COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basic if control engineering

Course

Field of study

Year/Semester
2/3

Area of study (specialization)
computing

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
20	20	0
Tutorials	**Projects/seminars**	
0	0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
Prof. dr hab. inż. Andrzej URBANIAK

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Responsible for the course/lecturer:
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Prerequisites

Student starting this course should have basic knowledge of mathematica analysis and operational calculus. The student should have the skills of effective utilization knowledge from mathematical analysis and physics and to acquire iinformation from the indicated sources. The student ought to be ready for cooperation in interdisciplinary team: technologist - control and computer engineers. Thestudent should be honest, rsponsible, persistent, congnitive, 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 conclutions [K1st_U3]

2. can do choice the controller and its adjustment values and detemine 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 clarly 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:

Lecture: writen test of knowledge

- theoretical quiz: about 10 questions with defferent points worths

- simply example of swiching systems and stability examination

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, writen 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

Teaching methods

1. Lecture: lectures with simple calculation example. Multimedia presentations

2. laboratory : team working, using MATLAB and PYTON 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	70	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate