



**Universitas Negeri Surabaya
Faculty of Engineering,
Bachelor of Information Systems Study Program**

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Probability and Statistics	5720102045		T=2 P=0 ECTS=3.18	4	July 17, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator	
	Dr. Wiyli Yustanti, S.Si,M.Kom		I Kadek Dwi Nuryana, S.T., M.Kom.	

Learning model	Case Studies	
Program Learning Outcomes (PLO)	PLO study program that is charged to the course	
	PLO-1 Able to demonstrate religious, national and cultural values, as well as academic ethics in carrying out their duties	
	PLO-2 Demonstrate the character of being tough, collaborative, adaptive, innovative, inclusive, lifelong learning and entrepreneurial spirit	
	PLO-3 Develop logical, critical, systematic and creative thinking in carrying out specific work in their field of expertise and in accordance with work competency standards in the field concerned	
	PLO-4 Develop yourself continuously and collaborate.	
	PLO-16 Able to make appropriate decisions in the context of solving problems in their field of expertise, based on the results of information and data analysis;	
	PLO-17 Able to package problems, scientific descriptions and thoughts in solving problems into communicative information both orally and in writing;	
	PLO-22 Have the skills to research and synthesize various real world problems with the application, development and creation of knowledge from previous learning processes in accordance with research methodology;	
	PLO-23 Able to document, store, secure and retrieve data to ensure validity and prevent plagiarism.	
	Program Objectives (PO)	
	PO - 1 Able to understand the concept of statistics	
	PO - 2 Able to understand Probability Theory	
	PO - 3 Able to Understand Random Variables	
	PO - 4 Able to understand the concept of mathematical expectations	
	PO - 5 Able to understand the distribution function of discrete random variables	
	PO - 6 Able to understand the distribution function of continuous random variables	
	PO - 7 Able to understand the sample distribution function	
	PO - 8 Capable of understanding the concept of parameter estimation and hypothesis testing	
	PO - 9 Able to Test the Difference in Mean/Variance of Two or More Samples	
	PO - 10 Able to Perform Simple Linear Regression Analysis	
	PO - 11 Able to carry out multiple linear regression analysis	
	PO - 12 Able to understand the concept of explanatory factor analysis	
	PO - 13 Able to understand the concept of confirmatory factor analysis	
	PO - 14 Able to understand the concept of non-parametric statistics	
	PO - 15 Able to understand the concept of sampling techniques	
PLO-PO Matrix		

P.O	PLO-1	PLO-2	PLO-3	PLO-4	PLO-16	PLO-17	PLO-22	PLO-23
PO-1	✓	✓	✓		✓			
PO-2	✓	✓	✓		✓	✓		
PO-3	✓	✓	✓		✓	✓		
PO-4	✓	✓	✓		✓			
PO-5	✓	✓	✓		✓	✓		
PO-6	✓	✓	✓		✓	✓		
PO-7	✓	✓	✓			✓	✓	
PO-8	✓	✓	✓	✓	✓	✓	✓	✓
PO-9	✓	✓	✓	✓	✓	✓	✓	✓
PO-10	✓	✓	✓	✓	✓	✓	✓	✓
PO-11	✓	✓	✓	✓	✓	✓	✓	✓
PO-12	✓	✓	✓	✓	✓	✓	✓	✓
PO-13								
PO-14	✓	✓	✓	✓	✓	✓	✓	✓
PO-15	✓	✓	✓	✓	✓	✓	✓	✓

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									✓							
PO-9																
PO-10										✓						
PO-11											✓					
PO-12												✓				
PO-13													✓			✓
PO-14														✓		
PO-15															✓	

Short Course Description This course provides understanding and mastery of statistical and probability concepts for data analysis starting with measurement theory and terms related to statistics, the concept of probability, random variables both discrete and continuous, mathematical expectations, distribution functions of random variables both discrete and continuous, parameter estimation as well as hypothesis testing. In the discussion of hypothesis testing, it includes testing the difference in mean and variance for one or more samples, both independent and paired, simple linear regression analysis, multiple linear regression analysis, explanatory factor analysis, confirmatory factor analysis, non-parametric statistical analysis and data collection techniques (methods). sampling).

