MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY
SRIWIJAYA UNIVERSITY
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR PROGRAM IN MATHEMATICS EDUCATION
Jl. Raya Palembang – Prabumulih Km.32, Indralaya Ogan Ilir 30662 Website:https://fkip.unsri.ac.id/mathedu/

Bachelor Program in Mathematics Education **MODULE HANDBOOK**

Module designation	:	Multivariable Calculus/GMA2212
Semester	:	4th (fifth)/ Even
Person responsible for the module	:	Dr. Ely Susanti, M.Pd. Ruth Helen Simarmata, M.PMat., M.Pd. Dea Alvionita, S.Pd., M.Sc.
Language	:	Indonesian
Relation to the curriculum	:	Study Program Compulsory Course
Teaching methods	:	The teaching method integrates: ● Expository and Class Discussion (Week 1) ● Problem-Based Learning and Discussion Groups (Week 2-5, Week 7-11 and Week 13-14) ● Project-Based Learning (Week 6 and Week 12) It facilitates concept formulation, comprehension, and theoretical explanations, enabling students to identify issues, analyze information, and develop solutions through structured small-group discussions. Project-based learning is based on problem-solving tasks on real-life problems related to multivariable calculus, and students enhance their teamwork, critical thinking, and conceptual understanding.
Workload	:	A semester consists of 14 weeks, excluding mid-term and final exams. Each 1 SKS corresponds to 170 minutes of learning per week, comprising 50 minutes of synchronous learning, 60 minutes of asynchronous learning, and 60 minutes of systematic project work. For a 3 SKS course, the total weekly learning time is 170 minutes × 3 SKS = 510 minutes (8.5 hours per week). Over 14 weeks, the total workload amounts to 8.5 hours × 14 weeks = 119 hours. As 1 ECTS is equivalent to 25 hours of workload, the ECTS equivalent for this course is: 119 hours ÷ 25 hours = 4.8 ECTS.
Credit points	:	3 SKS (4.8 ECTS)
Prerequisite's course(s)	:	Basic Calculus, Advanced Calculus
Module objectives	:	After taking this course, students have the ability to: CO1: Determining the concepts of vector and the geometry of the space, vector functions, derivatives for functions of two or

<table>
<tr><td></td><td></td><td>more variables, integration in vector fields partial derivatives, multiple integrals, vector calculus
CO2: Applying the concepts of vector and the geometry of the space, vector functions, derivatives for functions of two or more variables, integration in vector fields partial derivatives, multiple integrals, vector calculus as a tool to solve the problems in solving the problems
CO3: Analyzing the multivariable calculus concepts logically and critically to solve the problems
CO4: Evaluating the concept of multivariable calculus systematically to solve problems
CO5: Applying application or software in solving multivariable calculus problems and learning processes</td></tr>
<tr><td>Content</td><td>:</td><td>This course discusses:
1. Vector and The Geometry of the Space
2. Vector Functions
3. Derivatives for Functions of Two or More Variables
4. Integration in Vector Fields Partial Derivatives
5. Multiple Integral
6. Vector Calculus</td></tr>
<tr><td>Examination forms</td><td></td><td>Examinations in this course include:
1. Affective (actively participating during classroom processes)
2. Mid-term test in the 8th meeting
3. Project in 6th and12th
4. Final Examination in the 16th meeting
5. Assignment</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>The requirement for the Final Examination is that students attend 80% of the total meetings in the modules. The total score is converted into a qualitative score based on this table.

<table>
<tr><th>Total Score</th><th>Grade</th><th>Description</th></tr>
<tr><td>86 – 100</td><td>A</td><td>Excellent</td></tr>
<tr><td>71 – 85.99</td><td>B</td><td>Good</td></tr>
<tr><td>56 – 70.99</td><td>C</td><td>Fair</td></tr>
</table>
</td></tr>
</table>

41 – 55.99	D	Bad
0 – 40.99	E	Worse

Students must achieve a minimum grade of C to pass the module successfully. The final grade is calculated based on the following components: 15% from Assignments, 25% from the Mid-Term Exam, 30% from the Final Exam, 20% from the Project, and 10% from Affective.

Assessment and Evaluation Criteria:

1. Assignment (15%)
   - ✔ Assignments are given as an exercise in meetings 1-4 and meeting 7-12
   - ✔ Assignments are individual tasks with the deadline.
   - ✔ Assignments are structured to reinforce key concepts and critical thinking skills through problem-solving exercises.

2. Midterm Exam (25%)
   - ✔ Conducted in the **8th meeting**, the Mid-Term Exam is a **written test** held in the classroom.
   - ✔ The exam duration is **120 minutes** and evaluates students' comprehension of theoretical concepts.

3. Final Exam (UAS)
   - ✔ Conducted in the 16th meeting, the Final Exam follows the department's examination schedule.
   - ✔ It is a 120-minute written test that assesses students' ability to synthesize and apply their knowledge across various topics.

4. Project-Based Learning (20%)
   - ✔ Students work on two major projects, scheduled in the 6th and 12th meetings.
   - ✔ These projects involve applying theoretical knowledge to real-world situations, and reinforcing skills in analysis, teamwork, and innovation.

		✔ Collaboration is a key component, as students work in teams to explore complex problems and develop structured solutions. 4. Affective (10%) ✔ Students are assessed based on their attitude, participation, and engagement in classroom discussions and group activities. ✔ It is recorded using an observation sheet and graded according to an effective rubric.
Reading lists	:	1. Stewart, J. (2015). *Calculus, 8th edition*. Cengage Learning. 2. Varberg, D., Purcell, E., Rigdon, S. (2015). *Calculus, 9th edition*, Pearson. 3. George, B. Thomas, Jr., Maurice, D., Weir, Joel, Hass. (2017). Thomas's Calculus: *Early Transcendental 13th edition*, Pearson. 4. Budhi, Wono S. (2001). Kalkulus Peubah Banyak dan Penggunaannya.ITB PRESS.

PLO and CO Mapping

PLO	CO
PLO 4 Have knowledge of mathematical concepts in solving mathematical problems and supporting further studies.	CO1: Determining the concepts of vector and the geometry of the space, vector functions, derivatives for functions of two or more variables, integration in vector fields partial derivatives, multiple integrals, vector calculus
	CO2: Applying the concepts of vector and the geometry of the space, vector functions, derivatives for functions of two or more variables, integration in vector fields partial

	derivatives, multiple integrals, vector calculus as a tool to solve the problems in solving the problems
PLO 7 Able to apply mathematical knowledge logically, critically and systematically in solving problems.	CO3: Analyzing the multivariable calculus concepts logically and critically to solve problems
	CO4: Evaluating the concept of multivariable calculus systematically to solve problems
PL0 10 Able to utilize technology in solving mathematics and learning problems.	CO5: Applying application or software in solving multivariable calculus problems and learning processes.