



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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## Undergraduate Programme in Mathematics

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## MODULE HANDBOOK

Module name	Function of Complex Variable I
Module level, if applicable	Bachelor
Code, if applicable	MMM-2112
Subtitle, if applicable	-
Courses, if applicable	Function of Complex Variable I
Semester(s) in which the module is taught	4 <sup>th</sup> (fourth)
Person responsible for the module	Chair of the Lab. of Analysis
Lecturer(s)	Prof. Dr. Supama, M.Si. Drs. Yusuf, M.A.
Language	Indonesia
Relation to curriculum	Compulsary course in the second year (4 <sup>th</sup> semester) Bachelor Degree
Type of teaching, contact hours	100 minutes lectures and 120 minutes structured activities per week.
Workload	Total workload is 90.67 hours per semester, which consists of 100 minutes lectures per week for 14 weeks, 120 minutes structured activities per week, 120 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	2
Requirements according to the examination regulations	Students have taken Function of One Complex Variable I course (MMM-2112) and have an examination card where the course is stated on.
Recommended prerequisites	Students have taken Calculus of Multivariable I (MMM-2109) and have participated in the final examination of the course.
Module objectives/intended learning outcomes	After completing this course, the students have ability to: CO 1. generalize some operations in complex system. CO 2. generalize calculus concepts in complex system, such as: limit, continuity, and derivative. CO 3. justify a function is analytic or not. CO 4. determine the derivative of elementary functions.

Content	<ul style="list-style-type: none"><li>• Complex numbers system: notation, algebraic operation, geometric interpretation, modulus, polar form, power and roots of complex numbers.</li><li>• Topology on complex numbers system.</li><li>• Analytic functions: complex functions, mapping, limits, properties of limits, limit involving a point at infinity, continuity, derivative, differentiation formula, Cauchy-Riemann Equations, sufficient conditions, polar coordinates, analytic functions, harmonic functions.</li><li>• Elementary functions: exponential function and its properties, trigonometric functions, hyperbolic functions, logarithmic functions and their branches,</li></ul>
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	properties of logarithmic function, complex exponent, invers of trigonometric and hyperbolic functions.		
Study and examination requirements and forms of examination	The final mark will be weighted as follows:		
	No	Assessment methods (components, activities)	Weight (percentage)
	1	Final Examination	45%
	2	Mid-Term Examination	30%
	3	Class Activities: Quiz, Homework, etc.	25%
	The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.		
Media employed	White-board, Laptop, LCD Projector		
Reading List	James Ward Brown and Ruel V. Churchill, R, 2013, <i>Complex Variable and Applications</i> , 9th Edition, McGraw-Hill.		

### PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1		v				v			
CO 2			v						v
CO 3			v			v			v
CO 4			v						v