



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Undergraduate Chemistry Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
BASIC STATISTICS	4720102193	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	July 17, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
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Learning model	Case Studies
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Program Learning Outcomes (PLO) PLO study program that is charged to the course

Program Objectives (PO)

PO - 1	Understanding the nature of statistics for Chemistry Education students
PO - 2	Understand research data.
PO - 3	Understand when to use descriptive statistics and inferential statistics (parametric & non-parametric).
PO - 4	Understand various parametric statistical testing techniques for dissertation menu options in the SPSS application.
PO - 5	Understand various non-parametric statistical testing techniques for dissertation menu options in the SPSS application.
PO - 6	Understand cases regarding errors in the selection/use of parametric statistical tests in previous student theses or articles published in scientific journals.
PO - 7	Understand cases regarding errors in the selection/use of non-parametric statistical tests in previous student theses or articles published in scientific journals.

PLO-PO Matrix

	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> <tr><td>PO-4</td></tr> <tr><td>PO-5</td></tr> <tr><td>PO-6</td></tr> <tr><td>PO-7</td></tr> </table>	P.O	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7
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PO-1									
PO-2									
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PO-7									

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

	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr><td>PO-1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	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																
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Short Course Description Study of: descriptive statistics; discrete/continuous probability and probability distribution; inferential statistics which contains parameter estimation and hypothesis testing; data analysis with the SPSS program.

References Main :

1. Howell, D. C, 2010, Statistical Methods For Psychology, US : Wardsworth Learning
2. Sudjana, 1996, Metoda Statistika, Bandung : Tarsito
3. Sugiyono, 2009, Statistika untuk Penelitian, Bandung: Alfabeta
4. Sugiyono, 2010, Statistik Nonparametris untuk Penelitian, Bandung. Alfabeta
5. RPS Statistika Dasar
6. Kuzon, W.M., Urbanchek, M.G., & McCabe, S. (1996). The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,
7. Suriasumantri, J.S. (2013). Filsafat Ilmu; Sebuah Pengantar Populer, Jakarta: Pustaka Sinar Harapan, 2013.

Supporters:

Supporting lecturer
Prof. Dr. Achmad Lutfi, M.Pd.
Prof. Dr. Suyono, 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.Explain the position and/or role of statistics in scientific methods/research methods (Statistics is a tool of science). 2.Explaining CPMK Basic Statistics as part of a learning contract that must be internalized (felt).	1.Produce a short article in the form of an explanation of the role of statistics as a tool of science in the research stages in chemistry. 2.Produce a written statement containing a Basic Statistics learning contract that will be carried out in one semester.	Criteria: 1.The resulting short article contains the role of descriptive statistics and inferential statistics in the implementation of scientific methods in chemical research. 2.The learning contract written is realistic and in accordance with the Basic Statistics RPS, Form of Assessment : Participatory Activities	Given a flow diagram of the scientific method, students are asked to explain the position and/or role of statistics in the stages of the scientific method (research methods) in chemical research. Students are asked to read the RPS and then asked to write a learning contract that will be fulfilled during one semester. 2 x 50		Material: The role of statistics as a tool of science (the role of statistics in implementing scientific methods). References: Suriasumantri, JS (2013). Science phylosophy; A Popular Introduction, Jakarta: Pustaka Sinar Harapan, 2013. Material: Preparation of learning contracts according to RPS Basic Statistics. References: RPS Basic Statistics	5%
2	1.Distinguish between types of data scales (nominal, ordinal, interval, and ratio). 2.Organizing data according to the needs/objectives of data analysis in chemistry research.	1.Students can determine the appropriate data scale when given examples of chemical research data. 2.Students can choose the right way to organize data.	Criteria: 1.Each student can answer correctly when asked to determine the appropriate data scale if he is given an example of research data taken from a chemistry education student's thesis. 2.Each student can choose the appropriate way of organizing data when they are shown the research objectives. Form of Assessment : Participatory Activities	0	Presenting a short paper that represents students' ability to differentiate between types of data scales; assignment results presented at the end of the first meeting (applied to 50% of students). Presenting the results of a book report (Buku Sudjana) regarding various types of research data organization; assignment results given at the end of the first meeting (applied to 50% of students). 2 x 50	Material: Types of Data Scales (nominal, ordinal, interval, and ratio). References: Howell, D. C, 2010, Statistical Methods For Psychology, US : Wardsworth Learning Material: Various ways of organizing research data. References: Sudjana, 1996, Statistical Methods, Bandung: Tarsito	3%

