Advanced Differential Equations

ModuleName	Course Module
Module Levels	Degree program
Code, if applicable	**3115-208-3**
Sub-titles, if applicable	-
Courses, if applicable	Advanced Differential Equations
Semester(s) in which the module is taught	4 (Even Semester)
Person responsible for the modules	Drs. Tri Murdiyanto, M.Sc.
Lecturer(s)	Drs. Tri Murdiyanto, M.Si, Leni Dhianty S.Pd, M.Pd, Dr. Anni Sofia
language	Indonesian
Relations to Curriculum	This course is a compulsory course provided in the second semester
Type of teaching, contact hours	The teaching methods used in this course are: - Studying (synchronous:material presentations, group discussions and class discussions) - Structured assignments (Asyncronous in LMS: Discussion forums for individual assignments and questions) - Project Base Learning Class capacity for lectures is 40 students. The time for lectures is one meeting of 150 minutes
Workloads	For this course, students are required to fulfill a minimum of 136 hours in one semester, which consists of: - 40 hours for lectures - 48 hours for structured tasks - 48 hours for self study
Credit Points	4.5 ECTS
Requirements according to the examination regulations	Students must attend lectures at least 80%
Recommended prerequisites	Complete all individual tasks scheduled in the LMS

<table>
<tr><td>Program intended learning outcomes</td><td>PLO 6: Mastering the principles of mathematical modeling, linear programming, differential equations, and numerical methods.

Course Learning Outcomes(CLO) to be achieved in this course are:

CLOS 1: PD Solution with Laplace Transform
CLO 2: Series Solution of Linear PD

The relationship between PLO and CLO in this course is described as follows:

<table>
<tr><td rowspan="2">CLO</td><td>PLO</td></tr>
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<tr><td>Content</td><td>Students will learn about:
1. Definition of Laplace Transformation
2. Properties of the Laplace transform
3. Application of the properties of the Laplace transform
4. Inverse Laplace Transformation, properties of Inverse Laplace Transformation and its applications
5. Solve the initial value problem
6. Laplace transform and inverse Laplace transform for special functions
7. Convolution
8. Power series, analytic functions and the Taylor series method
9. Series Solution of Linear Differential Equations
10. Equations with analytical coefficients
11. The Cauchy-Euler equation
12. Frobenius method
13. The second solution is linearly independent</td></tr>
<tr><td>Forms of Assessment</td><td>Components and assessment weights in learning include assignments (30%), midterm exams (35%), and final exams (35%).</td></tr>
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Study and examination requirements and forms of examination	• **Study and examination requirements:** 1. Students must be present 15 minutes before class starts. 2. Students who are absent, either with notification or not, more than 20% of the total meeting are considered failed. 3. Students are not allowed to use communication tools for purposes that are not related to learning. 4. Students must submit all assignments before the allotted deadline. 5. Students must take an exam to get a final grade. • **Form of examination:** Presentation and written exam

media employed	Computer/laptop, internet, LCD, whiteboard, online platform (Microsoft Teams/Zoom, LMS), Microsoft Excel, Microsoft Power Point (for materials).
reading list	**Main Reference** 1) Ayres, Frank. (1995). Differential Equations. Erlangga. 2) Williamson. (2001). Introduction To Differential Equations and Dynamical Systems. McGraw-Hill. 3) Kent Nagle (1994), Fundamental Of Differential Equations and Boundary Value Problems, Addison-Wesley Publishing Company Inc. 4) Kreyzig, (1983), Advanced Engineering Mathematics, 5th Edition, Wiley International, 1983