MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
UNDERGRADUATE PROGRAM OF MATHEMATICS
Ketintang Campus, C8-C9 Buildings of FMIPA, Surabaya
Email: s1-mat@unesa.ac.id

Module Handbook

Module Name :	*Kalkulus Peubah Banyak* Multivariable Calculus
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420104057
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	4th/ Second year
Module coordinator(s)	Prof. Manuharawati, M.Si
Lecturer(s):	Rudianto Artiono, M.Si Dwi Nur Yunianti, M.Si Budi Priyo Prawoto, M.Si M. Jakfar, M.Si
Language:	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	4 contact hours of lectures (*sks* or credit unit*)
Workload :	4 x 50 minutes lectures, 4 x 60 minutes structured activity, and 4 x 60 minutes individual activity per week, 14 weeks per semester 158.66 total hours per semester ~ 6.35 ECTS**
Credit Unit:	4 credit unit (6.35 ECTS)
Requirements:	Integral Calculus

Learning goals/competencies:	**Knowledge (KNO-1:** Demonstrating mathematical knowledge and mathematical insight**)** CLO-1: Able to demonstrate mathematical knowledge related to vector, vector valued function, real valued multivariable vector, differential calculus of multivariable function, integral calculus of multivariable function, and calculus of vector field. **Skill (SKI-1:** Formulating and solving fundamental mathematical problems**)** CLO-2: Able to formulate and solve problem of vector, vector valued function, real valued multivariable function, differential calculus of multivariable function, and integral calculus of multivariable function. **Skill (SKI-2:** Applying the basic principles of mathematics to solve simple* mathematical problems**)** CLO-3: Able to use the method of finding solutions in solving related mathematical problems of vector, vector valued function, real valued multivariable function, differential calculus of multivariable function, and integral calculus of multivariable function. **Skill (SKI-4:** Implementing simple mathematical procedures in computer programs**)** CLO-4: Able to implement concept and properties of vector, vector valued function, real valued multivariable vector, differential calculus of multivariable function, and integral calculus of multivariable function for making a simple computer problem in order to solve problems. **Competences (COM-2:** Generating ideas used for completing mathematical tasks and to communicate them either in writing or orally, in accordance with scientific principles**)** CLO-5: Able to generalize the ideas used to complete the task related to the concept vector, vector valued function, real valued multivariable vector, differential calculus of multivariable function, and integral calculus

	of multivariable function and able to communicate orally or in writing.
Content	This Course discusses about two and three-dimensional vector, real function of two variable (definition, limit and continuity, partial derivative, algebraic derivation and the chain rule, higher order partial derivative, the Taylor theorem, maximum and minimum problems, the Lagrange method), vector valued function (definition, limit and continuity, partial derivative, algebraic derivation, higher order partial derivative, tensor), double integrals, line integral. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.

Attribute Soft skill:	Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class.
Study/exam achievements:	The final grade (*NA*) is calculated based on the following ratio:

Assessment Components	Percentage of contribution
Participation	20%
Assignment	30%
Mid-semester test	20%
Final semester test	30%

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<table>
<tr><td></td><td>Grade conversion of 0-100 scale into 0-4 scale is set as below:
<table>
<tr><th>Letter</th><th>Number</th><th>Grade Interval</th></tr>
<tr><td>A</td><td>4,00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Learning Methods :</td><td>Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities).
Skills or competence learning outcomes can be achieved by practicum activity</td></tr>
<tr><td>Form of Media:</td><td>Power point slides; video; worksheets, and textbooks</td></tr>
<tr><td>Literature (primary references):</td><td>1. Stewart, J., 2020, Multivariable Calculus 8th edition,Brooks/Cole Publishing, California.
2. Budiarto, M. T., 2013. Kalkulus Peubah Banyak. Surabaya: Zifatama.
3. Finney, Weir dan Giardano, 2001. Thomas' Calculus 10th, Addison-Wesley.
4. Holder, L.I, DeFranza, J., dan Pasachoff,J.M.1994, Multivariable Calculus, Brooks/Cole Publishing, California.
5. Hass, J,. et. all. 2017. Thomas Calculus, Multivariable, Pearson.</td></tr>
<tr><td>Notes:</td><td>*1 credit unit or sks in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research,
Technology, and Higher Education No. 50 Year 2018.</td></tr>
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	**1 credit unit or *sks* = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019