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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Educational Statistics	8420103168		T=3	P=0	ECTS=4.77	1	January 6, 2023

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 that is charged to the course

Program Objectives (PO)

PO - 1	Explain and apply descriptive statistical concepts and formulations to analyze data from science education research
PO - 2	Explain and apply basic concepts and formulations of inferential statistics to analyze and evaluate based on data obtained from science education research
PO - 3	Explain and apply formulations to evaluate the effectiveness of an intervention in science education research based on pre-test and post-test results (gain score analysis, normalized gain, normalized change, loss score analysis, and normalized loss)

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3

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																

Short Course Description: The Educational Statistics course is a mandatory subject for students of the Bachelor of Science Education study program. After attending this course, students are expected to have the knowledge and skills to apply statistical principles in science education research through data collection, analysis and presentation of data, communicating research results and scientific publications.

References

Main :

1. Martini. 2007. *Prosedur dan Prinsip-prinsip Statistika* . Surabaya: Unesa University Press.
   Sudjana, 2005. *Metoda Statistika* . Bandung: Tarsito

Supporters:

Supporting lecturer: Dra. Martini, M.Pd.
Dr. Elok Sudibyo, S.Pd.,M.Pd.
Dr. Mohammad Budiyanto, S.Pd., M.Pd.
Muhamad Arif Mahdiannur, S.Pd., M.Pd.
Ernita Vika Aulia, 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	1. Mastering theoretical concepts in statistics related to data collection and presentation 2. Apply procedural concepts of data distribution (ungrouped and grouped frequency distribution)	1. Explain the role of statistics in research. 2. Explain the difference between descriptive statistics and inferential statistics. 3. Identify research data as nominal, ordinal, interval or ratio data. 4. Apply theoretical concepts related to data collection and presentation.	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information and Literacy Discussion 3 x 50'	Asynchronous via LMS Unesa 3 x 60'	**Material:** theoretical concepts in statistics **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** theoretical concepts in statistics **Reference:** *Sudijono, A. (2014). Introduction to educational statistics. Rajagrafindo Perkasa*	5%
2	1. Mastering theoretical concepts in statistics related to data collection and presentation 2. Apply procedural concepts of data distribution (ungrouped and grouped frequency distribution)	1. Explain the role of statistics in research. 2. Explain the difference between descriptive statistics and inferential statistics. 3. Identify research data as nominal, ordinal, interval or ratio data. 4. Apply theoretical concepts related to data collection and presentation.	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information and Literacy Discussion 3 x 50'	Asynchronous via LMS Unesa 3 x 60'	**Material:** theoretical concepts in statistics **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** theoretical concepts in statistics **Reference:** *Sudijono, A. (2014). Introduction to educational statistics. Rajagrafindo Perkasa*	5%
3	1. Mastering theoretical concepts in statistics related to measuring data variability 2. Able to visualize data in the form of appropriate infographics	1. Determine the size of the location (quartiles, deciles, and percentiles). 2. Calculate standard deviation and variance 3. Determine the type of data visualization	**Criteria:** According to the rubric **Form of Assessment** : Practice / Performance	Information and Practice Discussion (Exercise) 3 x 50'	Asynchronous via LMS Unesa 3 x 60'	**Material:** data visualization **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary*	5%
4	1. Mastering theoretical concepts in statistics related to measuring data variability 2. Able to visualize data in the form of appropriate infographics	1. Determine the size of the location (quartiles, deciles, and percentiles). 2. Calculate standard deviation and variance 3. Determine the type of data visualization	**Criteria:** According to the rubric **Form of Assessment** : Practice / Performance	Information and Practice Discussion (Exercise) 3 x 50'	Asynchronous via LMS Unesa 3 x 60'	**Material:** data visualization **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary*	5%

