COURSE DESCRIPTION CARD - SYLLABUS

Course name

Research and problem laboratory

Course

Field of study

Automatic Control and Robotics

Area of study (specialization)

Automation and robotics systems

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2 / 4

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

-

Laboratory classes

-

Other (e.g. online)

-

Tutorials

-

Projects/seminars

12

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Knowledge: The student starting this course should have basic knowledge of mathematics useful for formulating and solving research problems in the field of automation and robotics.

Has knowledge of development trends and the most important new achievements in automation and robotics and in selected related scientific disciplines.

Skills: Should have the ability to use information and communication techniques used in the implementation of research projects, use analytical methods, simulations and experiments to formulate and solve engineering tasks and simple research problems, formulate and test hypotheses related to engineering problems and simple research problems, integrate knowledge from various areas and the ability to obtain information from the indicated sources and to present an oral presentation on specific issues in the field of automation and robotics.

Social Competences: He should also understand the necessity of expanding his competences and be ready to cooperate within the team.

In addition, in terms of social competences, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

1. The main goal is for students to carry out specific scientific research and to acquire knowledge necessary to solve selected elementary problems in various fields of automation and robotics as well as detailed knowledge in selected areas of these.

2. Developing students' skills in using scientific sources, analytical methods, simulations and experiments in scientific research and writing short studies on the conducted research.

3. Shaping students' teamwork skills, defining and taking on various roles in research teams, work organization and time management.

Course-related learning outcomes

Knowledge

1. Has ordered and in-depth knowledge of selected areas of robotics; - [K2_W10]

2. Has ordered and deepened knowledge related to control systems and control and measurement systems; - [K2_W11]

Skills

1. Can make critical use of literature information, databases and other sources in Polish and in a foreign language; - [K2_U1]

2. Is able to analyze and interpret technical design documentation and use scientific literature related to a given problem; - [K2_U2]

3. Is able to prepare a scientific study in the native language and a short scientific report in English, presenting the results of own research; - [K2_U4]

4. Is able to prepare and present an oral presentation in Polish and in a foreign language on specific issues in the field of automation and robotics; - [K2_U5]

5. Has self-education skills in order to raise and update professional competences; - [K2_U6]

6. Can formulate and verify (simulating or experimentally) hypotheses related to engineering tasks and simple research problems in the field of automation and robotics; - [K2_U15]

Social competences

1. Understands the need and knows the possibilities of continuous training - improving professional, personal and social competences, can inspire and organize the learning process of other people; - [K2_K1]

2. Is aware of the social role of a technical university graduate and understands the need to formulate and transmit to the society (in particular through the mass media) information and opinions on the achievements of automation and robotics in the field of research and application works and other aspects of engineering activities; endeavors to provide such information and opinions in a commonly understandable manner with justification from different points of view; - [K2_K6]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) in the field of seminars:

based on the assessment of the current progress in the implementation of tasks,

Summative assessment:

a) in the field of seminars, verification of the assumed learning outcomes is carried out by:

i. continuous assessment during each class (oral answers); rewarding the increase in the ability to use the learned rules and methods,

ii. time management skills in designing and carrying out research works,

iii. evaluation of the final study prepared partly during the classes, and partly after their completion; this assessment also includes the ability to work in a team,

iv. evaluation and defense by the student of the report on the implementation of the research project.

Obtaining additional points for activity during classes, especially for:

i. discuss additional aspects of the issue,

ii. the effectiveness of applying the acquired knowledge while solving a given problem,

Programme content

The seminar program covers the following topics:

1. Getting acquainted with and analysis of the source literature related to the field of the selected research problem.

2. Defining the research problem to be solved, defining the research hypothesis, defining the expected results.

3. Establishing a research team, assigning roles, defining a research project plan,

4. Designing a research experiment, defining the necessary programming and hardware tools.

5. Construction of the environment for simulation, experimentation, obtaining and.

6. Implementation of experiments, simulations, tests and other types of research. Collection of research results.

7. Processing and analysis of research results. Visualization of research results. Introducing possible corrections and returning to the implementation of the experiment.

8. Verification of the research hypothesis.

9. Development of a presentation of goals, methods of implementation and research results.

10. Writing the final study in Polish or English.

Teaching methods

1. Depending on the research group: multimedia presentation, presentation illustrated with examples given on the board, multimedia show, demonstration, experiments, discussion, team work, case studies.

Bibliography

Basic

1. Dobre rady dla piszących teksty naukowe, David Lindsay ; przeł. [z ang.].- Wrocław : Politechnika Wrocławska, 1995.

Additional

1. Jak pisać prace uniwersyteckie : poradnik dla studentów, Paul Oliver ; przekł. [z ang.]. - Kraków : Wydaw. Literackie, 1999.

2. Jak pisać teksty naukowe?, Jolanta Maćkiewicz. - [Wyd.2 poszerz., dodr.]. - Gdańsk : Uniwersytet Gdański, 2001.

3. Metodologia nauk, Jerzy Apanowicz. - Toruń : Towarzystwo Naukowe Organizacji i Kierownictwa Dom Organizatora, 2003.

4. Józef Pieter, Ogólna metodologia pracy naukowej, Ossolineum, Wrocław 1967

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2
Classes requiring direct contact with the teacher	13	1
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)[1]	37	1

[1] delete or add other activities as appropriate