



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	Advanced Calculus												
Module level, if applicable	Bachelor												
Code, if applicable	MMM-2111												
Subtitle, if applicable	-												
Courses, if applicable	Advanced Calculus												
Semester(s) in which the module is taught	4 th (fourth)												
Person responsible for the module	Chair of the Lab. of Analysis												
Lecturer	Drs. Yusuf, M.A.												
Language	Indonesia												
Relation to curriculum	Compulsary course in the second year (4 th semester) Bachelor Degree												
Type of teaching, contact hours	100 minutes lectures and 120 minutes structured activities (homework and task) 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 Advanced Calculus course (MMM-2111) and have an examination card where the course is stated on.												
Recommended prerequisites	Students have taken Calculus II course (MMM-1102) and have participated in the final examination of the course.												
Module objectives/intended learning outcomes	After completing this course, the students: CO 1. have ability to investigate the divergence or convergence of real number series. CO 2. have ability to determine the convergence interval of power series. CO 3. have ability to identify the Riemann integrability of a function according to definition and its properties. CO 4. have ability to determine the primitive of Riemann integrable function and its properties. CO 5. have ability to prove some basic properties of the gamma and beta functions.												
Content	Series: definition, algebra operation, convergence, series with positive terms, convergence tests, radius of convergence, absolute convergence and conditional convergence, alternating series, rearrangement of series terms. Riemann integral: partition, length of partition, upper and lower Riemann integral, Riemann integral and its properties, Darboux integral, primitive of Riemann integrable function and its properties, integral as upper bound function. Gamma and Beta functions.												
Study and examination requirements and forms of examination	The final mark will be weighted as follows: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>45%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>30%</td> </tr> <tr> <td>3</td> <td>Class Activities: Quiz, Homework, etc.</td> <td>25%</td> </tr> </tbody> </table> The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%,	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	45%	2	Mid-Term Examination	30%	3	Class Activities: Quiz, Homework, etc.	25%
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1	Final Examination	45%											
2	Mid-Term Examination	30%											
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	50%, and 40%, respectively.
Media employed	White-board, Laptop, LCD Projector
Reading List	<ol style="list-style-type: none"> 1. Angus E. Taylor, 1989, <i>Advanced Calculus</i>, Blaisdell. 2. Robert G. Bartle and Donald R. Sherbert, 2011, <i>Introduction to Real Analysis</i>, 4th Edition, John Wiley and Sons. 3. William R. Parzynski, and Philip W. Zipse, 1982, <i>Introduction to Mathematical Analysis</i>, McGraw-Hill Book Company, New York.

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			v
CO 3		v	v						
CO 4			v			v			
CO 5							v		v