

MODULE HANDBOOK

Module Name :	Research Technique of Biochemistry
Module level :	Bachelor
Course Code :	
Abbreviation, if applicable:	3074112076
Courses included in the module, if applicable:	-
Semester/Term	5 st /First Year
Module coordinator(s)	Prof. Dr. Nuniek Herdyastuti, M.Si.
Lecturer(s):	Prof. Dr. Nuniek Herdyastuti, M.Si. Prof. Dr. Rudiana Agustini, M.Pd. Dr. Prima Retno Wikandari, M.Si.
Language:	Indonesian
Classification within the curriculum:	Compulsory / Elective
Teaching format/class hours per week during the semester:	2 contact hours of lectures (Indonesia credit semester or sks*)
Workload :	Lecture: 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 Point:	2 CU x 1.59 = 3.18 ECTS
Requirements:	Metabolism and Pathways of Genetics Information Microbiology
Learning goals/competencies:	1. Students are able to make the right decisions in the context of solving problems in the field of chemistry (CLO 1) 2. Students are able to solve science, technology and art problems in general and simple chemistry and have the skills to isolate and identify enzymes, proteins and DNA from various sources and apply relevant technologies (CLO 2) 3. 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 (CLO 3) 4. Demonstrate a responsible attitude towards work in their area of expertise independently (CLO 4)
Content	Protein properties and environmental effects on protein stability: buffer solutions, salts, metal ions, detergents, environmental influences on protein activity, protease inhibitors Protein or enzyme isolation: cell breakdown techniques, determination of protein concentration, protein concentration, dialysis

	Determination of molecular weight by electrophoresis: gel preparation, sample preparation and gel staining Purification of protein or enzymes: immunoblotting, Ion exchange chromatography, gel filtration, affinity chromatography DNA isolation: cell splitting techniques, determination of DNA concentration, and DNA concentration Electrophoresis: DNA electrophoresis mechanism, DNA electrophoresis equipment, gel making, sample preparation, identification of DNA electrophoresis results Gene Cloning: Basic concepts of genetic engineering techniques / gene cloning, cloning vectors, restriction enzymes and competent cells Identification of gene cloning results: PCR basic principles, PCR cycle, sequencing, PCR application and sequencing																																								
Attribute Soft skill:	Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class and outdoor setting																																								
Study/exam achievements:	The final grade (NA) is calculated based on the following ratio: <table><tr><th>Assessment Components</th><th>Percentage of contribution</th></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><th>Letter</th><th>Number</th><th>Grade interval</th></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>	Assessment Components	Percentage of contribution	Participation	20%	Assignment	30%	Mid-semester test	20%	Final semester test	30%	Letter	Number	Grade interval	A	4.00	$85 \leq A \leq 100$	A-	3.75	$80 \leq A- < 85$	B+	3.50	$75 \leq B+ < 80$	B	3.00	$70 \leq B < 75$	B-	2.75	$65 \leq B- < 70$	C+	2.50	$60 \leq C+ < 65$	C	2.00	$55 \leq C < 60$	D	1.00	$40 \leq D < 55$	E	0.00	$0 \leq E < 40$
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Learning Methods :	Lecture using: Student-centered approach; and discussion; and presentations (structured activities)																																								
Form of Media:	Video, Module, power point																																								
Literature (primary references):	1. Brown, T.A., 1989, Genetics : A Molecular Approach, London : Van Nostrand Reinhold (International) Co. Ltd. 2. Glick,B.R.,and Pasternak, J.J.,1994, Molecular Biotechnology : Principles and Application of Recombinant DNA, Washington, D.C : ASM Press. 3. Bollag D. 1996. <i>Protein Method</i>. New York: John Willey and Sons. Inc																																								

	4. Boyer R, 2000. <i>Modern Experimental Biochemistry</i>. San Francisco: Addison Wesley Longman 5. Alexander R.R. and Griffiths J.M., 1993, <i>Basic Biochemical Methods</i>, New York : John Willey and Sons. Inc 6. Aehle W, 2007, <i>Enzyme in industry : Production and Application</i>, 3rd edition, Wiley-VCH Verlag GMBH & Co. KgaA Netherland
Notes:	*1 sks in learning process = three periods consist of: (a) scheduled instruction in a classroom (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. For lab activity: 1 sks in learning process = two periods consist of: (a) scheduled lab activity (100 minutes); (b) structured lab activity (70 minutes); **1 sks = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019