5	1.Mastering theoretical concepts in statistics related to hypothesis testing requirements 2.Apply the procedural concepts of homogeneity, normality and linearity tests to data sets	1.Explain the role of prerequisite tests in data analysis 2.Apply normality, homogeneity and linearity tests to the data	**Criteria:** According to the rubric **Forms of Assessment** : Participatory Activities, Practice/Performance, Tests	Information discussion and Assignment 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** homogeneity, normality and linearity tests on data sets. **Reference:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** homogeneity, normality and linearity tests on data sets **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** homogeneity, normality and linearity tests on data sets **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** homogeneity, normality and linearity tests on data sets **Reference:** *Martini. (2007). Procedures and Principles of Statistics. Unesa University Press.* **Material:** homogeneity, normality and linearity tests on data sets **Reference:** *Sudjana, N. (2005). Statistical Methods. Tarsito*	5%

6	1.Mastering theoretical concepts in statistics related to hypothesis testing requirements 2.Apply the procedural concepts of homogeneity, normality and linearity tests to data sets	1.Explain the role of prerequisite tests in data analysis 2.Apply normality, homogeneity and linearity tests to the data	**Criteria:** According to the rubric **Forms of Assessment** : Participatory Activities, Practice/Performance, Tests	Information discussion and Assignment 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** homogeneity, normality and linearity tests on data sets. **Reference:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** homogeneity, normality and linearity tests on data sets **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** homogeneity, normality and linearity tests on data sets **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** homogeneity, normality and linearity tests on data sets **Reference:** *Martini. (2007). Procedures and Principles of Statistics. Unesa University Press.* **Material:** homogeneity, normality and linearity tests on data sets **Reference:** *Sudjana, N. (2005). Statistical Methods. Tarsito*	5%

7	Applying the procedural concept of normality testing and gain and loss score analysis (normalized gain, normalized change, and normalized loss)	Using the Ms. program Excel to analyze gain score analysis from a number of data	**Criteria:** According to the rubric **Form of Assessment** : Portfolio Assessment, Practice / Performance	Information discussion and Assignment 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** normalized gain **References:** *Hake, RR (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. American journal of Physics, 66(1), 64-74.* **Material:** normalized change **References:** *Marx, JD, & Cummings, K. (2007). Normalized change. American Journal of Physics, 75(1), 87-91.* **Material:** normalized loss **References:** *Dellwo, DR (2010). Course assessment using multi-stage pre/post testing and the components of normalized change. Journal of the Scholarship of Teaching and Learning, 10 (1), 55 – 67*	10%
8	MIDTERM EXAM	According to indicators at Meetings 1-7	**Criteria:** According to the rubric	Mid-Semester Evaluation/Mid-Semester Examination (UTS) 2 x 50‘	-		0%

9	Apply procedural concepts of one-sample, paired, and independent t-tests, as well as ANOVA	1. Calculating the t value in the difference test analysis 2. Concludes acceptance/rejection of the null hypothesis (Ho) at a certain significant level.	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information discussion and Practice (Exercise) 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** one-sample, paired, and independent t-tests, and ANOVA **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** one-sample, paired, and independent t-test, and ANOVA **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** one-sample, paired, and independent t-test, and ANOVA **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary*	4%

10	Apply procedural concepts of one-sample, paired, and independent t-tests, as well as ANOVA	1. Calculating the t value in the difference test analysis 2. Concludes acceptance/rejection of the null hypothesis (Ho) at a certain significant level.	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information discussion and Practice (Exercise) 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** one-sample, paired, and independent t-tests, and ANOVA **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** one-sample, paired, and independent t-test, and ANOVA **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** one-sample, paired, and independent t-test, and ANOVA **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary*	5%

