



MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF NATURAL SCIENCES

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Undergraduate Programme in Science Education

Module Handbook

Module Name:	<i>Larutan</i> (Solution)
Module Level:	Bachelor degree/Undergraduate Program
Course Code:	
Abbreviation, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year
Module coordinator(s):	Dr. Wahono Widodo, M.Si.
Lecturer(s):	Dr. Wahono Widodo, M.Si. SitiNurulHidayati, S.Pd., M.Pd. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc. Ernita Vika Aulia, S.Pd., M.Pd.
Language:	<i>Bahasa Indonesia</i> (Indonesian)
Classification within the curriculum:	Compulsory Course / Elective Studies
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or <i>sks</i> *)
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 ~ 3.97 ECTS**
Credit point:	3 <i>sks</i> (3.97 ECTS)
Requirements:	
Learning goals/competencies:	Course Learning Outcomes (CLO): After taking this course, university students have ability to; 1. Apply the concept of solution, solution concentration, and colloid as the basis for solving problems in everyday life. 2. Apply the colligative nature of the solution and Raoult's law in order to solve relevant problems in everyday life 3. Apply the electrical properties of solutions in everyday life 4. Analyze acid-base, buffer solution, and hydrolysis in order to solve relevant problems in everyday life 5. Have responsible attitude in investigating / experimenting the properties of solutions 6. Willing to think critically in discussions and investigations / experiments on the properties of solutions
Content:	The concept of solution, solution concentration, colloid, colligative properties, acid-base, buffer, colligative,

	and the electrical properties of the solution												
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting												
Study/exam achievements:	<p>University students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on following weight:</p> <table border="1"> <thead> <tr> <th>Assessment Components</th> <th>Percentage Contribution</th> </tr> </thead> <tbody> <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> <tr> <td>Total</td> <td>100%</td> </tr> </tbody> </table>	Assessment Components	Percentage Contribution	Participation	20%	Assignment	30%	Mid-semester test	20%	Final semester test	30%	Total	100%
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Learning Methods	Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning												
Form of Media:	LCD, PowerPoint slides, worksheets, laboratory equipments and substances, and e-learning Unesa: (https://vi-learn.unesa.ac.id/course/view.php?id=3590)												
Literature (main references):	<ol style="list-style-type: none"> 1. Atkins, S.P.W. 1995. <i>Physical Chemistry</i>. Oxford: ELBS Oxford University Press. 2. Barrow Gordon M. 1996. <i>Physical Chemistry. Sixth edition</i>. New York : Mc Graw-Hill. 3. HiskiaAchmad. 2001. <i>Kimia Larutan</i>. Bandung: Citra Aditya Bakti 4. Merril, 1995. <i>Chemistry</i>. New York Columbus Ohio California: Glencao Mc Graw Hill. 5. Soren Prip Beier & Peter Dybdallhede. 2010. <i>Essential of Chemistry 2nd edition</i>. Ventus Publishing. 												
Notes:	<p>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity or independent learning (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.</p> <p>**Total ECTS = (total hours workload)/ 30 hours 30 study hours = 1 ECTS credit point</p>												