

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



Non - Destructive Test  
MFF5811 / 2 Credits

Lecturer Coordinator:  
**Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.**

**UNIVERSITAS GADJAH MADA  
FACULTY OF MATHEMATICS AND NATURAL SCIENCE  
2022**



## Universitas Gadjah Mada

Faculty of Mathematics and Natural Science

Physics Department / Study Program Master Physics

Semester Odd 2022/2023

### SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (credits)	Semester	Status	Prerequisite										
<i>MF5811</i>	<i>Non - Destructive Test</i>	<i>2</i>	<i>Odd</i>	<i>Elective</i>	<i>None</i>										
<b>Short Description</b>	<p>Non - Destructive Test course is Elective course 2 credits (Theory) in the 2022 Curriculum Master Physics Study Program, Faculty of Mathematics and Natural Science UGM.</p> <p>The syllabus of this course is as follows:            NDT history, Physics concepts, application context, NDT applications, and benefits of NDT. NDT for a material test. NDT for Object Defect test. Visual Testing: 2D Digital Camera, 3D Stereo Camera, Microscope, Timelapse Method, Panoramic Method. Liquid Penetrant Testing: Penetrant materials, Application methods, Scanning, and Analysis. Magnetic Particle Testing: Magnetization, Magnetic testing, Application methods, Scanning, and Analysis. Eddy Current Testing, Acoustic and Ultrasonic Testing, Thermography and InfraRed Testing, Radiography Testing, Tomography Testing, NDT Business, and NDT Research and Development Prospects.</p> <p>The courses are held in class for 14 weeks, each week's session last for 2 x 50 minutes. Four weeks of course period is used for Midterm Exam and Final Exam, each held for two weeks as scheduled.</p> <p>Student evaluation for course assessments is performed summative and formative. The summative evaluation is implemented as written exams, both Midterm and Final Exam, which take a maximum of 120 minutes. The formative evaluation is implemented as individual assignments for each student in the form of completing an assignment individually. Monitoring is carried out by observing student activities during the course, such as attendance, Q&amp;A and discussion about the material presented, and student performance in completing individual assignments.</p>														
<b>Program Learning Outcomes (PLO) Imposed on the Course</b>	<table border="1"> <tbody> <tr> <td>PLO 2</td> <td>Having the professional ability of a scientist.</td> </tr> <tr> <td>PLO 3</td> <td>Mastering further knowledge of classical and modern physics theory, and its relationship with other disciplines, and has mastered an advanced field of physics specialization that allows him to keep up with the latest international research developments.</td> </tr> <tr> <td>PLO 4</td> <td>Mastering various mathematical disciplines related to an advanced field of physics, and able to develop physical models using various mathematical and computational tools with an inter or multidisciplinary approach to solving problems related to an advanced field of physics.</td> </tr> <tr> <td>PLO 5</td> <td>Able to plan, manage and carry out experiments and conclude the results, or be able to create and use modeling and simulations based on the basic principles of physics to study and solve a problem in a scientific field of Physics or applied Physics that produces models, methods, or theories tested and innovative.</td> </tr> <tr> <td>PLO 6</td> <td>Able to apply knowledge to analyze, synthesize, formulate problems and solve problems comprehensively in one of advanced field of physics, through</td> </tr> </tbody> </table>					PLO 2	Having the professional ability of a scientist.	PLO 3	Mastering further knowledge of classical and modern physics theory, and its relationship with other disciplines, and has mastered an advanced field of physics specialization that allows him to keep up with the latest international research developments.	PLO 4	Mastering various mathematical disciplines related to an advanced field of physics, and able to develop physical models using various mathematical and computational tools with an inter or multidisciplinary approach to solving problems related to an advanced field of physics.	PLO 5	Able to plan, manage and carry out experiments and conclude the results, or be able to create and use modeling and simulations based on the basic principles of physics to study and solve a problem in a scientific field of Physics or applied Physics that produces models, methods, or theories tested and innovative.	PLO 6	Able to apply knowledge to analyze, synthesize, formulate problems and solve problems comprehensively in one of advanced field of physics, through
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PLO 6	Able to apply knowledge to analyze, synthesize, formulate problems and solve problems comprehensively in one of advanced field of physics, through														

