



UNIVERSITAS NEGERI PADANG
 FACULTY OF MATHEMATICS AND NATURAL SCIENCES
 MATHEMATICS DEPARTMENT, MATHEMATICS STUDY PROGRAM
 Main Campus Universitas Negeri Padang.
 Jalan Prof. Dr. Hamka Air Tawar Padang, Sumatera Barat
 Telepon: +62 751 7053902, Fax: +62 751 7055628
 Email: humas@unp.ac.id

Bachelor of Science in Mathematics

MODULE HANDBOOK

Module name:	Introduction to Dynamical Systems
Module level, if applicable:	Bachelor
Code:	MAT2.62.6007
Subheading, if applicable:	-
Classes, if applicable:	Introduction to Dynamical Systems
Semester:	6 th (sixth)
Module coordinator:	Head of Analysis Expertise Group
Lecturer(s):	Muhammad Subhan, M.Si. and Rara Sandhy Winanda, S.Pd., M.Sc.
Language:	Indonesian Language and English
Classification within the curriculum:	Elective course in the third year (6 th semester) Bachelor Degree
Teaching format / class hours per week during the semester:	<ul style="list-style-type: none"> a. Lectures: Project Based Learning with methods such as expository, discussion, and presentation. (3 x 50 minutes = 150 minutes). b. Structured assignment: Weekly individual written assignment. (3 x 60 minutes = 180 minutes). c. Individual study (3 x 60 minutes = 180 minutes).
Workload:	The total workload is 136 hours per semester, which consists of 150 minutes lectures, 180 minutes structured activities, and 180 minutes of self-study. In total, there are 16 weeks per semester, including midterm and final exams.
Credit points:	3 sks = 4,53 ECTS
Prerequisites Course(s):	Ordinary Differential Equation, Elementary Linear Algebra, and Vector Calculus.
Course outcomes:	<p>CO1. Students show scientific ethics, responsibility, creativity, honesty, and confidence.</p> <p>CO2. Students are able to analyze qualitatively the structure of dynamical systems.</p> <p>CO3. Students are able to interpret the behavior of simple dynamical systems as a mathematical model of real-world phenomena.</p> <p>CO4. Students are able to communicate effectively</p> <p>CO5. Students are able to use computers to visualize numerically dynamical systems.</p>

Content:	<ol style="list-style-type: none"> 1. Definition and Types of Dynamical Systems 2. Geometry of Dynamical Systems 3. Linear Systems 4. Nonlinear Systems 5. Bifurcations.
Study/ exam achievement	<p>The final grade will be weighted as follows:</p> <p>The assessment consists of a final project (30%), activities (20%), and tasks (50%).</p> <p>The final project comprises a review and analysis of the paper, an oral presentation, and the preparation of a final report. Students are given a weekly homework to discuss a specific problem in dynamical systems. Activities in the classroom consist of attitude, presence, and discussion in groups.</p>
Forms of media:	White Board, laptop, Projector, e-learning via elearning2.unp.ac.id , and zoom meeting.
Literature	<ol style="list-style-type: none"> 1. Layek (2015). An Introduction to Dynamical Systems and Chaos. Springer. 2. Hale (1991). Dynamics and Bifurcations. Springer. 3. Wiggins, S., 2003, Introduction to Applied Nonlinear Dynamical Systems and Chaos, 2nd Ed, Springer-Verlag New York, Inc.

PLO and CO Mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CO1	✓	✓								
CO2			✓							
CO3							✓			
CO4						✓				