STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Selected topics in Mathematics**		Code **1010601321010344271**

Field of study **Transport**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 2**

Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**

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

No. of hours				No. of credits **3**
Lecture: **2**	Classes: **1**	Laboratory: **-**	Project/seminars: **-**	

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	ECTS distribution (number and %**)**
the sciences	**3 100%**
Mathematical sciences	**3 100%**

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 Mathematics 1.
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. has extended and deep knowledge of mathematics useful for formulating and solving complex technical tasks regarding various means of transport - [T1A_W01]

2. knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature - [T1A_W07]

Skills:

1. can, by formulating and solving tasks in the field of transport, apply properly selected methods, including analytical, simulation or experimental methods   - [T1A_U04]

Social competencies:

1. understands that in technology, knowledge and skills quickly become obsolete - [T1A_K01]

Assessment methods of study outcomes

- Exercises: written tests (5 tests)
- Lecture: written exam

Course description

1. Combinatorics. Evets. (Lecture)

2. Probability space. (Lecture)

3. Axiomatic definition of probability: classical probability. (Lecture)

4. Conditional probability, Bayesian model. (Lecture)

5. Random variable, distribution function, expected value, variance. (Lecture)

6. Discrete random variable. Discrete distributions. (Lecture and Exercise)

7. The continuous random variable. Continuous distributions. (Lecture and Exercise)

8. The two-dimensional random variable (Lecture). The independence of random variables.(Lecture)

9. Elements of descriptive statistics. (Lecture and Exercise)

10. Point estimation. (Lecture)

11. Confidence intervals. (Lecture and Exercise)

12. Tests of significance: expected value, variance, proportion (one or two populations). (Lecture and Exercise)

13. Analysis of variance. (Lecture)

14. Correlation coefficients (Pearson, Spearman, Kendall, multiple correlation). Significance test (lecture)

15. Linear regression. Testing the significance of regression. (Lecture and Exercise)

16. Non-parametric tests (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

Additional bibliography:

1. Plucińska A., Pluciński E., Probabilistyka, Wydawnictwo WNT, Warszawa

2. 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 (15 x 2 hours)	30
2. participation in exercise classes (15 x 1 hour)	15
3. participation in consultations related to the implementation of the education process, in particular exercise classes (2 x 2 hours)	4
4. completion (as part of his own work) of the exercises: (16 x 1 hour).	16
5. preparation for tests	12
6. familiarization with the indicated literature / didactic materials (11h)	11
7. preparation for the exam and participation in the exam: (10 hours + 2 hours)	12

Student's workload

Source of workload	hours	ECTS
Total workload	100	3
Contact hours	51	2
Practical activities	0	0