



SEMESTER STUDY PLAN

Study program: Master of Environmental Science

Faculty: School of Postgraduate

Subject:		Environmental Statistics	Code: CIL-8-103	Credit: 2 (4 ECTS)	Smt:1		
Supporting lecturer:		<ol style="list-style-type: none"> 1. Dr. Budi Warsito, S.Si, M.Si 2. Dr. Dra. Sunarsih, M. Si 					
Learning Outcomes Subject:		Students are able to process and analyze data related to the environmental field by applying statistical methods. Able to apply the use of statistics in the environmental field and master the concepts needed for analysis of environmental problems and environmental management systems;					
Short Description of Courses:		Environmental Statistics course discusses the meaning of statistics, descriptive statistics, basic concepts of probability, probability distribution, theoretical distribution of random variables, theoretical distribution of continuous random variables, sampling distribution, estimation, single sample hypothesis testing, multiple sample hypothesis testing, several other inferential analyzes, simple linear regression and correlation, and some non-parametric methods.					
1	2	3	4	5	6	7	
Week	Final Ability of each learning stage	Study Materials/ Subjects	Learning methods	Workload	Student Learning Experience	Evaluation	
						Criteria & Indicators	Weight (%)
1.	<ol style="list-style-type: none"> 1. Knowing the plan learning and division of tasks 2. Knowing about matters relating to Environmental statistics courses 	<ol style="list-style-type: none"> 1. RPKPS, syllabus, rules lectures, and rules evaluation 2. Introduction : Definition of Statistics, Role of Statistics in the environment, Problem solving with Statistics, Role of 	Explanatory presentation lesson plans and subject matter	216 Minutes (0.25ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture : 120minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20minutes</i> • <i>Presentation : 20minutes</i> • <i>Individual tasks :36 minutes/day (Self Work)</i> 	College student shape group for distribution presentation	Presence	5

		Computers in Statistics					
2.	<p>1. Able to present data graphically</p> <p>2. Be able to calculate the measures of concentration: mean, median, mode, quartile, decile, percentile, etc.</p> <p>3. Be able to calculate the size of the spread of standard deviation, variance, etc.</p>	<p>Descriptive Statistics:</p> <p>1. Collection organizing and presenting data.</p> <p>2. Distribution of frequency and graphic presentation</p> <p>3. Centering size</p> <p>4. Spread size</p> <p>5. Moment, skewness and kurtosis</p>	Lecturer presentations, student discussions, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activeness in Discussion • Accuracy • Explain the history of air pollution throughout the ages 	5
3.	<p>1. Able to define terminology is important in probability.</p> <p>2. Able to understand and explain concepts about events conditional, free and mutually exclusive</p> <p>3. Able to do Probability calculation correctly and precisely</p>	<p>The basic concept of probability:</p> <p>1. Basic concepts and definitions</p> <p>2. Probability of compound events</p> <p>3. Enumeration technique (enumeration)</p>	Lecturer presentations, student discussions, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	Listening, summarizing and asking questions, giving opinions, answering questions	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Question and answer 	5
4.	<p>1. Able to distinguish discrete and continuous random variables</p> <p>2. Able to use probability distribution concept</p> <p>3. Able to use probability distribution</p>	<p>Probability distribution:</p> <p>1. Random variable</p> <p>2. Probability distribution discrete</p>	Lecturer presentations, student discussions, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> 	Students take part in lecturer presentations and discussions as well as practice questions and do assignments	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Assignments and assessments exercise 	5

	with parameters 4. Able to understand and using the concept of expected value (hope mathematics)	3. Probability distribution continuous 4. Probability distribution with parameters 5. Expected value (hope mathematics)		<ul style="list-style-type: none"> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 			
5.	<p>1. Able to identify and calculate distribution discrete variable theoretical probability</p> <p>2. Able to determine Descriptive statistics</p> <p>3. Able to use discrete random variable theoretical distribution approach</p>	<p>Theoretical distribution of discrete random variables:</p> <p>1. Bernoulli distribution</p> <p>2. Binomial Distribution</p> <p>3. Binomial Distribution negative</p> <p>4. Geometric Distribution</p> <p>5. Poisson distribution</p>	Lecturer presentations, student discussions, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	Students take part in lecturer presentations and discussions as well as practice questions and do assignments	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments • Exercise • Quiz 	5
6.	<p>1. Able to identify and calculate distribution continuous variable theoretical probability</p> <p>2. Able to determine Descriptive statistics</p> <p>3. Able to use Continuous random variable theoretical distribution approach</p>	<p>Variable theoretical distribution continuous random:</p> <p>1. Normal distribution (Gaussian)</p> <p>2. Gamma Distribusi</p> <p>Distribution</p>	Student discussion per group, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks :</i> 	Listening, summarizing and asking questions, giving opinions, answering questions	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments • exercise 	5

