

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Probability and Statistics		Code 1010115111010340008
Field of study Civil Engineering Extramural Second-cycle	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Structural Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 20 Classes: - Laboratory: 10 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 210 100%
Responsible for subject / lecturer: dr Karol Andrzejczak email: karol.andrzejczak@put.poznan.pl tel. 61-6652815 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student is good at notions, methods and applications of mathematical logic, set theory, analysis and algebras in the basic course in mathematics.
2	Skills	He is knowing how to use formal methods in the acquired mathematical knowledge.
3	Social competencies	He is conscious of the need to expand competence. He is able to talk about possibilities of the formalization of simple technical issues.
Assumptions and objectives of the course: - Taking control of bases of the probability calculus and mathematical statistics. - Of purchasing the ability of the modelling of random experience with using probabilistic adequate spaces and estimating probabilities of the random events. - Achieving the ability of applying random variables and appointing their functional and numerical characteristics. - Purchasing the ability of the models construction, also for examining the relation between studied features. - Understanding the nature and the meaning of limit theorem and their role in the mathematical statistics and in the engineering practice. - Purchasing of the statistical inference ability concerning parameters and the random variable distributions being models of studied features in statistical populations. - Taking control of the ability of applying statistical packages in the problem solving		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. He perceives random phenomena, understands the need of applying probabilistic methods and statistics. He can apply these methods and interpret results in engineering and social problems. - [-]		
Skills: 1. He perceives mechanical and social problems with random factors and is able to construct simple probabilistic models for them. - [-] 2. He is able to apply models of random experiments. - [-] 3. He is knowing how to use statistical characteristics of the population and their empirical counterpart. - [-] 4. He is able to conduct statistical inference with using computer tools. - [-]		
Social competencies:		

1. He is able to convince other about the need of applying probabilistic methods and mathematical statistics in the problem solving with the incomplete knowledge. - [-]
 2. In particular he is able to talk about random phenomena associated with the reliability and the maintaining of technical objects. - [-]

Assessment methods of study outcomes

- Lecture
 Assessing activities for solving problems intend for independent improving own abilities.
 The written final work concerning the practical application of methods get to know at lectures.
- Laboratory
 Evaluation of drawing up the cross-sectional problem with computer assisting.
 Constant assessing the knowledge for the effectiveness of applying acquired during the problem solving and for discussing additional aspects of the issue.

Course description

- Acquainting with the probabilistic space as the model of random experience and with operation on events and with the axiomatic and classical probability.
- Practical applying statement about the total probability and Bayes theorem.
- Defining and discussing one and two-dimensional random variables with real values.
- Introducing and discussing main properties of the functional and numerical characteristics of random variables.
- Review of essential distributions of the discreet and continuous type and presenting the possibility of their applications in the engineering practice.
- Characterizing dependent random variables.
- Law of large numbers and central limit theorem with practical applications.
- Entering into simulation methods.
- Presentation basic statistics and its properties as good estimators of parameters of the probability distribution.
- Discussing methods of the interval estimation and both parametric and nonparametric verification of statistical hypotheses.
- The inspection of statistical packages and their practical use in the engineering problem solving.

Basic bibliography:

1. Plucińska Agnieszka, Edmund Pluciński: Probabilistyka. WNT, Warszawa 2000.
2. Kordecki Wojciech: Rachunek prawdopodobieństwa i statystyka matematyczna. Definicje, twierdzenia, wzory. Oficyna Wydawnicza GiS, Wrocław 2003.
3. Kryszicki Włodzimierz i inni: Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, cz. I i cz. II. PWN Warszawa

Additional bibliography:

1. Bobrowski Dobiesław: Probabilistyka w zastosowaniach technicznych. WNT, Warszawa.
2. Bobrowski Dobiesław, Krystyna Maćkowiak-Łybacka: Wybrane metody wnioskowania statystycznego. Wyd. PP, Poznań.
3. Andrzejczak Karol: Statystyka elementarna z wykorzystaniem systemu Statgraphics. Wyd. PP, Poznań

Result of average student's workload

Activity	Time (working hours)	
1. Participatin in lectures	20	
2. Participation in laboratory classes	10	
3. Preparing for the lecture credit	12	
4. Preparation for laboratory exercises	10	
5. Completing (at home) the studies from laboratory exercises	10	
6. Consultation	3	
7. Preparing for the credit laboratory classes	15	
Student's workload		
Source of workload	hours	ECTS
Total workload	80	3
Contact hours	33	1
Practical activities	45	2