# INSTITUT TEKNOLOGI SEPULUH NOPEMBER
# FACULTY OF CIVIL, PLANNING AND GEO ENGINEERING
# DEPARTMENT OF GEOMATICS ENGINEERING
# UNDERGRADUATE PROGRAM

## SEMESTER LEARNING PLAN (SLP)

| COURSE NAME | CODE | COURSE GROUP | CREDITS | | SEMESTER | Compilation Date |
|---|---|---|---|---|---|---|
| Stastics | CM2344206 | Geodesy and Geodynamics | T=2 | P=1 | 3 | - |

| AUTHORIZATION | SLP DEVELOPER | COURSE GROUP COORDINATOR | HEAD OF UNDERGRADUATE PROGRAM |
|---|---|---|---|
| | Udiana Wahyu Deviantari, S.T., M.T. | Putra Maulida, ST, MT, Ph.D | Danar Guruh Pratomo,ST, MT, Ph.D. |

| Learning Outcome (LO) | | |
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| | **Expected Learning Outcomes (ELO) that Imposed in the Course** | |
| | ELO-4 | Able to apply mathematics, science, and engineering in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, geographic information systems, and cadastral to gain a thorough. understanding of the principles of engineering. " |
| | **Course Learning Outcomes (CLO)** | |
| | CLO-1 | Students are able to explain the general concept of statistics and also identify the data scale of variables |
| | CLO-2 | Students are able to practice presenting data in textual, tabular, and graphical ways |
| | CLO-3 | Students are able to select, calculate and process research data |
| | CLO-4 | Students are able to select, calculate and process research data |
| | CLO-5 | Students are able to understand the procedure in testing a statistical data |
| | CLO-6 | Students are able to analyze the test results of a statistical data |

<table>
<tr><td></td><td></td><td>Matrix ELO – CLO
<table>
<tr><td>CLO</td><td>ELO-4</td></tr>
<tr><td>CLO-1</td><td>V</td></tr>
<tr><td>CLO-2</td><td>V</td></tr>
<tr><td>CLO-3</td><td>V</td></tr>
<tr><td>CLO-4</td><td>V</td></tr>
<tr><td>CLO-5</td><td>V</td></tr>
<tr><td>CLO-6</td><td>V</td></tr>
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<tr><td>Course Description</td><td colspan="2">Statistics and probability course will give a study about statistical computation. The methods and computations of statistical data will be discussed in the lectures and several tasks. Therefore, students can understand and apply the statistical selection, computation, and test of observed data. Based on a statistical test, data can be further analyzed to reach the conclusion.</td></tr>
<tr><td>Course Materials</td><td colspan="2">1. Data statistics<br>2. Frequency distribution<br>3. Measurement of central value<br>4. Linear regression and multivariable<br>5. Correlation and covariance<br>6. Probability<br>7. Normal distribution<br>8. Student’s t- and chi-square distribution<br>9. Confidence interval<br>10. Estimation of mean and variance</td></tr>
<tr><td rowspan="3">References</td><td colspan="2">Main References :</td></tr>
<tr><td colspan="2">1. Johnson, R.A. and Bhattacharyya, G.K. 2010. Statistics Principles and Methods 6th Ed. John Wiley & Sons.<br>2. Mikhail,E.M., 1976. Analysis and Adjustment of Survey Measurements. Dun Donnelley Publisher New York..<br>3. Ghilani, C. and Wolf, P.R. 2006. Adjustment Computations: Spatial Data Analysis 4th Ed. John Wiley & Sons.<br>4. Anjasmara, I.M. 2016. Statistika untuk Geomatika. Jurusan Teknik Geomatika ITS.<br>Additional References :</td></tr>
<tr><td colspan="2">1. E-learning Hitung Perataan (share.its.ac.id)</td></tr>
<tr><td>Lecturer</td><td colspan="2">Udiana Wahyu Deviantari, ST, MT</td></tr>
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| | Ira Mutiara Anjasmara, ST, M.Phil, Ph.D<br>Akbar Kurniawan, ST, MT<br>Putra Maulida, ST, MT, Ph.D | | | | | | |
| **Prerequisite** | Mathematics 1 | | | | | | |
| **Class/ Week** | **Lesson Learning Outcome (Sub-CLO)** | **Evaluation** | | **Forms of Learning, Learning methods, Student Assignments/Task, [ Estimated time ]** | | **Learning Materials [ References ]** | **Weight (%)** |
| | | **Indicator** | **Criteria** | **Offline** | **Online** | | |
| **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** |
| 1-2 | Able to collect and create tables and graphics from statistical data | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | 1. The meaning of statistics<br>2. The function of statistics<br>3. Scale measurement<br>4. Qualitative and quantitative data" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 3 | Able to arrange random data to be collective data (frecuency distribution) | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | 1. The meaning of frecuency distribution<br>2. The Parts of frecuency distribution<br>3. Construction of frecuency distribution<br>4. Histogram, polygon frecuency, and curve | 10.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |

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| | | | | | | 5. The types of frecuency distribution" | |
| 4 | Able to calculate further data which covers the total value of data | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | The measurement of statistical description<br>1. Median<br>2. Distribution<br>3. Position measurement" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 5 | Able to know the measure of variance or standard deviation | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | The measurement of statistical description<br>1. Median<br>2. Dispersion<br>3. Position measurement" | 20.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 6 | Able to calculate general regression | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "Linear Regression<br>1. Median<br>2. Dispersion<br>3. Position measurement" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |

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| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 7 | Able to calculate the probabilty value based on frecuency | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Probability and random measurement<br>2. The function of probability distribution" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| **8** | Mid-Semester Evaluation | | | | | | **50%** |
| 9 | Able to calculate normal distribution value for the application of science, technology, industry, and survey measurement | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Density function and distribution function<br>2. Standard normal distribution" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 10 | Able to calculate the estimation of mean in term of probability theory and to measure the level of quantitative | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Expectation<br>2. Precision and Accuration" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |

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| | proximity to the true value | | | Practice, Problem-based learning [1 x 45’] | | | |
| 11 | Able to calculate variable X and Y with co-variant correlation and weight matrices | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Co-variance and correlation<br>2. Co-variance, correlation, and weight matrices" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 12 | Able to do statistical test using normal distribution and student’s t-distribution | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Student’s t-distribution<br>2. Chi-square distribution" | 5.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 13 | Able to calculate statistical data from sample of population data and to estimate parameter of probability distribution | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Sample statistics<br>2. Mean estimation<br>3. Variance estimation" | 10.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |

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| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 14 | Able to estimate parameters with the confidence interval | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Mean of confidence interval<br>2. Variance of confidence interval" | 10.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| 15 | Able to do test statistics from sample of population and make decision based on statistical value | | Completeness of material, depth of explanation, effectiveness of communication, accuracy of attitude | Lecture, Teacher-centered learning [1 x 45’] | | "1. Test statistics<br>2. Test statistics for a mean<br>3. Analysis of variance" | 10.00% |
| | | | | Discussion, Student-centered learning [1 x 45’] | | | |
| | | | | Practice, Problem-based learning [1 x 45’] | | | |
| **16** | **Final Semester Evaluation / Final Semester Examination** | | | | | | **100%** |