



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 552243 Fax: +62 274 555131 Email: math@ugm.ac.id Website: <http://math.fmipa.ugm.ac.id>

Undergraduate Programme in Mathematics

Telp : +62 274 552243

Email : maths1@ugm.ac.id; kaprodi-s1-matematika.mipa@ugm.ac.id

sekprodi-s1-matematika.mipa@ugm.ac.id

Website : <http://s1math.fmipa.ugm.ac.id/>

MODULE HANDBOOK

Module name	Introduction to Theory of Measure and the Lebesgue Integral													
Module level, if applicable	Bachelor													
Code, if applicable	MMM- 3105													
Subtitle, if applicable	-													
Courses, if applicable	Introduction to Theory of Measure and the Lebesgue Integral													
Semester(s) in which the module is taught	6 th (sixth)													
Person responsible for the module	Chair of the Lab. of Analysis													
Lecturer	Prof. Dr. Soeparna Darmawijaya													
Language	Bahasa Indonesia													
Relation to curriculum	Bachelor Degree, Elective Course, 6 th semester													
Type of teaching, contact hours	150 minutes lectures, 180 minute structured activities.													
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.													
Credit points	3													
Requirements according to the examination regulations	Students have taken Introduction to Theory of Measure and the Lebesgue Integral course (MMM-3105) and have participated in the final examination of the course.													
Recommended prerequisites	Introduction to Analysis I and sequence of functions.													
Module objectives/intended learning outcomes	After completing this course the students have ability to: CO 1. analyze the measurability of a set and a function. CO 2. analyze the Lebesgue integrability of a function on $[a, b]$. CO 3. prove and develop some properties of Lebesgue integrable functions.													
Content	• Measure: length of an interval and outer measure of a set. • Measurable space: definition of measurable space, properties of measurable space, and measure (Lebesgue). • Measurable function: definition of measurable function, some properties of measurable functions, operations of measurable functions, characteristic function, and simple function. • The Lebesgue Integral: definition of the Lebesgue integral on $[a, b]$, relation between the Riemann integral and the Lebesgue integral on $[a, b]$, some properties of the Lebesgue integral on $[a, b]$.													
Study and examination requirements and forms of examination	The final mark will be weighted as follows: <table> <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>35% – 45%</td></tr> <tr> <td>2</td><td>Mid-Term Examination</td><td>30% – 35%</td></tr> <tr> <td>3</td><td>Class Activities: Quiz, Homework, etc.</td><td>25% – 30%</td></tr> </tbody> </table>		No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	35% – 45%	2	Mid-Term Examination	30% – 35%	3	Class Activities: Quiz, Homework, etc.	25% – 30%
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1	Final Examination	35% – 45%												
2	Mid-Term Examination	30% – 35%												
3	Class Activities: Quiz, Homework, etc.	25% – 30%												

	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	Board, LCD Projector, Laptop/Computer
Reading List	1. Halsey L. Royden, and Patrick M. Fitzpatrick, 2010, <i>Real Analysis</i>, 4th Edition, Prentice Hall. 2. Richard L. Wheeden, and Antoni Zygmund, 1977, <i>Measure and Integration</i>, CRC Press 3. G. De Barra, 1974, <i>Introduction to Measure Theory</i>, Van Nostrand Reinhold 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	v		v
CO 2			v			v	v		v
CO 3			v			v	v		v