



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic of control engineering [S1Inf1>AUT]

Course

Field of study

Computing

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

20

Laboratory classes

20

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Student starting this course should have basic knowledge of mathematical analysis and operational calculus. The student should have the skills of effective utilization of knowledge from mathematical analysis and physics and to acquire information from the indicated sources. The student ought to be ready for cooperation in interdisciplinary team: technologist - control and computer engineers. The student should be honest, responsible, persistent, cognitive, creative and respectful for other people.

Course objective

The transfer knowledge to students about control theory and applications. 1. Development skills concerning with dynamic objects and systems characteristics in the time space, operational and frequency. 2. Development skills concerning with dynamic objects and control system design. 3. Formation skills of group working in the interdisciplinary teams.

Course-related learning outcomes

Knowledge:

1. has the deepened mathematical knowledge for description of dynamic objects and processes [K1st_W1]
2. describes dynamic control objects (in time function, operational variables and frequency domain)[K1st_W5]
3. knows rules, technics and tools for design and realization of control systems [K1st_W7]

Skills:

1. skills to carry out the simulation of control systems, to interpret the obtained results and to draw conclusions [K1st_U3]
2. can do choice the controller and its adjustment values and determine the control indicators [K1st_U4]
3. skills to implement the simualatio model of control system [K1st_U11]

Social competences:

1. understands the neccesity sistematic development of knowledge and skills and clary presentation of knowledge to others [K1st_K1]
2. obtained knowledge allows for creative operation in the automation field of man"s hard working {K1st_K2}

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Lecture: written test of knowledge

- theoretical quiz: about 10 questions with defferent points worths

Evaluation: points scale - proposition of grade; possibility of test inspection; possibility of oral exam (only with minimum 33% of points)

Final points result:

to 50% - unsufficient (F)

51% - 60% - sufficient (E)

61% - 70% -satisfactory plus (D)

71% - 80% - good (C)

81% - 90% - good plus (B)

over 91% - very good (A)

Laboratory: activity of exercises realization, evaluation of preparation to the problem solving, written exercises protocols

Programme content

Basic definitions of control theory and control engineering. Description of objects? dynamic with examples. Transfer function. Linearization of nonlinear characteristics. Identification of dynamic characteristics. Frequency response methods. Basic characteristics of objects: transfer function, jump function, amplitude-phase characteristic, examples and notation on the schema. Stability and quality of control systems. Blocks schema and its transformations. Classic governors: P, PI, PD, PID. Rules of controllers and parameters choice. Sensors and measurements converters of nonelectric magnitudes ? chosen examples, intelligent sensors. Nonlinear control systems. Introduction to computer control systems ? hardware and functional structure. Example

Course topics

none

Teaching methods

1. Lecture: lectures with simple calculation example. Multimedia presentations
2. laboratory : team working, using MATLAB and PYTHON for control system simulation

Bibliography

Basic

1. Urbaniak A., Podstawy automatyki, Wyd. PP, Poznań2007 (wyd. III)

2. Dorf R.C., Bishop R.H., Modern control systems, Addison Wesley, 1995

Additional

1. Olsson G., Piani G., Computer system for automation and control, Prentice Hall, London 1990

2. Findiesen W., Technika regulacji automatycznej, WNT, Warszawa 2006 r.

Breakdown of average student's workload

| | Hours | ECTS |
|---|-------|------|
| Total workload | 75 | 3,00 |
| Classes requiring direct contact with the teacher | 40 | 1,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 35 | 1,50 |