



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

IT techniques

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

18

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. J. Mosiężny

Responsible for the course/lecturer:

### Prerequisites

The student is able to effectively use basic office software and elements of modern computer systems.

### Course objective

The aim of the course is to provide students with information on software for scientific and technical calculations MATLAB, ANSYS, LABVIEW. Students gain knowledge and skills related to the design of IT measurement, control and analysis systems based on basic electronic and IT systems.

### Course-related learning outcomes

Knowledge

Has elementary knowledge of the basics of computer science, i.e. computer architecture, binary, decimal and hexadecimal counting system, representation of numbers and graphic characters in computer memory, variable types, general knowledge of low, medium and high level languages used in computer programming, operating systems, databases, RAD development environments, and typical engineering applications.



Has elementary knowledge of automation systems, microcontrollers, control algorithms, automatic machines and industrial robots, electronic navigation systems used in machines and wired and wireless communication systems in local computer networks used in machines.

Is aware of the latest trends in machine construction, i.e. automation and mechatronization, automation of machine design and construction processes, increased safety and comfort of operation, the use of modern construction materials.

#### Skills

Can use computer office packages for editing technical texts, including formulas and tables, technical and economic calculations using a spreadsheet and running a simple relational database.

Can use integrated with the packages for spatial modeling, programs for the calculation of mechanical structures by the finite element method and correctly interpret their results.

Can prepare and present a short verbal and multimedia presentation devoted to the results of an engineering task.

#### Social competences

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.

Is ready to initiate actions for the public interest.

Is ready to fulfill professional roles responsibly, including:

- observing the rules of professional ethics and requiring this from others, - caring for the achievements and traditions of the profession.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Exam in the form of a written exam.

#### Programme content

ANSYS overview. Sample analysis of engineering problems for flow and heat transfer issues in ANSYS: static mixer, solid body flow, heat transfer in a finned tube. Overview of LABVIEW. Examples of solutions of control systems and measurement systems encountered in engineering practice using LABVIEW. MATLAB overview. Sample analysis of engineering problems in Matlab.

Characteristics of basic control and measurement systems. Characteristics of available methods of process control and available sensors and transducers.

#### Teaching methods

Lecture in the form of a presentation

Laboratory classes in the form of solving thematic problems



## Bibliography

### Basic

M. Piekarski., M. Poniewski - Dynamika i sterowanie procesami wymiany ciepła i masy, WTN, Warszawa, 1994

H. Orłowski - Komputerowe układy automatyki, WNT, Warszawa, 1987

R. Hagel, J. Zakrzewski - Miernictwo dynamiczne, WNT, Warszawa, 1984

### Additional

Niederliński - Systemy komputerowe automatyki przemysłowej, t. 1 i 2, WNT, Warszawa, 1984

## Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	27	1,0
Student's own work (literature studies, preparation for tutorials, preparation of tutorials, execution of lecture tasks, preparation for tests) <sup>1</sup>	48	2,0

<sup>1</sup> delete or add other activities as appropriate