

**FACULTY OF ENGINEERING
STUDY COURSE DESCRIPTION**

Course Title:	Statistics in Engineering				
Course code (LAIS):					
Study programme:	Information technologies				
Level of Study programme:	<input type="checkbox"/>	1st level professional higher education			
	<input checked="" type="checkbox"/>	Professional Bachelor			
	<input type="checkbox"/>	Professional Master			
	<input type="checkbox"/>	Academic Master			
	<input type="checkbox"/>	PhD level			
Type of Study programme:	<input checked="" type="checkbox"/>	Compulsory course (Part A)			
	<input type="checkbox"/>	Professional specialization courses (Part B, compulsory)			
	<input type="checkbox"/>	Professional specialization optional courses (Part B, optional)			
	<input type="checkbox"/>	Elective courses (Part C)			
Course Workload:	Credits	ECTS	Academic hours	Contact hours	Independent work hours
	4	6	160	64	96
Course Author/ Tutor:	Sarma Cakula				
	Professor, Ph.D				
	sarma.cakula@va.lv				
	Consultation: according to the schedule for each semester				
Study Form:	Full time studies/part time studies				
Study year, semester:	Second study year, third semester				
Language:	Latvian, English				
Prerequisites for the Course:	Mathematics				
Course Summary:	The aim of the course is to acquaint students about fitness of statistics in different IT projects and especially in process evaluation, to use statistical methods in researches and practical work.				
Assessment:	Final assessment consists of:				
	<ol style="list-style-type: none"> 1. Individual work in practical exercises during the course - 30 %. 2. Research paper in engineering - 40 %. 3. Exam – 30% <p>If the student does not fulfill the conditions for obtaining a positive evaluation, the next time the course must be redeployed in full;</p> <p>Participation in the seminar will be evaluated in the 10-point system, taking into account the following criteria:</p> <p>brilliant (10) - knowledge, skills and competence go beyond the requirements of the seminar;</p> <p>Excellent (9) - Knowledge, skills and competence fully meet the requirements of the workshop;</p> <p>Very good (8) - Completely fulfilled requirements of the seminar, however, there are not enough deep awareness on some issues to apply knowledge independently to solve more complex problems;</p> <p>well (7) - the requirements of the seminar are generally met; however, sometimes the inability to use the acquired knowledge independently is detected;</p> <p>Almost well (6) - the requirements of the seminar are fulfilled, but at the same time there is an insufficient understanding of the deep problem and lack of skills to use the acquired knowledge;</p> <p>Mediocre (5) - In general, the requirements of the workshop have been met; however, there is insufficient knowledge of some problems and inability to use the acquired knowledge;</p> <p>almost satisfactory (4) - generally, the requirements of the workshop have been met; however, there is insufficient understanding of some basic concepts; there are significant difficulties in the practical use of the acquired knowledge;</p> <p>weak (3) - knowledge is superficial and incomplete, the student is not able to use it in specific situations;</p>				

