conceptualize chemical equilibrium (CPMK-1)

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Students are able to explain chemical bonds (CPMK-1)

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Students are able to determine the periodic system of elements. (CPMK-1)

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Students are able to explain the atomic structure. (CPMK-1)

HASANUDDIN UNIVERSITY
FAKULTY OF MATHEMATICS AND NATURAL SCIENCES
STUDY PROGRAM OF MATHEMATICS - S1
SEMESTER LEARNING PLAN

Course	Code	Cource Group	Credits	SEMESTER	Compilation Date
Basic Chemistry	23H03112702	Basic Science	2	1	1 Agustus 2023

AUTHORITY	SLP Developer Lecturer	Coordinator	Head of Study Program
	Dr. Djabal Nur Basir, S.Si.,M.Si.	Dr. Djabal Nur Basir, S.Si.,M.Si.	Dr. Firman, S.Si.,M.Si.

Learning Outcomes Course	**SLOs that are imposed on the course**	
	SLO-8:	Mahasiswa memiliki integritas yang sangat menghargai keilahian tertinggi, tanggung jawab sosial, dan etika profesional
	SLO-1:	Mahasiswa memiliki pemahaman yang relatif mendalam dalam matematika murni dan matematika terapan sederhana.
	SLO ⇒ Course Learning Outcomes	
	After completing this course, it is expected:	
	SLO-1	**CLO-1:** The ability to decipher comprehensively atomic structure material, elemental periodic system, chemical bonds, chemical equilibrium, hydrocarbon compounds, functional groups of organic compounds, and biomolecuker bases.
		CLO-2: The ability to analyze problems or cases critically related to stoichiometric material, solution, acid -base equilibrium, chemical thermodynamics, chemical kinetics, and electrochemistry.
	SLO-8	**CLO-1:** The ability to decipher comprehensively atomic structure material, elemental periodic system, chemical bonds, chemical equilibrium, hydrocarbon compounds, functional groups of organic compounds, and biomolecuker bases.
		CLO-2: The ability to analyze problems or cases critically related to stoichiometric material, solution, acid -base equilibrium, chemical thermodynamics, chemical kinetics, and electrochemistry.
	CLO ⇒ Sub-CLO	
	CLO-1	**Sub-CLO-1:**Students are able to explain the atomic structure.
		Sub-CLO-2: Students are able to determine the periodic system of elements.
		Sub-CLO-3: Students are able to explain chemical bonds
		Sub-CLO-4: Students are able to conceptualize chemical equilibrium
		Sub-CLO-5: Students are able to show hydrocarbon compounds
		Sub-CLO-6: Students are able to separate the functional group of organic compounds.

		Sub-CLO-7: Students are able to describe the basis of biomolecular.
	CLO-2	**Sub-CLO-8:**Students are able to solve problems related to stoichiometry material.
		Sub-CLO-9: Students are able to examine cases related to the solution material.
		Sub-CLO-10: Students are able to diagnose cases related to acid -base equilibrium material.
		Sub-CLO-11: Students are able to resolve cases related to chemical thermodynamics material.
		Sub-CLO-12: Students are able to detect cases related to chemical kinetics material.
		Sub-CLO-13: Able to analyze cases related to electrochemical material.

Correlation between SLOs/CLOs to Sub-CLOs

SLOs that are charged on the Course	CPMK	SUB CPMK	Form of Assessment*					Weight	Value	Student Score
			Formative	Sumative						
				Gagal diterjemahkan	Gagal diterjemahkan	Written Exam	Written Exam			
SLO-1	CLO-1	SUB-CLO-1		14	0	0	0	14		
SLO-1	CLO-1	SUB-CLO-4		0	16	0	0	16		
SLO-1	CLO-1	SUB-CLO-5		16	0	0	0	16		
SLO-1	CLO-1	SUB-CLO-7		0	0	0	15	15		
SLO-1	CLO-2	SUB-CLO-8		0	12	0	0	12		
SLO-1	CLO-2	SUB-CLO-10		0	0	15	0	15		
SLO-1	CLO-2	SUB-CLO-12		0	12	0	0	12		
				30	40	15	15	100		

Course Description	This course will enable students to have the ability to describe and analyze the basic material of chemistry including: atomic structure, periodic system of elements, chemical bonds, stoichiometry, solutions, chemical equilibrium, acid-base equilibrium, chemical thermodynamics, chemical kinetics, electrochemistry, compound hydrocarbons, functional groups of organic compounds, and biomolecular basis.

