



UNIVERSITY OF MITROVICA “ISA BOLETINI”

Course Curriculum Model (Syllabus)

Faculty:	Faculty of Mechanical and Computer Engineering	
Department:	Computer Science and Engineering	
Level:	Bachelor	
Code of the course:	CSE404	
Course:	Statistics	
Course Status:	Elective	
Semester:	IV	Summer
Number of hours per week:	2+2	
ECTS:	5	
Time / location:	Tuesday	
Year of studies:		
Lecturer:	Prof. asoc. dr Faton Merovci	
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Content	Randomness, finite probability space, probability measure, events; conditional probability, independence, Bayes' theorem; discrete random variables; binomial and Poisson distributions; concepts of mean and variance; continuous random variables; exponential and normal distribution, probability density functions, calculation of mean and variance; central limit theorem and the implications for the normal distribution; purpose and the nature of sampling; nature of estimates, point estimates, interval estimates; maximum likelihood principle approach, least-squares approach; confidence intervals; estimates for one or two samples; development of models and associated hypotheses; nature of hypothesis formulation, null and alternate hypotheses, testing hypotheses; criteria for acceptance of hypothesis t-test, chi-squared test; correlation and regression. Time series.
Purpose	The purpose of this course is to provide students with some concepts of probability and statistics with applications.

Accessability	Upon Successful completion of the course, students will be able to: • Use basic counting techniques (multiplication rule, combinations, permutations) to compute probability and odds. • Use R to run basic simulations of probabilistic scenarios. • Compute conditional probabilities directly and using Bayes' theorem, and check for independence of events. • Set up and work with discrete random variables. In particular, understand the Bernoulli, binomial, geometric and Poisson distributions. • Work with continuous random variables. In particular, know the properties of uniform, normal and exponential distributions. • Know what expectation and variance mean and be able to compute them. • Use available resources (the internet or books) to learn about and use other distributions as they arise. • Create and interpret scatter plots and histograms. • Understand the difference between probability and likelihood functions, and find the maximum likelihood estimate for a model parameter. • Use null hypothesis significance testing (NHST) to test the significance of results, and understand and compute the p-value for these tests. • Use specific significance tests including, z-test, t-test (one and two sample), chi-squared test. • Find confidence intervals for parameter estimates. • Compute and interpret simple linear regression between two variables ▪ Apply probability and statistics concepts to model, solve, and analyze real-world situations.	
Program	weeks	Lecture
	First week:	Introduction to Statistics
	Second week:	Various descriptive statistics (mean, standard deviation, variance) and visualization methods for 1D datasets
	Third week:	Elements of Probability Theory
	Fourth week:	discrete random variables
	Fifth week:	continuous random variable
	Sixth week:	Point estimation. Maximum likelihood estimation
	Seventh week:	Confidence interval
	Eighth week:	I colloquium.
	Ninth week:	Statistical Hypothesis Testing
	Tenth week:	t-test

	Eleventh week:	Chi-Square test		
	Twelfth week:	Simple linear regression		
	Thirteenth week:	Multiple linear regression		
	Fourteenth week:	Time series		
	Fifteenth week :	II colloquium.		
Literature	Principal literature: Ahmeti, A.(2018) Statistika per biznes dhe ekonomiks Larsen, R. J., & Marx, M. L. (2017). An introduction to mathematical statistics and its applications. Pearson; 6th edition Recommended Literature: Forsyth, D. (2018). <i>Probability and statistics for computer science</i> (pp. 3-361). Springer.			
Teaching methodology	Lecture, discussion, group work, exercises, homework, seminar papers			
	Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours)			
	Activity	Hours	Days/weeks	Total
	Lectures	2	15	30
	Exercise sessions (with TA)	2	15	30
	Practical work	-	-	-
	Office hours	-	-	-
	Fieldwork			
	Midterms, seminars	4	2	8
	Homework	2	12	24
	Self-study	1	15	15
	Final exam preparation	7	1	7
	Time spent in exams	3	1	3
	Projects, presentations, etc	8	1	8
	Total			125

Evaluation	Teaching methodology: (according to the Statute and Regulation for studies of UMIB)	
	Tests / Colloquia	40%
	Seminary work	20%
	Final exam	40%
	Student gets the passing grade by collecting 50% at least.	