UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
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Doctoral Program in Mathematics

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Matrices Over Ring
Module level, if applicable:	Doctoral Program
Code, if applicable:	MMM 5207
Semester(s) in which the module is taught:	**1st Semester (1st Year)**
Person responsible for the module:	Chair of Algebra Research Group
Lecturer(s):	1. Dr. Ari Suparwanto, M. Si 2. Dr. Sutopo, S.Si., M.Si
Language:	Bahasa Indonesia
Relation to curriculum:	Doctoral Degree in Mathematics, Compulsory / Elective Course
Credit points:	3 Semester Credit Unit
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.
Workload:	• 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations)
Recommended prerequisites:	Kompetensi Aljabar Linear, Pengantar Struktur Aljabar I dan Pengantar Struktur Aljabar II
Module objectives/intended learning outcomes:	On successful completion of this course, students should be able to: CO 1. Identify the ideal in $M_{n\times n}(R)$. CO 2. Identify the generalizing rank of matrices and calculate the solution system of linear equations over ring. . CO 3. Identiy the generalizing of Caylay-Hamilton theorem CO 4. Identify the Resultant and Zero divisor in. $M_{n\times n}(R)$. CO 5. Identify the Eigenvalues and Diagonalizing Matrix over ring
Content:	Matrices with enties from a commutative rings, The ideals in $M_n(R)$, The rank of a matrix, Linear Equations, Minimal primes and the Radical of an ideal, The caley-Hamilton Theorem, Resultant, Zero Divisors in $M_n(R)$, Eigenvalues and Diagonalizing Matrix.
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 35% 2 Mid-Term Examination 30% 3 Projects 25%

	4 Peer Assessment/Quiz 10%
Media employed:	White/Black Board, LCD Projector, Laptop/Computer
Reading List:	Brown, W. C., 1984, ***Matrices Over Commutative Rings***, Marcel Dekker, Inc

Mapping of The COs and PLOs

	PLO – 1 S3 Mat	**PLO – 2 S3 Mat**	**PLO – 3 S3 Mat**	**PLO – 4 S3 Mat**	**PLO – 5 S3 Mat**	**PLO –6 S3 Mat**
CO 1			**v**			
CO 2		**v**		**v**		
CO 3			**v**		**v**	
CO 4				**v**		
CO 5			**v**			

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	**Attitude:** Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.
PLO-2	:	**Knowledge:** Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).
PLO-3	:	**Knowledge:** Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public.
PLO-4	:	**Skill:** Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.
PLO-5	:	**Skill:** Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach.
PLO-6	:	***Life Long Learning:*** Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.