SYLLABUS OF A MODULE

Polish name of a module	**Analiza systemów probabilistycznych (i statystyka)**
English name of a module	Probabilistic systems analysis (& statistics)
ISCED classification - Code	0542
ISCED classification - Field of study	*Statistics*
Languages of instruction	*English*
Level of qualification:	*2*
Number of ECTS credit points	*5*
Examination:	*EW*
Available in semester:	*S*

Number of hours per semester:

Lecture	Tutorial	Laboratory	Seminar	Project	Others
30 E	15	30	0	0	0

MODULE DESCRIPTION

Module objectives

O1. Making the students familiar with the elements of the theory and methods of probability useful in engineering problems.

O2.   Making the students familiar with the elements of the statistical methods.

O3.   Introducing the students into using the computer methods in probability and statistics.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Course of the calculus of one variable

LEARNING OUTCOMES

LO 1 – student is familiar with the basics of probability; student understands the need

of probability in statistics.

LO 2 – student is familiar with the introductory methods of a point and interval estimation; student is able to use Maple in solving simple estimation problems

LO 3 – student is familiar with the introductory methods of a hypothesis testing; student is able to use Maple in solving problems of this type.

MODULE CONTENT

Type of classes – Lectures	Number of hours
Course introduction. The subject of statistics, the need of probability. Types of data	2
Methods for describing data	2
The numerical descriptive measures	2
The numerical descriptive measures, cont. , random experiment, events, sample spaces	2
Probability – axioms and properties	2
Conditional probability, total probability Bayes' theorem	2
Independence. Introduction to the random variables. Discrete random variables.	2
Probability distribution for discrete random variable, expected value. Basic discrete distributions.	2
Continuous random variables. Probability distribution for continuous random variables, expected value. Basic continuous distributions.	2
Basic continuous distributions cont. Introduction to sampling distributions.	2
Introduction to sampling distributions cont. The law of large numbers. The central limit theorem.	2
The point estimation	2
The confidence intervals	2
Test of hypothesis: single sample	2
Test of hypothesis: two samples	2

Type of classes– Tutorial	Number of hours
Types of data	1
Graphical description of data	1
The mode, the arithmetic mean	1
The range of data. Variance and standard deviation	1
Variance and standard deviation cont., Interpretation of the standard deviation.	1
Property of probability, Bayes' rule	1
Independence	1
Discrete random variables: calculating the expected value and the standard deviation	1
Discrete random variables: applications to the real world problems	1
Continuous random variables: calculating the expected value and the standard deviation	1
Continuous random variables: applications to the real world problems	1
Point estimation, maximum likelihood method	1
A confidence interval for a population mean – a large sample case	1
Test of hypothesis about a population mean – a large sample case	1
The power of a test, p-value of a test	1
Type of classes– Laboratories	Number of hours
Review of integration	2
Methods for describing data	2
Calculating numerical descriptive measures	2
Basic combinatorics	2
Classical definition of probability	2
Conditional probability, total probability, Bayes' theorem, independence	2
Discrete random variables.	2
Probability distribution for discrete random variable, expected value.	2

Continuous random variables. Probability distribution for continuous random variables, expected value.	2
Generating pseudorandom numbers	2
Various problems concerning discrete and continuous random variables	2
The point estimation	2
The confidence intervals	2
Test of hypothesis: single sample	4

TEACHING TOOLS

1. – lecture
2. – tutorials
3. – computer laboratory

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. – assessment of preparation for laboratory exercises
F2. – assessment of activity during classes
S1. – assessment of the ability to solve the posed problems and the method of presentation of the obtained results - credit for the grade
S2. – assessment of mastery of the lecture material - passing the lecture (or exam)

*) warunkiem uzyskania zaliczenia jest otrzymanie pozytywnych ocen ze wszystkich ćwiczeń laboratoryjnych oraz realizacji zadania sprawdzającego

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1.	**Contact hours with teacher**	
1.1	Lectures	30

1.2	Tutorials	15
1.3	Laboratory	30
1.4	Seminar	0
1.5	Project	0
1.6	Consulting teacher during their duty hours	1
1.7	Examination	2
Total number of contact hours with teacher:		78
2.	**Student's individual work**	
2.1	Preparation for tutorials and tests	12
2.2	Prreparation for laboratory exercises, writing reports on laboratories	15
2.3	Preparation of project	0
2.4	Preparation for final lecture assessment	0
2.5	Preparation for examination	10
2.6	Individual study of literature	10
Total numer of hours of student's individual work:		47
Overall student's workload:		125
Overall number of ECTS credits for the module		5
Number of ECTS points that student receives in classes requiring teacher's supervision:		3,12
Number of **ECTS** credits acquired during practical classes including laboratory exercises and projects :		1,8

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Lecture notes
Ramachandran, K. M., Tsokos.C.P., Mathematical statistics with applications, Elsevier Academic Press, 2009
J.T.McLeve, P.G.Benson, Statistics for business and economics, Macmillan, London 1988 and later issues

MODULE COORDINATOR (NAME, SURNAME, INSTITUTE, E-MAIL ADDRESS)

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