		3. Chi-Square Distribution 4. Exponential Distribution 5. Weibull distribution 6. Log Normal Distribution		36 minutes/day (Self Work)			
7.	1. Able to understand the need for a sampling 2. Able to understand the principle of central limit theorem on the sampling distribution 3. Able to explain the steps required to form a sampling distribution.	Sampling distribution: 1. Understanding and basic concepts 2. Distribution of mean sampling 3. Distribution of sampling proportion 4. Distribution of difference and addition sampling	Lecturer presentation, discussion student, practice questions	216 Minutes (0.25 ECTS) Consist of: • Lecture : 120 minutes • Q&A: 20 minutes • Discussion : 20 minutes • Presentation : 20 minutes • Individual tasks : 36 minutes/day (Self Work)	College student follow the presentation lecturer and discussion as well as practice questions and	Indicator • Presence • Activity in • Discussion • Assignments and assessments exercise	5
8	Mid Term Examination	Meeting Material 1-7	Independent Written Test	216 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UTS questions	Quality of answers and timeliness of collection	10
9.	1. Able to explain basic concepts estimation 2. Able to count mean estimate, percentage and population variance 3. Able to determine sample size	Estimate: 1. Understanding and concepts estimation basis 2. Estimated population mean 3. Estimated percentage population	Lecturer presentation, discussion student, practice questions	216 Minutes (0.25 ECTS) Consist of: • Lecture : 120 minutes • Q&A: 20 minutes • Discussion : 20 minutes	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	Indicator • Presence • Activity in • Discussion • Assignments and assessments exercise	5

		4. Estimated variance population 5. Size determination sample		<ul style="list-style-type: none"> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 			
10	<p>1. Able to explain steps hypothesis test procedure</p> <p>2. Able to count and analyze test single sample hypothesis</p>	<p>Sample hypothesis test single:</p> <p>1. General test procedure hypothesis</p> <p>2. Test the sample hypothesis single means</p> <p>3. Test the single sample hypothesis percentage</p> <p>4. Test the single sample variance hypothesis</p> <p>5. P value on the test hypothesis</p>	Lecturer presentation, discussion student, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments exercise 	5
11.	<p>1. Able to understand goal and To do test procedure hypothesis</p> <p>2. Able to do the calculation that required use test sample hypothesis</p>	<p>Multiple sample hypothesis test:</p> <p>1. Test the variance hypothesis with multiple samples</p> <p>2. Test the mean hypothesis with multiple samples</p>	Lecturer presentation, discussion student, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> 	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments exercise • Quiz 	5

	double	3. Test the percentage hypothesis with multiple samples		<ul style="list-style-type: none"> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 			
12.	<p>1. Able to explain and use test anova</p> <p>2. Able to explain and using the chi-square test</p>	<p>A number of analysis other inferential:</p> <p>1. Analysis of Variance (ANOVA)</p> <p>2. Chi-Square Test</p> <p>3. Function alignment test</p> <p>4. Contingency table test</p>	Lecturer presentation, discussion student, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments exercise • Quiz 	5
13.	<p>1. able to explain and interpret regression equation linear</p> <p>2. able to count and explain correlation coefficient and coefficient determination</p>	<p>Linear Regression and Correlation simple :</p> <p>1. Simple linear regression analysis</p> <p>2. Test the relation and prediction interval</p> <p>3. Linear correlation analysis simple</p>	Lecturer presentation, discussion student, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> • <i>Q&A: 20 minutes</i> • <i>Discussion : 20 minutes</i> • <i>Presentation : 20 minutes</i> • <i>Individual tasks : 36 minutes/day (Self Work)</i> 	College student follow the presentation lecturer and discussion as well as practice questions and carry out a task	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion • Assignments and assessments exercise 	5
14.	<p>1. Being able to know the situation that need method use non-parametric</p>	<p>Some non-parametric methods :</p>	Lecturer presentation, discussion student, practice questions	<p>216 Minutes (0.25 ECTS)</p> <p>Consist of:</p> <ul style="list-style-type: none"> • <i>Lecture : 120 minutes</i> 	College student follow the presentation lecturer and discussion as well as practice questions and	<p>Indicator</p> <ul style="list-style-type: none"> • Presence • Activity in • Discussion 	5

	2. Able use test non-parametric	1. The significance of the method non-parametric 2. Test sign 3. Wilcoxon marked rating test 4. The Mann-Whitney Test 5. Kruskal-Wallis test 6. Spearman rank correlation coefficient		<ul style="list-style-type: none"> • Q&A: 20 minutes • Discussion : 20 minutes • Presentation : 20 minutes • Individual tasks : 36 minutes/day (Self Work) 	carry out a task	<ul style="list-style-type: none"> • Assignments and assessments exercise • Quiz 	
15.	Capable apply theory statistics on problems in the field Environmental Science	Applications Statistics in the field LH	Student presentation and discussion	216 Minutes (0.25 ECTS) Consist of: <ul style="list-style-type: none"> • Lecture : 120 minutes • Q&A: 20 minutes • Discussion : 20 minutes • Presentation : 20 minutes • Individual tasks : 36 minutes/day (Self Work) 	Students play an active role in looking for case studies in the field of Engineering The environment that Need troubleshooting with statistics, present in front of the class and discussion.	Indicator <ul style="list-style-type: none"> • Presence • Paper • activeness in discussion 	5
16	Final Examination	Meeting Materials 1-15 (resume material)	Written test	216 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UAS questions	Quality of answers and timeliness of collection	20

8. Reference List:

1. Hadi, S., Statistics, Student Library, Yogyakarta, 2015.
 2. Harinaldi, Statistical Principles for Engineering and Science, Erlangga, Jakarta, 2005
 3. Rohmad, and Supriyanto, Introduction to Statistics, Kalimedia, Yogyakarta, 2015
 4. Spiegel MR, Statistics, Schaum Outline Series, Mc-Graw-Hill, New York, 1982.
 5. Supranto J., Statistical Theory and Application Volume 1, Erlangga, Jakarta, 2009.
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