



**Universitas Negeri Surabaya**  
**Faculty of Mathematics and Natural Sciences**  
**Physics Education Undergraduate Study Program**

Document Code

## SEMESTER LEARNING PLAN

<b>Courses</b>	<b>CODE</b>	<b>Course Family</b>	<b>Credit Weight</b>			<b>SEMESTER</b>	<b>Compilation Date</b>																																																																																																					
Philosophy of Education	8420302243	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	July 18, 2024																																																																																																					
<b>AUTHORIZATION</b>	<b>SP Developer</b>		<b>Course Cluster Coordinator</b>			<b>Study Program Coordinator</b>																																																																																																						
	Prof. Nadi Suprpto, Ph.D.		Prof. Nadi Suprpto, Ph.D.			Mita Anggaryani, M.Pd., Ph.D.																																																																																																						
<b>Learning model</b>	Case Studies																																																																																																											
<b>Program Learning Outcomes (PLO)</b>	PLO study program which is charged to the course																																																																																																											
	Program Objectives (PO)																																																																																																											
	PO - 1	Able to communicate effectively in solving science-physics education problems and adapting to situations faced through a philosophical approach to science-physics education																																																																																																										
	PO - 2	Able to collaborate effectively in solving science-physics education problems and adapting to the situations faced through a philosophical approach to science-physics education																																																																																																										
	PO - 3	Able to process information effectively in solving science-physics education problems and adapting to situations faced through a philosophical approach to science-physics education																																																																																																										
	PO - 4	Able to think at a high level (complex) effectively in solving science-physics education problems and adapting to situations faced through a philosophical approach to science-physics education																																																																																																										
	PLO-PO Matrix																																																																																																											
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PO Matrix at the end of each learning stage (Sub-PO)																																																																																																												
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<b>Short Course Description</b>	This Philosophy of Science course has four main parts, namely: Humans as thinking creatures; Scope of philosophy of science; Means of scientific thinking, and science; and the nature and use of knowledge. The first part discusses the advantages of humans with reason so that they have a curious nature and the ability to think that gives birth to knowledge. The second part discusses science as a philosophical study, the origins of science and the history of the development of science as well as the relationship between science and philosophy. The third part discusses the basics of knowledge which include reasoning, logic, as a way to find truth, criteria for truth, sources of knowledge and truth; the basics of science which include the object of knowledge study (ontology) as well as the interpretation of the nature of object reality, the laws of causality and regularity. The fourth section discusses the tools of scientific thinking which include language, mathematics and statistics, the role of mathematics in logic and the development of science, apart from that it also discusses aspects of logic, namely the role of symbols, systems and scientific theories, scientific explanations and finally it discusses the nature and use of science. . The lecture strategies used in this lecture are lecture methods, question and answer, discussion, assignments and presentations.																																																																																																											
<b>References</b>	Main :																																																																																																											

1. Kuhn, T., S., 2000. *The Structure of Scientific Revolutions, Peran Paradigma dalam Revolusi Sains*. Bandung: Remaja Rosdakarya.
2. Bakhtiar, A., 2006. *Filsafat Ilmu*. Jakarta: Raja Grafindo Persada. Campbell, N., 1953. *What is Science ?* New York: Dover Publications.
3. Roberts, R., M., 2004. *Serendipity, Penemuan-penemuan Bidang Sains yang Tidak Disengaja*. Bandung: Pakar Raya.
4. Kant, Immanuel, *Metaphysical Foundations of Natural Science* (Cambridge: Cambridge U. Press, 2004; ISBN-10:0521544750)
- 5 Hegel, G. W. F., *Philosophy of Nature* (Oxford: Oxford U. Press, 2004; ISBN: 0199272670)

**Supporters:**

1. Buku, artikel ilmiah, dan sumber lain yang relevan

**Supporting lecturer**  
 Dra. Suliyannah, M.Si.  
 Setyo Admoko, S.Pd., M.Pd.  
 Prof. Nadi Suprpto, S.Pd., M.Pd., Ph.D.  
 Utama Alan Deta, S.Pd., M.Pd., M.Si.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [ Estimated time]		Learning materials [ References ]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline ( offline )	Online ( online )		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Explains the relationship between humans, knowledge, science, philosophy, technology, and religion	Able to explain the relationship between humans, knowledge, science, philosophy, technology and religion.	<b>Criteria:</b> qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 X 50 minutes	Small Group Discussion 2 X 50 minutes	<b>Material:</b> Humans, knowledge, science, philosophy, technology and religion <b>References:</b> Kuhn, T., S., 2000. <i>The Structure of Scientific Revolutions, The Role of Paradigms in the Scientific Revolution</i> . Bandung: Rosdakarya Youth.	5%
2	Explains humans as thinking creatures and the advantages of humans compared to other creatures in their intelligence, curiosity and thinking.	Able to explain humans as thinking creatures and the advantages of humans compared to other creatures in their intelligence, curiosity and thinking.	<b>Criteria:</b> qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 X 50 minutes	Small Group Discussion 2 X 50 minutes	<b>Material:</b> Humans as thinking creatures <b>References:</b> Kuhn, T., S., 2000. <i>The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions</i> . Bandung: Rosdakarya Youth.	5%
3	Distinguish between facts, concepts and principles in Science-Physics and provide examples in Physics.	Able to differentiate between facts, concepts and principles in Science-Physics and provide examples in Physics.	<b>Criteria:</b> qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Facts, concepts and principles in Physics <b>Library:</b> Kuhn, T., S., 2000. <i>The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions</i> . Bandung: Rosdakarya Youth.	5%

