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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Biostatistics and Computers	8420503060	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	4	June 20, 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 that is charged to the course

Program Objectives (PO)

PO - 1	Understand the meaning of statistics and its benefits, data concepts, and measurement scales
PO - 2	Understand the use of computers for statistics
PO - 3	Able to design research experiments and analyze collected data.
PO - 4	Able to apply transferable skills to develop eco-commitment in an effort to realize the character of "Faith, Smart, Independent, Honest, Caring and Tough"
PO - 5	Able to make conclusions based on data analysis

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3
PO-4
PO-5

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																

Short Course Description

This course discusses the basics of biostatistics in practice and computer-based research, including: data form, data organization, central tendency and data distribution including average, standard deviation, variation; normal distribution; hypothesis testing, analysis of variance, correlation-regression analysis, analysis of covariance, and nonparametric statistics. Lectures are delivered using a student-centred approach in practical activities and assignments; while practical work is carried out using computer programs. These two learning activities are carried out to facilitate students to work honestly and independently.

References

Main :

1. Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press

Supporters:

	1. Kusriningrum-RS, 2008. Perancangan Percobaan. Surabaya: Airlangga University Press. 2. Gomez, K.A. 1984. Statistical Procedures for Agricultural Research, 2nd Edition. Wiley-Interscience 3. Snedecor, G.W. 1989. Statistical Methods Eighth Edition. Ames. Iowa State University Press. 4. Steel dan Torrie, 1996. Principle and Procedure Statistics: A Biometrical Approach. New York: McGraw Hill Book Comp
Supporting lecturer	Prof. Dr. Ir. Dyah Hariani, M.Si. Reni Ambarwati, S.Si., M.Sc. Dr. Muji Sri Prastiwi, S.Pd., M.Pd. Erlix Rakhmad Purnama, S.Si., M.Si. Dr. Pramita Yakub, 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	Understand the meaning of statistics and its benefits. Understand the concept of data and measurement scales	1.a. Explain the meaning of statistics 2.b. Explain the benefits of statistics 3.c. Explain the meaning of data and types of data 4.d. Give examples of each type of data 5.e. Distinguish between data measurement scales	**Criteria:** student activeness in class discussions	The lecturer explained the Biostatistics RPS and learning activities using the case method learning model to provide real experience of Biology research and its application in educational research. 2 X 50	-	**Material:** Introduction to Biostatistics **Library:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	0%
2	1.Understand the use of computers for statistics 2.Understand the concept of data presentation and apply MS. Office to present data	a. Explain computer programs that can be used to process data. Operate Excel and SPSS	**Criteria:** Students' activities and responses during learning activities as participation **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to computer programs (Excel and SPSS) for processing 2 X 50 data		**Material:** Introduction to Biostatistics **Library:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	5%
3	1. Understand the concept of data presentation 2. Applying the Ms. program Office to present data	Distinguish between the use of diagrams, graphs and tables for presenting data. Present data using diagrams and graphs using the MS program. Office. Presents data in the form of a frequency distribution table	**Criteria:** Students' activities and responses during learning activities **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to presenting data with MS. Excell in Biology research and Biology education 2 X 50		**Material:** Introduction to Biostatistics **Library:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	5%
4	1. Understand the concept of data concentration measures and data distribution measures 2. Using applications from Ms.Office and R Studio to calculate the size of the distribution and centering of data	a. Explain data centralization measures. Presenting data using data centering measures. Explain the dimensions of data distribution. Presenting data using data distribution measures. Calculating the mean and standard deviation using excel and R Studio	**Criteria:** Students' activities and responses during learning activities as participation **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to managing data using Excel and SPSS in research in the field of biology or education 3 X 50		**Material:** Introduction to Biostatistics **Library:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	10%

5	Understand and apply the concept of normality test and difference test (t test)	1.a. Explain the purpose and procedure of normality testing 2.b. Testing the normality of data 3.c. Explain the purpose and procedure of the t test 4.d. Apply the t test to test the difference between two groups of data 5.e. Using Excel and SPSS for normality test and difference test (t test)	**Criteria:** ASSIGNMENT with a weight of 30%. UTS with a weight of 20%. Students' activities and responses during learning activities as participation, with a weight of 20%. UAS with a weight of 30%. **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to the difference test (t test) in research in the field of biology or education 3 X 50		**Material:** Normality Test, t Test **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	0%
6	1.1. Understand and apply the concept of simple regression 2.2. Using Excel and SPSS to test simple regression tests	a. Explain the purpose and procedure of simple regression testing b. Analyzing data using simple regressionc. Using Excel and SPSS to test simple regression tests	**Criteria:** Students' activities and responses during learning activities as participation, weight 20% **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to simple regression in research in the field of biology or education 3 X 50		**Material:** Simple Regression **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	10%
7	1. Understand and apply the concept of multiple regression 2. Using Excel and SPSS for multiple regression tests	1.a. Explain the purpose and procedure of multiple regression testing 2.b. Analyze data using multiple regression 3.c. Using Excel and SPSS to test multiple regression tests	**Criteria:** Students' activities and responses during learning activities as participation **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to the difference test (t test) in research in the field of biology or education 3 X 50	-	**Material:** Multiple Regression **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	0%
8	UTS		**Form of Assessment** : Test	- 3 X 50	-	**Material:** - **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	20%
9	1.1. Understand and apply the concept of covariance analysis 2.2. Using Excel and SPSS to test covariance analysis	1.a. Explain the purpose and procedures of covariance analysis 2.b. Analyze data using covariance analysis 3.c. Using Excel and SPSS for covariance analysis tests	**Criteria:** Students' activities and responses during learning activities as participation, weight 20% **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to co-variance analysis in research in the field of biology or education 3 X 50	-	**Material:** Covariance Analysis **Literature:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	10%