Learning Materials/Subjects	1. Atomic Structure 2. Periodic system elements 3. Chemical bonds 4. Stoichiometry 5. Solution 6. Equilibrium chemistry 7. Equilibrium acid base 8. Chemical kinetics 9. Thermodynamics chemistry 10. Electrochemistry 11. Compounds Hydrocarbons 12. Functional Groups Organic Compounds 13. Basic biomolecular
Reference	**Main References**
	1. Tim Hasanuddin University Chemistry Lecturer, 2011, Basic Chemistry, Technical Implementation Unit-MKU, Hasanuddin University, Makassar. 2. Chemistry Lecturer Team, 2013, Organic Chemistry, Technical Implementation Unit-MKU, Hasanuddin University, Makassar.
	Additional References
	1. Brady, J., Jespersen, N., Hyslop J., 2015, Chemistry, Seventh Edition, Wiley, Singapore. 2. David L. Nelson, Michael M. Cox, 2005, Lehninger; *Principles of Biochemistry*, W.H. Freeman Company
Teaching Team	
Course requirement	

Week	**Sub CPMK (End-of-stage learning ability)**	**Penilaian (*Assesment*)**		**Learning Forms and Methods [time estimate]**		**Content**	**Weight of Assessment (%)**
		Indicator	**Techniques & Criteria**	**Offline**	**Online**		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**

1	Students are able to explain the atomic structure. (CPMK-1)	**Formative:** 1. Completely explain the properties of the particles that make up atoms (electrons, protons, neutrons), then do PT. 2. Complete writing the configuration electrons of an atom, then do PT. 3. Precisely determine the price of numbers outermost electron florets of an element (main quantum, azimuth, magnetic, spin), then do PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Collaborative Learning (CoL) (14) **Assessment Technique:** Non Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Contract college, RPS, CPMK, Sub-CPMK, Atomic Structure Material. Material of the Periodic System of Elements. Chemical Bonding Matter.	14

2	Students are able to determine the periodic system of elements. (CPMK-1)	**Formative:** 1. Completely explain the properties of the particles that make up atoms (electrons, protons, neutrons), then do PT. 2. Complete writing the configuration electrons of an atom, then do PT. 3. Precisely determine the price of numbers outermost electron florets of an element (main quantum, azimuth, magnetic, spin), then do PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Non Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Contract college, RPS, CPMK, Sub-CPMK, Atomic Structure Material. Material of the Periodic System of Elements. Chemical Bonding Matter.	0

3	Students are able to explain chemical bonds (CPMK-1)	**Formative:** 1. Completely explain the properties of the particles that make up atoms (electrons, protons, neutrons), then do PT. 2. Complete writing the configuration electrons of an atom, then do PT. 3. Precisely determine the price of numbers outermost electron florets of an element (main quantum, azimuth, magnetic, spin), then do PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Non Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Contract college, RPS, CPMK, Sub-CPMK, Atomic Structure Material. Material of the Periodic System of Elements. Chemical Bonding Matter.	0

4	Students are able to solve problems related to stoichiometry material. (CPMK-2)	**Formative:** 1. Completely explaining the basic laws of chemistry (conservation of mass, constant ratio, multiple ratio, volume ratio), then work on PT. 2. Complete solving problems related to the concept of moles and coordination numbers, then work on PT. 3. Complete solving problems related to reaction equations and balancing, then work on PT **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Case Study (CS) (12) **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Create lecture summaries and complete study module assignments case, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Material Solution. Material Chemical Equilibrium	12

5	Students are able to examine cases related to the solution material. (CPMK-2)	**Formative:** 1. Completely explaining the basic laws of chemistry (conservation of mass, constant ratio, multiple ratio, volume ratio), then work on PT. 2. Complete solving problems related to the concept of moles and coordination numbers, then work on PT. 3. Complete solving problems related to reaction equations and balancing, then work on PT **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Create lecture summaries and complete study module assignments case, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Material Solution. Material Chemical Equilibrium	0
6	Students are able to conceptualize chemical equilibrium (CPMK-1)	**Formative:** 1. Complete conceptualizing how to state and use the equilibrium constant, then do PT. 2. Complete the calculation of the equilibrium constant, then work PT. 3. Completely describe the factors that influence equilibrium, then work on PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Case Study (CS) (16) **Assessment Technique:** Test and Non-Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Chemical Equilibrium Matter. Acid-base Equilibrium Material. Thermodynamics Material Chemistry.	16

7-8	Students are able to diagnose cases related to acid -base equilibrium material. (CPMK-2)	**Formative:** 1. Complete conceptualizing how to state and use the equilibrium constant, then do PT. 2. Complete the calculation of the equilibrium constant, then work PT. 3. Completely describe the factors that influence equilibrium, then work on PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Written Exam (15) **Assessment Technique:** Test and Non-Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [2(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+2(2x60")]	Chemical Equilibrium Matter. Acid-base Equilibrium Material. Thermodynamics Material Chemistry.	15
9	Students are able to resolve cases related to chemical thermodynamics material. (CPMK-2)	**Formative:** 1. Complete conceptualizing how to state and use the equilibrium constant, then do PT. 2. Complete the calculation of the equilibrium constant, then work PT. 3. Completely describe the factors that influence equilibrium, then work on PT. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Test and Non-Test	**Studying:** Group discussions (Small Group Discussion), Collaborative Learning (Collaborative Learning) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")]	Chemical Equilibrium Matter. Acid-base Equilibrium Material. Thermodynamics Material Chemistry.	0

