SEMESTER LEARNING PLAN

BASIC MATHEMATICS I COURSES
(23H01110103)

TEACHING TEAM

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

CPL-3 (KU1) - The students are able to analyse a mathematical problem with logic, analytic, and systematic structure

Course Learning Outcomes (CLO)

CPMK-1: Students are able to determine solutions to problems related to the concept of single variable calculus. ()

CPMK-2: Students are able to apply the concepts of functions, derivatives and integrals, both to more complex calculus problems and problems related to their fields. ()

Sub-CLO

Sub CPMK-1: Students are able to use the properties of real numbers and functions in determining the domain and range of functions, as well as the solution set for root, square and absolute value inequalities. ()

Sub CPMK-2: Students are able to describe functions through algebraic operations and through graphs. ()

Sub CPMK-3: Students are able to investigate the existence of limits and continuity of a function, both analytically and graphically. ()

Sub CPMK-4: Students are able to determine the first derivative and higher order derivatives of a real function (both explicit and implicit functions) through limit approaches, derivative theorems and chain rules. ()

Sub CPMK-5: Students are able to demonstrate the application of first derivatives and higher derivatives through systematic steps, both in determining monotonicity intervals, extremes, turning points, concavity, sketching real function graphs, and in determining Taylor polynomials. ()

Sub CPMK-6: Students are able to solve integrals, both through the limit of Riemann sums for definite integrals, and through theorems and techniques of substitution integration, partial integration and integration of rational functions, as well as integration with trigonometric substitution. ()

Learning Analytics

Basic Mathematics I

↑

Students are able to solve integrals, both through the limit of Riemann sums for definite integrals, and through theorems and techniques of substitution integration, partial integration and integration of rational functions, as well as integration with trigonometric substitution. (CPMK-2)

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Students are able to demonstrate the application of first derivatives and higher derivatives through systematic steps, both in determining monotonicity intervals, extremes, turning points, concavity, sketching real function graphs, and in determining Taylor polynomials. (CPMK-2)

↑

Students are able to determine the first derivative and higher order derivatives of a real function (both explicit and implicit functions) through limit approaches, derivative theorems and chain rules. (CPMK-1)

↑

Students are able to investigate the existence of limits and continuity of a function, both analytically and graphically. (CPMK-2)

↑

Students are able to describe functions through algebraic operations and through graphs. (CPMK-1)

↑

Students are able to use the properties of real numbers and functions in determining the domain and range of functions, as well as the solution set for root, square and absolute value inequalities. (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 Mathematics I	23H01110103	Basic Science	3	1	1 Agustus 2024

AUTHORITY	SLP Developer Lecturer	Coordinator	Head of Study Program
	Jusmawati Massalesse, S.Si.,M.Si., Naimah Aris, S.Si.,M.Math.	Jusmawati Massalesse, S.Si.,M.Si.	Dr. Firman, S.Si.,M.Si.

Learning Outcomes Course

SLOs that are imposed on the course	
SLO-1:	Mahasiswa memiliki pemahaman yang relatif mendalam dalam matematika murni dan matematika terapan sederhana.
SLO-3:	Mahasiswa mampu menganalisis suatu masalah matematika dengan logika, analitik, dan struktur sistematis
SLO ⇒ Course Learning Outcomes	
After completing this course, it is expected:	
CLO ⇒ Sub-CLO	
CLO-1	**Sub-CLO-1:**Students are able to use the properties of real numbers and functions in determining the domain and range of functions, as well as the solution set for root, square and absolute value inequalities.
	Sub-CLO-2: Students are able to describe functions through algebraic operations and through graphs.
	Sub-CLO-4: Students are able to determine the first derivative and higher order derivatives of a real function (both explicit and implicit functions) through limit approaches, derivative theorems and chain rules.
CLO-2	**Sub-CLO-3:**Students are able to investigate the existence of limits and continuity of a function, both analytically and graphically.
	Sub-CLO-5: Students are able to demonstrate the application of first derivatives and higher derivatives through systematic steps, both in determining monotonicity intervals, extremes, turning points, concavity, sketching real function graphs, and in determining Taylor polynomials.
	Sub-CLO-6: Students are able to solve integrals, both through the limit of Riemann sums for definite integrals, and through theorems and techniques of substitution integration, partial integration and integration of rational functions, as well as integration with trigonometric substitution.

