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Undergraduate Programme in Physics

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MODULE HANDBOOK

Module Name	Introduction to Biophysics
Module level, if applicable	Bachelor
Code, if applicable	FIS424022
Subtitle, if applicable	-
Courses, if applicable	Introduction to Biophysics
Semester(s) in which the module is taught	4nd (fourth)
Person responsible for the module	Anis Yuniati, M.Si., Ph.D.
Lecturer(s)	Anis Yuniati, M.Si., Ph.D.
Language	Indonesia
Relation to curriculum	elective course in the second year (4th semester) Bachelor Degree
Type of teaching, contact hours	100 minutes lectures and 120 minutes structured activities per week.
Workload	Total workload is 90.6 hours per semester, which consists of 100 minutes lectures per week for 14 weeks, 120 minutes structured activities per week, 120 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam
Credit points	2
Requirements according to the examination	Minimum attendance 75% All assignments submitted Attendance on time
Recommended prerequisites	-
Module objectives/intended learning outcomes	After completing this course, the students: CO 1. Able to understand the scope of Biophysics, concepts and basic theories supporting Biophysics, cell structure and function, cell membrane CO 2. Able to explain the principles of metabolism, energy transformation, protein structure and function, protein structure measurement techniques CO 3. Able to explain the nervous tissue system, neuron cells and glia cells CO 4. Able to understand the electrical properties of cells, the occurrence of action potentials, understanding synapses, synapse models, measuring electrical activity in the body CO 5. Able to explain the principle of X-ray and its application in the field of radiology, radiotherapy, radiation principles, radiation measurement and safety
Content	1. Introduction: Overview and Scope of Biophysics 2. Cell structure and function, cell membrane 3. Energy metabolism and transformation 4. Protein structure and function 5. Measurement methods/techniques: XRD, NMR, STM, AFM 6. Nervous system, Neural tissue, Neurons, Glia Cell 7. Electrical properties of cells, Action Potential, Hodgkin-Huxley Model

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<table>
<tr><td></td><td>8. Synapses, Synapse Model
9. Electrical systems in the body, Measures of electrical activity: EMG, ECG, EEG
10. X-rays and its application in Radiology
11. Radiation and its applications, Radiation measurement and safety
12. Computational Biophysics, Computational Neuroscience</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>The final mark will be weighted as follows:
<table>
<tr><th>NO</th><th>Assessment methods (components, activities)</th><th>Weight (percentage)</th></tr>
<tr><td>1</td><td>Final Examination</td><td>40%</td></tr>
<tr><td>2</td><td>Mid-Term Examination</td><td>30%</td></tr>
<tr><td>3</td><td>Class Activities : Quiz, Homework, etc.</td><td>30%</td></tr>
</table>
The final assessment is expressed in the form of a letter value converted from a number value with the following categories:
<table>
<tr><th>NO</th><th>Number Value</th><th>Letter Value</th><th>NO</th><th>Number Value</th><th>Letter Value</th></tr>
<tr><td>1</td><td>≥ 95</td><td>A</td><td>7</td><td>65-69.99</td><td>B/C</td></tr>
<tr><td>2</td><td>90-94.99</td><td>A-</td><td>8</td><td>60-64.99</td><td>C+</td></tr>
<tr><td>3</td><td>85-89.99</td><td>A/B</td><td>9</td><td>55-59.99</td><td>C</td></tr>
<tr><td>4</td><td>80-84.99</td><td>B+</td><td>10</td><td>50-54.99</td><td>C-</td></tr>
<tr><td>5</td><td>75-79.99</td><td>B</td><td>11</td><td>55-34.99</td><td>D</td></tr>
<tr><td>6</td><td>70-74.99</td><td>B-</td><td>12</td><td><35</td><td>E</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Whiteboard, markers, LCD projector, laser pointer, power point presentation, laptop/PC</td></tr>
<tr><td>Reading list</td><td>1. Biophysics, An Introduction, Rodney Cotterill, Wiley
2. Fundamentals of Biophysics, A.B.Rubin, Wiley</td></tr>
</table>

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			√						
CO 2			√						
CO 3				√					
CO 4				√					
CO 5									√