SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Celestial Mechanics

MFF 2953/ 2 Credits

Lecturer Coordinator:

Dr. Eng. Rinto Anugraha NQZ, S.Si., M.Si

UNIVERSITAS GADJAH MADA

FACULTY OF MATHEMATICS AND NATURAL SCIENCE

2022

	Universitas Gadjah Mada Faculty of Mathematics and Natural Science Physics Department / Physics Undergraduate Study Program Semester ODD 2022/2023	**Document Number :** ……

SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 2953	*Celestial Mechanics*	*T: 2*	*P: …*	*ODD*	*Elective*	*Mechanics I (MFF 1401)*

Short Description		The Mechanics of Celestial Objects is an elective course of 2 credits in the 2021 curriculum for the Bachelor of Physics at Gadjah Mada University, which can be taken in Odd semesters. To be able to take this course, students are recommended to have completed the Mechanics I course. In the 2021 Curriculum, the Physics Undergraduate Study Program is associated with competence in the Knowledge Aspect (PLO 2) and the Long Life Learning/self-development Aspect (PLO 5).
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.
Course Outcomes (CO)	**After completing this course, students are expected to be able to:**	
	CO1	Knowing and Understanding Plane and Spherical Trigonometry
	CO2	Know and understand the Coordinates of the Earth and Heavenly Bodies
	CO3	Know and understand Julian Day and the Calendar System
	CO4	Know and understand two and three object problems
	CO5	Knowing and understanding the motion of the sun, planets, and moon, phases of the moon, solar and lunar eclipses

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1	Plane and Spherical Trigonometry	TCL-SCL mixed	***4X50 minutes***
	CO 2	Coordinates of Earth and Celestial Bodies	TCL-SCL mixed	***4X50 minutes***
	CO 3	Julian Day	TCL-SCL mixed	***2X50 minutes***
	CO 3	Calendar System	TCL-SCL mixed	***2X50 minutes***
	CO 3	Problems two and three things	TCL-SCL mixed	***2X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 4	The motion of the Sun, Planets, and Moon	TCL-SCL mixed	***4X50 minutes***
	CO 5	Moon phases	TCL-SCL mixed	***4X50 minutes***
	CO 5	Solar and Moon Eclipse	TCL-SCL mixed	***6X50 minutes***
	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**

<table>
<tr><td>Student Learning Experience</td><td colspan="8">Listen, ask, answer questions and discuss</td></tr>
<tr><td>Access to Learning Media/ LMS and Offline and Online Percentage</td><td colspan="8">Offline (LCD, PPT Slide, Whiteboard, Laptop) and Online (Zoom Meeting, Google Meet, Google Classroom)</td></tr>
<tr><td rowspan="11">Assessment Methods and Synchronization with CO</td><td>Assessment Methods</td><td>Assessment Percentage</td><td>Criteria/ Indicators</td><td>CO1</td><td>CO2</td><td>CO3</td><td>CO4</td><td>CO5</td></tr>
<tr><td>Participatory Activity*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Project Results/ Case Study Results/ PBL Results*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">Cognitive</td></tr>
<tr><td>Assignment</td><td>15</td><td></td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Quiz</td><td>15</td><td></td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Midterm Exam</td><td>35</td><td></td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Final Exam</td><td>35</td><td></td><td></td><td></td><td></td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">*) 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%.</td></tr>
<tr><td>References</td><td colspan="8">Main References;
1. Jean Meeus, 1991, Astronomical Algorithm, Willmann-Bell, Virginia, USA. .
2. Y. Ryabov, 2006, An Elementary Survey of Celestial Mechanics, Dover Publication, USA..</td></tr>
<tr><td>Lecturers (Team Teaching)</td><td colspan="8">1. Dr. Eng. Rinto Anugraha NQZ, S.Si., M.Si</td></tr>
<tr><td rowspan="2">Authorization</td><td>Date of Drafting</td><td colspan="3">Lecturer Coordinator</td><td colspan="2">Head of Curriculum Committee</td><td colspan="2">Head of Study Program</td></tr>
<tr><td></td><td colspan="3">Dr. Eng. Rinto Anugraha NQZ, S.Si., M.Si</td><td colspan="2"></td><td colspan="2">Dr. Eng. Ahmad Kusumaatmaja, S.Si., M.Sc.</td></tr>
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