Module Description of Introduction to Real Analysis

Module Name	:	Introduction to Real Analysis
Module Level	:	Bachelor
Code, if applicable	:	23H01110103
Subtitle, if applicable	:	-
Courses, if applicable	:	Introduction to Real Analysis
Semester(s) in which the module is taught	:	3 (Third Semester)
Module coordinator(s)	:	Prof. Budi Nurwahyu, M.Si.
Lecturer(s)	:	Prof. Budi Nurwahyu, M.Si; Jusmawati Massalesse, S.Si, M.Si; Dr. M. Nur S.Si, M.Si; Dr. Muh Zakir, M.Si
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in second year (semester III) for Bachelor degree in Mathematics
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Cooperative Learning, Self-Directed Learning
Contact hours	:	150 minutes lectures per week, 180 minutes structured activities per week, and 180 minutes independent study per week
Workload	:	Total workload is 135 hours per semester which consists of 40 hours for Learning and Teaching, 47.5 hours for Self-Study, and 47.5 hours for Structured Works.
Credit points	:	3 (4.8 ECTS)
Requirements according to the examination regulations	:	Students are required to attend at least 80% of the total meetings which is recorded via the attendance menu at https://sikola-v2.unhas.ac.id/, complete all mandatory assignments, and obtain permission from the lecturer to participate in the written examination.
Recommended prerequisites	:	Basic Mathematics I; Basic Mathematis II; Mathematical Logic and Set Theory
Module objectives/intended learning outcomes	:	After the completion of this module, the student will be able to: CLO 1. Students are able to apply basic concepts related to completely ordered fields, topology, sequences of real numbers, limits, and continuous functions CLO 2. Students are able to demonstrate logically and systematically the concepts and properties of completely ordered fields, topology, sequences of real numbers, limits, and continuous functions CLO 3. Students are able to use and relate concepts to each other to identify and solve problems

<table>
<tr><td></td><td></td><td>The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 1</th><th>ILO 2</th><th>ILO 3</th></tr>
<tr><td>CLO 1</td><td>X</td><td></td><td></td></tr>
<tr><td>CLO 2</td><td></td><td>X</td><td></td></tr>
<tr><td>CLO 3</td><td></td><td></td><td>X</td></tr>
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<tr><td>Content</td><td>:</td><td>This course covers the complete ordered field, topology, sequences of real numbers, and limits and continuity of real functions. The discussion on the complete ordered field includes the algebraic properties of real numbers, order properties derived from the set of positive numbers, bounded sets, supremum–infimum, and their applications. In topology, the focus is on open and closed sets and their relation to interior and limit points. The study of sequences of real numbers addresses convergence and divergence criteria, the Monotone Convergence Theorem, the Bolzano–Weierstrass Theorem, and Cauchy sequences. Finally, the topic of limits and continuity emphasizes the epsilon–delta definition, the Bolzano Intermediate Value Theorem, the Maximum–Minimum Theorem, uniform continuity, and the distinction between ordinary continuity and uniform continuity.</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>Study and examination requirements:
Students must attend 15 minutes before the class starts.
Students must switch off all electronic devices.
Students must inform the lecturer if they will not attend the class due to sickness, etc.
Students must submit all class assignments before the deadline.
Students must attend the exam to get final grade.</td></tr>
<tr><td>Exams and assessment formats</td><td>:</td><td>The assessment of this course consists of assignments (15%), quizzes (15%), a written exam (20%), and report (50%).

Reports measure analytical and writing skills. Quizzes are used to test continuous understanding of weekly content. The Written Exam assesses comprehension and synthesis of all materials discussed during the semester. Altogether, these components account for 100% of the final grade.

Students are marked based on their percentage of points obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>85 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr>
<tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr>
</table></td></tr>
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			70 - < 75	B	3.0	
			65 - < 70	B-	2.75	
			60 - < 65	C+	2.5	
			50 - < 60	C	2.00	
			40 - < 50	D	1.00	
			< 40	E	0.00	
Reading list	:	1. Robert G. Bartle and Sherbert and Donald R., 2000, Introduction to Real Analysis, John Wiley and Sons. 3rd ed. 2. William F. Trench, 2003, Intoduction to Real Analysis, Pearson Education. 3. Manfred Stoll, 1997,"An Introduction to Real Analysis", Addison-Wesley Educational Publishers Inc.				
Last revision date	:	July 28th, 2025				