Module Description of Real Analysis

Module Name	:	Real Analysis
Module Level	:	Bachelor
Code, if applicable	:	23H01120903
Subtitle, if applicable	:	-
Courses, if applicable	:	Real Analysis
Semester(s) in which the module is taught	:	4 (Fourth Semester)
Module coordinator(s)	:	Naimah Aris, S.Si., M.Math
Lecturer(s)	:	Prof. Dr. Budi Nurwahyu, MS., Jusmawati Massalesse, S.Si.,M.Si., Naimah Aris, S.Si.,M.Math., Dr. Muh. Nur, S.Si., M.Si.
Language	:	Bahasa (Indonesian language)
Classification within the curriculum	:	Compulsory course in semester IV for Bachelor degree in Mathematics
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Cooperative Learning, Self-Directed Learning, Case Method
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 per semester for Learning and Teaching, 47.5 hours per semester for Self-Study, and 47.5 hours per semester 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 examination.
Recommended prerequisites	:	Students have completed and taken the exams for Advanced Mathematics and Introduction to Real Analysis
Module objectives/intended learning outcomes	:	After the completion of this module, the student will be able to: CLO 1. describe, explain, interpret, and apply the concept and theorem of the derivative of function, integral, sequence of function, infinite series and topology in metric space; CLO 2. Interpret the concept in proving theorems and other related concepts concerning derivatives, integrals, sequences of functions, and the topology of metric spaces; CLO 3. communicate concepts of derivatives, integrals, sequences of functions, and the topology of metric

<table>
<tr><td></td><td></td><td>spaces orally and in writing, both independently and in groups.

The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 2</th><th>ILO 4</th><th>ILO 7</th></tr>
<tr><td>CLO 1</td><td>X</td><td>X</td><td></td></tr>
<tr><td>CLO 2</td><td></td><td>X</td><td>X</td></tr>
<tr><td>CLO 3</td><td>X</td><td></td><td>X</td></tr>
</table></td></tr>
<tr><td>Content</td><td>:</td><td>The course Introduction to Real Analysis covers fundamental concepts of mathematical analysis that serve as a foundation for further studies in pure and applied mathematics. The main topics include: Derivatives, Riemann Integral, Sequences of Functions, Series of Functions, and Metric Spaces. Through this course, students are expected to understand, apply, and communicate the key concepts of real analysis both orally and in writing, individually as well as collaboratively. This course also provides the necessary background for advanced courses such as Advanced Real Analysis and Complex Analysis.</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>Participants are marked based on their performance in theory: Report (75%), Written Exam (20%), and Quiz (5%).

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>
<tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr>
<tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr>
<tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr>
</table></td></tr>
</table>

		50 - < 60 | C | 2.00 40 - < 50 | D | 1.00 < 40 | E | 0.00
Reading list		1. Bartle, Robert.G and Sherbert, Donald R., 2000, Introduction to Real Analysis, John Wiley and Sons. 3rd ed. 2. Budi Nurwahyu. 2019. Common fixed-point theorems on generalized ratio contraction mapping in extended rectangular B-metric spaces, International Journal of Mathematics and Mathematical Sciences, pp 1-14 3. Trench, William F., 2003, Intoduction to Real Analysis, Pearson Education. 4. Rudin, Walter. Principles of Mathematical Analysis. 3rd ed. McGraw-Hill, 1976. 5. Charles C. Pugh, 2015, "Real Mathematical Analysis", Springer International Publishing Switzerland. 2nd ed.
Last revision date		February 5th, 2025