References

Main :

- Walpole, R E, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.
- Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.

Supporters:

Supporting lecturer Dr. Wiyli Yustanti, S.Si., M.Kom.
Aries Dwi Indriyanti, S.Kom., M.Kom.

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	Know the aims and objectives of statistics and probability	Students know the aims and objectives of statistics and probability	<p>Criteria:</p> <ol style="list-style-type: none"> 1. The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2) x Lever Score (3) x UTS Score (2) x UAS Score (3) divided by 10. <p>Form of Assessment : Participatory Activities, Tests</p>	Lectures and Questions and Answers 3 X 50	Lectures and Questions and Answers 3 X 50	<p>Material: Introduction to Probability and Statistics</p> <p>Literature: <i>Sudaryono, Probability Statistics 13 Theory & Applications, Andi, 2012</i> <i>Johnson, James L, Probability and Statistics for computer science, Wiley Interscience, English, 2011</i></p> <p>-----</p> <p>Material: Chapter 1</p> <p>References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i></p>	2%

2	Understand and explain the concept of probability Understand and operate probability formulas	Students understand and are able to explain the concept of probability. Students understand and operate probability formulas	Form of Assessment : Participatory Activities, Tests	Lectures, questions and answers and solving 6 X 50 questions	Lectures, questions and answers and solving 6 X 50 questions	Material: Basic Concepts of Probability Literature: <i>Sudaryono, Probability Statistics 13 Theory & Applications, Andi, 2012</i> <i>Johnson, James L., Probability and Statistics for computer science, Wiley Interscience, English, 2011</i> <hr/> Material: Chapter 2 References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	2%
3	Understand and explain the concept of random variables for an event	Students understand and are able to explain the concept of probability	Form of Assessment : Participatory Activities	Lectures, questions and answers and solving 2x50 questions	Lectures, questions and answers and solving 2x50 questions	Material: Chapter 3 References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i> <hr/> Material: Chapter 3 References: <i>Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.</i>	2%

4	Understand and explain enumeration rules Understand and explain factorial numbers, permutations and combinations	Students understand and are able to explain enumeration rules. Students understand and are able to explain factorial numbers, permutations and combinations	Form of Assessment : Participatory Activities, Tests	Lectures, questions and answers and solving 3 X 50 questions	Lectures, questions and answers and solving 3 X 50 questions	Material: Chapter 4 References: <i>Walpole, R E, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i> <hr/> Material: Chapter 4 References: <i>Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.</i>	4%
5	Understand and explain theoretical distribution. Understand and operate uniform, binomial and multinomial distribution formulas	Students understand and are able to explain theoretical distributions. Students understand and are able to operate uniform, binomial and multinomial distribution formulas	Forms of Assessment : Participatory Activities, Portfolio Assessment, Practice / Performance	Lectures, Questions and Answers and Problem Based Learning 9 X 50	Lectures, Questions and Answers and Problem Based Learning 9 X 50	Material: Chapter 5 References: <i>Walpole, R E, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i> <hr/> Material: Chapter 5 References: <i>Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.</i>	4%

6	Understand and explain theoretical distributions		Forms of Assessment : Participatory Activities, Portfolio Assessment, Practice / Performance	Lectures, Questions and Answers and Problem Based Learning 9 X 50	Lectures, Questions and Answers and Problem Based Learning 9 X 50	Material: Chapter 6 References: <i>Walpole, R E, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i> <hr/> Material: Chapter 6 References: Ross, S M. 2020. <i>Introduction to probability and statistics for engineers and scientists. Academic press.</i>	5%
7	1. Understand and explain theoretical distributions 2. Understand and operate uniform, binomial and multinomial distribution formulas		Forms of Assessment : Participatory Activities, Practice/Performance, Tests	Lectures, Questions and Answers and Problem Based Learning 9x50	Lectures, Questions and Answers and Problem Based Learning 9x50	Material: Chapter 7 References: <i>Walpole, R E, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i> <hr/> Material: Chapter 7 References: Ross, S M. 2020. <i>Introduction to probability and statistics for engineers and scientists. Academic press.</i>	3%
8	UTS		Form of Assessment : Assessment of Project Results / Product Assessment, Practices / Performance	UTS 3 X 50	UTS 3 X 50	Material: UTS Library:	20%

