MODULE HANDBOOK NUMERICAL DIFFERENTIAL EQUATIONS

BACHELOR DEGREE PROGRAM
DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE AND DATA ANALYTICS

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Module name	**Numerical Differential Equations**	
Module level	Undergraduate	
Code	KM184721	
Course (if applicable)	Numerical Differential Equations	
Semester	Fall (Ganjil)	
Person responsible for the module	Prof. Dr. Chairul Imron, M.I.Komp	
Lecturer	Prof. Dr. Chairul Imron, M.I.Komp	
Language	Indonesia and English	
Relation to curriculum	Undergraduate degree program, **elective**, 7th semester.	
Type of teaching, contact hours	Lectures, <60 students	
Workload	1. Lectures : 2 x 50 = 100 minutes per week. 2. Exercises and Assignments : 2 x 60 = 120 minutes (2 hours) per week. 3. Private learning : 2 x 60 = 120 minutes (2 hours) per week.	
Credit points	2 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	Ordinary Differential Equations Numerical Methods	
Learning outcomes and their corresponding PLOs	Course Learning Outcome (CLO) after completing this module, CLO-1 Students are able to follow developments and apply mathematics and are able to communicate actively and correctly both orally and in writing. CLO-2 Students are able to explain the basic principles of the theory that they understand, especially those related to the completeness of real numbers, convergence, limits and constancy of a function. CLO-3 Students are able to explain the significant role of Real Analyst I in related fields or other fields. CLO-4 Students are able to present an understanding of Real Analysis I independently or in teamwork.	
Content	In this course, methods of solving differential equations numerically, both single step and multistep, will be studied. In addition, it will also	

	provide numerical solutions for systems of differential equations. The topics related to this subject are the solving of numerical differential equations using the Euler, Heun, Runge Kutta, Milne and Adam-Moulton Methods.
Study and examination requirements and forms of examination	• In-class exercises • Assignment 1, 2 • Mid-term examination • Final examination
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading lists	Main: 1. Gerald, C. F. & Wheatley O. P, 2013. " Applied Numerical Analysis 7th edition", Addison Wesley Publishing Company, California. 2. Burden, R.C., Faires J.D, Reynolds, A.C., 2010, " Numerical Analysis", Brooks/Cole Cengage Learning, Boston. Supporting: 1. Smith, GD, 1986, "Numerical Solution of Partial Differential Equations: Finite Difference Methods", Oxford University Press, New York. 2. Soehardjo, " Refreshing Matematika ", 1997, ITS, Surabaya.