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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Physics Education Measurements and Instruments	8420302264	Physics Learning Assessment	**T=2**	**P=0**	**ECTS=3.18**	6	January 29, 2022

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	Program Objectives (PO)	
	PO - 1	CPMK-1: Students are able to demonstrate knowledge of developing physics education assessment instruments in the form of tests and non-tests.
	PO - 2	CPMK-2: Students are able to study the process of testing the quality of physics education assessment instruments in the form of tests using item analysis.
	PO - 3	CPMK-3: Students are able to study the process of testing the quality of physics education assessment instruments in non-test form using EFA (Exploratory Factor Analysis), Rasch Analysis, and CFA (Confirmatory Factor Analysis).
	PO - 4	CPMK-4: Students are able to develop physics education assessment instruments in the form of tests and non-tests.
	PO - 5	CPMK-5: Students are able to apply the study of the quality testing process for physics education assessment instruments (both in the form of tests and non-tests) to instruments that have been previously developed.
	PO - 6	CPMK-6: Students are able to use certain software (for example: ANATES, SPSS, AMOS, or Winstep) to evaluate the quality of previously developed physics education assessment instruments.
	PO - 7	CPMK-7: Students are able to design physics education assessment instruments in the form of tests and non-tests up to the instrument quality testing stage.
	PO - 8	CPMK-8: Students are able to compose articles on the development of physics education assessment instruments along with instrument quality tests to improve their pedagogical knowledge as a provision for continuing their studies to a higher level.
	PLO-PO Matrix	

P.O
PO-1
PO-2
PO-3
PO-4
PO-5
PO-6
PO-7
PO-8

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																
PO-2																
PO-3																
PO-4																
PO-5																
PO-6																
PO-7																
PO-8																

Short Course Description	This course studies the process of developing physics education instruments, both test and non-test, up to the stage of testing the quality of the instrument. This course studies how to test the quality of physics education instruments in the form of non-tests using EFA (Exploratory Factor Analysis), Rasch Analysis, and CFA (Confirmatory Factor Analysis) in addition to deepening instrument quality testing in the form of tests (Question Item Analysis). This course also introduces software for validating physics education assessment instruments such as ANATES, SPSS, AMOS, and Winstep. Lectures are carried out using repository discussion methods, workshops, collaborative learning, classroom discussions, and software tutorials.
References	**Main :** 1. Panduan Asesmen dan Pembelajaran Kurikulum Merdeka 2. Panduan Penilaiak Kurikulum 2013 3. Buku-buku tentang analisis butir soal **Supporters:** 1. Software ANATES 2. Software SPSS
Supporting lecturer	Dr. Titin Sunarti, M.Si. Prof. Dr. Wasis, M.Si. Woro Setyarsih, S.Pd., M.Si. Abu Zainuddin, S.Pd., M.Pd. Mukhayyarotin Niswati Rodliyatul Jauhariyah, S.Pd., M.Pd.

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	Students are able to demonstrate pedagogical knowledge regarding the development of assessment instruments in the form of tests and non-tests	1.1. Students are able to describe the process of developing physics education assessment instruments in the form of tests.2. Students are able to describe the process of developing non-test physics education assessment instruments. 2.2. Students are able to describe the process of developing non-test physics education assessment instruments.	**Form of Assessment** : Participatory Activities	2 X 50 repository discussion	2 X 50 repository discussion		20%

2	Students develop physics education assessment instruments in the form of Multiple Choice and Essays.	1.1. Students are able to identify K-13 Basic Competencies (KD) and formulate indicators of competency achievement to indicators of knowledge domain questions.2. Students compose a grid of Multiple Choice questions and Essays based on the selected KD in K-13.3. Students prepare assessment instruments in the form of tests referring to the selected KD in K-13.4. Students communicate the process and results of preparing the assessment instruments that have been developed. 2.2. Students prepare a grid of multiple choice questions and/or essays based on the KD in the chosen curriculum. 3.3. Students prepare an assessment instrument in the form of a test referring to the KD they have chosen. 4.4. Students communicate the process and results of preparing the assessment instruments that have been developed.	**Form of Assessment** : Participatory Activities	Collaborative Learning and guided workshops. 2 X 50	Collaborative Learning and guided workshops. 2 X 50	**Material:** Preparation of assessment instruments in the form of tests. **Library:** *2013 Curriculum Assessment Guide*	30%

