STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mathematics**		Code **1010334211010340025**
Field of study **Automatic Control and Robotics**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
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: **34** 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		ECTS distribution (number and %)

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

Algebra of complex numbers. Trigonometric and algebraic form. Geometry of complex numbers. Elementary functions of complex values. Polynomials. Determinants. Definition and classification matrix. Inverse matrix. Row of the matrix. The Gauss-Jordan algorythm . Systems of linear equations. Methods for solving systems of linear equations. Eigenvalues and eigenvectors of the matrix. The Cayley-Hamilton theorem. Limits. Derivative. Differentiation. Finding monotonicity, maxima, minima, concavity, convex and the points of inflection of functions. Asymptotes of functions. Drawin graphs of functions. Integrals. Integration by substitution and by parts. Integration of rational, trigonometric and some irrational functions. Geometric interpretation of definite integrals. Examples of applications of the definite integral: calculation of measures of areas, the length of curves, calculate volumes and surface areas of solids of revolution.

Basic bibliography:

1. G. M. Fichtenholz, Rachunek różniczkowy i całkowy, PWN, Warszawa, 1986.
2. B. Gleichgewicht, Algebra, Oficyna wydawnicza GIS, Wrocław , 2002.
3. S. Lang, Algebra, PWN, Warszawa , 1973.
4. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, Część I , II, PWN, Warszawa.
5. W. Stankiewicz, Zadania z matematyki dla wyższych uczelni technicznych, Część I , II, PWN, Warszawa.
6. E. Kącki, L. Siewierski, Wybrane działy matematyki wyższej z ćwiczeniami, PWN, Warszawa.
7. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa , 1971.
8. H. J. Musielakowie, Analiza matematyczna, Wydawnictwo Naukowe UAM, Poznań, 2000.

Additional bibliography:

1. J. Rutkowski, Algebra abstrakcyjna w zadaniach, PWN, Warszawa , 2002.
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.	34
6. Consultations	35

Student’s workload

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