11	Apply procedural concepts from correlation and regression analysis	1. Calculating the t value in the difference test analysis 2. Concludes acceptance/rejection of the null hypothesis (Ho) at a certain significant level.	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information discussion and Practice (Exercise) 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** correlation and regression **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** correlation and regression **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** correlation and regression **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary*	5%
12	Apply procedural concepts of non-parametric statistics	1. Calculating the significance of the difference test 2. Concludes acceptance/rejection of the null hypothesis (Ho) at a certain significant level	**Criteria:** According to the rubric **Form of Assessment** : Participatory Activities, Practice/Performance	Information discussion and Practice (Exercise) 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** non-parametric statistics **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** non-parametric statistics **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley*	10%
13	Analyzing the results of data presentation from descriptive, inferential statistical processes and data analysis processes using gain score analysis presented in the thesis (project)	1. Suitability of the results of the analysis of the data presented in the thesis 2. Able to re-verify data analysis results and find procedural errors (if any)	**Criteria:** According to the rubric **Form of Assessment** : Project Results Assessment / Product Assessment	Team based project 3 x 50‘	Asynchronous via LMS Unesa 3 x 60‘	**Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley*	10%

						Material: data analysis procedures (descriptive and inferential statistics) **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** normalized gain **References:** *Hake, RR (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. American journal of Physics, 66(1), 64-74.* **Material:** normalized change **References:** *Marx, JD, & Cummings, K. (2007). Normalized change. American Journal of Physics, 75(1), 87-91.* **Material:** normalized loss **References:** *Dellwo, DR (2010). Course assessment using multi-stage pre/post testing and the components of normalized change. Journal of the Scholarship of Teaching and Learning, 10 (1), 55 – 67*	
14	Analyzing the		**Criteria:**	Team based	Asynchronous via LMS	**Material:** data	10%

	results of data presentation from descriptive, inferential statistical processes and data analysis processes using gain score analysis presented in the thesis (project)	1. Suitability of the results of the analysis of the data presented in the thesis 2. Able to re-verify data analysis results and find procedural errors (if any)	According to the rubric **Form of Assessment** : Project Results Assessment / Product Assessment	project 3 x 50‘	Unesa 3 x 60‘	analysis procedures (descriptive and inferential statistics) **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** normalized gain **References:** *Hake, RR (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. American journal of Physics, 66(1), 64-74.* **Material:** normalized change **References:** *Marx, JD, & Cummings, K. (2007). Normalized change. American Journal of Physics, 75(1), 87-91.* **Material:** normalized loss **References:** *Dellwo, DR*	

						(2010). Course assessment using multi-stage pre/post testing and the components of normalized change. Journal of the Scholarship of Teaching and Learning, 10 (1), 55 – 67	
15	Analyzing the results of data presentation from descriptive, inferential statistical processes and data analysis processes using gain score analysis presented in the thesis (project)	1. Suitability of the results of the analysis of the data presented in the thesis 2. Able to re-verify data analysis results and find procedural errors (if any)	**Criteria:** According to the rubric **Form of Assessment** : Project Results Assessment / Product Assessment	Team based project (presentation of results) 3 x 50'	Asynchronous via LMS Unesa 3 x 60'	**Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Abbott, ME (2011). Understanding educational statistics using Microsoft Excel® and SPSS®. Wiley* **Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Quirk, TJ (2016). Excel 2016 for educational and psychological statistics: A guide to solving practical problems. Springer* **Material:** data analysis procedures (descriptive and inferential statistics) **References:** *Yount, WR (2006). Research design and statistical analysis for Christian ministry. Southwestern Baptist Theological Seminary* **Material:** normalized gain **References:** *Hake, RR (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. American journal of Physics, 66(1), 64-74.* **Material:** normalized	15%

						change **References:** *Marx, JD, & Cummings, K. (2007). Normalized change. American Journal of Physics, 75(1), 87-91.* **Material:** normalized loss **References:** *Dellwo, DR (2010). Course assessment using multi-stage pre/post testing and the components of normalized change. Journal of the Scholarship of Teaching and Learning, 10 (1), 55 – 67*	
16		Sub-CPMK TM 1st to 15th	**Criteria:** According to the UAS Assessment Rubric **Form of Assessment** : Test	2 x 50' Written Test	-		0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	20.34%
2.	Project Results Assessment / Product Assessment	35%
3.	Portfolio Assessment	5%
4.	Practice / Performance	35.34%
5.	Test	3.34%
		99.02%

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.