UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Department of Mathematics
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

Master in Mathematics

Telp : +62 274 552243
Email : maths2@ugm.ac.id; kaprodi-s2-matematika.mipa@ugm.ac.id
sekprodi-s2-matematika.mipa@ugm.ac.id
Website : http://s2math.fmipa.ugm.ac.id/

MODULE HANDBOOK

Module name	Matrix Analysis
Module level, if applicable	Master
Code, if applicable	MMM-5216
Subtitle, if applicable	
Courses, if applicable	Matrix Analysis
Semester(s) in which the module is taught	2
Person responsible for the module	Algebra Research Group
Lecturer(s)	Dr. rer.nat. Ari Suparwanto, M.Si. Dr. Sutopo, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Master Degree, Compulsory Course
Teaching methods	Lecture, discussion, presentations, homework etc.
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 Credits
Requirements according to the examination regulations	Students have an examination card where the course is stated on.
Recommended prerequisites	Students should be proficient in linear algebra.
Module objectives/intended learning outcomes	On successful completion of this course, students should be able to: CO 1 explain various advanced concepts and techniques in matrix theory CO 2 utilize matrices as a tool to solve problems mathematics; CO 3 Apply basic matrix techniques in various fields such as mathematics, statistics, physics, computer science, and engineering, etc.
Content	a. Partitioned Matrices: Elementary Operations of Partitioned Matrices, The Determinant and Inverse of Partitioned Matrices, The Rank of Product and Sum, The Eigenvalues of *AB* b. Matrix Functions c. Matrix Norms d. Matrix Decompositions: Schur Decomposition, Spectral Decomposition, Singular Value Decomposition, Polar Decomposition, Jordan Canonical Forms. e. Special Types of Matrices: Idempotent matrices, nilpotent matrices, involutary matrices, projection matrices, tridiagonal matrices, circulant matrices, Vandermonde matrices, Hadamard matrices, permutation matrices, doubly stochastic matrices, and nonnegative matrices.,

Study and examination requirements and forms of examination	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight 1. Final Examination 25-40% 2. Mid-Term Examination 25-40% 3. Quiz/Presentation, Homework 20-30% Minimum final mark to pass : 60 (C).
Media employed	White/Black Board, LCD Projector, Laptop/Computer, Zoom, E-Learning, Simaster
Reading List	1. Nicholson, W.K., 2019, *Linear Algebra with Applications*, Base Textbook, Version 2019 – Revision A 2. Zhang, F, 2011, *Matrix Theory*, Second Edition, Springer, Linear Park, Davie, Florida, USA

PLO and CO Mapping

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

Compilation Date	**:**	**July 25, 2022**
Modified Date	**:**	