10	1. Understand and apply concepts about experimental design and 1-factor analysis of variance (CRD). 2. Understand and apply the concept of the BNT test. Use the SPSS program to analyze data	Designing a 1-factor experimental design Analyzing data variance from experimental results Analyzing data with the BNT test Using the SPSS program to analyze the data	**Criteria:** Students' activities and responses during learning activities as participation, weight 20% **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to experimental design in research in the field of biology or Biology education 3 X 50	-	**Material:** 1-factor analysis of variance (CRD) **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	10%
11	Understand and apply concepts about experimental design and 1 factor analysis of variance (RCBD, Latin square). Using the SPSS program to analyze data	a. Designing a 1 factor experimental design; RCBD, Latin square b. Analyzing data variants from experimental results c. Using the SPSS program to analyze data	**Criteria:** TASK with a weight of 30% **Form of Assessment** : Practice / Performance	Discussion activities, information and assignments related to experimental design in research in the field of biology or Biology education 3 X 50	-		5%
12	Understand and apply concepts about experimental design and 1-factor variance analysis (split plot and strip plot). Using the SPSS program to analyze data	1. a. Design a 2 factor experimental design: split plot and strip plot 2. b. Analyzing data variants resulting from a 2-factor experiment c. Using the SPSS program to analyze data	**Criteria:** TASK with a weight of 30% **Form of Assessment** : Practice / Performance	Discussion activities, information and assignments related to experimental design in research in the field of biology or Biology education 3 X 50	-	**Material:** 2-factor analysis of variance (separate plot and strip plot) **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	5%
13	1. 1. Understand the concept of nonparametric statistical tests 2. 2. Understand and apply the concept of the Wilcoxon signed rank test 3. 3. Understand and apply the concept of the Spearman correlation test 4. 4. Using the SPSS program to analyze the data	a. Explain various types of non-parametric statistics b. Explain the requirements of the Wilcoxon signed rank test c. Analyze the data using the Wilcoxon d signed rank test. Explain the requirements for the Spearman correlation test e. Analyzing data using sperm correlation f. Using the SPSS program to analyze data	**Criteria:** TASK with a weight of 30% **Form of Assessment** : Participatory Activities	Discussion activities, information and assignments related to non-parametric statistical tests in research in the field of biology or Biology education 3 X 50		**Material:** Wilcoxon Analysis **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	5%
14	Understand and apply the concept of the Chi-Square test. Use the SPSS program to analyze data	Differentiating the use of the Chi-Square test: goodness of fit and contingency tables Analyzing data using the Chi-Square test: goodness of fit and contingency tables Using the SPSS program to analyze data	**Criteria:** TASK with a weight of 30% **Form of Assessment** : Participatory Activities, Practice/Performance	Discussion activities, information and assignments related to the Chi-Square test in biology research or Biology education 3 X 50	-	**Material:** Chi-Square Analysis **Literature:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	5%

15	Understand and apply the concept of the Cruscal Wallis test and Friedman test. Using the SPSS program to analyze data	a. Differentiate between the use of the Cruscal Wallis test and the Friedman test b. Analyzing data using the Cruscal Wallis test and Friedman test c. Using the SPSS program to analyze data	**Criteria:** Students' activities and responses during learning activities as participation, weight 20% **Form of Assessment** : Participatory Activities, Practice/Performance	Discussion activities, information and assignments related to the Wallis Cruscal Test in biology research or Biology education 3 X 50		**Material:** Crusscal Wallis analysis and Friedman test **References:** *Hariani D, Ambarwati R, Purnama ER, 2019. Student Textbook: Biostatistics and Biocomputers. Surabaya: Unesa Press*	0%
16			**Form of Assessment** : Project Results Assessment / Product Assessment	UAS 2x50			10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	57.5%
2.	Project Results Assessment / Product Assessment	10%
3.	Practice / Performance	12.5%
4.	Test	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.