UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
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Undergraduate Programme in Mathematics

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MODULE HANDBOOK

Module name	Computational Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MMM-3401
Subtitle, if applicable	
Courses, if applicable	
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Lab. of Mathematical Computation
Lecture(s)	Dr. Sumardi, M.Si and Imam Solekhudin, Ph.D
Language	Bahasa Indonesia
Relation to curriculum	Bachelor Degree, Compulsory, 5th semester
Type of teaching, contact hours	100 minutes lectures, 240 minutes structured activities (homework and task), and 170 minutes laboratory work per week.
Workload	Total workload is 136 hours per semester, which consists of 100 minutes lectures per week for 14 weeks, 120 minutes structured activities per week, 120 minutes individual study per week, and 170 minutes laboratory work per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3(1)
Requirements according to the examination regulations	Students have taken Computational Mathematics course (MMM-3401) and have an examination card where the course is stated on.
Recommended prerequisites	Students have taken Introduction to Numerical Analysis course (MMM-2401), Introduction to Partial Differential Equations course (MMM-2310), and have participated in the final examination of the course. Before taking this course, students must have a good understanding about concepts of advanced calculus, ordinary and partial differential equation.
Module objectives/intended learning outcomes	After completing this course the students have ability to CO1. demonstrate knowledge and understanding of mathematical computing CO2. motivate and describe the derivation of the numerical algorithms covered in the module CO3. carry out simple numerical processes "by hand" CO4. implement, evaluate, contrast and reflect upon the numerical results arising from different algorithms.
Content	Topic: 1. Solution of nonlinear and linear equations system using Newton Methods and iterative methods, 2. interpolation: Hermite interpolation, splines, trigonometric interpolation, Fast Fourier Transform, multivariable function interpolation, function approximation Theory, 3. Numerical Integral: Newton-Cotes method and Romberg method, Gaussian quadrature, Improper integrals, 4. Numerical Solution Ordinary Differential Equations: Runge-Kutta Methods, Multistep Methods 5. Numerical for Partial Differential Equations : Finite Difference Methods and Finite Element Method.

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	White/Black Board, LCD Projector, Laptop/Computer, Laboratory
Reading List	1. John Penny, 1995, Numerical Methods Using MATLAB. 2. Jan Kiusalaas, 2010, Numerical Methods in Engineering with MATLAB 3. Won Y. Yang, Wenwu Cao, Tae S. Chung, John Mor, 2005, Applied Numerical Method Using MATLAB.

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	v				v
CO 2			v	v					v
CO 3			v		v				v
CO 4			v	v	v				v