



TEACHING INSTRUCTIONAL DESIGN (BRP)

COURSE

LABORATORY WORK OF BASIC PHYSICS 1

by

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**Undergraduate Program in Physics
Faculty of Mathematics and Natural Sciences
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Depok
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UNIVERSITAS INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
PHYSICS UNDERGRADUATE STUDY PROGRAM

TEACHING INSTRUCTIONAL DESIGN

Course Name	Laboratory Work of Basic Physics 1	Credit(s)	Prerequisite course(s)	Requisite for course(s)	Integration Between Other Courses
Course Code	SCPH601142	1	Heat and Mechanics & Statistical Methods	-	-
Relation to Curriculum	-				
Semester	2				
Lecturer(s)	Dr. Djoko Triyono				
Course Description	<i>After completing this practicum lecture, physics students in semester 2 are able to analyze (C4) basic physics concepts and operate (P3) measurement instruments in everyday life appropriately to solve (A5) existing problems in accordance with the laws of physics applies. The language of instruction used in this course is Indonesian.</i>				
Graduate Learning Outcome (GLO)					
GLO-1	Formulating problems and solving physics of mechanics, electricity and magnetism, thermodynamics, and modern physics.				

GLO-2	Formulate general physics problems and solutions
GLO-3	Measure physical quantities
GLO-4	Processing data and interpreting data
GLO-5	Studying the latest instruments that support his work
GLO-6	Apply knowledge of physics in society and practical life.
GLO-7	Able to work in teams.
GLO-8	Have attitudes and skills that support success at work and in participating in community activities.
Course Learning Outcome (CLO)	
CLO	Students are able to analyze (C4) basic physics concepts and operate (P3) measurement instruments appropriately to solve (A5) problems in everyday life.
Sub-CLO(s)	

Sub-CLO 1	Able to analyze (C4) and demonstrate (P2) the physics of motion mechanics to solve (A5) problems in everyday life.
Sub-CLO 2	Able to analyze (C4) and demonstrate (P2) the concepts of fluid mechanics physics to solve (A5) problems in everyday life.
Sub-CLO 3	Able to analyze (C4) and demonstrate (P2) the concept of heat physics to solve (A5) problems in everyday life.
Sub-CLO 4	Able to use (C3) and operate (P3) physical measurement instruments to solve (A5) problems in everyday life.
Sub-CLO 5	Able to investigate (C3) and report (P2) basic physics phenomena and make (A2) practical reports according to applicable rules.
Study Materials	<ul style="list-style-type: none"> • Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms • Free Fall Motion • Density of the Liquid and Viscosity of the Liquid • Coefficient of Friction • Law of Collision • Twist Swings and Mathematical Swings • Young's Modulus and Advance Stress Coefficient • Perforated Cylinder • Hardness Test • Linear expansion coefficient and thermal conductivity • Calorimetry and Ideal Gas Law • Joule and Solar Collector Constants • Newton cooling • Radiation Constants and Radiation Energy Absorption
Reading List	<ul style="list-style-type: none"> • Basic Physics Practicum Guidebook, UPP IPD, 3rd edition, 2010. • Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005

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I. Teaching Plan

Week	Sub-CLO	Study Materials [with reference]	Teaching Method [with est. time]	Learning Experiences (*O-E-F)	Sub-CLO Achievement Indicator		Sub-CLO Weight on Course (%)
					General	Specific	
1	Introduction						
2	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	Practicum and work on practicum report [Estimated time] 200 minutes	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback: Laboratory assistant comments (20%)</p>	General indicators: Able to report practicum results in the form of reports in accordance with existing rules.	Special indicators: Able to operate practicum instruments and get good results.	10%

3	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	Practicum and work on practicum report [Estimated time] 200 minutes	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback: Laboratory assistant comments (20%)</p>	General indicators: Able to report practicum results in the form of reports in accordance with existing rules.	Special indicators: Able to operate practicum instruments and get good results.	10%
4	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	Practicum and work on practicum report [Estimated time] 200 minutes	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback:</p>	General indicators: Able to report practicum results in the form of reports in accordance with existing rules.	Special indicators: Able to operate practicum instruments and get good results.	10%

				Laboratory assistant comments (20%)			
5	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	<p>Practicum and work on practicum report</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback: Laboratory assistant comments (20%)</p>	<p>General indicators: Able to report practicum results in the form of reports in accordance with existing rules.</p>	<p>Special indicators: Able to operate practicum instruments and get good results.</p>	10%
6	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	<p>Practicum and work on practicum report</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum</p>	<p>General indicators: Able to report practicum results in the form of reports in accordance with existing rules.</p>	<p>Special indicators: Able to operate practicum instruments and get good results.</p>	10%

