	Universitas Negeri Surabaya **Faculty of Sports and Health Sciences Master** **of Sports Science Study Program**	**Document Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Statistical Methods	1234702003		T=2	P=0	ECTS=4.48	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Prof. Dr. Erman, M.Pd.	....	Dr. Achmad Widodo, M.Kes.

Learning model	**Case Studies**

Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-9	Able to understand, analyze and evaluate and apply scientific theory, especially in the field of sports science
	PLO-12	Able to implement and analyze sports events based on science and technology
	Program Objectives (PO)	
	PO - 1	Explains the basic concepts of statistics and their application in organizing, displaying and analyzing sports data
	PO - 2	Using statistical methods to organize, display and analyze data in the context of sports science
	PO - 3	Interpret data and statistical test results to make decisions in solving problems
	PO - 4	Case study of the use of statistical methods to organize, display, analyze and interpret data in thesis research
	PLO-PO Matrix	

P.O	PLO-9	PLO-12
PO-1		
PO-2		
PO-3		
PO-4		

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																

Short Course Description	This course aims to enable students to be able to apply statistical techniques appropriately to process data and interpret it meaningfully and in depth which is widely used in quantitative sports science research. Apart from that, this course also helps students to map and analyze sports problems to find the right solution.

References	**Main :**	

1. Kaiser, M. S. (2005). Advance statistical methods Iowa. State University: Departement of Statistics. 4. Qian, J. (2012). An introduction to advanced probability and statistics. China, junhuiq@gmail.com.
2. Coletti, P. (2010). Advanced statistis. Free Univeristy of Bolzano Bozen.
3. Shalizi, C.R. (2013). Advance data analiysis . Cosma Rohilla Spring 2013.

Supporters:

1. .....Tutorial statistic for research (e-book)

Supporting lecturer	Prof. Dr. Erman, M.Pd.						

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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	Explain the basic concepts of statistics	Actively participate in learning and questions and answers	**Criteria:** 1. Score 4 if you actively listen and participate in questions and answers 2. Score 3 if you actively listen but are less active in asking questions 3. Score 2 if you actively listen but are not involved in questions and answers 4. Score 1 if you do not actively listen and ask questions **Form of Assessment** : Participatory Activities	Delivering information and questions and answers for 100 minutes	Convey information and ask questions	**Material:** Basic concepts of statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Basic concepts of statistics **Reference:** *.....Tutorial on statistics for research*	2%
2	Explain the concept of descriptive statistics	Describe data in the form of tables, diagrams and graphs.	**Criteria:** 1. Score 4 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration correctly 2. Score 3 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration but a small portion is not accurate 3. Score 2 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration but most of it is not accurate 4. Score 1 if you cannot describe the data in the form of tables, diagrams and graphs **Form of Assessment** : Participatory Activities	Presentation of material and assignments 100 minutes		**Material:** Descriptive statistics **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.* **Material:** Descriptive statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Descriptive statistics **References:** *.....Tutorial on statistics for research* **Material:** Descriptive statistics Describe data in the form of tables, diagrams and graphs. **References:**	3%

| 3 | Understand the concept of probability and its distribution | 1. Describe data in the form of tables, diagrams and graphs.
2. Calculating data centralization measures | **Criteria:**
1. Score 4 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration correctly
2. Score 3 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration but a small portion is not accurate
3. Score 2 if you can describe data in the form of tables, diagrams and graphs and determine the size of data concentration but most of it is not accurate
4. Score 1 if you cannot describe data in the form of tables, diagrams and graphs and determine the size of data concentration correctly

Form of Assessment:
Portfolio Assessment | Presentation of information and assignments 100 minutes | | **Material:** Descriptive statistics **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.*

Material: Descriptive statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.*

Material: Descriptive statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.*

Material: Descriptive statistics **References:** *.....Tutorial on statistics for research* | 3% |
| 4 | | | **Criteria:**
1. Score 4 if you can determine the opportunity for continuous distributed data correctly
2. Score 3 if you can determine the opportunity for continuous distribution data but a small portion is not quite right
3. Score 2 if it can determine the opportunity for continuous distribution data but most of it is not precise
4. Score 4 if you have not been able to determine the opportunity for continuous distribution data correctly

