Master Program of Mathematics Education **Module Handbook**

Module Name:	Real Analysis
Module Level:	Master (S-2)
Abbreviation, if applicable:	
Sub-heading, if applicable:	-
Course included in the module, if applicable:	-
Semester/term:	2 / First year
Module Coordinator(s):	Prof. Dr. Manuharawati, M.Si.
Lecturer(s):	1. Prof. Dr. Manuharawati, M.Si. 2. Dr. Yusuf Fuad, M.App.Sc.
Language:	Indonesian
Classification within the curriculum:	Compulsory course / ~~elective studies~~
Teaching format/class hours per week during the semester	Teaching format: lectures, tutorial assignment, and individual study. 3 × 240 minutes = 720 minutes = 12 hours lectures
Workload:	15 weeks per semester consisting of: • 1 hour lecture (1 × 50 minutes) per week, • 2 hours assignments (2 × 45 minutes) per week, • 2 hours individual study (2 × 50 minutes) per week, Total workload: 14 × 3 × 240 minutes = 10,080 minutes = 6.72 ECTS*
Credit Point:	3
Requirements:	N/A
Learning Goals:	**Knowledge (KNO-1)** CLO-1: able to Understand the interval system, neighborhood and topology in R (open and closed sets) CLO-2: able to understand the concepts of sequences/series of real numbers, convergence, limits and tails of sequences, and monotone sequences and related principles (the Bolzano-Weierstrass theorem and Cauchy's criterion) CLO-3: able to understand the concepts of limits and continuity of real functions and the related principles

<table>
<tr><td></td><td>Skill (SKI-1)
CLO-4: able to prove the principles that apply to sequences/series of real numbers and to the limit (continuity) of real functions with various methods/approaches

Competency (COM-1)
CLO-5: able to communicate ideas and solve problems related to the convergence of sequences/series and limits/continuity of real functions orally and in writing

Social (SOC-1)
CLO-6: able to collaborate and be responsible professionally and ethically in completing tasks</td></tr>
<tr><td>Content:</td><td>Studying real number system: properties, order relations, absolute values, intervals and topologies in R, completeness of R, nested intervals; sequences/series of real numbers: convergence, monotone sequences, Bolzano-Weierstrass theorem, Cauchy's criterion and its relation to sequence convergence; the concept of limit function and its properties; concept of continuous function and its properties</td></tr>
<tr><td>Study/exam achievements</td><td>• Students are considered competent and pass if the final score calculated from the score of midterm exam, assignments, participation, and final exam is at least 55 or C.
• Final score is calculated as follows:
20% midterm exam + 30% assignments + 20% participation + 30% final exam
• Final index is defined as follow:
<table>
<tr><th>Index</th><th>Converted Score</th><th>Score Range</th></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>Media employed</td><td>Slides and LCD projectors, white board</td></tr>
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Reading list	[1] Bartle, R. G. & Sherbert, D. R. 2011. *Introduction to Real Analysis* (4th Ed.). John Wiley and Sons. [2] Manuharawati. 2014. *Analisis Real*. Zifatama [3] Parzynski, R. & Zipse, P. W. 1987. *Introduction to Mathematical Analysis*. McGraw-Hill Book Company
Note	*Total hours per 1 credit in 1 semester = {(1 credit × 240 minutes × 14 weeks)/60 minutes} = 56 hours. Each ECTS equals 25 hours, so 1 credit in 1 semester is equivalent to 2.24 ECTS.
Last amendment	January 2023