3	Students develop physics education assessment instruments in the form of Multiple Choice and Essays.	1.1. Students are able to identify K-13 Basic Competencies (KD) and formulate indicators of competency achievement to indicators of knowledge domain questions.2. Students compose a grid of Multiple Choice questions and Essays based on the selected KD in K-13.3. Students prepare assessment instruments in the form of tests referring to the selected KD in K-13.4. Students communicate the process and results of preparing the assessment instruments that have been developed. 2.2. Students prepare a grid of multiple choice questions and/or essays based on the KD in the chosen curriculum. 3.3. Students prepare an assessment instrument in the form of a test referring to the KD they have chosen. 4.4. Students communicate the process and results of preparing the assessment instruments that have been developed.	**Form of Assessment** : Participatory Activities	Collaborative Learning and guided workshops. 2 X 50	Collaborative Learning and guided workshops. 2 X 50	**Material:** Preparation of assessment instruments in the form of tests. **Library:** *2013 Curriculum Assessment Guide*	30%

4	Students try out physics education assessment instruments that have been developed for entry-level students or high school students.	1.1. Students are able to carry out trials of physics education assessment instruments in the form of tests.2. Students are able to make corrections and make reports on the results of testing physics education assessment instruments in the form of tests.3. Students are able to manually analyze the questions to be communicated at the next meeting. 2.2. Students are able to make corrections and make reports on the results of testing physics education assessment instruments in the form of tests. 3.3. Students are able to manually analyze the questions to be communicated at the next meeting.		Collaborative learning 2 X 50	Collaborative learning 2 X 50	**Material:** Testing of physics education assessment instruments in the form of tests. **Library:** *Independent Curriculum Assessment and Learning Guide*	30%

5	Students are able to use ANATES software to analyze test items.	1.1. Students are able to operate ANATES software to analyze question items (using ICT).2. Students are able to evaluate the results of the analysis of question items using ANATES.3. Students are able to report the results of the analysis of question items using ANATES software. 2.2. Students are able to evaluate the results of item analysis using ANATES. 3.3. Students are able to report the results of the analysis of question items using ANATES software.	**Criteria:** 1.Performance assessment 2.Participatory Activities **Form of Assessment** : Participatory Activities	Software tutorial and 2 X 50 workshop	Software tutorial and 2 X 50 workshop	**Material:** ANATES software tutorial and workshop **Reference:** *ANATES Software*	30%
6	Students are able to use SPSS software to analyze test items.	1.1. Students are able to operate SPSS software to analyze question items (using ICT).2. Students are able to evaluate the results of item analysis using SPSS.3. Students are able to report the results of the analysis of question items using SPSS software. 2.2. Students are able to evaluate the results of item analysis using SPSS. 3.3. Students are able to report the results of the analysis of question items using SPSS software.	**Criteria:** 1.Performance assessment 2.Work method	Software tutorial and 2 X 50 workshop	Software tutorial and 2 X 50 workshop	**Material:** SPSS software tutorial and workshop **Reference:** *SPSS software*	30%

7	Students are able to demonstrate knowledge of quality testing strategies for non-test assessment instruments.	1.1. Students are able to identify types of non-test assessment instruments based on needs referring to KD in K-13.2. Students are able to describe the types of quality tests of non-test assessment instruments.3. Students are able to determine the type of instrument quality test used based on the type of non-test assessment instrument as well as the physics education research design that will be planned so that the instruments developed can truly measure the variables in the research. 2.2. Students are able to describe the types of quality tests of non-test assessment instruments. 3.3. Students are able to determine the type of instrument quality test used based on the type of non-test assessment instrument as well as the physics education research design that will be planned so that the instrument developed truly measures the variables in the research.	**Criteria:** quantitative assessment strategies, non-test forms. **Form of Assessment** : Participatory Activities	Classroom discussion 2 X 50	Classroom discussion 2 X 50	**Material:** strategies for testing the quality of assessment instruments in physics education research. **Library:** *Free Curriculum Assessment and Learning Guide*	20%

8	Midterm exam	Practice exam for using ANATES and SPSS software	**Form of Assessment** : Practice / Performance	Practice exam for using ANATES and SPSS 2 X 50 software		**Material:** practice analyzing question items using ANATES **Library:** *ANATES Software* **Material:** practice analyzing the results of physics education measurements using SPSS **Library:** *SPSS Software*	20%

