SEMESTER STUDY PLAN
INTRODUCTION TO MATHEMATICS
(COMPULSORY COURSE)

DEPARTMENT OF MATHEMATICS AND DATA SCIENCE
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS ANDALAS
2024

SEMESTER STUDY PLAN (SSP)
BACHELOR PROGRAM OF MATHEMATICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS ANDALAS

Course Name	Course Code	URL *I-Learn*	Credits	Semester	Compilation Date
Introduction to Mathematics	MAT61111	https://sci.ilearn.unand.ac.id	3	1	13 May 2024

Person In Charge	Study Plan Creator	Head of Research Group	Head of Study Program
	Prof. Dr. Syafrizal Sy Dr. Shelvi Ekariani Prof. Dr. Admi Nazra Nova Noliza Bakar, M.Si.	Nova Noliza Bakar, M. Si	Dr. Noverina Alfiany

Intended Learning Outcomes (ILO) and Performance Indicator (PI)	Intended Learning Outcomes	
	ILO-2	Possesses profound knowledge of the basic concept mathematics PI-1: An ability to explain basic mathematical concepts PI-2: An ability to provide examples that are relevant to basic mathematical concepts. PI-3: An ability to determine solutions to simple problems using basic mathematical concepts
	ILO-3	An ability to identify, explain and generalize simple mathematical problems. PI-1: An ability to identify simple mathematical problems. PI-2: An ability to explain simple mathematical problems.
	ILO-4	An ability to use concept and fundamental technique of mathematics in solving simple mathematical problems PI-1: An ability to choose appropriate basic mathematical concepts and techniques in solving simple mathematical problems PI-2: An ability to illustrate simple mathematical problems based on appropriate basic mathematical concepts and techniques
	ILO-5	An ability formally and correctly a simple mathematical statement using facts and methods that have been studied. PI-1: An ability to identify formal structures and analogous forms in mathematics.

		PI-2: An ability to use facts and apply methods to prove simple mathematical statements. PI-3: An ability to present simple mathematical statement proof rigorously (sequentially and carefully)
	Course Learning Outcomes	
	1	An ability to explain the terms and connecting operators in logic, as well as related basic theorems. (ILO-2: PI-1, PI-2; ILO-3: PI-1, PI-2)
	2	An ability to explain the concepts of sets, subsets, and operations on sets. (ILO-2: PI-1, PI-2, PI-3; ILO-3: PI-1, PI-2)
	3	An ability to explain the concept of first order logic (ILO-2: PI-1, PI-2, PI-3; ILO-3: PI-1, PI-2, ILO-4: PI-1)
	4	An ability to explain the concept of function, one-to-one function, function on, and composition function (ILO-2: PI-1, PI-2, PI-3; ILO-3: PI-1, PI-2, ILO-4: PI-1, PI-2, ILO-5: PI-1, IK-3)
Brief Description	This course explains several basic concepts and properties in mathematics related to logic, sets and operations on sets, first order logic, and the concept of function	
Course Materials	1. Logic 2. Set 3. First order logic 4. Functions	
References	**Main:** 1. D.W. Morris and J. Morris, Proofs and Concepts: The Fundamental of Abstract Mathematics, University of Lethbridge, 2009 **Additional:** 2. E. D. Bloch, Proofs and Fundamentals: A First Course in Abstract Mathematics, Birkhauser, Boston, 2000	
Learning Media	**Software:**	**Hardware:**
	• LMS Unand (http://fmipa.ilearn.unand.ac.id/) • Zoom meeting • Whatsapp	• Computer/Laptop • Smartphone
Team Teaching	1. Prof. Dr. Syafrizal 2. Nova Noliza Bakar, M.Si	

	3. Dr. Shelvi Ekariani 4. Prof. Dr. Admi Nazra
Assessment	Homework, Quizzes, Mid-Term exam, Final exam
Required courses	-
Academic Norms	https://akademik.unand.ac.id/images/2022-03-30%20Regulation%20Rector%20Number%207%20Year%202022%20Administration%20Special-education%20Chapter%20II.pdf