				2. Work on practicum report (60%) Feedback: Laboratory assistant comments (20%)			
7	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	<p>Practicum and work on practicum report</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback: Laboratory assistant comments (20%)</p>	<p>General indicators: Able to report practicum results in the form of reports in accordance with existing rules.</p>	<p>Special indicators: Able to operate practicum instruments and get good results.</p>	10%
8	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference]</p>	<p>Practicum and work on practicum report</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Pre-test before doing practicum (20%)</p>	<p>General indicators: Able to report practicum results in the</p>	<p>Special indicators: Able to operate practicum</p>	10%

		Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005		<p>Exercise:</p> <ol style="list-style-type: none"> 1. Doing practicum 2. Work on practicum report (60%) <p>Feedback: Laboratory assistant comments (20%)</p>	form of reports in accordance with existing rules.	instruments and get good results.	
9	Sub-CLO 1-5	<ul style="list-style-type: none"> • One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	<p>Practicum and work on practicum report</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise:</p> <ol style="list-style-type: none"> 1. Doing practicum 2. Work on practicum report (60%) <p>Feedback: Laboratory assistant comments (20%)</p>	General indicators: Able to report practicum results in the form of reports in accordance with existing rules.	Special indicators: Able to operate practicum instruments and get good results.	10%

10	Sub-CLO 1-5	<ul style="list-style-type: none"> One module of all materials according to the group division <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	Practicum and work on practicum report [Estimated time] 200 minutes	<p>Orientation: Pre-test before doing practicum (20%)</p> <p>Exercise: 1. Doing practicum 2. Work on practicum report (60%)</p> <p>Feedback: Laboratory assistant comments (20%)</p>	General indicators: Able to report practicum results in the form of reports in accordance with existing rules.	Special indicators: Able to operate practicum instruments and get good results.	10%
13	Sub-CLO 1-3	<ul style="list-style-type: none"> The practicum module that has been done <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	Presentation of practicum reports that have been done [Estimated time] 200 minutes	<p>Orientation: Review material and presentation exercises (20%)</p> <p>Exercise: 1. Make a presentation on the results of the practicum</p>	General Indicators: Able to explain practicum results in the form of presentations in accordance with existing rules.	Special indicators: Able to answer examiner's questions during the presentation.	5%

				<p>2. Presenting the results of the practicum (60%)</p> <p>Feedback: Question and answer session and final examiner comments (20%)</p>			
14	Sub-CLO 1-3	<ul style="list-style-type: none"> The practicum module that has been done <p>[Reference] Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005</p>	<p>Presentation of practicum reports that have been done</p> <p>[Estimated time] 200 minutes</p>	<p>Orientation: Review material and presentation exercises (20%)</p> <p>Exercise: 1. Make a presentation on the results of the practicum 2. Presenting the results of the practicum (60%)</p>	<p>General Indicators: Able to explain practicum results in the form of presentations in accordance with existing rules.</p>	<p>Special indicators: Able to answer examiner's questions during the presentation.</p>	5%

				Feedback: Question and answer session and final examiner comments (20%)			
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II. Assignment Design

Week	Assignment Name	Sub-CLOs	Assignment	Scope	Working Procedure	Deadline	Outcome
2-10	Practicum Report	SUB-CLO 1-5	Make a practicum report	<ul style="list-style-type: none"> • Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms • Free Fall Motion • Density of the Liquid and Viscosity of the Liquid • Coefficient of Friction • Law of Collision • Twist Swings and Mathematical Swings 	Homework	1 week	Collected practicum reports

				<ul style="list-style-type: none"> • Young's Modulus and Advance Stress Coefficient • Perforated Cylinder • Hardness Test • Linear expansion coefficient and thermal conductivity • Calorimetry and Ideal Gas Law • Joule and Solar Collector Constants • Newton cooling • Radiation Constants and Radiation Energy Absorption 			
2-10	Pre-test	SUB-CLO 1-5	Work on problems	<ul style="list-style-type: none"> • Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms • Free Fall Motion • Density of the Liquid and Viscosity of the Liquid • Coefficient of Friction • Law of Collision • Twist Swings and Mathematical Swings 	Work on problems before practicum	30 minutes	Collected answer sheet

				<ul style="list-style-type: none"> • Young's Modulus and Advance Stress Coefficient • Perforated Cylinder • Hardness Test • Linear expansion coefficient and thermal conductivity • Calorimetry and Ideal Gas Law • Joule and Solar Collector Constants • Newton cooling • Radiation Constants and Radiation Energy Absorption 			
13-14	Presentation	SUB-CLO 1-3	Presenting the results of the practicum in accordance with the modules that have been worked on	<ul style="list-style-type: none"> • Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms • Free Fall Motion • Density of the Liquid and Viscosity of the Liquid • Coefficient of Friction • Law of Collision • Twist Swings and Mathematical Swings 	<ol style="list-style-type: none"> 1. Make a presentation on practicum results 2. Presenting practicum result 	1 week	Collected presentation file

