STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mathematics**		Code **1010334121010340025**

Field of study **Control Engineering and Robotics**	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) **part-time**

No. of hours Lecture: **42** Classes: **32** Laboratory: **-** Project/seminars: **-**	No. of credits **9**

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 %**)** **9 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge with range of secondary school.
2	**Skills**	Student is able to meet the challenges arising from the high school.
3	**Social competencies**	Student understands the need and knows the possibility of studying (postgraduate courses, second-degree studies), improving language skills, professional, personal and social skills.

Assumptions and objectives of the course:

Students should acquire a range of mathematical skills, particularly those which will enable them to use applications of mathematics in the context of everyday situations and of other subjects they may be studying.

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

Knowledge:

1. Student has a basic knowledge of mathematics, including algebra, calculus, logic, probability and elements of discrete mathematics and applied mathematics.   - [[K_W01+++]]

Skills:

1. Student is able to get information from the literature and other sources, able to integrate the information, make their interpretation as well as draw conclusions and formulate and justify opinions.   - [[K_U01+]]

Social competencies:

1. Student understands the need and knows the possibility of studying (postgraduate courses, second-degree studies), improving language skills, professional, personal and social skills.   - [[K_K01+]]

2. Student understands the importance of non-technical aspects and consequences of engineering-science activities and the associated responsibility for decisions. - [[K_K02+]]

Assessment methods of study outcomes

Lectures: written exam concerning mainly the theoretic part of the subject and ability to use it in practical exercises.

Classes: tests during the semester and the direct activity during the classes. Getting extra points related with activity.

Course description

Improper integrals of the first and the second kind. Series of numbers and power series. Criteria for convergence of series. Functions of two and three variables. Limits and continuity of functions of several variables. Calculus. The Schwarz theorem. The directional derivative. The Taylor's formula. Extrema of functions of several variables. Examples of applications of geometrical and physical. Ordinary differential equations. The Laplace transform and it applications. Linear differential equations of higher order. Systems of linear differential equations with constant coefficients. Probability. Random variables. Functions of the random variable.

Basic bibliography:

1. G. M. Fichtenholz, Rachunek różniczkowy i całkowy, PWN, Warszawa, 1986.

2. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, Część I , II, PWN, Warszawa.

3. W. Stankiewicz, Zadania z matematyki dla wyższych uczelni technicznych, Część I , II, PWN, Warszawa.

4. E. Kącki, L. Siewierski, Wybrane działy matematyki wyższej z ćwiczeniami, PWN, Warszawa.

5. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa , 1971.

6. H. J. Musielakowie, Analiza matematyczna, Wydawnictwo Naukowe UAM, Poznań, 2000.

7. W. Feller, Wstęp do rachunku prawdopodobieństwa I, PWN, 1980.

8. M. Siudak, Rachunek prawdopodobieństwa i statystyka matematyczna - zbiór zadań, PW, 1978.

Additional bibliography:

1. H. J. Musielakowie, Analiza matematyczna, Wydawnictwo Naukowe UAM, Poznań, 2000.

2. W. Swokowski, Calculus with analytic geometry, Prindle, Weber & Schmidt Publishers, 1998.

Result of average student's workload

Activity	Time (working hours)
1. Preparation for exams.	50
2. Preparation for classes and tests.	62
3. Exams.	3
4. Lectures.	42
5. Classes.	32
6. Consultations	37

Student's workload

Source of workload	hours	ECTS
Total workload	226	9
Contact hours	114	5
Practical activities	0	0