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 :	*Analisis Real* Real Analysis
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420103018
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	4th/ first year
Module coordinator(s)	Prof. Dr. Manuharawati, M.Si.
Lecturer(s):	Prof. Dr. Manuharawati, M.Si. Dwi Nur Yunianti, M.Sc. Muhammad Jakfar, M.Si.
Language:	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (*sks* or credit unit*)
Workload :	3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week, 14 weeks per semester 119 total hours per semester ~ 4.76 ECTS**
Credit Unit:	3 credit unit (4.76 ECTS)
Requirements:	Foundations of Mathematics

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Learning goals/competencies:	**Knowledge (KNO-2):** Identifying and explaining the characteristics of mathematical problems. **CLO-1**: Explain problems that involve critical thinking for topology on real lines, and convergence of real number sequence **Skill (SKI-1) :** Formulating and solving fundamental mathematical problems. **CLO-2:** Solve the problems of real number system, topology on real lines, and convergence of real number sequence **Skill (SKI-2) :** Applying the basic principles of mathematics to solve simple* mathematical problems **CLO-3:** Apply definition and theorems of real number system, topology on real lines, and convergence of real number sequence to solve simple mathematical problems **Competences (COM-1) :** Proving mathematical statements by various methods. **CLO-4:** Prove properties of real number system, topology on real lines, and real number sequence by direct or undirect proofing **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-3:** Use theorems related to solve or complete mathematical tasks and communicate them in writing
Content	This course discusses Real number systems (algebra of real numbers and their properties, rational and irrational numbers, sequences of real numbers and their properties, absolute values, orbits of points, supremum and infimum of a set and their properties, intervals and properties, the orbit of a point), topology

	on real lines (specific points of a set and their properties, open and closed sets and their properties), real number sequences (sequence limits, sequence limit properties, sequence tails, monotonous sequences, subset sequences, sequences divergent, Cauchy criterion, contractive sequences). Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.

<table>
<tr><td>Attribute Soft skill:</td><td>Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class.</td></tr>
<tr><td>Study/exam achievements:</td><td>The final grade (NA) is calculated based on the following ratio:
<table>
<tr><td>Assessment Components</td><td>Percentage of contribution</td></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
</table>
Grade conversion of 0-100 scale into 0-4 scale is set as below:
<table>
<tr><td>Letter</td><td>Number</td><td>Grade Interval</td></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).</td></tr>
<tr><td>Form of Media:</td><td>Power point slides; video; worksheets, and textbooks</td></tr>
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Literature (primary references):	1. Manuharawati. 2014. Analisis Real. Zifatama: Surabaya. 2. Bartle, R.G. Sherbert Donald R. 2021. Introduction to Real Analysis (Fourth Edition), New York, John Wiley and Sons. 3. Stoll. R. 2021. Introduction to Real Analysis (Third Edition), Boca Raton, Chapman & Hall/CRC.
Notes:	*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.
	**1 credit unit or *sks* = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019