

## MODULE HANDBOOK

Module Name :	Structure and Function of Biomolecules
Module level :	Bachelor
Course Code :	
Abbreviation, if applicable:	8420402037
Courses included in the module, if applicable:	-
Semester/Term	5 <sup>th</sup> /Third Year
Module coordinator(s)	Prof. Dr. Rudiana Agustini, M.Pd.
Lecturer(s):	Prof. Dr. Rudiana Agustini, M.Pd. Prof. Dr. Nuniek Herdyastuti, M.Si. Dr. Prima Retno Wikandari, M.Si. Mirwa Adi Prahara, 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 sks (3.18 ECTS)
Requirements:	Organic chemistry II
Learning goals/competencies:	<ol style="list-style-type: none"> <li>1. Students have knowledge of the structure of macromolecules: carbohydrates, proteins, fats, nucleic acids; the function or role of macromolecules and vitamins, minerals, hormones in organisms. (CLO 1)</li> <li>2. Students mastering the concept of structure and function of macromolecules carbohydrate, protein, fat, nucleic acid; as well as vitamins and minerals in organisms. (CLO 2)</li> <li>3. Students have the ability to utilize learning resources and ICT to support mastery of concepts and theories of Biochemistry.(CLO 3)</li> <li>4. Students have the ability to solve science and technology problems in biochemistry and in a simple scope through the application of knowledge of the structure and function of macromolecules, and relevant technology. (CLO 4)</li> <li>5. Students have responsibility and independent attitude in their expertise field (CLO 5)</li> </ol>
Content	<p><b>The molecules of organisms and their composition:</b> Characteristics of living matter, Biochemistry in living matter, Cells as the smallest unit of life, Basic structure of cells and their functions, Organization of molecules in cells, Energy for living systems</p> <p><b>Structure and function of carbohydrates:</b> Classification of carbohydrates, structure of carbohydrates, function of carbohydrates in biological systems,</p>

	<p><b>Structure and function of proteins:</b> The structure and properties of amino acids, Peptide bonds and functions, Separation and purification of amino acids, Homologs protein, Structure of protein, Fibrous and globular proteins, Protein genetic disorders</p> <p><b>Structure and function of enzymes:</b> Structure, properties and functions of enzymes. Enzyme nomenclature, Enzymatic reaction kinetics, Factors affecting enzyme activity, Enzyme inhibition, Multi-enzyme systems.</p> <p><b>Structure and function of vitamins and minerals:</b> Types of vitamins, Structure and role in enzyme function, Inorganic elements needed in nutrition and their role in enzyme function.</p> <p><b>Structure and function of nucleic acids:</b> Components of nucleosides, Nucleosides, Nucleic acids, Structure of nucleic acids, Free nucleotides, Properties of DNA, RNA, Role of nucleic acids in protein synthesis</p> <p><b>Structure and function of lipids and biomembranes:</b> Structure and function of lipids; the main component of Membrane.</p>																													
Attribute Soft skill:	Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class and outdoor setting																													
Study/exam achievements:	<p>The final grade (NA) is calculated based on the following ratio:</p> <table border="1" data-bbox="494 956 1300 1192"> <thead> <tr> <th data-bbox="494 956 887 990">Assessment Components</th><th data-bbox="887 956 1300 990">Percentage of contribution</th></tr> </thead> <tbody> <tr> <td data-bbox="494 1001 887 1035">Participation</td><td data-bbox="887 1001 1300 1035">20%</td></tr> <tr> <td data-bbox="494 1046 887 1080">Assignment</td><td data-bbox="887 1046 1300 1080">30%</td></tr> <tr> <td data-bbox="494 1091 887 1125">Mid-semester test</td><td data-bbox="887 1091 1300 1125">20%</td></tr> <tr> <td data-bbox="494 1136 887 1170">Final semester test</td><td data-bbox="887 1136 1300 1170">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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<p>Grade Conversion of 0-100 scale into 0-4 scale is set as below:</p> <table border="1" data-bbox="494 1248 1397 1731"> <thead> <tr> <th data-bbox="494 1248 791 1282">Letter</th><th data-bbox="791 1248 1085 1282">Number</th><th data-bbox="1085 1248 1397 1282">Grade interval</th></tr> </thead> <tbody> <tr> <td data-bbox="494 1293 791 1327">A</td><td data-bbox="791 1293 1085 1327">4.00</td><td data-bbox="1085 1293 1397 1327"><math>85 \leq A \leq 100</math></td></tr> <tr> <td data-bbox="494 1338 791 1372">A-</td><td data-bbox="791 1338 1085 1372">3.75</td><td data-bbox="1085 1338 1397 1372"><math>80 \leq A- &lt; 85</math></td></tr> <tr> <td data-bbox="494 1383 791 1417">B+</td><td data-bbox="791 1383 1085 1417">3.50</td><td data-bbox="1085 1383 1397 1417"><math>75 \leq B+ &lt; 80</math></td></tr> <tr> <td data-bbox="494 1428 791 1462">B</td><td data-bbox="791 1428 1085 1462">3.00</td><td data-bbox="1085 1428 1397 1462"><math>70 \leq B &lt; 75</math></td></tr> <tr> <td data-bbox="494 1473 791 1507">B-</td><td data-bbox="791 1473 1085 1507">2.75</td><td data-bbox="1085 1473 1397 1507"><math>65 \leq B- &lt; 70</math></td></tr> <tr> <td data-bbox="494 1518 791 1551">C+</td><td data-bbox="791 1518 1085 1551">2.50</td><td data-bbox="1085 1518 1397 1551"><math>60 \leq C+ &lt; 65</math></td></tr> <tr> <td data-bbox="494 1563 791 1596">C</td><td data-bbox="791 1563 1085 1596">2.00</td><td data-bbox="1085 1563 1397 1596"><math>55 \leq C &lt; 60</math></td></tr> <tr> <td data-bbox="494 1608 791 1641">D</td><td data-bbox="791 1608 1085 1641">1.00</td><td data-bbox="1085 1608 1397 1641"><math>40 \leq D &lt; 55</math></td></tr> <tr> <td data-bbox="494 1653 791 1686">E</td><td data-bbox="791 1653 1085 1686">0.00</td><td data-bbox="1085 1653 1397 1686"><math>0 \leq E &lt; 40</math></td></tr> </tbody> </table>	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):	<ol style="list-style-type: none"> <li>1. Koolman, J and Roehm K.H, 2005, <i>Color Atlas of Biochemistry</i> 2<sup>nd</sup> edition. Stutgard New York</li> <li>2. Lehninger, 1988, <i>Dasar-dasar Biokimia</i>, jilid 1, Terjemahan Maggi Thenawidjaya, Penerbit Erlangga, Jakarta</li> <li>3. Mathews,C.K and Van Holde K.E, 2000, <i>Biochemistry</i>, second ed., The Benjamin Cumming company, Inc.</li> </ol>																													

	<p>4. Nelson D.L., and Cox M.M., 2003, <i>Lehninger Principle of Biochemistry</i>, 4<sup>th</sup> edition, University of Wisconsin-Madison</p> <p>Stryer, L., 1988, <i>Biochemistry</i>, third ed., New York : W.H. Freeman and company</p>
Notes:	<p>*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.</p> <p>For lab activity: 1 sks in learning process = two periods consist of: (a) scheduled lab activity (100 minutes); (b) structured lab activity (70 minutes);</p> <p>**1 sks = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019</p>