Undergraduate Programme in Mathematics

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MODULE HANDBOOK

Module name	Numerical Linear Algebra
Module level, if applicable	Bachelor
Code, if applicable	MMM-3208
Subtitle, if applicable	-
Courses, if applicable	Numerical Linear Algebra
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Lab. of Algebra and Chair of the Lab. of Mathematical Computation
Lecture(s)	Dr. Ari Suparwanto, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Bachelor Degree, Elective, 5th semester
Type of teaching, contact hours	150 minutes lectures, 180 minutes structured activities.
Workload	150 minutes lectures, 180 minutes structured activities, 180 minutes individual study, 16 weeks per semester (including mid-term and final examinations), 136 hours per semester.
Credit points	3(1)
Requirements according to the examination regulations	Students have taken Numerical Linear Algebra course (MMM-3208) and have an examination card where the course is stated on.
Recommended prerequisites	Students have taken Linear Algebra course (MMM-2202) and have participated in the final examination of the course.
Module objectives/intended learning outcomes	After completing this course, the students have ability to: CO 1. work on the decomposition of the matrix (LU factorization, Jordan Canonical Form, QR factorization, Main Axis Theorem, Schur Theorem, Cholesky Factorization, SVD, etc.). CO 2. do calculation using MATLAB due the topic under discussion. CO 3. find a solution of some real problems related to the topic under discussion.
Content	a. Triangular matrix and its properties, factorization LU. b. Matrix Orthogonal and its properties, Diagonalization. c. Principle Axis Theorem, Theorem Schur, Factorization QR. d. Positive definite matrix and its properties, Factorization Cholesky. e. Matrix Hermit and matrix Unitary and its properties, Unitary Diagonalization. f. Singular Value Decomposition (SVD) and Polar Decomposition.
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 — 30 2 — Mid-Term Examination — 25 3 — Laboratory — 25 4 — Class Activities: Quiz, Homework, etc. — 20 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. George R. Lindfield, John E. T. Penny, 2012, Numerical Methods Using MATLAB, 3rd edition

2. Xiao-Qing **JIN** and Yi-Min WEI, 2008, *Numerical Linear Algebra And Its Applications*,
3. Cleve Barry Moler, 2004, *Numerical Computing with MATLAB*, SIAM, Philadelphia
4. David S. Watkins, 2002, *Fundamentals of Matrix Computations*, 2nd Ed, John Wiley and Sons, https://davidtabora.files.wordpress.com/2015/01/david_s-_watkins_fundamentals_of_matrix_computat.pdf
5. Keith Nicholson, 2001, *Elementary Linear Algebra*, McGraw-Hill Book Co., Singapore.
6. John T. Scheick, 1997, *Linear Algebra with Applications,* McGraw-Hill International Editions.
7. Lloyd N. Trefethen, dan David Bau, III, 1997, *Numerical Linear Algebra*, SIAM, Philadelphia.

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			
CO 3		v							