"BASICS OF STATISTICS" SYLLABUS

Basic data of the subject	
Academic Unit:	**Faculty of Life and Environmental Sciences**
Course title:	**Basics of statistics**
Program:	**Forestry and Environmental Sciences**
Level:	**Bachelor**
Course status:	**Elective**
Study year:	**Second year, Second semester**
Number of hours per week:	**2+1**
Credit value – ECTS:	**3**
Time / location:	**To be announced**
Lecturer:	**Prof.Assoc.Dr. Mirvjena Kellezi**
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Course description:	Through this subject, students will be introduced to the objectives and importance of Statistics and specifically: the collection, analysis, interpretation, presentation and organization of data. Indicators of position, variation and shape of experimental distributions. When a general census is not feasible, a selected subcategory of the population is studied, which is called a "sample" or in forestry terminology "trial". The withdrawal of the test has been subject to chance, therefore the numerical data resulting from the test or sample is part of the uncertainty. In order to still draw meaningful conclusions about the entire population, inferential statistics are necessary. It uses patterns in sample data to make inferences about the population the sample represents, taking into account chance (statistical hypothesis testing). The standard approach is to test a null hypothesis against an alternative hypothesis. A critical region is the set of values that leads to the rejection of the null hypothesis. Type I error probability is the probability that the Estimator falls into the critical region given that the null hypothesis is true (statistical significance) and Type II error is the probability that the Estimator does not fall into the given critical region, so the alternative hypothesis is true. The statistical power of a test is the probability that it correctly rejects the null hypothesis when the null hypothesis is false. Most studies only consider parts or samples of a population, so the results are not fully representative of the entire population. Any estimate obtained from the sample only approximates the population value. Confidence intervals allow statisticians to express how close the test (sample) estimate is to the true value of the entire population. Often they are expressed as 95% confidence intervals.

Course objectives:	In addition to specific learning outcomes, this course naturally aims to shape students' behavior in relation to the field of Statistics. Specifically, it certainly aims to: motivate students to have an intrinsic interest in statistical thinking. To create the belief that Statistics is important for scientific research. To provide a foundation and motivation for exposure to statistical ideas after the course.
Learning outcomes:	This module aims to give students sufficient knowledge on: • Basic notions of mathematical statistics applied in the field of forestry as indicators of experimental distributions. • Theoretical distributions encountered in the forest field. Essentiality screening methods.

Contribution on student load (must correspond with learning outcomes)			
Activity	**Hours**	**Days/week**	**Total**
Lectures	2	15	30
Exercise theoretical/laboratory	1	15	15
Practice work			
Contact with lecturer/consultations	1	15	15
Field exercises	-	-	-
Mid-terms, seminars	-	-	-
Homework	-	-	-
Individual time spent studying (at the library or home)	1	5	5
Final preparation for the exam	1	5	5
Time spent in evaluation (tests, quiz, final exam)	1	5	5
Projects, presentations, etc.	-	-	-
Total			**75 orë (3 ECTS)**

Teaching methods :	Lectures, discussions, laboratory exercises, consulting expeditions, seminars, independent projects, homework, colloquiums, course assignments, exams.
Evaluation methods:	Vlerësimi i parë (kolokvium): 15%, Seminaret ose angazhime tjera: 10%, Vijimi i rregullt: 5%, Provimi final: 70%, Total: 100%.
Literature	

Basic Literature:	• A.Salillari.P.Rrapo.S.Hoxha.H.Demiri 1998.Eksperimentimi Bujqesor. • David Freedman, Robert Pisani, Roger Purves 2007. Statistics (Fourth Edition). • G.Barbensi 1965.Elementi di biometria applicati alle scienze forestali. • Jim Fowler.Lou Cohen.Phil Jarvis 2005.Practical statistics for field biology (Second Edition) • Postoli. A. Tabaku. B. 1982. Metoda te statistikes dhe eksperimentimit shkencor ne pyje (I). • Postoli. A. Tabaku. B. 1982. Metoda te statistikes dhe eksperimentimit shkencor ne pyje (II).
Additional Literature:	• Prem S. Mann with the help of Christopher Jay Lacke 2010 Introductory Statistics (Seventh Edition). • Robert R.SOKAL and F. James ROHLF 2006. Biometry (The principles and practice of statistics in biological research-Third Edition).

Designed study plan:		
Week	**Lectures**	**Exercises**
First week:	Statistical surveys, statistical population, registration and initial processing of surveys, densities of empirical distributions, graphical representations of one-dimensional distributions.	Exercises and concrete examples on initial processing of observations, densities of empirical distributions, graphical representations of one-dimensional distribution.
Second week:	Average values: simple and weighted arithmetic mean; Median.	Calculation of the simple and weighted arithmetic mean. Calculation of the median (examples).
Third week:	Dispersion indicators: Variance and standard deviation, weighted variance and coefficient of variation.	Examples on calculating variance and standard deviation, weighted variance and coefficient of variation.
Fourth week:	Indicators of the shape of distributions: Asymmetry and excess.	Exercises on the calculation of asymmetry and excess.
Fifth week:	Binomial distribution. Fitting experimental distributions to the binomial distribution.	The methodology of matching experimental distributions with theoretical ones - the binomial distribution
Sixth week:	The Poisson distribution and matching experimental distributions to this theoretical distribution; The	Methodology of matching experimental distributions with theoretical ones-Poison distribution.

	normal distribution and matching experimental distributions with it.	
Seventh week:	Normal-logarithmic and generalized normal distributions and experimental distributions that matches with them.	The methodology of matching experimental distributions with theoretical ones - the normal distribution.
Eighth week:	Student distribution: X^2 distribution; Fisher's distribution, which are used to verify statistical hypotheses.	Colloquium on experimental distributions and theoretical distributions, their matching.
Ninth week:	Generalizations. Basic hypothesis, truth classes, confidence interval; The confidence interval of the arithmetic mean when the theoretical type deviation is known and when it is not known.	Course assignments on the formation and graphical presentation of empirical distributions, the calculation of indicators of experimental distributions and the methodology of matching experimental distributions with theoretical ones.
Tenth week:	The significance of the difference between an experimental mean and a given value when the theoretical standard deviation is known and not known.	Calculation of the confidence interval of the arithmetic mean when the theoretical deviation is known and when it is not known.
Eleventh week:	Comparison of an experimental variance with a given theoretical variance.	Exercises on the essentiality of the difference between an experimental average and a given value when the theoretical type deviation is known and not known.
Twelfth week:	Verification of the authenticity of the difference between two variances.	Exercises on comparing an experimental variance with a given theoretical variance.
Thirteenth week:	Examining the equality of many variances.	Exercises on verifying the validity of the difference between two variances. Examining the equality of many variances.
Fourteenth week:	Comparison of two experimental means when the theoretical variances of the respective populations are equal or not.	Exercises on comparing two experimental means when the theoretical variances of the respective populations are equal or not. Comparison of the effect of two ways (treatments) with the method of pairs.
Fifteenth week:	Comparison of the effect of two ways (treatments) with the method of pairs.	Colloquium on the consideration of essentiality in all cases and the verification of statistical hypotheses.

Academic policies and rules of conduct:
Students are obliged to regularly attend lectures, participate in field study visits (excursions). Switching off mobile phones, entering the classroom on time and keeping quiet in class are also mandatory.