		experimental or theoretical research, then be able to classify and draw conclusions about their findings for the development of science and technology.			
<b>Course Outcomes (CO)</b>	<b>Upon completion of this course, students should be able to:</b>				
	<b>CO1</b>	Explain the history of NDT, Physics concepts, application context, NDT applications, and benefits of NDT.			
	<b>CO2</b>	Explain NDT for material testing. NDT for Object Defect test. Visual Testing: 2D Digital Camera, 3D Stereo Camera, Microscope, Timelapse Method, Panoramic Method.			
	<b>CO3</b>	Explain Liquid Penetrant Testing: Penetrant materials, Application methods, Scanning and analysis. Magnetic Particle Testing: Magnetization, Magnetic testing, Application methods, Scanning and analysis.			
	<b>CO4</b>	Explain Eddy Current Testing, Acoustic and Ultrasonic Testing, Thermography and InfraRed Testing, Radiography Testing, Tomography Testing, NDT Business and NDT Research and Development Prospects.			
	<b>CO5</b>				
	<b>CO6</b>				
	<b>CO7</b>				
	<b>CO8</b>				
<b>The Correlation of CO to Learning Materials and Methods, and Time Allocation</b>		<b>Learning Materials</b>	<b>Learning Methods</b>	<b>Time Allocation</b>	
	<b>CO1</b>			2 x 50 minutes	
	<b>CO1</b>			2 x 50 minutes	
	<b>CO1</b>			2 x 50 minutes	
	<b>CO2</b>			2 x 50 minutes	
	<b>CO2</b>			2 x 50 minutes	
	<b>CO2</b>			2 x 50 minutes	
	<b>CO2</b>			2 x 50 minutes	
	<b>CO3</b>			2 x 50 minutes	
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	<b>CO3</b>			2 x 50 minutes	
	<b>CO4</b>			2 x 50 minutes	
	<b>CO4</b>			2 x 50 minutes	

	<b>CO4</b>				2 x 50 minutes		
	<b>CO4</b>				2 x 50 minutes		
	<b>Final Exam/ Project Task Results/ Case Analysis Results</b>						
<b>Learning Methods</b>							
<b>Student Learning Experience</b>	Learn to analyze and review: , , , , , , , , , , , .						
<b>Access to Learning Media/ LMS and Offline and Online Percentage</b>							
<b>Assessment Methods and Synchronizati on with CO</b>	<b>Assessment Methods</b>	<b>Assessment Percentage</b>	<b>Criteria/In dicators</b>	<b>CO1</b>	<b>CO2</b>	<b>CO3</b>	<b>CO4</b>
	<b>Participatory Activity*</b>						
	<b>Project Results/ Case Study Results/ PBL Results*</b>						
	<b>Cognitive</b>						
	<b>Assignment</b>	30%		7,5%	7,5%	7,5%	7,5%
	<b>Quiz</b>						
	<b>Midterm Exam</b>	35%		17,5%	17,5%		
	<b>Final Exam</b>	35%				17,5%	17,5%
	*) 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%.						
<b>References</b>	<b>Main references:</b> 1. IAEA, 1999. Non-destructive Testing: A Guidebook for Industrial Management and Quality Control Personel. Training Course Series No. 9, IAEA Vienna. 2. Hellier, C.J., 2003. Handbook of Nondestructive Testing. McGraw-Hill, New York. 3. Ida, N. and Meyendorf, N., 2019. Handbook of Advanced Nondestructive Evaluation, Springer, Cham. DOI <a href="https://doi.org/10.1007/978-3-319-26553-7">https://doi.org/10.1007/978-3-319-26553-7</a>						
<b>Lecturers (Team Teaching)</b>	1. Prof. Drs. Gede Bayu Suparta, M.S., Ph.D. 2. 3. 4.						
<b>Authorization</b>	<b>Date of Drafting</b>	<b>Lecturer Coordinator</b>	<b>Head of Curriculum Committee</b>	<b>Head of Study Program</b>			

		<i>Prof. Drs. Gede Bayu Suparta, M.S., Ph.D.</i>	Dr.Ing. Ari Setiawan	Mirza Satriawan, M.Si., Ph.D
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