



**TEACHING INSTRUCTIONAL DESIGN (BRP)  
COURSE  
UNDERGRADUATE THESIS**

**by**

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## **PREFACE**

The Teaching Instructional Design (BRP) for Undergraduate Thesis was prepared to be used as a guideline for Undergraduate Thesis course in the Physics Undergraduate Study Program of the Faculty of Mathematics and Natural Sciences Universitas Indonesia, which was attended by final semester physics students that had taken the Seminar course and at least completed 114 credits. In their final year, students will do research based on their elective in the Department of Physics laboratory or elsewhere provided the main supervisor comes from Physics Department. Student will be guided through their thesis writing process by their advisor and at the end, need to defense their thesis in front of the thesis committee. It is hoped that this guideline can become helpful in the thesis process for both the advisor and the student alike.

Depok, September 2016

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## I. General Information

1. Name of Program / Study Level : Physics / Undergraduate
2. Course Name : Undergraduate Thesis
3. Course Code : SCFI604102
4. Semester : 8
5. Credit(s) : 6 Credits
6. Teaching Methods(s) : Thesis guidance, oral exam
7. Prerequisite Course(s) : Seminar, >114 Credits
8. Requisite Course(s) : None
9. Integration Between Other Courses : Seminar, Internship in Medical Physics and Biophysics
10. Lecturer(s) : Thesis Advisors
11. Course Description : Undergraduate Thesis is the final project for final year student (8th semester) which contains activities of thesis guidance and thesis writing from their research for at least one semester under the guidance of an advisor. Research can be carried out in the Department of Physics laboratory or outside the department provided the main supervisor is still from the Department of Physics. This undergraduate thesis can be integrated with research internships, industrial internship, field work, or other forms of independent learning before or during the writing. To be able to take this course, students are required to have completed at least a total of 114 credits. Thesis writing can be done in Indonesian or English.

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

### **A. CLO**

Students are able to apply solve both theoretical and applied physics problem in a systematic way through an academic paper that is in accordance with scientific writing guidelines and present their findings in an adequate and structured manner.

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

1. Able to write problem formulation for the chosen topic in the thesis.
2. Able to do research and write a comprehensive literature review of the problem in the thesis.
3. Able to write their thesis writing workflow to achieve the desired goal.
4. Able to do laboratory research independently and systematically following the laboratory guideline.
5. Able to discuss and pay attention to thesis advisor and related expert on the topic of the thesis during guidance or scientific seminar.
6. Able to do mathematic calculation to process research data both analytically and numerically.
7. Able to write undergraduate thesis that can be published according to the scientific standard and guideline of academics.
8. Able to present their research findings systematically using good scientific language.

### III. Teaching Plan

Week	Sub-CLO	Study Materials	Teaching Method	Time Required	Learning Experiences (*O-E-F)	Sub-CLO Weight on Course (%)	Sub-CLO Achievement Indicator	References
1-16	1-8	<ul style="list-style-type: none"> <li>• Determining research topics</li> <li>• Writing problem formulation</li> <li>• Literature review and citation guideline</li> <li>• Designing research workflow</li> <li>• Thesis proposal exam</li> <li>• Research preparation</li> <li>• Carrying out research in the laboratory</li> <li>• Data analysis</li> <li>• Thesis writing</li> <li>• Writing scientific papers that can be published in national or international seminars</li> <li>• Scientific presentations in national or international seminars</li> <li>• Thesis defense</li> </ul>	Independent study and research and thesis guidance	<ul style="list-style-type: none"> <li>• 170 minutes each week for research</li> <li>• 240 minutes each week for independent study</li> </ul>	15% O, 70% E, 15% F	100	Able to solve the problems of the thesis according to the workflow made	Related articles and papers

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

#### IV. Assignment Design

Week	Assignment Name	Sub-CLOs	Assignment	Scope	Working Procedure	Deadline	Outcome
1-16	Laboratory Research	1-8	Research	<ul style="list-style-type: none"> <li>Research is done in laboratories or field work</li> </ul>	Independent or group research as guided by advisor or field mentor	1 semester	Research activities logbook Thesis guidance report
Around 1-8	Thesis Proposal Exam	8	Thesis Proposal	<ul style="list-style-type: none"> <li>Presentation of research proposal for thesis</li> </ul>	Presentation in front of thesis committee	Beginning of semester	Presentation
16	Thesis Defense	8	Thesis and Research	<ul style="list-style-type: none"> <li>Presentation of research result and thesis defense</li> </ul>	Presentation front of thesis committee	End of semester	Presentation

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

Evaluation Type	Sub-CLOs	Assessment Type	Frequency	Evaluation Weight (%)
Thesis Defense	1-8	Thesis defense rubric	1	100
<b>Total</b>				<b>100</b>

