MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY
Ketintang Campus, Jalan Ketintang, Surabaya 60231
Telephone : +6231- 8298761, email: kimia@unesa.ac.id, Laman : http://kimia.fmipa.unesa.ac.id

MODULE HANDBOOK

Module Name:	Mathematics For Chemistry
Module level:	Bachelor
Course Code:	8420403185
Abbreviation, if applicable:	-
Course included in the module, if applicable:	-
Semester/term:	2nd/First Year
Module coordinator(s):	Dr. Nuniek Herdyastuti, M.Si
Lecturer(s):	Dr. Pirim Setiarso, M.Si
Language:	Indonesian
Classification within the Curriculum:	Compulsory Course
Teaching format/class hours per week during the semester:	3 hours lecturers (50 min per hours)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit unit:	3 CU = 3 x 1.59 = 4.77 ECTS
Prerequisite course(s):	Basic Mathematics
Targeted learning outcomes:	CLO 1 Students have Capable to demonstrate knowledge related to theoretical concepts about structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals
Content:	**Introduction**: Briefly discuss the subject of mathematics for chemistry. **Functions and Limits** **Concept of differential** **Calculus of differential** **Integral concept** **Integration methods** **Improper integrals** **Line integral and integral fold** **Operator** **Matrices:** The definition of a matrix, matrix operations include addition of matrices, subtraction of matrices, multiplication of matrices and transpose matrix and properties as well as inverse matrix by Gauss substitution. Applied of matrices to solve problems in chemistry such as reaction stoichiometry, redoxs reactions and quantitative analysis as well.

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<table>
<tr><td></td><td>Determinants include the definition of the matrix determinant and its properties as well as the minors and cofactors related to adjoint matrices and inverse matrices.
Applied of the determinant matrices for quantitative analysis and determining the eigenvalues of the Schodinger equation phi electron energy in chemical compounds with double bonds
Differential equation: Definition of a differential equation, Differential equation with separate variables
Homogeneous differential equations
Exact Differential Equations
Inexact differential equations
Level 1 Linear Differential Equations
Bernauli Differential Equations
Level n Linear Differential Equations
Vector and tensor
Sequence and series
Special functions
Fourier and Laplace transforms</td></tr>
<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>$85 \leq A \leq 100$</td></tr>
<tr><td>A-</td><td>3,75</td><td>$80 \leq A- < 85$</td></tr>
<tr><td>B+</td><td>3,50</td><td>$75 \leq B+ < 80$</td></tr>
<tr><td>B</td><td>3,00</td><td>$70 \leq B < 75$</td></tr>
<tr><td>B-</td><td>2,75</td><td>$65 \leq B- < 70$</td></tr>
<tr><td>C+</td><td>2,50</td><td>$60 \leq C+ < 65$</td></tr>
<tr><td>C</td><td>2,00</td><td>$55 \leq C < 60$</td></tr>
<tr><td>D</td><td>1,00</td><td>$40 \leq D < 55$</td></tr>
<tr><td>E</td><td>0,00</td><td>$0 \leq E < 40$</td></tr>
</table></td></tr>
<tr><td>Media:</td><td>Computer, LCD, White board</td></tr>
<tr><td>Learning Methods:</td><td>Lectures and discussions, and working on problems</td></tr>
<tr><td>Literature:</td><td>1. Robert G Mortimer, 2005, Mathematics for Physical Chemistry, 3th ed, Elsevier Inc, USA.
2. Irwin Krizig, 1989, Advanced Mathematic for Physicist</td></tr>
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	and Engineering, 4thed, John Wiley & Sons Inc, New York.
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