3	Able to utilize statistical application programs (Excell or others) to visualize data in the form of images.	Produce written reports on the results of data transformation from list/table form into diagram/image form.	<p>Criteria: The transformation of the reported data supports the interests of the data analysis and research objectives.</p> <p>Form of Assessment : Participatory Activities</p>	0	The practice of changing data organization from list/table form to diagram/image form. 2 x 50	<p>Material: Conventional ways of transforming data organization from list/table form to diagram/image form.</p> <p>References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i></p> <hr/> <p>Material: Use of SPSS in data organization transformation.</p> <p>Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i></p>	3%
4	<ol style="list-style-type: none"> 1.Explain the differences in the implementation of data analysis conclusions descriptively and inferentially. 2.Explain the difference in "strength" of conclusions developed through parametric and non-parametric data analysis. 3.Determine the suitability of the data scale with the choice of parametric or non-parametric statistical tests. 	<ol style="list-style-type: none"> 1. 2.When given the formulation of research objectives and available supporting data, students can determine the statistical methods used. 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. 2.When given the formulation of research objectives and available supporting data, students can determine the statistical methods used correctly. <p>Form of Assessment : Participatory Activities</p>	0	After being given information about the axiology of descriptive statistics and inferential statistics (both parametric and non-parametric) with the help of material presentations (PPT format), students are asked to determine the choice of statistics that will be used. 2 X 50	<p>Material: Axiology of descriptive statistics and inferential statistics (parametric & non-parametric).</p> <p>References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i></p> <hr/> <p>Material: Axiology of descriptive statistics and inferential statistics.</p> <p>Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i></p> <hr/> <p>Material: Errors in choosing statistical methods.</p> <p>References: <i>Kuzon, WM, Urbancheck, MG, & McCabe, S. (1996). The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,</i></p>	5%
5	Able to evaluate the requirements for the applicability of IT-assisted parametric statistics (SPSS).	Produce reports on the results of population homogeneity and normality test practices.	<p>Criteria: Report on the practical results of population homogeneity and normality tests accompanied by a meaningful conclusion statement.</p> <p>Form of Assessment : Participatory Activities, Practical Assessment</p>	0	Practice using SPSS in homogeneity tests and normality tests for groups of interval and/or ratio data as a representation of the population. 2 X 50	<p>Material: SPSS in data analysis.</p> <p>Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i></p>	5%

6	Able to evaluate the requirements for the applicability of IT-assisted parametric statistics (SPSS).	A correction formulation and revision plan was produced for the SPSS practice report after the class evaluation.	Criteria: Produce reports on the results of revised population homogeneity and normality test practices. Form of Assessment : Participatory Activities	Class evaluation of SPSS practice results for homogeneity and normality tests. 2 X 50	0	Material: Meaning of SPSS practice results in population homogeneity and normality tests. Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i>	5%
7	Able to carry out comparative parameter tests of one or more samples with the help of SPSS.	Produce a report on the results of comparative parametric statistical test practice using SPSS.	Criteria: The report on the results of comparative parametric statistical test practice made by each student contains statistical conclusions and research conclusions. Form of Assessment : Participatory Activities, Portfolio Assessment	The lecturer's presentation on various comparative parametric statistical testing techniques was followed by practice in using them with the help of SPSS. 2 X 50	0	Material: Various types of comparative parametric statistical tests. References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i> Material: SPSS application in comparative parametric statistical tests. Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i>	10%
8	Representation (sampling) abilities from week 1 to week 7 of learning.	<ol style="list-style-type: none"> 1. 2. Representative (sampling) indicators from sub-CPMK learning weeks 1 to 7. 	Criteria: All indicators tested were declared 100% achieved. Form of Assessment : Test	Midterm Exam (UTS) 2 X 50	0	Material: Learning material for meetings 1 to 7 References:	10%
9	Able to carry out correlational parametric tests with two variables using SPSS.	Produce a report on the results of the practice of correlational parametric statistical tests of two variables with the help of SPSS.	Criteria: The report on the results of the correlational parametric statistical test practice made by each student contains statistical conclusions and research conclusions. Forms of Assessment : Participatory Activities, Portfolio Assessment, Practical Assessment	The lecturer's presentation on various correlational parametric statistical testing techniques was followed by practice in using them with the help of SPSS. 2 X 50	0	Material: Various types of correlational parametric statistical tests. References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i> Material: SPSS application in statistical tests Reference: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i>	10%

