STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Mathematical statistics	**1010604241010344571**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**general academic**	**2 / 4**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **18** Classes: **8** Laboratory: **-** Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
basic	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
the sciences	**2 100%**
Mathematical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has a knowledge of combinatorics and probability calculus at the secondary school level. Student has a basic knowledge of linear algebra. Student has a basic knowledge of mathematical analysis.
2	**Skills**	Student is able to think logically. Student is able to use a calculator.
3	**Social competencies**	Student understands the necessity of learning and usefulness of acquired knowledge.

Assumptions and objectives of the course:

The aim of the course is to familiarize students with selected problems of probability and mathematical statistics. Students acquire the ability to use probabilistic and statistical methods to describe technical issues.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the basic probability distributions. Student knows the basic terms of mathematical statistics - [K1A_W01]
2. Student knows different methods of statistical inference (theory of estimation, testing of hypothesis - [K1A_W01]

Skills:

1. The student is able to analyze and interpret statistical data. The student knows how to use the statistical characteristics of the population and their sample equivalents. Can draw conclusions - [K1A_U03]
2. The student can make simple statistical inferences in the field of: point and interval estimation of parameters testing parametric hypotheses correlation analysis regression analysis - [K1A_U03]
3. The student has the ability to self-study with the use of modern teaching tools, such as remote lectures, internet sites - [K1A_U06]

Social competencies:

1. Student understands the need and know the possibilities of lifelong learning - [K1A_K01]
2. The student can think and act in a creative and enterprising way. Understands the need for systematic work on all tasks. - [K1A_K05]

Assessment methods of study outcomes

Written exam.
Written test.

Course description

1. Random variable, distribution function, expected value, variance. (Lecture and Exercise)
Discrete random variable. Discrete distributions. (Lecture and Exercise)
The continuous random variable. Continuous distributions. (Lecture and Exercise)
The two-dimensional random variable (Lecture). The independence of random variables.(Lecture)

2. Elements of descriptive statistics. (Lecture and Exercise)
3. Point estimation. Confidence intervals. (Lecture and Exercise)
4. Tests of significance: expected value, variance, proportion (one population). (Lecture and Exercise)
5. Tests of significance: expected value, variance, proportion (populations). (Lecture)
6. Linear regression. Testing the significance of regression. (Lecture)

Basic bibliography:

1. D. Bobrowski, (1986) Probabilistyka w zastosowaniach technicznych, Wydawnictwo Naukowo Techniczne.
2. D. Bobrowski, K. Maćkowiak-Łybacka, (2006) Wybrane metody wnioskowania statystycznego, Wydawnictwo Politechniki Poznańskiej.
3. J. Koronacki, J. Melniczuk (2001) Statystyka dla studentów kierunków technicznych i przyrodniczych. WNT, Warszawa.
4. W. Kordecki (2010) Rachunek prawdopodobieństwa i statystyka matematyczna, Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS.
5. H. Jasiulewicz, W. Kordecki, (2003) Rachunek prawdopodobieństwa i statystyka matematyczna, Przykłady i zadania Oficyna Wydawnicza GiS.
6. D.A. MacQuarrie, (2005) Matematyka dla przyrodników i inżynierów I i II, WN PWN

Additional bibliography:

1. R. Kala, (2005) Statystyka dla przyrodników, Wydawnictwo Akademii Rolniczej w Poznaniu.
2. H. Chudzik, H. Kiełczewska, I. Mejza, (2006) Statystyka matematyczna w przykładach i zadaniach, Wydawnictwo Akademii Rolniczej w Poznaniu.
3. R. L. Scheaffer, J. T. McClave (1995) Probability and Statistics for Engineers, Duxbury.

Result of average student's workload

Activity	Time (working hours)
1. participation in lectures (9 x 2godz.)	18
2. participation in exercise classes (4 x 2godz.)	8
3. participation in the consultations related to the implementation of the education process, in particular exercises (5godz.)	5
4. completion (own work) reports on exercises: (5godz).	5
5. prepare for the test (4godz.)	4
6. familiarization with the indicated literature / teaching materials (4godz)	4
7. preparing to pass the course and participation in completion of lectures: (4 godz. + 2 godz)	6

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	33	1
Practical activities	0	0