Form of Assessment:
Portfolio Assessment | Presentation of information and assignments 100 minutes | | **Material:** Probability distribution **Reference:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.*

Material: Probability distribution **Reference:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* | 3% |

| 5 | Understand the concept of probability and its distribution | | **Criteria:**
1. Score 4 if you can determine the opportunity for continuous distributed data correctly
2. A score of 3 if you can determine the opportunity for continuous distribution data but there are a small number of things that are not quite right
3. Score 2 if it can determine the opportunity for continuous distribution data but most of it is less precise
4. Score 1 if you have not been able to determine the opportunity for continuous distribution data correctly

Form of Assessment:
Portfolio Assessment | Presentation of information, questions and answers, and assignments 100 minutes | | **Material:** `probability distribution **Reference:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.*

Material: Probability and its distribution **Reference:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.*

Material: Opportunities and their distribution **Reference:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* | 3% |
| 6 | | Explain the concept of hypothesis, types of hypothesis testing errors, and hypothesis testing | **Criteria:**
1. Score 4 if you can explain the concept and formulate a hypothesis and test it precisely and in detail
2. Score 3 if you can explain the concept of the hypothesis and its testing correctly but not in detail
3. Score 2 if you can explain the concept and formulate a hypothesis but cannot explain hypothesis testing correctly
4. Score 1 if you cannot formulate a hypothesis

Form of Assessment:
Participatory Activities | | Presentation of information and assignments 100 minutes | **Material:** Descriptive statistics **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics. 4. Qian, J. (2012). An introduction to advanced probability and statistics. China, junhuiq@gmail.com.*

Material: Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.*

Material: Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)* | 3% |

| 7 | | 1. Write down pairs of null hypotheses with alternatives. 2. Establish a formula to test the hypothesis. | **Criteria:** 1. Score 4 if you can write down the pair of null and alternative hypotheses and how to test them correctly 2. Score 3 if you can write down the pair of null and alternative hypotheses and how to test them but a small portion is wrong 3. Score 2 if you can write down the pair of null and alternative hypotheses and how to test them but most of them are wrong 4. Score 1 if you have not been able to write the null and alternative hypothesis pair correctly **Form of Assessment**: Practice / Performance | Presentation of information, questions and answers, and 100 minutes of practice | | **Material:** Hypothesis and hypothesis testing **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Hypothesis testing **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research* **Material:** Write down pairs of null and alternative hypotheses, and determine statistical methods for testing hypotheses. **Reference:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics. 4. Qian, J. (2012). An introduction to advanced probability and statistics. China, junhuiq@gmail.com.* | 3% |
| 8 | Meetings 1-7 | CPMK assessment 1 - 7 | **Criteria:** 1. Score 4 if all answers are correct 2. Score 3 if there are a small number of wrong answers 3. Score 2 if most of the answers are wrong 4. Score 1 if almost all answers are wrong | 100 minute exam | | **Material:** All meeting materials 1-7 **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.* | 20% |

9	1.Determine appropriate statistical tests to analyze data in various cases of sports science research publications 2.Analyze data according to the research design used 3.Interpreting statistical test results in various sports science research cases	1.Determine the type of statistical test to analyze data in various sports science study cases 2.Apply types of statistical tests appropriately according to the data	**Criteria:** 1.Score 4 if you determine the type and carry out statistical tests to analyze the data correctly 2.Score 3 if you determine the type and carry out statistical tests to analyze the data but some of it is inaccurate 3.Score 2 if you can determine the type and carry out statistical tests correctly but have not analyzed the data 4.Score 1 if you cannot determine the type and carry out statistical tests correctly **Form of Assessment** : Portfolio Assessment		Case studies in various sports science studies	**Material:** Inferential statistics **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research*	5%
10	Analyze data according to the research design used	1.Determine appropriate statistical tests to analyze data in various cases of sports science research publications 2.Analyze data	**Criteria:** 1.Score 4 if you can determine statistical tests and analyze data correctly 2.Score 3 if you can determine statistical tests and analyze the data but there are a small number of errors 3.Score 2 if you can determine statistical tests and analyze data but most of them are inaccurate 4.Score 1 if you can determine a statistical test but cannot yet use it to analyze the data correctly **Form of Assessment** : Participatory Activities, Portfolio Assessment		Case study 100 minutes	**Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **Reference:** *.....Tutorial on statistics for research*	5%
11	Analyze data according to the research design used	1.Analyze data according to the research design used in the sports context 2.Interpreting data in a sports context	**Criteria:** 1.Score 4 if you can analyze and interpret data correctly 2.Score 3 if you can analyze the data but are still lacking in interpretation 3.Score 2 if you can analyze the data but cannot interpret it 4.Score 1 if you have not been able to analyze the data **Form of Assessment** : Participatory Activities, Portfolio Assessment		Case study 100 minutes	**Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)*	5%