9	Understand and explain the normal distribution Explain the properties of the normal distribution Understand the use of the standard normal curve	Students understand and explain the normal distribution. Students explain the properties of the normal distribution. Students understand the use of the standard normal curve	Form of Assessment : Participatory Activities, Practice/Performance	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Material: Chapter 8 References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	3%
10	1.Understand and explain the concept of simple linear regression analysis 2.Apply simple regression techniques using statistical software for business analysis		Form of Assessment : Participatory Activities, Practical Assessment	Lectures, Questions and Answers and Problem Based Learning 6x50	Lectures, Questions and Answers and Problem Based Learning 6x50	Material: Chapter 9 References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	5%
11	1.Understand and explain multiple linear regression analysis 2.Apply multiple regression techniques using statistical software for business analysis	Students understand and explain sample statistics and population parameters. Students understand and explain types of sampling. Students understand the concept of sampling distribution and its calculations	Form of Assessment : Participatory Activities, Practical Assessment	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Material: Chapter 9 References: <i>Walpole, RE, Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	5%
12	1.Understand and explain explanatory factor analysis 2.Understand and explain the types of sampling		Form of Assessment : Participatory Activities, Practical Assessment	Lectures, Questions and Answers and Problem Based Learning 6x50	Lectures, Questions and Answers and Problem Based Learning 6x50	Material: Chapter 10 References: <i>Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.</i>	5%

13	1.Understand and explain the concept of confirmatory factor analysis 2.Apply CFA techniques using statistical software for model validation in business	Students understand and explain the concept of parameter estimation. Students understand and explain the criteria for a good estimator	Forms of Assessment : Participatory Activities, Practical Assessment, Practical / Performance	Lectures, Questions and Answers and Problem Based Learning 1 X 1	Lectures, Questions and Answers and Problem Based Learning 1 X 1	Material: Chapter 10 References: <i>Walpole, R.E., Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	5%
14	Understand and explain hypotheses and research hypotheses Understand and explain various types of errors Understand and operate formulas for various hypothesis tests	Students understand and are able to explain hypotheses and research hypotheses Students understand and are able to explain various types of errors Students understand and are able to operate formulas for various hypothesis testing	Form of Assessment : Participatory Activities	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Lectures, Questions and Answers and Problem Based Learning 6 X 50	Material: Chapter 12 References: <i>Ross, S M. 2020. Introduction to probability and statistics for engineers and scientists. Academic press.</i>	2%
15	Understand and explain sampling methods		Form of Assessment : Participatory Activities, Tests	Lectures, Questions and Answers and Problem Based Learning 6x50	Lectures, Questions and Answers and Problem Based Learning 6x50	Material: Chapter 12 References: <i>Walpole, R.E., Myers, R H., Myers, S L. and Keying, E Y. 2016. Probability and Statistics for Engineers and Scientists. Global Edition. Pearson Higher Ed.</i>	2%
16	UAS		Form of Assessment : Assessment of Project Results / Product Assessment, Practices / Performance	UAS 3 X 50	UAS 3 X 50	Material: UAS Literature:	30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	23.67%
2.	Project Results Assessment / Product Assessment	25%
3.	Portfolio Assessment	3%
4.	Practical Assessment	9.17%
5.	Practice / Performance	32.17%
6.	Test	6%
		99.01%

Notes

- 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.
- 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.