POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)
pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Selected topics in mathematics I

Course

Field of study	Year/Semester
Automatic Control and Robotics	I/I
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	English
Form of study	Requirements
full-time	

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15		
Tutorials	Projects/seminars	
15		

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
dr Wiesława Nowakowska
wieslawa.nowakowska@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of differentation and integration (first semester).

Course objective

The aim is to acquaint with some types of differential equations, to introduce the concept of Laplace transform and to teach how to use those concepts.

Course-related learning outcomes

Knowledge

The student has knowlegde of some types of differential equations and knows methods of solving them.

The student has knowlegde of the Laplace Transform its properties and application to solve the differential equations.

Skills

Is able to obtain information from bibliography, databases and other sources.

Has the ability to self-educate in order to improve and update professional competences.

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Is able to recognize the type of differential equation and can solve it.

Can determine the inverse Laplace transform.

Is able to apply the Laplace transform to solve linear differential equations and systems of linear differential equations with constant coefficients.

Social competences

The graduate is ready to critically evaluate his or her knowledge. The graduate understands the need for and knows the possibilities of continuous learning - improving professional, personal and social competences, the graduate is able to inspire and organize the learning process of others.

The graduate is aware of responsibility for own work and willingness to conform to the principles of teamwork.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: test in the end of the semester to check theoretical knowledge (it consists of 3-5 questions, point range differs for each one). Test is passed if student gains 50% of all points.

Tutorials: test on the last tutorials which consists of 5 tasks. Range of grades:

60% - 3.0

68% - 3,5

76% - 4,0

84% - 4,5

92% - 5,0

Students have an opportunity to gain additional points (10% from the total) for their activity during classes(e.g. giving correct answers to teacher's or colleagues' questions).

Programme content

Lectures and tutorials: the Laplace transform, its properties and application to differential equations. Convolution and its properties. The inverse Laplace transform. Some types of the first order differential equations. The higher order linear differential equations.

Teaching methods

1. Interactive lecture with questions to the group of students which is supported by solving examples on board.

2. Classes during which students solve tasks on board.Teacher's detailed assessment of students' solutions followed by discussion and comments. Revision at home by solving tasks.

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Bibliography

Basic

1. B. Sikora, E. Łobos, Advanced calculus : selected topics, Wydawnictwo Politechniki Śląskiej, Gliwice 2009.

2. J. Morchało, Z. Ratajczak, J. Werbowski, Równania różniczkowe w zastosowaniach, Wydawnictwo Politechniki Poznańskiej, Poznań 2002.

3. . D. Bobrowski, Z. Ratajczak, Przekształcenie Laplace'a i jego zastosowania, Wydawnictwo Politechniki Poznańskiej, Poznań 1994.

Additional

1. E. Łobos, B. Sikora, Calculus and differential equations in exercises , Wydawnictwo Politechniki Śląskiej, Gliwice 2004.

2. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, Oficyna Wyd. GiS, Wrocław 2011.

3. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, Część II, PWN, Warszawa 2012.

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) [1]	40	1

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[1] delete or add other activities as appropriate