

**SEMESTER LEARNING ACTIVITY PLANS
(SLAP)
SEMESTER EVEN 2022/2023**



Physics Undergraduate Study Program
Physics Department
Biophysics
MFF 3872/ 2 Credits

Lecturer Coordinator:
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UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
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Universitas Gadjah Mada
 Faculty of Mathematics and Natural Science
 Physics Department / Physics Undergraduate Study Program
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Document Number :

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| Code | Course Name | Credits (Credits) | | Semester | Status | Prerequisite |
|----------------|-------------------|-------------------|---------------|-------------|-----------------|---|
| <i>MF 3872</i> | <i>Biophysics</i> | <i>T: 2</i> | <i>P: ...</i> | <i>EVEN</i> | <i>Elective</i> | <i>Thermodynamics (MF 1053), Wave (MF 1405)</i> |

Short Description

The Biophysics Course is an elective course of 2 Credits in the 2021 Curriculum of the Physics Undergraduate Study Program, FMIPA UGM. Organizing these courses aims to provide mastery of the basic physics concepts in Biological phenomena. In the 2021 curriculum of the Physics Study Program, these courses are associated with competence in aspects of Knowledge (PLO 2) and aspects of long-life learning/self-development (PLO 5). Learning is carried out based on a face-to-face schedule in class for 14 weeks, with meetings held for 300 minutes each week, interspersed with group assignment presentations. Four weeks for The lecture period is used for the Mid-Semester Examination and the Final Semester Examination, each of which is scheduled for two weeks by the Academic Section of FMIPA UGM.

Evaluation for students for course assessment is carried out in a summative and formative manner. Summatively it is realized in the form of a written exam, both the Mid-Semester Examination and the Final Semester Examination, which takes a maximum of 120 minutes. The formative evaluation is realized through independent assignments for each student and group. The form of independent activity is completing a task given to students independently at home and giving presentation assignments. The monitoring process is carried out by observing student activities during the lecture process, such as attendance in lectures, questions and answers, discussions on the material being presented, and student performance in doing independent assignments in the form of homework given.

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| Program Learning Outcomes (PLO) Imposed on the Course | PLO 2 | Knowledge. Able to explain theoretical concepts and principles of classical and modern physics and able to apply basic concepts of physics and related mathematical methods in finding solutions to physical problems. |
| | PLO 5 | Long Life Learning. Able to analyze various alternative solutions to physical problems and conclude them for appropriate decision-making, both in familiar and new problems. |

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| Course Outcomes (CO) | After completing this course, students are expected to be able to: | |
| | CO1 | Students can explain the concepts of physics in biology |
| | CO2 | Students can explain concepts and relate cases in biology from a physics perspective. |

| The Correlation of CO to Learning Materials and Methods, and Time Allocation | Learning Materials | | Learning Methods | Time Allocation |
|---|---------------------------|---|-------------------------|------------------------|
| | CO 1 | RPKPS explanation, introduction | TCL-SCL mixed | 2X50 minutes |
| | CO 1 | Components in biological systems | TCL-SCL mixed | 2X50 minutes |
| | CO 1 | Approach to Statistical Physics in biological systems | TCL-SCL mixed | 2X50 minutes |
| | CO 1 | Diffusion physics in biology and surface phenomena | TCL-SCL mixed | 2X50 minutes |
| | CO 1 | Life in the study of Reynolds Numbers | TCL-SCL mixed | 2X50 minutes |
| | CO 2 | Entropy and Energy in Biology | TCL-SCL mixed | 2X50 minutes |

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|--|---|---|-----------------------------|---------------------|------------|
| | CO 2 | The environment and its effects on humans | TCL-SCL mixed | <i>2X50 minutes</i> | |
| Midterm exam/Project Task Results/Case Analysis Results | | | | | |
| | CO 2 | Mechanics in cell biology | TCL-SCL mixed | <i>2X50 minutes</i> | |
| | CO 2 | Sequences in cell biology | TCL-SCL mixed | <i>2X50 minutes</i> | |
| | CO 2 | Photobiophysics | TCL-SCL mixed | <i>2X50 minutes</i> | |
| | CO 2 | Radiation and its effects on humans | TCL-SCL mixed | <i>4X50 minutes</i> | |
| | CO 2 | Effects of magnetic fields on humans | TCL-SCL mixed | <i>4X50 minutes</i> | |
| Final exams/ Project Task Results/Case Analysis Results | | | | | |
| Learning Methods | SCL (Student Centered Learning): Project-based learning (Team-based Project)/Case-based learning/PBL/other SCL methods | | | | |
| Student Learning Experience | Learn to study and study: introduction to biophysics, components in biological systems, statistical physics approaches in biological systems, physics diffusion in biology and surface phenomena, life in the study of Reynolds number, entropy and energy in biology, environment and their effects on humans, energy in biology, natural mechanics of cell biology, photobiophysics, radiation and its effects on humans, the effect of magnetic fields on humans. In addition, students learn to express opinions and discuss in group presentations in class. | | | | |
| Access to Learning Media/ LMS and Offline and Online Percentage | Offline (LCD, PPT Slide, Whiteboard, Laptop) and Online (Zoom Meeting, Google Meet, Google Classroom) | | | | |
| Assessment Methods and Synchronization with CO | Assessment Methods | Assessment Percentage | Criteria/ Indicators | CO1 | CO2 |
| | Participatory Activity* | | | | |
| | Project Results/ Case Study Results/ PBL Results* | 20 | | √ | √ |
| | Cognitive | | | | |
| | Assignment | 10 | | √ | √ |
| | Quiz | 10 | | √ | √ |
| | Midterm Exam | 30 | | √ | |
| | Final Exam | 30 | | | √ |
| | Total | 100 | | | |
| | *) can also be obtained from the Midterm or Final Exam as the result of participatory activities or project/ case study results. According to IKU 7, the percentage of project results/ case study/ PBL results is at least 50%. | | | | |
| References | Main References; <ol style="list-style-type: none"> 1. Philip Nelson, Biological Physics, W. H. Freeman, 1st Edition, 2007. 2. Roland Glaser, Biophysics, Springer, 2nd edition, 2012. | | | | |

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| Lecturers <i>(Team Teaching)</i> | 1. Drs. Wagini, S.U 2. Dr. Sc. Ari Dwi Nugraheni | | | |
| Authorization | Date of Drafting | Lecturer Coordinator | Head of Curriculum Committee | Head of Study Program |
| | | <i>Drs. Wagini, S.U</i> | | <i>Dr. Eng. Ahmad Kusumaatmaja, S.Si., M.Sc.</i> |