# Module Description of Complex Functions

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| Module Name | : | Complex Functions |
| Module Level | : | Bachelor |
| Code, if applicable | : | 23H01130303 |
| Subtitle, if applicable | : | - |
| Courses, if applicable | : | Complex Functions |
| Semester(s) in which the module is taught | : | 5 (Fifth Semester) |
| Module coordinator(s) | : | Prof. Dr. Amir Kamal Amir, M.Sc. |
| Lecturer(s) | : | Dra. Nur Erawati, M.Si. |
| Language | : | Bahasa (Indonesian language) |
| Relation to curriculum | : | Compulsory course in third year 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 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 written examination. |
| Recommended prerequisites | : | Students have completed and taken the exams for Introduction to Real Analysis |
| Module objectives/intended learning outcomes | : | After the completion of this module, the student will be able to:<br>CLO 1. have a relatively deep understanding of the concept of complex variable functions.;<br>CLO 2. identify objects, and master the techniques for proving complex variable function theorems;<br>CLO 3. reconstruct, modify, analyze, the fundamentals of complex function theory and other fields, and be able to assess accuracy, interpret it, and communicate it both verbally and in writing.<br><br>The following is the mapping of the ILO and the CLO of this course: |

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<table>
<tr><th></th><th>ILO 1</th><th>ILO 2</th></tr>
<tr><td>CLO 1</td><td>X</td><td>X</td></tr>
<tr><td>CLO 2</td><td></td><td>X</td></tr>
<tr><td>CLO 3</td><td>X</td><td></td></tr>
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<tr><td>Content</td><td>:</td><td>Complex Functions covers fundamental and important concepts in complex functions and encourages students to think creatively in solving various problems, ranging from simple to complex. The main focus is on the problem-solving process, with several theorems presented and proven to train students' logical reasoning skills. The material covers complex numbers and their operations, complex functions, limits and continuity, differentials and analytic functions, Cauchy-Riemann equations, harmonic functions, complex function integrals, Cauchy's integral theorem, Taylor and Laurent series, and residue theorems and their applications.</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>Study and examination requirements:<br>● Students must attend 15 minutes before the class starts.<br>● Students must switch off all electronic devices.<br>● Students must inform the lecturer if they will not attend the class due to sickness, etc.<br>● Students must submit all class assignments before the deadline.<br>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: Quizzes (10%), Report (50%), Written Exam (40%).<br><br>Assignments assess student's ability to apply concepts independently, while 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.<br><br>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>
<tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr>
<tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr>
<tr><td>< 40</td><td>E</td><td>0.00</td></tr>
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| Reading list | : | 1. Ruel V Churchill and James Ward Brown, (2010), Complex Variables and Applications, McGRAW-HILL.<br>2. Murray Spigel (1964), Theory and Problem of Complex Variables, McGRAW-HILL.<br>3. John Erik Fornaess (1993), Several Complex Variables, Princeton University Press<br>4. Stephen D. Fisher (1990), Complex Variables, Dover Publications, INC. |
| Last revision date | : | July 28th, 2025 |