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					
				Case Studies	Written Exam	Written Exam			
SLO-	CLO-1	SUB-CLO-1	None	9	6	0	15		
SLO-	CLO-1	SUB-CLO-2		9	6	0	15		
SLO-	CLO-2	SUB-CLO-3		12	8	0	20		
SLO-	CLO-1	SUB-CLO-4		10	0	10	20		
SLO-	CLO-2	SUB-CLO-5		10	0	10	20		
SLO-	CLO-	SUB-CLO-7		10	0	0	10		
				60	20	20	100		

Course Description	This course equips students with basics of one-variable calculus and systems of linear equations through approximation analytics and visuals. Material includes real number systems, functions and graphs, limits and continuity, derivatives and their applications, indefinite integrals and of course, as well as matrix-based systems of linear equations. Learning emphasizes logical, deductive and systematic reasoning, and strengthen understanding conceptual through interactive lectures, group discussions, and case studies. Some enrichment topics like graph transformations, integration techniques continuation, as well as solving SPL using determinants and inverses adapted to the needs and depth of learning outcomes.
Learning Materials/Subjects	Gagal diterjemahkan
Reference	**Main References**

1. Thomas G.B., Weir, M.D. , Hass, J.R. “Thomas Calculus early transcendentals (13th Edition)”, Pearson. 2013.
2. Chris McMullen, “Essential Calculus Skills Practice Workbook with Full Solutions”, Zishka Publishing, 2018.
3. James Stewart, Single Variable Calculus: Early Transcendentals, Thomson Brooks/Cole, 2015.
4. Mathematics Lecturer Team, "Basic Mathematics", 2023.

	Additional References
	Khan Academy: https://www.khanacademy.org/math/calculus-1. Mathematics Lecture Series - Prof. Hendra Gunawan Bandung Institute of Technology,
Teaching Team	Jusmawati Massalesse, S.Si.,M.Si., Naimah Aris, S.Si.,M.Math., Edy Saputra Rusdy , S.Si., M.Si.
Course requirement	

Week	**Sub CPMK (End-of-stage learning ability)**	**Penilaian (*Assesment*)**
		Indicator
1	**2**	**3**
1-2	Students are able to use the properties of real numbers and functions in determining the domain and range of functions, as well as the solution set for root, square and absolute value inequalities. (CPMK-1)	**Formative:** **Sumative:** Gagal diterjemahkan
3-4	Students are able to describe functions through algebraic operations and through graphs. (CPMK-1)	**Formative:** Gagal diterjemahkan **Sumative:** 1. **Precision** in pacing and writing proof of the existence of the left limit, right limit, infinite limit, and di limit infinite 2. **Clarity** description of verification of continuity of function at a point. 3. **Completeness** description in identifying types of discontinuities and explain their causes 4. **Precision** describes the graph of a function that is continuous and discontinuous, including horizontal, vertical, and oblique asymptotes

5-7	Students are able to investigate the existence of limits and continuity of a function, both analytically and graphically. (CPMK-2)	**Formative:** Gagal diterjemahkan **Sumative:** 1. Calibri in using the derivative theorem and chain rule (substitution method) in determining derivatives of composition functions 2. Accuracy accuracy high-order derivatives of the given explicit function and implicit function 3. Precision in determine extreme points, turning points, monotone intervals and concavity intervals function. 4. Approximation accuracy of a function using a polynomial or series Taylor. 5. Completeness in formulating simple optimization problems and visualize in graphic form
8	Written Exam	
9-10	Students are able to determine the first derivative and higher order derivatives of a real function (both explicit and implicit functions) through limit approaches, derivative theorems and chain rules. (CPMK-1)	**Formative:** Gagal diterjemahkan **Sumative:** Gagal diterjemahkan