4	Identifying science as an object of philosophical study and understanding the philosophy of science.	Able to identify science as an object of philosophical study and understand the philosophy of science	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Science, Philosophy and Philosophy of Science <b>Library:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%
5	Explain the history of the development of science	Able to explain the history of the development of science from prehistoric times, Greece and the Islamic era	<b>Criteria:</b> qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 X 50 minutes	Discussion and Presentation 2 X 50 minutes	<b>Material:</b> History of the Development of Science <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in the Scientific Revolution . Bandung: Rosdakarya Youth.</i>	5%
6	Explain the history of the development of science	Able to explain the renaissance and modern	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 x 50 minutes	Discussion and Presentation 2 x 50 minutes	<b>Material:</b> History of the Development of Science <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in the Scientific Revolution . Bandung: Rosdakarya Youth.</i>	5%
7	Explain the history of the development of science	Able to explain advances in contemporary science	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 x 50 minutes	Discussion and Presentation 2 x 50 minutes	<b>Material:</b> History of the Development of Science <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in the Scientific Revolution . Bandung: Rosdakarya Youth.</i>	5%

8	Midterm Evaluation/Midterm Exam	<p>1. Able to explain the relationship between humans, knowledge, science, philosophy, technology and religion.</p> <p>2. Able to explain humans as thinking creatures and the advantages of humans compared to other creatures in their intelligence, curiosity and thinking.</p> <p>3. Able to explain humans as thinking creatures and the advantages of humans compared to other creatures in their intelligence, curiosity and thinking.</p> <p>4. Able to differentiate between facts, concepts and principles in Science- Physics and provide examples in Physics.</p> <p>5. Able to identify science as an object of philosophical study and understand the philosophy of science</p> <p>6. Able to explain the history of the development of science from prehistoric times, Greece and the Islamic era</p> <p>7. Able to explain the renaissance and modern</p> <p>8. Able to explain advances in contemporary science.</p>	<p><b>Criteria:</b> Quantitative</p>	Written Test 2 x 50 minutes	Written Test 2 x 50 minutes	<p><b>Material:</b> Mid-semester Evaluation  <b>References:</b>  <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i></p>	10%
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9	Explains the basics of knowledge which are composed of: reasoning, logic, sources of knowledge and criteria of truth	Able to explain the basics of knowledge which are composed of: reasoning, logic, sources of knowledge and criteria of truth.	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Basics of Knowledge: Reasoning, Logic, Sources of Knowledge, and Criteria for Truth <b>Bibliography:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%
10	Explains the basics of science consisting of: Ontology, Epistemology and Axiology	Able to analyze ontology: metaphysics, assumptions, opportunities, some assumptions in science, the limits of scientific exploration.	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 x 50 minutes	Discussion and Presentation 2 x 50 minutes	<b>Material:</b> Ontology: Metaphysics, Assumptions, Opportunities, and the Limits of Exploring Science <b>Library:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%
11	Explains the basics of science consisting of: Ontology, Epistemology and Axiology	Able to explain the epistemology of knowledge, scientific methods and the structure of scientific knowledge	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 x 50 minutes	Discussion and Presentation 2 x 50 minutes	<b>Material:</b> Epistemology: Scientific Method and Structure of Scientific Knowledge <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in the Scientific Revolution . Bandung: Rosdakarya Youth.</i>	5%
12	Explains the basics of science consisting of: Ontology, Epistemology and Axiology	Able to explain the axiology of science and morals (nuclear, etc.)	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Discussion and Presentation 2 x 50 minutes	Discussion and Presentation 2 x 50 minutes	<b>Material:</b> Axiology: Science and Morals <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%

13	Identifying scientific concept methods, scientific explanations, and science	Able to identify scientific concept methods, scientific explanations, and science	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Science concept methods, science explanations, and <b>Bibliography Science:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%
14	Explain the theory of Scientific Argumentation	Able to apply Scientific Argumentation in Physics Learning	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Scientific Argumentation <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%
15	Explaining Scientific Literacy	Able to explain about Scientific Literacy	<b>Criteria:</b> Qualitative  <b>Form of Assessment :</b> Participatory Activities	Small Group Discussion 2 x 50 minutes	Small Group Discussion 2 x 50 minutes	<b>Material:</b> Scientific Literacy <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	5%

16	Final Semester Evaluation / Final Semester Examination	<ol style="list-style-type: none"> <li>1. Able to explain the basics of knowledge which are composed of: reasoning, logic, sources of knowledge and criteria of truth</li> <li>2. Able to analyze ontology: metaphysics, assumptions, opportunities, some assumptions in science, the limits of scientific exploration.</li> <li>3. Able to explain the epistemology of knowledge, scientific methods and the structure of scientific knowledge</li> <li>4. Able to explain the axiology of science and morals (nuclear, etc.)</li> <li>5. Able to identify scientific concept methods, scientific explanations, and science</li> <li>6. Able to apply Scientific Argumentation in Physics Learning</li> <li>7. Able to explain about Scientific Literacy</li> </ol>	Criteria: Quantitative	Written Test 2 x 50 minutes	Written Test 2 x 50 minutes	<b>Material:</b> Final Semester Evaluation <b>References:</b> <i>Kuhn, T., S., 2000. The Structure of Scientific Revolutions, The Role of Paradigms in Scientific Revolutions . Bandung: Rosdakarya Youth.</i>	20%
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**Evaluation Percentage Recap: Case Study**

No	Evaluation	Percentage
1.	Participatory Activities	70%
		70%

**Notes**

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and

unbiased. Criteria can be quantitative or qualitative.

7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.