Weekly Study Plan

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]					Subject, references (10)	Weight (11)
				Synchronous*		Asynchronous**		Media (9)		
				Face to face Offline (5)	Face to face Online (6)	Individual (7)	Collaboration (8)			
1/1	• Capable understand rule lecture • Capable explain topics that will be studied on this course • CLO-1 Capable explains the terms and connecting operators in logic, as well as	• Discipline in operate contract lectures • Accuracy in mention topics on this course	• Activeness	• Lectures and discussion about contract lectures, study plan, and term proposition and deduction [1 x 2 x 50 minutes]		• Students look for references and learn course material [1 x 2 x 120 minute]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Contract lectures • Study plan • Propositional terms and deduction	

	the related basic theorems									
1/2	CLO-1 Capable explains the terms and connecting operators in logic, as well as the related basic theorems	• Accuracy in explaining the terms validation, contradiction, tautology, contingent, and equivalence. • Accuracy in giving examples.	• Activeness	• Lectures and discussions about the terms valida-tion, contradiction, tautology, contingent, and equivalence [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1x2x120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• The terms validation, contradiction, tautology, contingent, and equivalence [1]	5%
2/3	CLO-1 Capable explains the terms and connecting operators in logic, as well as the related basic theorems	• Ketepatan dalam menjelaskan operator negasi, operator dan, dan operator atau. • Ketepatan dalam menjawab soal tugas • Orisinalitas hasil tugas	• Activeness • Task 1	• Lectures and discussions about the negation operator, the and operator, and the or operator. [1 x 2 x 50 minutes] • A.M Students do assignments about terms in logic as well as negation operators, and operators, and or operators.		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Negation Operator • Operator And Operator Or	5%

				[1 x 2 x 60 minutes]						
3/4	CLO-1 Capable explains the terms and connecting operators in logic, as well as the related basic theorems	• Accuracy in explaining implication operators and biimplication operators • Accuracy in giving examples.	• Activeness	• Lectures and discussions about implication operators and biimplication operators [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Implication Operator. • Biimplication operator	4%
3/5	CLO-1 Capable explains the terms and connecting operators in logic, as well as the related basic theorems	• Accuracy in explaining truth value, tautology, contradiction, contingency and logical equivalence. • Honesty in taking quizzes	• Activeness • Quiz 1	• Quiz about connecting operators in logic (nation, and, or, implication, and biimplication) [1 x 1 x 50 minutes] • Lectures and discussions about truth value, tautology, contradiction, contingency, and logical equivalence. [1 x 1 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• The truth value of a logic • Tautology, contradiction and contingent sentences • Logical equivalence	5%
4/6	CLO-1 Capable explains the terms and connecting operators in logic,	• Accuracy in explaining converses, inverses, contrapositions, valid deductions,	• Activeness	• Lectures and discussions about converse, inverse, contraposition, valid deduction,		• Students look for references and study		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Converse, inverse, contraposition, • Valid deduction	3,5%

	as well as the related basic theorems	and counterexamples • Accuracy in giving examples.		and counterexamples [1 x 2 x 50 minutes]		lecture material [1 x 2 x 120 minutes			• Example of refutation	
5/7	CLO-2 An ability to explain the concepts of sets, subsets, and operations on sets.	• Accuracy in explaining proportional logic, sets and set members, and subsets. • Accuracy in answering assignment questions • Originality of task results	• Activeness • Task 2	• Lectures and discussions on proportional logic, sets and members of sets, and subsets. [1 x 2 x 50 minutes] • A.M Students do assignments on basic theorems in proportional logic [1 x 2 x 60 minutes]		•Students look for references and study lecture material [1 x 2 x 120 minutes		• Whiteboards • Infocus • WhatsApp • Myfmipa	• Proportional logic • Sets and set members • Subsets	5%
5/8	CLO-2 An ability to explain the concepts of sets, subsets, and operations on sets.	•Accuracy in explaining predicates, use of predicates to define subsets •Accuracy in giving examples.	• Activeness	• Lectures and discussions about predicates, the use of predicates to define subsets [1 x 2 x 50 minutes]		•Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Predicate • Use predicates to define subsets	4%
6/9	CLO-2 An ability to explain the concepts of sets, subsets, and	• Accuracy in explaining union, intersection, difference and	• Activeness • Quiz 2	• Quiz about predicates, using predicates to define subsets [1 x 1 x 50 minutes]		•Students look for references and study		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Unions and intersections in sets	3,5%

