COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronic measuring systems

Course

Field of study
Electrical Engineering

Year/Semester
1 / 1

Area of study (specialization)
Smart Measurement Systems

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
dr hab. inż. Grzegorz Wiczyński
email: grzegorz.wiczynski@put.poznan.pl
tel. 61 6652639
Wydział Automatyki, Robotyki i Elektrotechniki
ul.Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:
dr inż. Dariusz Prokop
email: dariusz.prokop@put.poznan.pl
tel. 61 6652614
Wydział Automatyki, Robotyki i Elektrotechniki
ul.Piotrowo 3, 60-965 Poznań

Prerequisites

Basic knowledge of mathematical analysis, basics of electrical engineering and metrology.

Using the laws of electrical engineering to analyze AC and DC circuits.

He is aware of the need to expand his competences and is ready to cooperate as part of a team.

Course objective

Acquiring knowledge by a student about advanced electronic measuring systems used in industry and medicine. Familiarization with simulation and design techniques with the use of appropriate tools and software. Expanding the knowledge of testing and checking procedures for electronic circuits.

Course-related learning outcomes

Knowledge

1. Student knows the basic circuit solutions of electronic measurement systems.

2. Student has knowledge of modern development trends of electronic circuits and their limitations.
3. Student knows the principle of operation of basic electronic components their properties in the context of measurement and control solutions.
4. Student has knowledge of electronic circuit design in industrial and biomedical applications.
5. Student has the knowledge of how to properly test and check the properties and parameters of built electronic circuits.

Skills

1. Student is able to verify the design of the operation of electronic circuits through the use of specialized simulation and design tools.
2. Student is able to design the process of testing and experimentally carry out basic measurements of electronic circuits using appropriate techniques and tools.
3. Student is able to work individually and in a group, realizing the set objectives to be achieved in a given time.

Social competences

1. Student understands the need for continuous training and improvement of his professional competence due to the development of the field of electronic measurement systems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: assessment of knowledge and skills demonstrated on a written test of a test and calculus nature (the written test sheet contains the information necessary to perform calculus tasks). Threshold for passing the test 50%.

Laboratory: Input tests and bonus knowledge necessary to complete the set problems in the laboratory task area. Evaluation of skills related to the implementation of the measurement task. Evaluation of reports on the performed exercises. Evaluation of the knowledge demonstrated on the written test in the content area of laboratory classes (test questions and calculation tasks).

Programme content

Methods of education are orientated to students to motivate them to participate actively in education process by discussion and reports.

Lecture:

L1/2: Basic circuits with operational amplifiers used in measurements .
L3: I/I, U/U, U/I, I/U converters.
L4: Advanced active and switched capacitance filter circuits.
L5: Noise and interference in electronic systems.
L6: Biomedical signals - acquisition, conditioning and processing systems.
L7: Electronic measurement systems in industrial metrology systems .

Laboratory:

Laboratory classes are implemented in seven 90-minute meetings, in 4 subgroups. The topics of the laboratory classes are divided into three parts.

a) Topics of the first part are: getting acquainted with the measuring instruments and techniques used during the laboratory classes.

b) In the second part, a previously designed electronic measurement system is performed

c) The topics of the third part are: checking and testing the previously made circuits.

Teaching methods

Lectures are performed using multimedia presentations illustrated with simulation examples and necessary mathematical calculations on the blackboard.

Laboratory exercises are carried out in laboratory groups. During the course of the classes, the connection of the measuring system is performed, the indicated measurements are carried out, the results of the measurements are processed and a report is prepared. In addition, individual design and assembly of uncomplicated printed circuit boards is performed.

The educational methods used are student-oriented and motivate students to actively participate in the learning process through discussions and papers.

Bibliography

Basic

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3. U. Tietze, Ch. Schenk, Układy półprzewodnikowe, WNT, Warszawa 2007
4. J. Zakrzewski, Czujniki i przetworniki pomiarowe, Wyd. Politechniki Śląskiej, Gliwice 2004
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6. K. Booth, Optoelektronika, WKiŁ, Warszawa, 2001.

Additional

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Breakdown of average student's workload

	Hours	ECTS
Total workload	59	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for laboratory classes, preparation of reports or preparation of applications, preparation for tests) [1]	29	1,0

[1] delete or add other activities as appropriate