Course description

Course abbreviation:	KI/MAI1		
Course name:	Mathematics for informatics I		
Academic Year:	2014/2015	**Printed:**	29.03.2024 06:58

Department/Unit /	KI / MAI1	**Academic Year**	2014/2015
Title	Mathematics for informatics I	**Type of completion**	Exam
Accredited/Credits	No, 5 Cred.	**Type of completion**	Combined
Number of hours	Přednáška 2 [HOD/TYD] Cvičení 2 [HOD/TYD]		
Occ/max	Status A Status B Status C	**Course credit prior to**	YES
Summer semester	0 / - 0 / - 0 / -	**Counted into average**	YES
Winter semester	0 / - 0 / - 0 / -	**Min. (B+C) students**	not determined
Timetable	Yes	**Repeated registration**	NO
Language of instruction	Czech, English	**Semester taught**	Winter semester
Optional course	Yes	**Internship duration**	0
Evaluation scale	1|2|3|4	**Ev. sc. – cred.**	S|N
No. of hours of on-premise			
Auto acc. of credit	No		
Periodicity	K		
Substituted course	KI/MAT3		
Preclusive courses	N/A		
Prerequisite courses	KMA/P210		
Meet all prerequisites before registering	NO		
Informally recommended courses	N/A		
Courses depending on this Course	KI/MAI2		

Course objectives:

The aim of the course is to provide the students with a systematical survey of the subject matter taught at comprehensive school level, particularly in the areas of combinatorial analysis and probability. The course also intends to acquaint the students with ways of determining and describing correlations in the field of statistically immutable random experimentation as well as with ways of applying some of the most salient probability models. Random events and processes simulation will also be dealt with during the course. The students are expected to have a working knowledge of the subject matter covered by preceding courses in algebra and mathematical analysis.
The course is a follow-up to the Probability and Statistics I course, and its focus is predominantly on the methods of information extrapolation from the selected partial set to the core set. As for methods employed in the field of mathematical statistics, the following issues will be dealt with: point and interval parameter estimates in elementary probability distributions, the testing of hypotheses relating to parameters in normal distribution, the approximate testing of parameters in some other types of distribution (using data from one or two random selections), some non-parameter tests, linear regression, and some issues related to the correlation of random variables.

Requirements on student

Zápočet - získání nejméně 100 bodů. Body se udělují z tří testů (každý maximálně za 20 bodů), z docházky (5 bodů za účast na cvičení) a z prezentace domácí práce na cvičení (body dle obtížnosti prezentace).

Zkouška - ústní

Content

1. Overview of basic principals of probability
2. Random variables, probability density, probability functions, distribution functions, basic characteristics
3. Discrete and continuous probability distribution, properties and application
4. Specialized statistical probability distribution - Pearson, Student, Fischer
5. Random samples
6. Random sampling from a normal probability distribution
7. Confidence intervals and their construction

8.   Hypothesis testing of normal distribution - single sample
9.   Hypothesis testing of normal distribution - two samples
10.   Hypothesis testing of other distributions. Dependent- and independent-sample t-test. Tests of correlation
11.   Theoretical analysis of linear regression, methods of least squares, determination of systems of normal equations. Coefficient estimation.
12.   Correlation analysis, co-variance, correlation coefficients, Spearman's coefficient
13.   Contingency tables
14.   Connectivity and application

Prerequisites - other information about course preconditions

Teaching in English is meant only for erasmus and foreign students. In the case of a small number of students is teaching in a form of individual consultations.

Competences acquired

Fields of study

Guarantors and lecturers

- **Guarantors:**   doc. RNDr. Jiří Felcman, CSc. (100%)
- **Lecturer:**   doc. RNDr. Jiří Felcman, CSc. (100%), Mgr. Jan Spěvák, Ph.D. (100%), RNDr. Jiří Škvor, Ph.D. (100%)
- **Tutorial lecturer:**   Mgr. Jan Spěvák, Ph.D. (100%), RNDr. Jiří Škvor, Ph.D. (100%)

Literature

- **Recommended:**   HEBÁK P., KAHOUNOVÁ J. *Počet pravděpodobnosti v příkladech*. SNTL Praha, 1978.
- **Recommended:**   CIHLÁŘ J., PELIKÁN Š. *Pravděpodobnost - cvičení*. PF UJEP, Ústí nad Labem, 1996.
- **Recommended:**   PELIKÁN Š. *Pravděpodobnost a statistika I*. PF UJEP, Ústí nad Labem, 2003.
- **Recommended:**   MCCLAVE J. T., DIETRICH F.H. *Statistics*. Dellen Publishing Compeny, San Francisco, 1988.
- **Recommended:**   PELIKÁN Š. *Základy pravděpodobnosti a statistiky*. PřF UJEP, Ústí nad Labem, 2007.

Teaching methods

Assessment methods

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Applied Informatics	Bachelor	Full-time	Information Systems	1	A8	2014	Povinné předměty	A	2	ZS
Applied Informatics	Bachelor	Full-time	Information Systems	1	A11	2014	Povinné předměty	A	2	ZS