#### VI. Rubric(s)

##### A. Criteria of Thesis Defense

Thesis Defense Rubric							
Faculty of Mathematics and Natural Science Universitas Indonesia							
Average:							
No	Aspects	INADEQUATE (<70)	LACKING (70 - 74.9)	ADEQUATE (75 - 79.9)	SATISFACTORY (80 - 84.9)	EXCELLENT (85 - 100)	SCORE
1	Writings structure and technique	Does not contain most of the required structures.	Unsystematic writings,	Systematic writings according to guideline,	Systematic writings according to guideline,	Systematic writings according to guideline,	
			introduction lacks background information,	introduction contains background information,	introduction contains background information,	introduction contains background information,	

			literature review, theory, and concepts are irrelevant to the research problem,	literature review, theory, and concepts are relevant to the research problem,	literature review, theory, and concepts are relevant to the research problem,	literature review, theory, and concepts are relevant to the research problem	
			research method is not in accordance with the objectives,	research method is not in accordance with the objectives,	research method support the thesis objectives,	research method support the thesis objectives,	
			references used are less relevant and less credible (most are not peer-reviewed or from official websites),	references used are less relevant and less credible (most are not peer-reviewed or from official websites),	references used are less relevant but credible (peer-reviewed or from official websites),	references used are relevant and credible (peer-reviewed or from official websites),	
			language and terminology can be understood but are not relevant and inconsistent.	language and terminology can be understood and consistent.	language and terminology used are clear and consistent	language and terminology used are clear, easy to understand and consistent	
2	Introduction (title, problem formulation, objectives) and hypothesis	No connection between each item.	Background information doesn't establish the problem,	Background information doesn't establish the problem vaguely,	Background information establish the problem,	Background information establish the problem clearly,	
			objectives do not solve problem and hypothesis is not relevant to the problem.	objectives only address the problem partially and hypothesis is not relevant to the problem.	objectives address the problem but hypothesis is not relevant to the problem.	objectives address the problem and hypothesis is relevant to the problem.	
3	Substance	No innovation (Master/Doctor),	Little innovation (Master/Doctor),	Innovative but less contribution to science (Master/Doctor),	Innovative but less contribution to science (Master/Doctor),	innovative and contribute to science (Master/Doctor),	

		problems are discussed superficially,	problems are discussed superficially,	problem are discussed shallowly,	problems are discussed at depth but less comprehensive,	problems are discussed at depth and comprehensively,	
		concepts used are not accurate and inadequate,	concepts used are not accurate and inadequate,	concepts used are accurate but not comprehensive enough,	concepts used are accurate and comprehensive,	concepts used are accurate and comprehensive,	
		research objective werent achieved.	research objective achieved partially.	research objective achieved partially.	research objective achieved.	research objective achieved.	
4	Method and data analysis	Discussion is vague,	Discussion contain vague connection between data and analysis,	Discussion contain clear connection between data and analysis,	Discussion contain very clear connection between data and analysis,	Discussion contain very clear connection between data and analysis,	
		data are hard to understand, doesn't support research objectives, and not original.	data comparison isnt supported by the theory,	data comparison is supported slightly by the theory,	data comparison is supported adequately by the theory,	data comparison is supported by the theory,	
			data are understandable (picture, table, and graphic are understandable), support the objectives, and original.	data are understandable (picture, table, and graphic are understandable), support the objectives, and original.	data are understandable (picture, table, and graphic are understandable), support the objectives, and original.	data are detailed (picture, table, and graphic are apparent), support the objectives, and original.	
5	Conclusion	Conclusion isnt made according to research result and discussion.	Conclusion isnt sufficient, doesn't address the problem or research objectives.	Conclusion is sufficient but doesn't address the problem or research objectives.	Conclusion is adequate but only address the problem or research objectives slightly.	Conclusion is good enough and address the problem as well as research objectives.	
6	Research result presentation	Presentation have no structure,	Presentation have disorganized structure,	Presentation have slight structure,	Presentation is structured,	Presentation is well structured,	



		isnt focused on the research done,	use poor sentence structure and language,	use adequate sentence structure and language,	use good sentence structure and language,	use good sentence structure and language,	
		presentation preparation are inadequate.	bad attitude,	good attitude,	good attitude,	good attitude,	
			less focus on the research done,	focus on the research done,	focus on the research done,	very focused on the research done,	
			presentation preparation are lacking.	presentation preparation are adequate.	presentation preparation are good.	presentation preparation are excellent.	
7	Research result discussion	Does not answer most if not all question asked,	Not able to answer the question clearly, straightforwardly, precisely, and politely,	Able to answer the question in a slightly clear, straightforward, polite, and precise manner,	Able to answer the question in a clear, straightforward, polite, and precise manner,	Able to answer the question in a clear, straightforward, polite, and precise manner,	
		does not give argument.	very little argument based on data.	argument based on data slightly.	argument based on data slightly.	argument based on data.	
8	Thesis completion and scientific attitude* (addition for advisor)	Thesis guidance didn't increase thesis quality	Thesis guidance didn't really increase thesis quality,	Thesis guidance increase thesis quality slightly,	Thesis guidance increase thesis quality,	Thesis guidance increase thesis quality greatly,	
			follows some of the guidance given by advisor,	follows some of the guidance given by advisor,	follows all guidance given by advisor,	follows all guidance given by advisor,	
			ineffective communication,	effective communication,	effective communication,	effective communication,	
			revision quality is lacking.	revision quality is good enough.	revision quality is good enough.	revision quality is very good.	