



**TEACHING INSTRUCTIONAL DESIGN (BRP)**  
**COURSE**  
**LABORATORY WORK OF BASIC PHYSICS 1**

**by**

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## **PREFACE**

The Teaching Instructional Design (BRP) for the Laboratory Work of Basic Physics 1 course was prepared to be used as a reference for learning the Laboratory Work of Basic Physics 1 course at the FMIPA UI Undergraduate Physics Study Program which was attended by 2nd semester physics students on the condition that the student had taken the Mechanics and Heat Physics course and Statistical Methods course. In Basic Physics Practicum 1, students will analyze basic physics concepts and operate measurement instruments in the laboratory. It is hoped that this BRP can become a reference in a good learning process for lecturers as teachers and students as course participants so that the material is conveyed properly and perfectly.

Depok, November 13<sup>th</sup> 2016

**Dr. Djoko Triyono.**

## I. General Information

1. Name of Program / Study Level : Physics / Undergraduate
2. Course Name : Laboratory Work of Basic Physics 1
3. Course Code : SCFI601121
4. Semester : 2
5. Credit : 1 credit
6. Teaching Method(s) : Practicum, data processing, report writing, independent assignments, presentations, and written examinations.
7. Prerequisite course(s) : Mechanics and Heat, Statistical Method
8. Requisite for course(s) : None
9. Integration Between Other Courses : None
10. Lecturer : Dr. Djoko Triyono
11. Course Description : After completing the Laboratory Work of Basic Physics, physics students in semester 2 are able to analyze (C4) Basic physics concepts as well as operate (P3) measuring instruments in everyday life with precisely to solve (A5) existing problems in accordance with the applicable laws of physics. The language of instruction used in this course is Bahasa Indonesia.

## **II. Course Learning Outcome (CLO) and Sub-CLOs**

### **A. CLO**

Students are able to analyze (C4) basic physics concepts as well as operate (P3) instruments to take exact measurements to solve (A5) problems in everyday life. (ELO(s) 1, 2, 5, 6, 8)

### **B. Sub-CLOs**

1. Able to analyze (C4) and demonstrate (P2) motion mechanics physics concepts to solve (A5) problems in everyday life.
2. Able to analyze (C4) and demonstrate (P2) fluid mechanics physics concepts to solve (A5) problems in everyday life.
3. Able to analyze (C4) and demonstrate (P2) heat physics concepts to solve (A5) problems in everyday life.
4. Able to use (C3) and operate (P3) physics measurement instruments to solve (A5) problems in everyday life.
5. Able to investigate (C3) and report (P2) basic physical phenomena as well as making (A2) practicum report according to applicable rules.

### III. Rencana Pembelajaran

Week	Sub-CLO	Study Materials	Teaching Method	Time Required	Learning Experiences (*O-E-F)	Sub-CLO Weight on Course (%)	Sub-CLO Achievement Indicator	References
1	<b>Introduction</b>							
2	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules.	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
3	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
4	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
5	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
6	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports	Giancoli, DC., Physics: Principle with Applications,

		division of the group					in accordance with existing rules	6th ed., Prentice Hall, 2005
7	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
8	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
9	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
10	1-5	<ul style="list-style-type: none"> <li>One module of all materials according to the division of the group</li> </ul>	Practicum and report preparation	170 minutes	20% O, 60% E, 20% F	10	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
11	<b>REMEDIAL</b>							
12	<b>REMEDIAL</b>							
13	1-3	<ul style="list-style-type: none"> <li>The practicum module that has been done</li> </ul>	Presentation of practicum reports that have been done	170 minutes	20% O, 60% E, 20% F	5	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
14	1-3	<ul style="list-style-type: none"> <li>The practicum module that has been done</li> </ul>	Presentation of practicum reports that have been done	170 minutes	20% O, 60% E, 20% F	5	Able to report simulation results in the form of practicum reports in accordance with existing rules	Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005
10	<b>Final Exam</b>							

\*) O : Orientation  
E : Exercise  
F : Feedback

Reference:

1. Basic Physics Practicum Guidebook, UPP IPD, 3<sup>rd</sup> edition, 2010.
2. Giancoli, DC., Physics: Principle with Applications, 6th ed., Prentice Hall, 2005

#### IV. Assignment Design

Week	Assignment Name	Sub-CLOs	Assignment	Scope	Working Procedure	Deadline	Outcome
2-10	Practicum Report	SUB-CLOs 1-5	Make a practicum report	<ul style="list-style-type: none"> <li>• Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms</li> <li>• Free Fall Motion</li> <li>• Density of the Liquid and Viscosity of the Liquid</li> <li>• Coefficient of Friction</li> <li>• The Law of Collision</li> <li>• Twist Swings and Mathematical Swings</li> <li>• Young's Modulus and Advance Tension Coefficient</li> <li>• Perforated Cylinder</li> <li>• Hardness Test</li> <li>• Linear expansion coefficient and thermal conductivity</li> <li>• Calorimetry and Ideal Gas Law</li> <li>• Joule Constants and Solar Collector</li> <li>• Newton cooling</li> <li>• Radiation Constants and</li> </ul>	Homework	1 week	Practical reports collected