11-12	Students are able to demonstrate the application of first derivatives and higher derivatives through systematic steps, both in determining monotonicity intervals, extremes, turning points, concavity, sketching real function graphs, and in determining Taylor polynomials. (CPMK-2)	**Formative:** Gagal diterjemahkan **Sumative:** 1. **Carefulness** in translating geometric/physical problems into integral models exact. 2. **Completeness** in setting integral limits, integrand functions, and constants according to the context of the problem. 3. **Precision** in solving integrals and interpreting the results according to meaning geometric/physical. **4. Systematics** in preparing logical, coherent, and use mathematical notation correctly.
14-15	Students are able to use definite integrals in determining the area of a closed region, average value, curve length and mass point of a lamina. ()	**Formative:** Gagal diterjemahkan **Sumative:** Gagal diterjemahkan
16	Written Exam	

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2
CPL-1 (ILO 1)		
CPL-3 (KU1)		

Evaluation Type and Assessment Weight

Type	Assessment Weight
Case Studies	60
Written Exam	20
Written Exam	20
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				
				Case Studies	Written Exam	Written Exam			
SLO-	CLO-1	SUB-CLO-1	None	9	6	0	15		
SLO-	CLO-1	SUB-CLO-2		9	6	0	15		
SLO-	CLO-2	SUB-CLO-3		12	8	0	20		
SLO-	CLO-1	SUB-CLO-4		10	0	10	20		
SLO-	CLO-2	SUB-CLO-5		10	0	10	20		
SLO-	CLO-	SUB-CLO-7		10	0	0	10		
				60	20	20	100		

Lampiran Rubrik 01 | ASSESMENT TERTULIS

Kriteria Penilaian	Bobot/Skor Penilaian				
	5	4	3	2	1/0
Konsep/ metode yang digunakan	Penjelasan konsep /metode (*) sangat lengkap dan akurat	Penjelasan konsep/metode (*) cukup jelas tetapi beberapa informasi tidak dituliskan secara lengkap.	Penjelasan konsep/metode (*) kurang jelas dan banyak informasi yang tidak dituliskan	Penjelasan yang dituliskan hampir tidak berkaitan dengan konsep/ metode (*)	Tidak memberikan konsep yang dibutuhkan
Sistematika penulisan/ pembuktian	Sistematika penulisan/ pembuktian sangat jelas dan terstruktur	Sistematika penulisan/ pembuktian cukup jelas namun ada langkah yang hilang	Sistematika penulisan/ pembuktian kurang jelas	Sistematika penulisan/ pembuktian tidak jelas	Jawaban tidak benar/ tidak ada
Interpretasi geometri/ kualitatif/ kuantitatif.	Interpretasi geometri/ kualitatif/ kuantitaBtif (*) tepat dan lengkap	Interpretasi geometri/ kualitatif/ kuantitatif (*) cukup lengkap/ tepat	Interpretasi geometri/ kualitatif/ kuantitatif (*) kurang lengkap/ tepat	Interpretasi geometri/ kualitatif/ kuantitatif(*) tidak lengkap/ tepat	Interpretasi geometri/ kualitatif/kuantitatif(*) tidak benar
Perhitungan/kesimpulan	Perhitungan/ kesimpulan sangat akurat/tepat dan disertai alasan yang mendasarinya	Perhitungan/ kesimpulan cukup akurat/tepat dan disertai alasan yang mendasarinya	Kesimpulan cukup tepat, namun tidak disertai alasan yang jelas	Perhitungan/ kesimpulan kurang akurat/tepat dan tidak disertai alasan yang mendasarinya	Perhitungan/kesimpulan salah