9	Students are able to develop non-test physics education assessment instruments in accordance with the selected KD in K-13	1.1. Students are able to identify the need for non-test assessment instruments based on KD in K-13.2. Students are able to compile a non-test form of assessment grid based on needs.3. Students are able to prepare assessment instruments in the form of non-tests such as questionnaire sheets, observation sheets, interview question sheets.4. Students are able to communicate non-test assessment plans that will be carried out based on the selected KD in K-13. 2.2. Students are able to prepare a non-test form of assessment grid based on the research needs of physics education. 3.3. Students are able to prepare non-test assessment instruments such as questionnaire sheets, observation sheets, interview question sheets. 4.4. Students are able to communicate non-test assessment plans that will be carried out based on the selected KD in K-13.		Collaborative learning and workshops 2 X 50	Collaborative learning and workshops 2 X 50	**Material:** Preparation of assessment instruments in the form of non-tests. **Reference:** *Independent Curriculum Assessment and Learning Guide*	30%

10	Students are able to develop non-test physics education assessment instruments in accordance with the selected KD in K-13	1.1. Students are able to identify the need for non-test assessment instruments based on KD in K-13.2. Students are able to compile a non-test form of assessment grid based on needs.3. Students are able to prepare assessment instruments in the form of non-tests such as questionnaire sheets, observation sheets, interview question sheets.4. Students are able to communicate non-test assessment plans that will be carried out based on the selected KD in K-13. 2.2. Students are able to prepare a non-test form of assessment grid based on the research needs of physics education. 3.3. Students are able to prepare non-test assessment instruments such as questionnaire sheets, observation sheets, interview question sheets. 4.4. Students are able to communicate non-test assessment plans that will be carried out based on the selected KD in K-13.	**Form of Assessment** : Participatory Activities	Collaborative learning and workshops 2 X 50	Collaborative learning and workshops 2 X 50	**Material:** Preparation of assessment instruments in the form of non-tests. **Reference:** *Independent Curriculum Assessment and Learning Guide*	30%

11	Students are able to demonstrate knowledge of quality analysis of non-test assessment instruments for physics education research (EFA, Rasch Analysis, CFA).	1. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using EFA (Exploratory Factor Analysis). 2. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using Rasch Analysis. 3. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using CFA (Confirmatory Factor Analysis).	**Form of Assessment** : Participatory Activities	Classroom Discussion 2 X 50			0%

12	Students are able to demonstrate knowledge of quality analysis of non-test assessment instruments for physics education research (EFA, Rasch Analysis, CFA).	1. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using EFA (Exploratory Factor Analysis). 2. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using Rasch Analysis. 3. Students are able to describe knowledge about the quality test of physics education assessment instruments in the form of non-tests using CFA (Confirmatory Factor Analysis).		Classroom Discussion 2 X 50			0%
13	Students are able to use software to test the quality of physics education assessment instruments in non-test form so that they can measure physics education research variables well.	1. Students are able to use SPSS software for the purposes of testing the quality of physics education assessment instruments in non-test form. 2. Students are able to use AMOS software for the purposes of testing the quality of physics education assessment instruments in non-test form. 3. Students are able to use Winstep software for the purposes of testing the quality of physics education assessment instruments in non-test form.		Tutorial and workshop 2 X 50			0%

14	Students are able to use software to test the quality of physics education assessment instruments in non-test form so that they can measure physics education research variables well.	1. Students are able to use SPSS software for the purposes of testing the quality of physics education assessment instruments in non-test form. 2. Students are able to use AMOS software for the purposes of testing the quality of physics education assessment instruments in non-test form. 3. Students are able to use Winstep software for the purposes of testing the quality of physics education assessment instruments in non-test form.		Tutorial and workshop 2 X 50			0%
15	Students compose scientific articles about the development of test and non-test assessment instruments based on KD High School Physics in K-13 up to the instrument quality testing stage.	1. Students are able to process data and information resulting from the analysis of the questions that have been carried out. 2. Students are able to process data and information from the quality test results of non-test assessment instruments that have been carried out. 3. Students are able to present the entire process of developing an assessment instrument based on the KD in K-13 that has been selected up to the instrument quality testing stage.		Workshop and collaborative learning 2 X 50			0%

16	Final exams	Presentation of scientific articles, revisions, and submission to target journals.		Presentation of scientific articles, revisions, and submission to target journals. 2 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	160%
2.	Practice / Performance	20%
		100%

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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.