Module Description of Advanced Mathematics

Module Name	:	Advanced Mathematics
Module Level	:	Bachelor
Code, if applicable	:	23H01120204
Subtitle, if applicable	:	-
Courses, if applicable	:	Advanced Mathematics
Semester(s) in which the module is taught	:	3 (Third Semester)
Module coordinator(s)	:	Naimah Aris, S.Si., M.Math.,
Lecturer(s)	:	Jusmawati Massalesse, S.Si., M.Si., Naimah Aris, S.Si., M.Math., Dr. Muhammad Zakir, M.Si.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in second year for Bachelor degree in Mathematics
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Collaborative Learning, Self-Directed Learning
Contact hours	:	200 minutes lectures per week, 240 minutes structured activities per week, and 240 minutes independent study per week
Workload	:	Total workload is 180 hours per semester which consists of 53,3 hours per semester for Learning and Teaching, 63,3 hours per semester for Self-Study, and 63,3 hours per semester for Structured Works
Credit points	:	4 (6.8 ECTS)
Requirements according to the examination regulations	:	Students are required to attend at least 80% of the total meetings which is recorded via the attendance menu at https://sikola-v2.unhas.ac.id/, complete all mandatory assignments, and obtain permission from the lecturer to participate in the written examination.
Recommended prerequisites	:	Students have completed and taken the exams for Basic Mathematics I, and Basic Mathematics II
Module objectives/intended learning outcomes	:	After the completion of this module, the student will be able to: CLO 1. understand the basic concepts of multivariable calculus, including vectors, vector calculus, several techniques and tools needed in mathematics; CLO 2. having geometric intuition and the underlying visualization will enable students to understand problems; CLO 3. understand how to use multivariable calculus concepts and several mathematical tools effectively to solve simple mathematics, science and engineering problems.

<table>
<tr><td></td><td></td><td>The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 1</th><th>ILO 2</th><th>ILO 3</th></tr>
<tr><td>CLO 1</td><td>X</td><td></td><td></td></tr>
<tr><td>CLO 3</td><td></td><td>X</td><td>X</td></tr>
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<tr><td>Content</td><td>:</td><td>The focus of this course will be on vector functions, using calculus to analyze the geometry of curves and surfaces in three-dimensional space and some necessary mathematical techniques/toolkit. Topics will be covered are: vectors and vector functions in 3-dimensional Euclidean spaces, vector calculus including vector fields, line integrals, Green’s theorem, curl and divergence, surface integrals, Stokes's theorem; Series Convergent Test; improper integral; gamma and beta functions.</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>Study and examination requirements:
Students must attend 15 minutes before the class starts.
Students must switch off all electronic devices.
Students must inform the lecturer if they will not attend the class due to sickness, etc.
Students must submit all class assignments before the deadline.
Students must attend the exam to get final grade.</td></tr>
<tr><td>Exams and assessment formats</td><td>:</td><td>Participants are marked based on their performance in theory: Report (60%), Written Exam (40%)

Reports measure analytical and writing skills. The Written Exam assesses comprehension and synthesis of all materials discussed during the semester. Altogether, these components account for 100% of the final grade.

Students are marked based on their percentage of points obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>85 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr>
<tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr>
<tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr>
<tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr>
<tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr>
<tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr>
<tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr>
<tr><td>< 40</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>:</td><td>1. James Stewart, Daniel Clegg, Saleem Watson, " Calculus Early Transcendentals " Ninth Edition, Thomson Brooks/Cole, 2021.</td></tr>
</table>

		2. James Stewan, "Calculus Early Transcendentals, Sixth edition", Thomson Brooks/Cole, 2008. 3. George B Thomas, Advanced Calculus, Twelfth Edition", Addison Wesley, 2004. 4. Robert Wrede, Spiegel Murray, "Theory and Problems of Advanced Calculus", Schaum series, 1997. 5. Lecture Multivariable Calculus MIT: https://www.youtube.com/playlist?list=PL4C4C8A7D06566F38 6. www.khanacademy.org
Last revision date		February 5th, 2025