				Radiation Energy Absorption			
2-10	Pre-test	SUB-CLOs 1-5	Work on problems	<ul style="list-style-type: none"> <li>• Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms</li> <li>• Free Fall Motion</li> <li>• Density of the Liquid and Viscosity of the Liquid</li> <li>• Coefficient of Friction</li> <li>• The Law of Collision</li> <li>• Twist Swings and Mathematical Swings</li> <li>• Young's Modulus and Advance Tension Coefficient</li> <li>• Perforated Cylinder</li> <li>• Hardness Test</li> <li>• Linear expansion coefficient and thermal conductivity</li> <li>• Calorimetry and Ideal Gas Law</li> <li>• Joule Constants</li> </ul>	Doing problems before practicum	30 minutes	Answers to the questions collected

				and Solar Collector <ul style="list-style-type: none"> <li>• Newton cooling</li> <li>• Radiation Constants and Radiation Energy Absorption</li> </ul>			
13-14	Presentatio n	SUB-CLOs 1-5	Presenting the results of the practicum in accordance with the modules that have been worked on	<ul style="list-style-type: none"> <li>• Measurement of Object Dimensions and Center of Mass and Moment of Inertia of Firms</li> <li>• Free Fall Motion</li> <li>• Density of the Liquid and Viscosity of the Liquid</li> <li>• Coefficient of Friction</li> <li>• The Law of Collision</li> <li>• Twist Swings and Mathematical Swings</li> <li>• Young's Modulus and Advance Tension Coefficient</li> <li>• Perforated Cylinder</li> <li>• Hardness Test</li> <li>• Linear expansion coefficient and thermal conductivity</li> <li>• Calorimetry and Ideal Gas Law</li> <li>• Joule Constants</li> </ul>	1. Make a presentation on the results of the practicum  2. Presentatio n of practicum results	1 week	Collected presentation

				and Solar Collector <ul style="list-style-type: none"> <li>• Newton cooling</li> <li>• Radiation Constants and Radiation Energy Absorption</li> </ul>			
15	Final Exam	SUB-CLOs 1-5	Work on problems	<ul style="list-style-type: none"> <li>• All materials for Laboratory Work of Basic Physics 1</li> </ul>	Do the final exam	100 minutes	Answers to the questions collected

#### V. Assessment Criteria (Learning Outcome Evaluation)

Evaluation Type	Sub-CLOs	Assessment Type	Frequency	Evaluation Weight (%)
Prakticum	1-5	1. Practicum Report 2. Pre-test Problem	1 per week	70
Presentation	1-3	Presentation	1	20
Final Exam	1-3	Final exam problem	1	10
<b>Total</b>				<b>100</b>

#### VI. Rubric(s)

##### A. Criteria of Practicum Report Grades

Nilai	Kualitas Jawaban
>90	If the student can complete more than 90% problem correctly
70-89	If the student can complete more than 70% - 89% problem correctly
60-69	If the student can complete more than 60% - 69% problem correctly

55-59	If the student can complete more than 55% - 59% problem correctly
50-54	If the student can complete more than 50% - 54% problem correctly

**B. Criteria of Presentation Grades**

<b>Criteria</b>	<b>A (90)</b>	<b>B (75)</b>	<b>C (60)</b>	<b>D (50)</b>
<b>Organization</b> (The whole sequence, flow, and movement)	Information is presented in an effective order. The excellent structure of paragraphs and transitions improves readability and comprehension. The executive summary or abstract is presented first, allowing the reader 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. The details and examples are disorganized, difficult to understand.
<b>Quality of information</b>	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.
<b>Introduction</b>	The introductory paragraph is clearly stated, has a sharp focus, is different and increases the impact of the	The introductory paragraph is clearly stated with focus.	The introductory paragraph is unclear.	The introductory paragraph is unclear.

	report			
<b>Summary</b>	Summarize paragraphs summarize and draw clear, effective conclusions 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.
<b>Use of language: choice words, grammar, and sentence structure</b>	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 is 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
<b>Use of pictures: numbers, graphs &amp; pictures</b>	All numbers, graphics and images used are accurate, consistent with text, and of good quality. Appropriate and consistent labeling.	For the most part, the numbers, graphics, and images used are accurate, consistent with the text, and of good quality. Some labels are imprecise and	Few of the numbers, graphics, and images used are accurate, consistent with text, and of good quality. They are not properly labeled.	Numbers, graphics, and images are of poor quality, have lots of inaccuracies & mislabelling or none at all.

		consistent.		
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**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%)