

## MODULE HANDBOOK

Module Name	Research Technique of Biochemistry
Module level	Bachelor
Abbreviation, if applicable	3074112076
Sub-heading, if applicable	-
Course included in the module, if applicable	-
Semester/term	7 <sup>th</sup> /Fourth Year
Module coordinator(s)	Prof. Dr. Rudiana Agustini, M.Pd ;
Lecturer(s)	Dr. Nuniek Herdyastuti, M.Si Dr. Prima Retno Wikandari, M.Si
Language	Indonesian
Classification within the curriculum	Elective Course
Teaching format/class hours per week during the semester:	2 hours lecturers (50 min per hours)
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79,33 total hours per semester ~ 3.18 ECTS**
Credit points:	2 CU x 1.59 = 3.18 ECTS
Prerequisites course(s):	Structure and Function Biomolecule (Biochemistry I) and Metabolism and Pathways of Genetics Information (Biochemistry II)
Targeted learning outcomes:	<p><b>CLO 1</b> Students are able to make the right decisions in the context of solving problems in the field of chemistry.</p> <p><b>CLO 2</b> Students are able to solve science, technology and art problems in the field of chemistry that are general and in simple terms and have the skills to isolate and identify enzymes, proteins and DNA from various sources as well as the application of relevant technologies.</p> <p><b>CLO 3</b> Mastering the theoretical concepts of techniques or methods of isolation of enzymes, proteins and DNA from various sources, purification and characterization of proteins and DNA, PCR and Sequencing techniques as well as understanding the basic techniques of recombinant DNA and its application.</p> <p><b>CLO 4</b> Demonstrates a responsible attitude towards work in his/her area of expertise independently.</p>
Content:	<p><b>Protein properties and environmental effects on protein stability:</b> buffer solutions, salts, metal ions, detergents, environmental influences on protein activity, protease inhibitors</p> <p><b>Protein or enzyme isolation:</b> cell breakdown techniques, determination of protein concentration, protein concentration, dialysis</p> <p><b>Determination of molecular weight by electrophoresis:</b> gel preparation, sample preparation and gel staining</p>

	<p><b>Purification of proteins or enzymes:</b> immunoblotting, Ion exchange chromatography, gel filtration, affinity chromatography</p> <p><b>DNA isolation:</b> cell splitting techniques, determination of DNA concentration, and DNA concentration</p> <p><b>Electrophoresis:</b> DNA electrophoresis mechanism, DNA electrophoresis equipment, gel making, sample preparation, identification of DNA electrophoresis results</p> <p><b>Gene Cloning:</b> Basic concepts of genetic engineering / gene cloning techniques, cloning vectors, restriction enzymes and competent cells</p> <p><b>Identification of gene cloning results:</b> PCR basic principles, PCR cycle, sequencing, PCR application and sequencing</p>										
Study / exam achievements:	<p>Students are considered to complete the course and pass if they obtain at least 40% of maximum final grade. The final grade (NA) is calculated based on the following ratio:</p> <table border="1"> <thead> <tr> <th>Assessment Components</th> <th>Percentage of 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> </tbody> </table>	Assessment Components	Percentage of contribution	Participation	20%	Assignment	30%	Mid-semester test	20%	Final semester test	30%
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Media:	Computer, LCD, White board										
Learning Methods	Individuals assignment, group assignment, discussion, presentation										
Literature:	<ol style="list-style-type: none"> <li>1. Brown, T.A., 1989, Genetics : A Molecular Approach, London : Van Nostrand Reinhold (International) Co. Ltd.</li> <li>2. Glick,B.R.,and Pasternak, J.J.,1994, Molecular Biotechnology : Principles and Application of Recombinant DNA, Washington, D.C : ASM Press.</li> <li>3. Bollag D. 1996. <i>Protein Method</i>. New York: John Willey and Sons. Inc</li> <li>4. Boyer R, 2000. <i>Modern Experimental Biochemistry</i>. San Francisco: Addison Wesley Longman</li> <li>5. Alexander R.R. and Griffiths J.M., 1993, Basic Biochemical Methods, New York : John Willey and Sons. Inc</li> <li>6. Aehle W, 2007, Enzyme in industry : Production and Application, 3rd edition, Wiley-VCH Verlag GMBH &amp; Co. KgaA Netherland</li> </ol>										
Notes:	*1 CU 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 CU = 1,59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019
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