10	Able to carry out comparative non-parametric tests on one or more samples with the help of SPSS.	Produce a report on the results of comparative non-parametric statistical test practices assisted by SPSS.	<p>Criteria: The report on the results of comparative non-parametric statistical test practice made by each student contains statistical conclusions and research conclusions.</p> <p>Form of Assessment : Portfolio Assessment, Practical Assessment</p>	The lecturer's presentation on various comparative non-parametric statistical testing techniques was followed by practice in using them with the help of SPSS. 2 X 50	0	<p>Material: Various types of correlational non-parametric statistical tests.</p> <p>References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i></p> <hr/> <p>Material: SPSS application in correlational non-parametric statistical tests.</p> <p>Reader: <i>Sugiyono, 2009, Statistics for Research, Bandung: Alfabeta</i></p>	5%
11	Able to carry out correlational non-parametric tests with two variables using SPSS.	Produce a report on the results of the practice of correlational non-parametric statistical tests of two variables with the help of SPSS.	<p>Criteria: The report on the results of the correlational non-parametric statistical test practice made by each student contains statistical conclusions and research conclusions.</p> <p>Forms of Assessment : Participatory Activities, Portfolio Assessment, Practical Assessment</p>	0	The lecturer's presentation on various correlational non-parametric statistical testing techniques was followed by practice in using them with the help of SPSS. 2 X 50	<p>Material: Various types of correlational non-parametric statistical tests.</p> <p>References: <i>Sudjana, 1996, Statistical Methods, Bandung: Tarsito</i></p> <hr/> <p>Material: Various types of correlational non-parametric statistical tests.</p> <p>References: <i>Sugiyono, 2010, Nonparametric Statistics for Research, Bandung. Alfabet</i></p> <hr/> <p>Material: SPSS application in correlational non-parametric statistical tests.</p> <p>References: <i>Sugiyono, 2010, Nonparametric Statistics for Research, Bandung. Alfabet</i></p>	5%

12	Able to evaluate cases; errors in the selection/use of parametric statistical tests in previous student theses or articles published in scientific journals.	Produce a report in the form of the findings of a thesis or article in which statistical tests are used incorrectly.	<p>Criteria: The report made is accompanied by supporting documents/references for the claims made (statement of errors in selecting statistical tests).</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	0	Case study; searching for research reports and/or articles that use parametric statistical tests incorrectly/inappropriately. 2 X 50	<p>Material: Material that is relevant to the needs of case evaluation Reference:</p> <hr/> <p>Material: Seven major sins in statistical analysis. References: Kuzon, WM, Urbancheck, MG, & McCabe, S. (1996). <i>The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,</i></p>	5%
13	Able to provide suggestions for improvements to errors in the use of statistical tests that are found.	The written suggestions for improvement are supported by dissertation scientific references with empirical evidence in the form of data re-analysis using SPSS.	<p>Criteria: Using the facilitator's expert judgment on case study reports made by students.</p> <p>Form of Assessment : Participatory Activities, Project Results Assessment / Product Assessment</p>	Student presentation of findings from case studies and submission of suggestions for improvement. 2 X 50	0	<p>Material: Seven major sins of Statistical Analysis. References: Kuzon, WM, Urbancheck, MG, & McCabe, S. (1996). <i>The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,</i></p> <hr/> <p>Material: Material that is relevant to the need to improve data analysis, including SPSS applications. References:</p>	5%
14	Able to provide suggestions for improvements to errors in the use of statistical tests that are found.	The written suggestions for improvement are supported by dissertation scientific references with empirical evidence in the form of data re-analysis using SPSS.	<p>Criteria: Using the facilitator's expert judgment on case study reports made by students.</p> <p>Form of Assessment : Participatory Activities, Project Results Assessment / Product Assessment</p>	Student presentation of findings from case studies and submission of suggestions for improvement. 2 X 50	0	<p>Material: Deadly sins in statistical analysis. References: Kuzon, WM, Urbancheck, MG, & McCabe, S. (1996). <i>The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,</i></p> <hr/> <p>Material: Material that is relevant to assessing and correcting errors in the use of statistical tests. References:</p>	5%

15		The substance of the evaluation results indicates that the CPMK Basic Statistics has been completed.	Form of Assessment : Participatory Activities	0	Joint evaluation (lecturers & students) of learning processes & products that have been carried out together. 2 x 50	Material: Assessment of semester learning processes and products (made in check list and explanation format). References:	8%
16	Representation (sampling) abilities from week 9 to week 15 of learning.	Representative (sampling) indicators from sub-CPMK learning weeks 9 to 14.	Criteria: All students complete all the indicators tested. Form of Assessment : Test	Final Semester Examination (UAS) with HOTS & Open Book level 2 X 50		Material: All material from week 9 to week 15. References:	10%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	49%
2.	Project Results Assessment / Product Assessment	5%
3.	Portfolio Assessment	15%
4.	Practical Assessment	10%
5.	Test	20%
		99%

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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.