10	Students are able to detect cases related to chemical kinetics material. (CPMK-2)	**Formative:** 1. Completely explaining reaction rates, laws and reaction rate equations. then do **PT**. 2. Complete detecting cases related to reaction order (zero, first, and second order reactions), then do **PT**. 3. Completely detect cases related to factors that influence the reaction rate, then carry out **PT**. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Case Study (CS) (12) **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [1(2x50) minutes]		Chemical Kinetics Material. Material Electrochemistry.	12

11-12	Able to analyze cases related to electrochemical material. (CPMK-2)	**Formative:** 1. Completely explaining reaction rates, laws and reaction rate equations. then do **PT**. 2. Complete detecting cases related to reaction order (zero, first, and second order reactions), then do **PT**. 3. Completely detect cases related to factors that influence the reaction rate, then carry out **PT**. **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [2(2x50) minutes]		Chemical Kinetics Material. Material Electrochemistry.	0
13	Students are able to show hydrocarbon compounds (CPMK-1)	**Formative:** 1. Complete showing the general formula and nomenclature of alkane, alkene and alkyne compounds, then do PT. Completely describing the properties of alkane, alkene and alkyne compounds, then do P.Complete showing cyclic and aromatic hydrocarbon compounds, then do PT **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Collaborative Learning (CoL) (16) **Assessment Technique:** Test and Non-Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")	Material Hydrocarbon Compounds. Organic Compound Material. Material Biomolecular basis.	16

14	Students are able to separate the functional group of organic compounds. (CPMK-1)	**Formative:** 1. Complete showing the general formula and nomenclature of alkane, alkene and alkyne compounds, then do PT. Completely describing the properties of alkane, alkene and alkyne compounds, then do P.Complete showing cyclic and aromatic hydrocarbon compounds, then do PT **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** **Assessment Technique:** Test and Non-Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [1(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+1(2x60")	Material Hydrocarbon Compounds. Organic Compound Material. Material Biomolecular basis.	0
15-16	Students are able to describe the basis of biomolecular. (CPMK-1)	**Formative:** 1. Complete showing the general formula and nomenclature of alkane, alkene and alkyne compounds, then do PT. Completely describing the properties of alkane, alkene and alkyne compounds, then do P.Complete showing cyclic and aromatic hydrocarbon compounds, then do PT **Sumative:** Gagal diterjemahkan	**Formative Criteria:** **Sumative Criteria:** Written Exam (15) **Assessment Technique:** Test and Non-Test	**Studying:** Group discussion (Small Group Discussion), Case Study (Case Study) [2(2x50")]	**Studying:** Self-Directed Learning BM: Reading teaching materials. PT: Make a summary of lectures or work on assignments module, then submit to LMS/SIKOLA according to the specified time. [1+2(2x60")	Material Hydrocarbon Compounds. Organic Compound Material. Material Biomolecular basis.	15

	100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2
CPL-1 (ILO 1)	data not found (Weight 14%) data not found (Weight 16%) data not found (Weight 16%) Written Exam (Weight 15%)	data not found (Weight 12%) Written Exam (Weight 15%) data not found (Weight 12%)
CPL-8 (S1)	data not found (Weight 14%) data not found (Weight 16%) data not found (Weight 16%) Written Exam (Weight 15%)	data not found (Weight 12%) Written Exam (Weight 15%) data not found (Weight 12%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Collaborative Learning (CoL)	30
Case Study (CS)	40
Written Exam	15
Written Exam	15
Total	100

Assessment and Evaluation of Student Achievement of CLOs

SLOs that are charged on the Course	CLO	SUB CLO	Form of Assessment*					Weight	Value	Student Score
			Formative	Sumative						
				Gagal diterjemahkan	Gagal diterjemahkan	Written Exam	Written Exam			
SLO-1	CLO-1	SUB-CLO-1		14	0	0	0	14		
SLO-1	CLO-1	SUB-CLO-4		0	16	0	0	16		
SLO-1	CLO-1	SUB-CLO-5		16	0	0	0	16		
SLO-1	CLO-1	SUB-CLO-7		0	0	0	15	15		
SLO-1	CLO-2	SUB-CLO-8		0	12	0	0	12		
SLO-1	CLO-2	SUB-CLO-10		0	0	15	0	15		
SLO-1	CLO-2	SUB-CLO-12		0	12	0	0	12		
				30	40	15	15	100		