COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automatics and Automatic Control [S1Eltech1>AiRA]

Course

Field of study
Electrical Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Every student attending the subject is expected to have basic knowledge of mathematics, selected fields of physics, as well as basic knowledge about signal theory and processing. Every student should also be able to describe selected physical phenomena using mathematical apparatus and demonstrate independence and initiative in acquiring new knowledge.

Course objective

To provide students with the knowledge of the basic elements of automatics, automatic control systems, principles of the selection of controllers and their parameters in various control systems. To familiarise students with the methods of synthesis and analysis of the continuous-time control systems operation, using various methods of analysis and digital modelling.

Course-related learning outcomes

Knowledge:
1. Has the general knowledge of the purpose and way of functioning of control systems
2. Understand the rules and methods of mathematical modelling and has knowledge of automatic control systems applications

3. Has the main knowledge of control basics and control systems

Skills:
1. Is able to identify the basic elements of automatics and automatic control systems, based on their special characteristics
2. Can apply algorithms to investigate the features of control systems, especialy their stability
3. Can project and assess the behaviour of basic automatic control systems

Social competences:
1. Is aware of the influence on the environment and consequences of the engineer activity and the automatic control systems built by him
2. Understands the necessity of continuous developing of professional, personal and social skills, and cooperation in a group

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge gained during lectures is veryfied by the final test consisting of 40-60 closed questions. The skills acquired during laboratory classes is verified by: written tests, knowledge and skills assessment during excersises made by students, evaluation of the reports, which are prepared individually by students.

Programme content

Basics of control theory, dynamic elements and systems, control systems - structure, operation and application.

Course topics

Basic concepts of control theory, the division of control systems. Mathematical description of linear control systems, transfer and spectral function, examples. Description of the control system in state variables representation. Properties of the basic elements of automation. Time and frequency characteristics. Block diagrams of automatic control systems, flowchart conversion. Properties of regulators, tuning and examples. The stability of continuous linear systems, the general conditions of stability, algebraic and graphical criteria. Correction in control systems. Nonlinear elements in control systems. All above issues are discussed during lectures and laboratory classes.

Teaching methods

1. Lectures: interactive presentation supplemented by examples calculated on the blackboard. Students are encouraged to active 2. Laboratyo participation in the classes.
2. Laboratory classes: practice excercises performed by students on computers, according to the instruction given by a teacher. Students are encouraged to independent thinking, analysis and solving problems arising in automatics.

Bibliography

Basic
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Additional

1. Byrski W., Obserwacja i sterowanie w systemach dynamicznych, UWND AGH Kraków 2007
2. Dorf R.C. Bishop R.H., Modern Control Systems, Upper Saddle River: Prentice Hall, 2001
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Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00