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Master in Mathematics

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MODULE HANDBOOK
Master in Mathematics

Module name:	**Applied Numerical Methods (*Metode Numerik Terapan*)**
Module level, if applicable:	**Master Programme**
Code, if applicable:	**MMM 5311**
Subtitle, if applicable	
Courses, if applicable	
Semester(s) in which the module is taught:	1st semester
Person responsible for the module:	Chair of the Applied Mathematics Research Group
Lecturer(s):	Lina Aryati
Language:	Bahasa Indonesia
Relation to curriculum:	Master Degree in Mathematics, Elective, 1st semester
Teaching methods	
Workload (incl. contact hours, self-study hours)	• **3x50 minutes lectures,** • **3x60 minutes structured activities,** • **3x60 minutes individual study,** • **In 16 weeks per semester (including mid-term and final examinations).** • The total workload is 136 hours per semester.
Credit points	3
Required and recommended prerequisites for joining the module:	**Before taking this course, it is better if students have understood very well about finite difference methods.**
Module objectives/intended learning outcomes:	After taking this course, students are expected to be able to choose the right finite difference method to solve CO 1. elliptic type boundary problems, and assess their accuracy. CO 2. parabolic type initial and boundary problems, and assess their accuracy. CO 3. hyperbolic type initial and boundary problems, and assess their accuracy.
Content:	Introduction, finite difference method. Elliptic Differential Equations: Poisson Equation with Dirichlet and Non-Dirichlet boundary conditions in the rectangular (regular) and irregular domains, accuracy, application. Parabolic Differential Equations: Heat Equations with Dirichlet boundary conditions, Heat Equations with heat sources and decay with Non-Dirichlet boundary conditions, absolute stability, application. Hyperbolic Differential Equations: Advection Equation, Upwind Differencing method and Mac-Cormack method, Convection-Diffusion Equation, absolute stability, application.
Examinations forms	Essay.
Study and examination requirements	To pass the course, the minimum grade is C. The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination — 35% 2 — Mid-Term Examination — 35% 3 — Class Activities: Quiz, Homework, etc. — 30%
Media employed:	Board, LCD Projector, Laptop/Computer

Reading List:	1. Bradie, B., 2006*, A Friendly Introduction to Numerical Analysis*, Pearson Education, Inc., New Jersey. 2. Strikwerda, J. C., 2004, *Finite Difference Schemes and Partial Differential Equations,* Second Edition, SIAM, Philadelphia.

CO-PLO Mapping

	PLO – 1 S2 Mat	**PLO – 2 S2 Mat**	**PLO – 3 S2 Mat**	**PLO – 4 S2 Mat**	**PLO – 5 S2 Mat**	**PLO –6 S2 Mat**
CO 1			V	V	V	V
CO 2			V	V	V	V
CO 3			V	V	V	V

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