MODULE DESCRIPTION

Module code	
Module name	**Metody probabilistyczne i statystyka**
Module name in English	**Probabilistic Methods and Statistics**
Valid from academic year	**2012/2013**

MODULE PLACEMENT IN THE SYLLABUS

Subject	**Computer Science**
Level of education	**1st degree** *(1st degree / 2nd degree)*
Studies profile	**General** *(general / practical)*
Form and method of conducting classes	**Full-time** *(full-time / part-time)*
Specialisation	
Unit conducting the module	**The Department of Computer Science Applications**
Module co-ordinator	**Prof. Aleksander Jastriebow, PhD hab., Eng.**
Approved by:	

MODULE OVERVIEW

Type of subject/group of subjects	**Basic** *(basic / major / specialist subject / conjoint / other HES)*
Module status	**Compulsory** *(compulsory / non-compulsory)*
Language of conducting classes	**English**
Module placement in the syllabus - semester	**2nd semester**
Subject realisation in the academic year	**Summer semester** *(winter / summer)*
Initial requirements	**Mathematical Analysis, Linear Algebra** *(module codes / module names)*
Examination	**Yes** *(yes / no)*
Number of ECTS credit points	**5**

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	**30**	**30**			

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the module is to familiarise students with the basics of the probability theory, statistical analysis as well as computer simulation of random variables (generators of random variables).

Effect symbol	Teaching results	Teaching methods *(l/c/l/p/other)*	Reference to subject effects	Reference to effects of a field of study
W_01	A student has knowledge as regards probabilistic methods and mathematical statistics covering probability issues, the expected value, stochastic processes, estimation, and testing statistical hypotheses.	l	K_W02	T1A_W01 InzA_W02
W_02	A student has knowledge as regards probabilistic methods and mathematical statistics covering probability issues, the expected value, stochastic processes, estimation, and testing statistical hypotheses.	c	K_W02	T1A_W01 InzA_W02
U_01	A student can calculate the probability of events, the expected value, variance and a standard deviation; in addition, a student can analyse algorithms as regards average behaviour; moreover, a student can calculate the reliability of simple device and program systems; a student can also apply the concept of stochastic processes to analyse the efficiency of simple device-program systems; a student can also conduct simple statistical inference.	l	K_U08	T1A_U08 T1A_U09 InzA_U02
U_02	A student can calculate the probability of events, the expected value, variance and a standard deviation; in addition, a student can analyse algorithms as regards average behaviour; moreover, a student can calculate the reliability of simple device and program systems; a student can also apply the concept of stochastic processes to analyse the efficiency of simple device-program systems; a student can also conduct simple statistical inference.	c	K_U08	T1A_U08 T1A_U09 InzA_U02
K_01	A student is aware of the importance and understands both non-technical aspects and effects as regards the activity of an engineer-computer programmer and the connected responsibility for the collectively completed tasks.	l	K_K02	T1A_K02 InzA_K01
K_02	A student is aware of the importance and understands both non-technical aspects and effects as regards the activity of an engineer-computer programmer and the connected responsibility for the collectively completed tasks.	c	K_K02	T1A_K02 InzA_K01

Teaching contents:

Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module

1	The fundamentals of combinatorics. Probabilistic methods.	W_01 U_01 K_01
2	The methods of calculating probability.	W_01 U_01 K_01
3	Conditional probability.	W_01 U_01 K_01
4	The Bayes method. The Bernoulli model.	W_01 U_01 K_01
5	Continuous and discrete random variables. The distributions of random variables.	W_01 U_01 K_01
6	Numerical characteristics of discrete random variables.	W_01 U_01 K_01
7	Numerical characteristics of continuous random variables.	W_01 U_01 K_01
8	Characteristic function of random variables.	W_01 U_01 K_01
9	Multi-dimensional random variables and their characteristics.	W_01 U_01 K_01
10	Two-dimensional random variables. The regression function. The coefficient of correlation.	W_01 U_01 K_01
11	The laws of large numbers and a limit theorem.	W_01 U_01 K_01
12	Experimental calculation methods of characteristics of random variables. Scoring and interval evaluation.	W_01 U_01 K_01
13	Computer modelling of random variables. Pseudo-Random Number Generator with discrete distributions.	W_01 U_01 K_01
14	Pseudo-Random Number Generator with continuous distributions. Monte Carlo methods.	W_01 U_01 K_01
15	The application of probabilistic methods in modelling and simulation. Introduction to statistics.	W_01 U_01 K_01

Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module
1	Probabilistic methods.	W_02 U_02 K_02
2	Classical method of calculating probability.	W_02 U_02 K_02

3	Geometric and experimental method of calculating probability.	W_02 U_02 K_02
4	Conditional probability.	W_02 U_02 K_02
5	The Bayes method.	W_02 U_02 K_02
6	The Bernoulli model.	W_02 U_02 K_02
7	A test.	
8	The characteristics of discrete random variables.	W_02 U_02 K_02
9	The characteristics of continuous random variables.	W_02 U_02 K_02
10	The laws of large numbers and a limit theorem.	W_02 U_02 K_02
11	A random sample and point estimation.	W_02 U_02 K_02
12	A random sample and interval estimation.	W_02 U_02 K_02
13	Testing statistical hypotheses.	W_02 U_02 K_02
14	Computer methods of modelling random variables (Pseudo-Random Number Generators).	W_02 U_02 K_02
15	A test.	

The methods of assessing teaching results

Effect symbol	**Methods of assessing teaching results** *(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)*
W_01	An examination
W_02	A test
U_01	An examination
U_02	A test
K_01	An examination
K_02	A test

STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	**Student's workload**
1	Participation in lectures	**30**

2	Participation in classes	**30**
3	Participation in laboratories	
4	Participation in tutorials (2-3 times per semester)	**2**
5	Participation in project classes	
6	Project tutorials	
7	Participation in an examination	**2**
8		
9	**Number of hours requiring a lecturer's assistance**	**64** *(sum)*
10	**Number of ECTS credit points which are allocated for assisted work** *(1 ECTS credit point=25-30 hours)*	**2.56**
11	Unassisted study of lecture subjects	**20**
12	Unassisted preparation for classes	**20**
13	Unassisted preparation for tests	**10**
14	Unassisted preparation for laboratories	
15	Preparing reports	
16	Preparing for a final laboratory test	
17	Preparing a project or documentation	
18	Preparing for an examination	**11**
19	Preparing questionnaires	
20	**Number of hours of a student's unassisted work**	**61** *(sum)*
21	**Number of ECTS credit points which a student receives for unassisted work** *(1 ECTS credit point=25-30 hours)*	**2.44**
22	**Total number of hours of a student's work**	**125**
23	**ECTS credit points per module** *1 ECTS credit point=25-30 hours*	**5**
24	**Work input connected with practical classes** *Total number of hours connected with practical classes*	**62**
25	**Number of ECTS credit points which a student receives for practical classes** *(1 ECTS credit point=25-30 hours)*	**2.48**