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Undergraduate Programme in Mathematics

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MODULE HANDBOOK

Module name	Introduction to Partial Differential Equations
Module level, if applicable	Bachelor
Code, if applicable	MMM-2310
Subtitle, if applicable	-
Courses, if applicable	Introduction to Partial Differential Equations
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of Applied Mathematics Research Group
Lectures	Dr. Lina Aryati, M.S. and Dr. Sumardi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) Bachelor Degree
Type of teaching, contact hours	3 hours lectures, 3 hours structured activities.
Workload	150 minutes lectures, 180 minutes structured activities, 180 hours individual study, 16 weeks per semester (including mid-term and final examinations), 136 hours per semester.
Credit points	3
Requirements according to the examination regulations	Students have taken Introduction to Partial Differential Equations course (MMM-2310) and have an examination card where the course is stated on.
Recommended prerequisites	Multivariable Calculus I (MMM-2109), Ordinary differential equations (MMM-2301) Before taking this course, students must have a good understanding about concepts of multivariable calculus, ordinary differential equation.
Module objectives/intended learning outcomes	After completing this course the students have ability to CO 1. solve first order linear and quasi linear initial value problems by method of characteristics. CO 2. solve initial boundary value problems by the method of separation variables. CO 3. recognize how to prove the existence and uniqueness solution of an initial boundary value problem. CO 4. solve initial value problems on infinite interval by the Fourier Integral or Fourier Transform. CO 5. solve initial value problems on semi-infinite interval by the Fourier Transform. CO 6. determine d'Alembert solution. CO 7. solve boundary value problem on disc by Fourier-Bessel series. CO 8. solve initial boundary value problems by finite difference method.
Content	a. Boundary and initial conditions b. Method of Characteristics: first order linear and quasi linear initial value problems. c. Fourier Series d. Sturm Liouville eigenvalue problems e. Method of Separation variables: Initial boundary value problems parabolic, hyperbolic, and elliptic types f. Example on existence and uniqueness solution of initial boundary value problem g. The Fourier Integral and solution of Initial boundary value problems on infinite interval

	h. The Fourier Transform and solution of Initial boundary value problems on semi-infinite interval i. D'Alembert Solution j. Fourier-Bessel Series and its Applications k. Example on numerical solution of Initial boundary value problems by finite difference 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 40% 2 Mid-Term Examination 30% 3 Class Activities: Quiz, Homework, etc. 30% 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
Reading List	[1] DuChateau, P., and Zachmann, D.W., 2011, *Partial Differential Equations, 3rd Ed*, McGraw-Hill, New York. [2] Zauderer, E., 2011, *Partial Differential Equations of Applied Mathematics, 3rd Ed*, John Wiley & Sons, New York. [3] Humi, M. And Miller, W.B., 1992, *Boundary Value Problems and Partial Differential Equations*, PWS-KENT Publishing Company, Boston.

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		V
CO 2		V			V		V		
CO 3			V			V	V		V
CO 4		V			V		V		
CO 5		V			V		V		
CO 6		V					V		V
CO 7		V			V		V		
CO 8		V				V	V		