MATHEMATICAL STATISTICS

Faculty of Computer Science				
Study programme:	**Computer Science**		Degree level:	**Engineer's degree full-time programme**
Specialization	**---**		Diploma path:	**2026/2027W - 2026/2027S**
Module name:	**Mathematical Statistics** (Statystyka matematyczna)			
Module type:	**obligatory**	**Semester: 2**	ECTS:**5**	Module ID:**FCS-00065**
No. of hrs in semester:	Lecture (L) - **30** Classes(C) - **0** Specialization workshop (SW) - **30** Project (P) - **0** Laboratory classes (LC) - **0** Seminar (S) - **0**			
Prerequisites	-			

Aims and objectives:	To familiarize students with the basic methods of mathematical statistics. Literacy education from the corresponding theorems and formulas. Learning how to verify their calculations. Focusing on the need to draw conclusions and to formulate and justify opinions. Education ability to use Excel statistical functions, data analysis tools in Excel, R and in Python's libraries.		
Forms of teching activities::	lecture, specialization workshop,	Assessment:	Evaluation must be relevant to the intended learning outcomes:
			Lecture - written exam. Specialist workshop - quizzes on the e-learning platform, reports on subsequent topics, observation of work during classes
Module content:	Elements of descriptive statistics, probability distributions occurring in the statistics, point estimates and compartments, confidence intervals, hypothesis verification parametric compatibility tests, tests of independence, ANOVA, estimators of the correlation coefficient and the regression coefficient.		
Teaching methods:	project method, laboratory exercises, discussion related to the lecture, lecture problem, informative lecture,		

Learning outcomes

Symbol	Specify min. 4, max. 8 learning outcomes in the following order: knowledge – skills – competence. Each learning outcome must be verifiable	Reference to the programme learning outcomes of education
LO1	selects and distinguishes the corresponding mathematical models and justify the selection of the theorem, it can refute erroneous hypothesis	
LO2	lists and selects the appropriate model verification using estimation theory and test hypotheses attempt to one-dimensional	
LO3	knows how to lead a simple statistical inference, including the use of computer tools	
LO4	knows how to use the characteristics of the population and their estimators	
LO5	lists and explains the basic use of mathematical statistics in the natural sciences, social, technical, and as a tool engineer	

No. of learning outcome	Methods of assessing the learning outcome	Type of teaching activities (if more than one) during which the outcome is assessed
LO1	exam	L
LO2	exam	L
LO3	entry at laboratory, evaluation reports carry out the task	SW
LO4	entry at laboratory, evaluation reports carry out the task, exam	SW
LO5	observation of work at laboratory	SW

Student's workload (in hours)			
	1 - Participation in lectures		30
	2 - Participation in the laboratory specialist		30
	3 - Preparation for laboratory specialist		20
	4 - Development of laboratory reports and / or completion of homework assignments (homework)	None	29
	5 - Participation in the consultations	None	4
	6 - Presence on the exam		2
	7 - Preparation to the exam	None	10
		TOTAL:	**125**

Quantitative indicators			
	Student's workload - activities that require direct teacher participation: (6)+(2)+(1)+(5)	66	**ECTS**
			2.6
	Student's workload connected with practical classes (2)+(4)+(3)	79	3.2

Basic references:	1.. W. Freiberger, U. Grenander, A short course in computational probability and statistics, New York : Springer-Verlag, 1971. 3. R. Walpole, R. Myers, S. Myers, K. Ye, Probability and Statistics for engineers and scientists, 7th edition, 2002. 3. https://docs.python.org/3/library/statistics.html

Further reading	1. K. Hinkelmann, O. Kemptorne, Design and analysis of experiments. Vol.1, Introduction to experimental design,New York : Wiley J., 1994. 2. A. Saha, Doing math with Python: use programming to explore algebra, statistics, calculus and more, No Starch Press; 1st edition, 2015.		
Unit:	Software Department	Lecturer/ instructor	
Date of issuing the programme:	31st March 2026	Author of the programme:	dr inż. Magdalena Topczewska

L - lecture, C - classes, LC - laboratory classes, P-project, SW - specialization workshop, S - seminar