	<p>Very weak (2) - there is superficial knowledge only about certain problems, most of the requirements of the seminar have not been learned; very, very weak (1) - there is no understanding of the basic problems of the seminar, there is almost no knowledge of the topics discussed in the seminar. The exam will be evaluated in the 10-point system. The exam will be evaluated as passed if the student answers correctly to 3 expanded questions</p>	
Requirements for Credits:	<p>Requirements:</p> <ol style="list-style-type: none"> 1. Practical exercises must be prepared and delivered in determined time. 2. Attendance of practical works is compulsory or individual tasks must be work off. 3. Positive evaluation must be received for in all practical works, control tests, exercises and pre-tests. 	
Abiding by the Academic Ethics	<p>Students must abide by the academic and research ethics, Vidzeme University of Applied Sciences Ethics Regulations, incl.:</p> <ul style="list-style-type: none"> – study papers must be independently developed; – the study work should reference all statements, ideas and data used that have been authored by someone else; – appropriate data acquisition methods should be used in the acquisition of data, the research ethics must be respected, empirical data must be collected independently and cannot be distorted or falsified; – the examination must be carried out by the student independently, without the use of supporting materials and/or consultations with other students, unless the lecturer states otherwise. <p>In the event of non-compliance with the academic and research ethics, punishment is imposed in accordance with the ViA Ethics Regulations and the study course must be re-taken, unless the punishment is extramarital.</p>	
Learning Outcomes; the evaluation methods and criteria	Learning Outcomes	The evaluation methods and criteria
	Knowledge	
	Understanding of qualitative and quantitative research methods	Visiting and mastering lectures, practical works
	Understanding the use of statistical data analysis methods	Visiting and mastering lectures, practical works
	Understanding the program for input and output data analysis	Visiting and mastering lectures, practical works
	Skills	
	Understand and apply the mathematical formulas for statistical calculations	5 tests
	Understand the statistical and practical significance of the calculated results	3 tests
	Use computer software for statistical calculations	4 tests
	Competency	
Organize a scientific research and design an appropriate design	Valuation of research work	
Understand and apply statistical methods for data analysis	Valuation of research work, exam	
Obtain information from quantitative data	Valuation of research work, exam	
Course Compulsory literature:	<p>Morrison S.J. <i>Statistics in Engineering</i>. Wiley, 2009 Bluman. <i>Elementary Statistics. Step by Step Approach</i>. McGraw-Hill Higher Education, 2012</p>	
Course additional literature:	<p>John W. Creswell. <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i>. Sage Publications, 2009, ISBN 978-1-4129-6556-9 Uwe Flick. <i>Introducing Research Methodology: A Beginner's Guide to Doing a Research project</i>. Sage publications, 2011 Sumeet Dua, Sartaj Sahni, D. P. Goyal. <i>Information Intelligence, Systems, Technology and Management</i>. Springer-Verlag Berlin, 2011 Schwartz B, Wilson J., Goff D., <i>An EasyGuide to Research Design & SPSS (EasyGuide Series) Second Edition</i>, SAGE, 2018.</p>	

	Lasmanis A. Datu ieguves, apstrādes un analīzes metodes pedagoģijas un psiholoģijas pētījumos: SPSS.Rīga : Izglītības solī, 2002.
Course confirmation date:	
Date of course description update:	

Study Course Plan:

Date	Theme	Academic hours		Study Form/ Organization of independent work of students and task description
		Contact hours	Independent work hours	
<i>The date is specified before the implementation of the course</i>	Research design in engineering. Quantitative & Qualitative Approaches in Engineering. Data mining in engineering. Questionnaires. General terms. Basic key concepts. Sampling methods. Problems.	4	6	Lecture, group work, independent work studying literature
	Qualitative research, designs, methods. Population and sample. Collecting quantitative data. Types of variables. Measure.	4	6	Lecture, group work, independent work studying literature
	Data descriptive methods. Graphical methods for describing quantitative data. The central tendency, skewness, kurtosis, standard deviation, dispersion, coefficients.	4	6	Lecture, practical work, independent work studying literature
	Development of a professional questionnaire. Methods for describing sets of data.	4	4	Lecture, practical work, independent work studying literature
	Basic of Probability Theory. Combinations, Variations. Classical model. Dependent and independent variables.	4	6	Lecture, practical work, independent work
	Random Variables, Sampling Distribution. Probability Distributions. Normal Distribution. Binomial Distribution. Poisson Distribution. Exponential Distribution.	4	6	Lecture, practical work, independent work studying literature
	Analyses of normal distribution, uses in engineering. Hypothesis tests. Statistical t-tests. Type I and Type II errors. Chi-square tests.	4	6	Lecture, practical work, independent work studying literature
	Analyses of dispersion ANOVA. Use of computer programs	4	6	Lecture, laboratory work, independent work studying literature
	Use of computer programs- crosstabs	4	6	Lecture, laboratory work, independent work
	Correlation. Covariance. Linear regression. Use of computer programs- frequency tables, central tendency.	4	6	Lecture, laboratory work, independent work studying literature
	Construction of basic business and economics indexes. Use of computer programs- correlation, linear regression	4	6	Lecture, laboratory work, independent work studying literature
	Statistics in project development. Decision tree. Statistical control of processes. Weights.	4	4	Lecture, independent work studying literature
	Multiple regression and correlation	4	6	Lecture, independent work studying literature
	Statistical estimation of processes	4	6	Lecture, laboratory work, independent work studying literature



	Application of computer software for quantitative analysis of data	4	6	Lecture, laboratory work, independent work studying literature
	Individual research work	4	10	Seminar, presentations
	Hours total:	64	96	