				<ul style="list-style-type: none"> • Young's Modulus and Advance Stress Coefficient • Perforated Cylinder • Hardness Test • Linear expansion coefficient and thermal conductivity • Calorimetry and Ideal Gas Law • Joule and Solar Collector Constants • Newton cooling Radiation Constants and Radiation Energy Absorption 			
15	Final Exam	SUB-CLO 1-3	Work on problems	<ul style="list-style-type: none"> • • All materials for Laboratory Work of Basic Physics 1 	Written examination	100 minutes	Collected answer sheet

III. Assessment Criteria (Learning Outcome Evaluation)

Evaluation Type	Sub-CLO	Assessment Type	Frequency	Evaluation Weight (%)
Practicum	1-5	1. Practicum report 2. Pre-test problems	1 per week	70
Presentation	1-3	Presentasi	1	20
Final	1-3	Soal ujian	1	10
Total				100

IV. Rubric(s)

This rubric is used as a guideline for assessing or giving levels of student performance results. a rubric usually consists of assessment criteria that include the dimensions / aspects that are assessed based on indicators of learning achievement. This assessment rubric is useful for clarifying the basics and aspects of the assessment so that students and lecturers can be guided by the same thing regarding the expected performance demands. Lecturers can choose the type of rubric according to the assessment given.

A. Conversion of the student's final score

Score	Grade	Equivalent
85—100	A	4,00
80—<85	A-	3,70
75—<80	B+	3,30
70—<75	B	3,00
65—<70	B-	2,70
60—<65	C+	2,30
55—<60	C	2,00
40—<55	D	1,00
<40	E	0,00

B. Assessment rubric

Practicum Report Grade Criteria

Score	Answers Quality
>90	If students can fulfill more than 90% of the rules of the practicum report correctly
70-89	If students can meet between 70% s.d. 89% of practicum report rules correctly
60-69	If students can meet between 60% s.d. 69% correct practicum report rules
55-59	If students can meet between 55% s.d. 59% correct practicum report rules
50-54	If students can meet between 50% s.d. 54% correct practicum report rules

Presentation Value Criteria

Criteria	A (90)	B (75)	C (60)	D (50)
Organization (Overall sequences, flows, and transitions)	Information is presented in an effective order. The excellent structure of paragraphs and transitions improves readability and comprehension. Executive summary or abstract is presented first, allows readers to easily follow the rest of the report	Information is logically ordered by paragraphs and transitions. Within a section, the order in which ideas are presented may be confusing at times	Information is scattered and needs further development.	There is no clear sequence of paragraphs, so there is no progressive flow of ideas. Details and examples are disorganized, difficult to follow and understand.
Quality of information	Supporting details are specific to the topic and provide the necessary information.	Some details do not support the topic of the report.	Details are a bit vague.	Unable to find certain details.

Introduction	The introductory paragraph is clearly stated, has a sharp, distinct and focus increase the impact of the report	The introductory paragraph is clearly stated with focus.	The introductory paragraph is unclear.	The introductory paragraph is unclear.
Conclusion	Summarizes the paragraph clearly, effective conclusion and increase the impact of the report.	Summarize the following paragraphs and summarize the discussion report and draw conclusions.	Closing paragraphs are only remotely related to the topic of the report.	Closing paragraphs are not clear.
Use of language: choice words, grammar, and sentence structure	Sentences are complete and grammatical, and they flow together easily. The word is chosen for its proper meaning.	For the most part, sentences are complete and grammatical, and they flow together easily. Every mistake is minor and doesn't distract the reader. Repetition of the same words and phrases Be avoided	Minor mistakes in sentence structure and grammar are frequent enough that they detract from the reader and distract from meaning. There are unnecessary repetitions of the same words and phrases	Major mistakes in sentence structure and grammar are frequent enough that they distract the reader and interfere with meaning. There are unnecessary repetitions of the same words and phrases
Use of images: graphics, graphics & images	All numbers, graphics, graphics, and pictures are accurate, consistent with text, and of good quality.	For the most part, numbers, graphics, graphics, and images are accurate, consistent with text, and of good quality	ew of the numbers, graphics, graphics, and images are accurate, consistent with text, and of good quality.	Numbers, graphics, graphics, pictures & are of poor quality, have a lot of inaccuracies & mislabelings, or may be lost.

C. Pre-test and Final Exam (UAS)

- 1) Able to express ideas in solving problems (25%)
- 2) Be able to determine the right basic concepts in solving problems (35%)
- 3) Able to formulate the final solution of problems correcting language errors (30%)
- 4) Able to use the appropriate important units and figures (10%)