SEMESTER LEARNING ACTIVITY PLANS (SLAP)
SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Tomography Physics

MFF 3871/ 2 Credits

Lecturer Coordinator:

Drs. Gede Bayu Suparta, M.S., Ph.D.

UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
2022

SEMESTER LEARNING ACTIVITY PLANS (SLAP)					
Code	**Course Name**	**Credits (Credits)**		**Semester**	**Status**	**Prerequisite**
MFF 3871	*Tomography Physics*	*T: 2*	*P: ...*	*ODD*	*Elective*	*None*

Short Description	The Tomography Physics course is an elective course of 2 Credits in the 2021 curriculum of the Physics Undergraduate Study Program, Universitas Gadjah Mada, which can be taken in Odd semesters. To be able to take this course, students are recommended to have completed the courses in Image Physics and Radiography Physics. In the 2021 Curriculum of the Physics Undergraduate Study Program, this course is associated with competencies 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 the History of CT, application trends, and R&D trends
	CO2	Know and understand the basic theory of Hough, Radon, Fourier, Matrix, and Matrix equations and iteration transformations
	CO3	Knowledge and understanding of the CT system
	CO4	Knowing and understanding the Sampling Process
	CO5	Know and understand reconstruction methods
	CO6	Know and understand CT Software

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1	Introduction: CT history, application trends, R&D trends	TCL-SCL mixed	*2X50 minutes*
	CO 2	Basic Theory of Hough Transformation, Radon Transformation,	TCL-SCL mixed	*2X50 minutes*
	CO 2	Fourier transform, Matrix transform,	TCL-SCL mixed	*2X50 minutes*
	CO 2	Matrix Equation and Iteration.	TCL-SCL mixed	*2X50 minutes*
	CO 3	CT System: Design, Components	TCL-SCL mixed	*2X50 minutes*
	CO 3	CT system: set-up, working principle	TCL-SCL mixed	*2X50 minutes*
	CO 3	CT system: Parameters	TCL-SCL mixed	*2X50 minutes*
	Midterm exam/Project Task Results/Case Analysis Results			

	CO 4	Sampling Process: data acquisition, interpolation,	TCL-SCL mixed	*2X50 minutes*
	CO 4	Process Sampling: pre-processing data	TCL-SCL mixed	*2X50 minutes*
	CO 5	Reconstruction Method: interpolation process,	TCL-SCL mixed	*2X50 minutes*
	CO 5	, reverse project process, and image display process	TCL-SCL mixed	*2X50 minutes*
	CO 6	CT software: sampling,	TCL-SCL mixed	*2X50 minutes*
	CO 6	CT software: image processing	TCL-SCL mixed	*2X50 minutes*
	CO 6	CT software: image analysis.	TCL-SCL mixed	*2X50 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**
Student Learning Experience	**Listen, ask, answer questions and discuss**
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	CO3	CO4	CO5	CO6
	Participatory Activity*								
	Project Results/ Case Study Results/ PBL Results*								
	Cognitive								
	Assignment	**20**		√	√	√	√	√	√
	Midterm Exam	**40**		√	√	√			
	Final Exam	**40**					√	√	√
	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;** 1. Buzug, T.M., 2008. Computed Tomography: From Photon Statistics to Modern Cone-Beam CT, SpringerVerlag Berlin Heidelberg.. 2. Kak, A.C. and M. Slaney, 1988, Principles of Computed Tomography Imaging, IEEE Press, Piscataway, NJ.

Lecturers (*Team Teaching*)	1. Drs. Gede Bayu Suparta, M.S., Ph.D.			
Authorization	**Date of Drafting**	**Lecturer Coordinator**	**Head of Curriculum Committee**	**Head of Study Program**
		Drs. Gede Bayu Suparta, M.S., Ph.D.		*Dr. Eng. Ahmad Kusumaatmaja, S.Si., M.Sc.*