12	Analyze data according to the research design used	1. Analyze data according to the research design used in the context of sports science 2. Interpreting data	**Criteria:** 1. Score 4 if you can analyze data to test hypotheses and interpret them correctly 2. Score 3 if you can analyze the data to test the hypothesis but are less precise in the interpretation 3. Score 2 if you can analyze the data but cannot interpret it **Form of Assessment**: Project Results Assessment / Product Assessment		Case study 100 minutes	**Material:** Inferential statistics **References:** *Kaiser, MS (2005). Advanced statistical methods Iowa. State University: Department of Statistics. 4. Qian, J. (2012). An introduction to advanced probability and statistics. China, junhuiq@gmail.com.* **Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)*	5%
13	Analyze data according to the research design used	1. Analyze data to test hypotheses 2. Interpret data based on hypothesis test results	**Criteria:** 1. Score 4 if you can analyze and interpret data correctly 2. Score 3 if you can analyze the data correctly but are less precise in interpreting it 3. Score 2 if you can analyze the data correctly but cannot interpret it. 4. Score 1 if you have not been able to analyze the data **Form of Assessment**: Project Results Assessment / Product Assessment, Portfolio Assessment		100 minutes presentation and discussion	**Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)*	5%
14			**Criteria:** 1. Score 4 if you can interpret the data correctly 2. Score 3 if you can interpret the data but lack detail 3. Score 2 if you can interpret the data but some of it is inaccurate 4. Score 1 if you cannot interpret the data correctly **Form of Assessment**: Participatory Activities, Portfolio Assessment	100 minutes presentation and discussion		**Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)*	5%

No							
15	Using statistical test results to solve sports science problems	1. Interpret statistical data 2. Using statistical test results to solve sports problems	**Criteria:** 1. Score 4 if you can interpret data correctly and use it to solve sports problems correctly 2. Score 3 if you can interpret data correctly but use it less in solving sports problems 3. Score 2 if you can interpret the data correctly but cannot solve the problem 4. Score 1 if you have not been able to test the hypothesis **Form of Assessment**: Participatory Activities, Portfolio Assessment	100 minutes presentation and discussion		**Material:** Inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Inferential statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Inferential statistics **Bibliography:** *.....Tutorial on statistics for research (e-book)*	5%
16	Sub-CPMK 9-15	All indicators confluence 9-15	**Criteria:** 1. Score 4 if all answers are correct 2. Score 3 if a small number of answers are wrong 3. Score 2 if most of the answers are wrong 4. Score 1 if almost all answers are wrong	UAS 100 minutes		**Material:** Descriptive and inferential statistics **References:** *Coletti, P. (2010). Advanced statistics. Free University of Bolzano Bozen.* **Material:** Descriptive and inferential statistics **References:** *Shalizi, CR (2013). Advanced data analysis. Cosma Rohilla Spring 2013.* **Material:** Descriptive and inferential statistics **Reference:** *.....Tutorial on statistics for research (e-book)*	0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	18%
2.	Project Results Assessment / Product Assessment	7.5%
3.	Portfolio Assessment	26.5%
4.	Practice / Performance	3%
		55%

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.