



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Mathematics

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Master in Mathematics

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MODULE HANDBOOK

Module Name	Advanced Ring Theory
Module level, if applicable	Master
Code, if applicable	MMM 5206
Subtitle, if applicable	
Courses, if applicable	Advanced Ring Theory
Semester(s) in which the module is taught	First year
Person responsible for the module	Chair of Algebra Research Group
Lecturer(s)	<ul style="list-style-type: none">● Prof. Dr. Sri Wahyuni● Prof. Dr. Indah Emilia Wijayanti● Dr. Budi Surodjo● Dr. Ari Suparwanto● Dr. Sutopo● Dr. Uha Isnaeni
Language	Indonesia
Relation to curriculum	Elective courses
Teaching methods	Lecture, presentation
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours: 150 minutes lectures per week, 180 minutes structured activities per week, 180 hours individual study, 16 weeks per semester (including mid-term and final examinations), in total 136 hours per semester.
Credit points	3
Required and recommended prerequisites for joining the module	Before taking this course, students must master the introduction of ring theory and introduction of module theory.

<p>Module objectives/intended learning outcomes</p>	<p>Upon successful completion of this course, students are able to:</p> <ul style="list-style-type: none"> ● CO 1. clarify various concepts, definitions and important properties related to regularity in rings, special ideals, special rings and special modules. ● CO 2. prove concepts related to regularity in rings, special ideals, special rings and special modules. ● CO 3. linking results and theorems in rings and modules between topics covered in lecture. ● CO 4. linking theories, methods and techniques that have been learned in lectures to solve some ring and module problems. 															
<p>Content</p>	<p>The syllabus</p> <ul style="list-style-type: none"> ● the concept of regularity in rings, namely regular elements, regular rings; ● idempotent element, nilpotent element, idempotent ideal, nilpotent ideal, nil ideal; ● prime elements, irreducible elements, prime ideals, and semiprime ideals; ● simple ring, simple module and semi simple module; ● Noether ring, Artin ring, Noether module, Artin module; ● various advanced topics related to ring theory and module theory to enrich students' insight: group rings, submodules and prime modules, regular submodules, idempotent submodules, single factorization modules, etc. 															
<p>Examination forms</p>	<p>Oral presentation, essay, project</p>															
<p>Study and examination requirements</p>	<p>The final mark will be weighted as follows:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">No</th> <th style="text-align: left;">Assessment methods (components, activities)</th> <th style="text-align: right;">Weight</th> </tr> </thead> <tbody> <tr> <td colspan="3">(percentage)</td> </tr> <tr> <td>1</td> <td>Final Examination</td> <td style="text-align: right;">20 – 30 %</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td style="text-align: right;">20 – 30 %</td> </tr> <tr> <td>3</td> <td>Project</td> <td style="text-align: right;">50 - 55 %</td> </tr> </tbody> </table> <p>To pass the course, the minimum grade is C.</p>	No	Assessment methods (components, activities)	Weight	(percentage)			1	Final Examination	20 – 30 %	2	Mid-Term Examination	20 – 30 %	3	Project	50 - 55 %
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1	Final Examination	20 – 30 %														
2	Mid-Term Examination	20 – 30 %														
3	Project	50 - 55 %														
<p>Media employed</p>	<p>White Board, LCD Projector, Laptop/Computer</p>															

Reading list	<ol style="list-style-type: none"> 1. Blyth, T.S, 2018, <i>Module Theory An Approach to Linear Algebra</i>, University of St Andrews. 2. Adkins, W.A. Weintraub, S.H., 1992, <i>Algebra: An Approach via Module Theory</i> (Graduate Texts in Mathematics, 136), Springer-Verlag, New York. 3. Lam, T.Y., 1999, <i>Lectures on Modules and Rings</i>, Springer Verlag, New York. 4. Wisbauer, R., 1991, <i>Foundation of Module and Ring Theory</i>, Gordon and Breach, Philadelphia. 5. Lam, T.Y., 1991, <i>A First Course in Noncommutative Rings</i>, Springer Verlag, New York. 6. Huyn, D.V., Lopez-Permouth, S.R., 2010, <i>Advances in Ring Theory</i>, Birkhaeuser, Basel.
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CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1	V		V	V	V	V
CO 2	V		V	V	V	V
CO 3	V		V	V	V	V
CO 4	V		V	V	V	V

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