	operations on sets.	complement operations on sets. • Honesty in taking quizzes		• Lectures and discussions on union, intersection, difference, and complement operations on sets • [1 x 1 x 50 minutes]		lecture material [1 x 2 x 120 minutes]			• Differences and complements of sets	
7/10	CLO-2 An ability to explain the concepts of sets, subsets, and operations on sets.	• Accuracy in explaining Cartesian products, mutually exclusive sets, and power sets • Accuracy in giving examples	• Activeness	• Lectures and discussions on Cartesian products, mutually exclusive sets, and power sets [1 x 2 x 50 minutes]		•Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Cartesian product • Disjoint sets • Power set	5%
7/11	CLO-2 An ability to explain the concepts of sets, subsets, and operations on sets.	• Accuracy in answering the questions given. • Accuracy in giving examples	• Activeness	• Lectures and discussions for Mid-Term Exam preparation [1 x 2 x 50 minutes]		•Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Review material	5%
8/12	**MID-TERM EXAM**									
9/13	CLO-3 An ability to explain the	• Accuracy in explaining quantifiers and first order logic.	• Activeness	• Lectures and discussions on quantifiers and first-order logic.		• Students look for references and study		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Quantifiers • First order logic	4,5%

	concept of first order logic	◆ Accuracy in giving examples		[1 x 2 x 50 minutes]		lecture material [1 x 2 x 120 minutes]				
10/14	CLO-3 An ability to explain the concept of first order logic	Accuracy in explaining double quantifiers and negation. • Accuracy in answering assignment questions • Originality of task results	• Activeness • Task 3	• Lecture and discussion on double quantifiers and negation. [1 x 2 x 50 minutes] • A.M Students do assignments about quantifiers, first order logic, double quantifiers, and negation. [1 x 2 x 60 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Double quantifier • Negation	4,5%
10/15	CLO-3 An ability to explain the concept of first order logic	• Accuracy in explaining similarities, vocus truth, and singularity • Accuracy in giving examples	• Activeness	• Lectures and discussions on similarity, vocus truth, and singularity. [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Similarity • Vocous truth • Uniqueness	5%
11/16	CLO-3 An ability to explain the concept of first order logic	• Accuracy in explaining bound variables and refuting examples • Honesty in taking quizzes	• Activeness • Quiz 3	• Quiz about similarity, vocous truth, and singularity. [1 x 1 x 50 minutes]		• Students look for references and study lecture material		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Bound variables • Counter example	4,5%

				• Lecture and discussion about bound variables and counter examples [1 x 1 x 50 minutes]		[1 x 2 x 120 minutes				
12/17	CLO-3 An ability to explain the concept of first order logic	• Accuracy in explaining quantifier rules and proofs related to sets • Accuracy in giving examples	• Activeness	• Lectures and discussions about quantifier rules and proofs related to sets [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Quantifier rule • Proof regarding sets	4,5%
12/18	CLO-3 An ability to explain the concept of first order logic	• Accuracy in explaining the meaning of theorems, propositions, consequences, lemmas, and conjectures • Accuracy in answering assignment questions • Originality of task results	• Activeness • Task 4	• Lectures and discussions on the meaning of theorems, propositions, consequences, lemmas, and conjectures. [1 x 2 x 50 minutes] • A.M Students do assignments about quantifier rules, proofs related to sets, and understanding		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Understanding theorems, propositions, consequences, lemmas, and conjectures	4,5%

