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 Fungsional* Functional Analysis
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420103013
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	7th/ third year
Module coordinator(s)	Prof. Dr. Manuharawati, M.Si
Lecturer(s):	Prof. Dr. Manuharawati, M.Si Dwi Nur Yunianti, S.Si., M.Sc.
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 ~ 4.77 ECTS**
Credit Unit:	3 credit unit (4.77 ECTS)
Requirements:	Real Analysis II

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Learning goals/competencies:	**Knowledge (KNO-1)** CLO-1: Demonstrate the ability to think structured, reasoned, proof based on deductive-axiomatic analysis, and proof of mathematical induction; understand the concept of metric spaces, completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces.and its application. **Skill (SKI-1)** CLO-2: Formulate and solving fundamental mathematical problems in metric spaces, completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces.and its application **Skill (SKI-3)** CLO-3: Analyze the formal structure of mathematical problems and relevant fields with metric spaces, completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces.and its application **Competences (COM-1)** CLO-4: Prove mathematical statements in metric spaces, completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces by various methods. **Competences (COM-2)** CLO-5: Generate ideas used for completing mathematical tasks and to communicate them either in writing or orally, in accordance with scientific principles about metric spaces, completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces.and its application
Content	Metric spaces (Neigborhood, point positions in sets, open and closed sets, convergence of Cauchy sequences and sequences in metric spaces), completeness of metric spaces, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert Spaces.and its application. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.

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<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>$85 \leq A \leq 100$</td></tr>
<tr><td>A-</td><td>3,75</td><td>$80 \leq A- < 85$</td></tr>
<tr><td>B+</td><td>3,50</td><td>$75 \leq B+ < 80$</td></tr>
<tr><td>B</td><td>3,00</td><td>$70 \leq B < 75$</td></tr>
<tr><td>B-</td><td>2,75</td><td>$65 \leq B- < 70$</td></tr>
<tr><td>C+</td><td>2,50</td><td>$60 \leq C+ < 65$</td></tr>
<tr><td>C</td><td>2,00</td><td>$55 \leq C < 60$</td></tr>
<tr><td>D</td><td>1,00</td><td>$40 \leq D < 55$</td></tr>
<tr><td>E</td><td>0,00</td><td>$0 \leq E < 40$</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>
</table>

Literature (primary references):	1. Kreyzig. 1978. *Introductory to Functional Analysis*. Canada. John Wiley & Sons. 2. Berberian. 1961. Introducton to Hilbert Space. New York : Oxford University Press. 3. Royden, H.L. and Fitzpatrick. Real Analysis (4th edition). 2010. New York: Pearson.
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