MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
UNDERGRADUATE PROGRAM OF MATHEMATICS
Ketintang Campus, C8-C9 Buildings of FMIPA, Surabaya
Email: s1-mat@unesa.ac.id

Module Handbook

Module Name :	*Persamaan Diferensial Biasa* Ordinary Differential Equations
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420103109
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	3rd/ Second year
Module coordinator(s)	Dr. Abadi, M.Sc
Lecturer(s):	Dr. Abadi, M.Sc Dr. Dian Savitri, M.Si Rudianto Artiono, M.Si Yuliani Puji Astuti, M.Si Budi Priyo Prawoto, M.Si Dimas A. Maulana, M.Si Dayat Hidayat, M.Pd., M.Si
Language:	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (*sks* or credit unit*)
Workload :	3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week, 14 weeks per semester 119 total hours per semester ~ 4.77 ECTS**
Credit Unit:	3 credit unit (4.76 ECTS)
Requirements:	Elementary Linear Algebra and Integral Calculus

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Learning goals/competencies:	**Knowledge (KNO-2)** Identifying and explaining the characteristics of mathematical problems CLO-1: Identify the characteristic of the 1st order and the 2nd order of ODEs (Ordinary Differential Equations) CLO-2: Explain the characteristics of mathematical problems in the 1st order and the 2nd order ODEs **Skill (SKI-2)** Applying the basic principles of mathematics to solve simple* mathematical problems. CLO-3: Implement basic principle of mathematics to solve the 1st order and the 2nd order of ODEs **Competences (COM-3)** Solving mathematical problems using technology CLO-4: Solve mathematical problem in the 1st order and the 2nd order of ODEs using technology **Attitude and Social (SOC-1)** Working collaboratively and having social sensitivity (obligations as citizens and towards religion) and being able to bring change to a techno-ecopreneurship community. CLO-5: Working collaboratively and active to participate in the process of solving mathematical problems in the 1st order and the 2nd order of ODEs
Content	This course discusses about First order differential equation covers linear differential equation with integrating factor, separable differential equation, homogeneous equation, exact equation, non-exact equation, Bernoulli equation, Ricatti equation, and d'Alembert equation. Second order differential equation covers homogeneous differential equation with characteristic equation, non-homogeneous differential equation with undetermined coefficient, and the method of variation of parameter. Differential equation involving piecewise defined function with Laplace transform. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.

Attribute Soft skill:	Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class

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<table>
<tr>
<td>Study/exam achievements:</td>
<td>
The final grade (NA) is calculated based on the following ratio:
<table>
<tr><td>Assessment Components</td><td>Percentage of contribution</td></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
</table>
Grade conversion of 0-100 scale into 0-4 scale is set as below:
<table>
<tr><td>Letter</td><td>Number</td><td>Grade Interval</td></tr>
<tr><td>A</td><td>4,00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
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<tr><td>Learning Methods :</td><td>Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities)</td></tr>
<tr><td>Form of Media:</td><td>Power point slides; video; worksheets, and textbooks</td></tr>
</table>

Literature (primary references):	1. Boyce W.E. & DiPrima R.C. 2012.Elementary Ordinary Differential Equations and Boundary Value Problems 10th Edition, New York: John Willey and Sons. 2. Kreyszig, E. 2011. Advanced Engineering Mathematics 10th edition. New York: John Wiley and Sons. 3. Andrei D. Polyanin, Valentin F. Zaitsev, 2018, Handbook of Ordinary Differential Equations: Exact Solution, Methods, and Problems, Chapman and Hall/CRC 4. Ali Umit Keskin, 2019, Ordinary Differential Equations for Enginners: Problems with Matlab solutions, Springer International Publishing 5. Hartmut Logemann, Eugene P. Ryan, 2014, Ordinary Differential Equations: Analysis, Qualitative Theory and Control.: London: Springer-Verlag 6. Ravi P. Agarwal, Donal O'Regan, 2008, An Introduction to Ordinary Differential Equations. New York: Springer-Verlag 7. Prawoto, BP. 2019. Persamaan Diferensial Biasa. Surabaya: Unesa University Press
Notes:	*1 credit unit or *sks* in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**1 credit unit or *sks* = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019