				theorems, propositions, consequences, lemmas, and conjectures. [1 x 2 x 60 minutes]						
13/19	CLO-4 An ability to explain the concepts of function, one-to-one function, onto function, and composition function	• Accuracy in stating the definition of function and function one to one • Accuracy in giving examples	• Activeness	• Lectures and discussions on the meaning of function and one-to-one function [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Function • One-to-one function	7,5%
14/20	CLO-4 An ability to explain the concepts of function, one-to-one function, onto function, and composition function	• Accuracy in explaining the meaning of function and function one to one • Accuracy in giving examples • Honesty in taking quizzes	• Activeness • Quiz 4	• Quiz about the meaning of function and one-to-one function [1 x 1 x 50 minutes] • Lectures and discussions about onto or surjection functions and bijection functions [1 x 1 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Onto or surjection function • Bijection function	7,5%
14/21	CLO-4 An ability to explain the concepts of function, one-to-one function, onto	• Accuracy in explaining inverse functions and composition functions	• Activeness	• Lectures and discussions on inverse functions and composition functions		• Students look for references and study lecture material		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Inverse function • Composition function	7,5%

	function, and composition function	• Accuracy in giving examples		[1 x 2 x 50 minutes]		[1 x 2 x 120 minutes]				
15/22	CLO-4 An ability to explain the concepts of function, one-to-one function, onto function, and composition function	• Accuracy in answering the questions given. • Accuracy in giving examples	• Activeness	• Lectures and discussions for final exam preparation [1 x 2 x 50 minutes]		• Students look for references and study lecture material [1 x 2 x 120 minutes]		• Whiteboard • Infocus • Whatsapp • Myfmipa	• Review material	5%
									Total Weight	100%
16/23	**FINAL EXAM**									

1 credit = 50 minutes face-to-face meeting, 60 minutes structured study, 60 minutes independent study
Each meeting duration is 3 credits = 3×50 minutes

Indicators, Criteria, and Assessment Weights

1. Assessment weight for each Assessment

NO	Assessment	Weight (%)
1	Mid-Term Exam	35
2	Final Exam	25
3	Task	20
4	Quizzes	20

TOTAL	100

2. Assessment weight for Intended Learning Outcome
   - CLO-1: 22,5%
   - CLO-2: 22,5 %
   - CLO-3: 27,5 %
   - CLO-4: 27,5 %

Assessment Plan Table:

No.	CLO	Assessment				Weigth (%)
		Task (%)	Quizzes (%)	Mid-Term Exam (%)	Final Exam (%)	
1	An ability to explain the meaning of vector spaces and subspaces, as well as determine the basis of a vector space. (ILO-5: PI-1, PI-2)	5	5	12,5	-	25
2	An ability to explain the meaning of linear transformations, presentation matrices, and prove related properties. (ILO-5: PI-1, PI-2, PI-3; ILO-9: PI-1)	5	5	12,5	-	25
3	An ability to explain the eigenvalues and eigenvectors of a linear transformation, as well as the diagonalization process. (ILO-5: PI-1, PI-2, PI-3; ILO-9: PI-1)	7,5	5	-	15	25
4	An ability to explain orthogonal bases in inner product spaces, as well as prove related properties. (ILO-5: PI-1, PI-2, PI-3; ILO-9: PI-1)	2,5	5	-	15	25
Total		**20**	**20**	**25**	**35**	**100**

Matrix of CLO and ILO

CLO	ILO																															
	1			**2**			**3**			**4**			**5**				**6**					**7**			**8**				**9**			
	PI			**PI**			**PI**			**PI**			**PI**				**PI**					**PI**			**PI**				**PI**			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	4	1	2	3	4	5	1	2	3	1	2	3	4	1	2	3	4
1				✓	✓		✓	✓																								
2				✓	✓	✓	✓	✓																								
3				✓	✓	✓	✓	✓		✓																						
4				✓	✓	✓	✓	✓		✓	✓		✓		✓																	