STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mathematics		**1010311421010340025**
Field of study: **Power Engineering**	Profile of study (general academic, practical): **general academic**	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: Lecture: **30** Classes: **30** Laboratory: **-** Project/seminars: **-**		No. of credits: **5**
Status of the course in the study program (Basic, major, other): **basic**	(university-wide, from another field): **university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

dr Wiesława Nowakowska
email: wieslawa.nowakowska@put.poznan.pl
tel. 61 665 2320
Wydział Elektryczny
ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of complex numbers, matrix calculus, differentation from I semester
2	**Skills**	Ability solving problems with range of complex numbers, matrix calculus, differentation
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:

The recognizing methods and applications of differential and integral calculus of functions of single and several variable.

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

Knowledge:

1. To calculate indefinite and definite integrals, measures of areas, the length of curves, volumes and surface areas of solids of revolution - [-]
2. To mean the idea of partial derivatives, to be able calculate extrema for functions of two variables - [K_W01+++]
3. To comprehend the concept of multiple integral and know methods of calculation and applications - [K_W01+++]
4. To know types of differential equations and methods of their solving - [K_W01+++]
5. To understand the concept of The Laplace transform and know it properties and methods of calculation - [K_W01+++]

Skills:

1. To calculate indefinite and definite integrals, measures of areas, the length of curves, volumes and surface areas of solids of revolution - [K_U06++ K_U07+++]
2. To calculate partial derivatives, extrema for functions of two variables, to calculate divergence and curl of vector field - [K_U06++ K_U07+++]
3. To calculate multiple and line integrals - [K_U06++ K_U07+++]
4. To recognize type of differential equation and solve it - [K_U06++ K_U07+++]
5. To apply The Laplace transform to solve linear differential equations and systems of linear differential equations with constant coefficients - [K_U06++ K_U07+++]
6. To represent functions by the Fourier series - [K_U06++ K_U07+++]

Social competencies:

Assessment methods of study outcomes

Lectures: written exam checking theoretic knowledge and ability it application

Classes: tests during the semester and colloquium

Course description

Indefinite and definite integral. Geometric interpretation of definite integral. Applications of the definite integral: calculation of measures of areas, the length of curves, calculate volumes and surface areas of solids of revolution. Differential calculus of functions of several variables. Multiple integrals and their applications. Line integrals. Infinite series and power series.

First order differential equations. Differential equations of higher order-reduction of order. Linear differential equations of higher order. The Laplace transform and it application to differential equations.

Update 2017.

Applied methods of education:

I Lectures

1. Interactive lecture with questions to the group of students
2. Discussions

II Classes

1. Solving illustrative tasks on board
2. Teacher?s detailed assessment of students? solutions followed by discussion and comments

Basic bibliography:

1. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka, cz. I, II, III, Wyd. Politechniki Poznańskiej, Poznań, 2004.
2. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa, 2008.
3. G. Decewicz, W. Żakowski, Matematyka: analiza matematyczna, cz. I, WNT, Warszawa, 2009.
4. W. Żakowski, M. Kołodziej, Matematyka: analiza matematyczna, cz. II, WNT, Warszawa, 2013.

Additional bibliography:

1. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach. Część I, II, PWN, Warszawa, 2013.
2. Stankiewicz W.: Zadania z matematyki dla wyższych uczelni technicznych. Część I, II, PWN, Warszawa, 2012.
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 i 2, Oficyna Wyd. GiS, Wrocław, 2012.

Result of average student's workload

Activity	Time (working hours)

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	75	3
Practical activities	50	2