COURSE DESCRIPTION CARD - SYLLABUS

Course name
Research and Problem Laboratory [S2AiR2-ISAiR>PBP]

Course

Field of study
Automatic Control and Robotics

Year/Semester
1/2

Area of study (specialization)
Intelligent Control and Robotic Systems

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

2,00

Coordinators

dr hab. inż. Tomasz Pajchrowski prof. PP
tomasz.pajchrowski@put.poznan.pl

Lecturers

Prerequisites

Students must possess engineering competences (i.e. professional title of engineer) and qualifications, i.e. knowledge, skills and competences defined in the field of learning outcomes in accordance with PRK 6 for the studies conducted in the field of Automation and Robotics at the Poznan University of Technology, with particular emphasis on learning outcomes from the first degree studies of this field.

Course objective

- Preparation of the student for independent and collaborative, methodical and systematic work and learning necessary to independently solve a selected research issue. - Acquiring and developing skills of formulating content and research, conducting discussions, correct reasoning; using scientific sources, solving problems through the selection of appropriate analytical, simulation and experimentation methods in scientific research and writing studies from conducted research - Gain the student's experience necessary for the future MA thesis, - Acquisition of social competences necessary for research activities, teamwork skills, defining and assuming various roles in scientific teams, work organisation and time management

Course-related learning outcomes

Knowledge
1. understands the methodology of designing specialized analog and digital electronic systems;[K2_W4+, P7S_WG].
2. has knowledge of running a business, engineering project management and quality management; [K2_W15+, P7S_WG]
Skills
1. can critically use literary information, databases and other sources in Polish and foreign languages; [K2_U1+, P7S_UW]
2. is able to prepare a scientific study in his/her mother tongue and a short scientific report in English presenting the results of his/her own scientific research;[K2_U4+, P7S_UW].
3. possesses self-education skills in order to improve and update professional competences;[K2_U6+, P7S_UW].
4. has language skills in the field of automation and robotics, in accordance with the requirements specified for level B2+ of the Common European Framework of Reference for Languages;[K2_U7+, P7S_UW].
5. is able to manage the work of a team; is able to manage the team and estimate the time needed to complete a task; is able to prepare a schedule of work and complete tasks ensuring that deadlines are met; [K2_U24+, P7S_UW].
Social competences
1. is aware of the importance of and understands non-technical aspects and effects of engineering activities, including their impact on the environment and the related responsibility for the decisions taken; is ready to develop the professional achievements;[K2_K2+, P7S_KR]
2. is aware of the social role of a technical university graduate and understands the need to formulate and communicate to the public (in particular through the mass media) information and opinions on the achievements of automation and robotics in the field of research and application work and other aspects of engineering activities; makes efforts to communicate such information and opinions in a way that is widely understood and justifies various points of view;[K2_K6+, P7S_KO]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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- Analysis and discussion of various methods (including unconventional) of problem solving
-The ability to manage time in the design and execution of research work
-Promote the growth of skills in using the learned principles and methods
-Resulting progress in the implementation of tasks
-The student's evaluation and defence of the research project report

Programme content

The aim of the course is for the student team to carry out an independent project in the field of automation, as well as industrial electronics, robotics and industrial IT. The subject of the project may or may not refer to the realized subject of the thesis. The project implementation includes:
review of current literature based on literature databases, selection and discussion of the topic of the thesis, definition of the research hypothesis, determination of expected results, constitution of the research team, division of tasks among team members, analysis and discussion of various methods of solving the problem, design of the research experiment so as to realize the subject's educational results and the goal of the subject. During the realization the team builds and analyzes mathematical models, builds and analyzes control algorithms. The team processes and analyzes the results, verifies the research hypothesis. It is advisable to use the available "open-source" tools, which also allows you to perform some tasks independently at home.
As a result of the research and development work, a final written study is created and the results are presented by team members in public speeches for a group of students.

Course topics

The aim of the course is for the student team to carry out an independent project in the field of automation, as well as industrial electronics, robotics and industrial IT. The subject of the project may or may not refer to the realized subject of the thesis. The project implementation includes:
review of current literature based on literature databases, selection and discussion of the topic of the thesis, definition of the research hypothesis, determination of expected results, constitution of the research

team, division of tasks among team members, analysis and discussion of various methods of solving the problem, design of the research experiment so as to realize the subject's educational results and the goal of the subject. During the realization the team builds and analyzes mathematical models, builds and analyzes control algorithms. The team processes and analyzes the results, verifies the research hypothesis. It is advisable to use the available "open-source" tools, which also allows you to perform some tasks independently at home.
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Teaching methods

Project
Depending on the research group: lecture with multimedia presentation (including: drawings, photos, animations, sound, films) supplemented with examples given on the board, demonstration, performing experiments, .discussion in a team, case study.

Bibliography

Basic
1. Maria Węglińska, Jak pisać pracę magisterską? Impuls 2016
2. Jak pisać prace uniwersyteckie : poradnik dla studentów, Paul Oliver ; przekł. [z ang.]. - Kraków : Wydaw. Literackie, 1999.
3. Dobre rady dla piszących teksty naukowe, David Lindsay ; przeł. [z ang.].- Wrocław : Politechnika Wrocławska, 1995.
Additional
1. Jak pisać teksty naukowe?, Jolanta Maćkiewicz. - [Wyd.2 poszerz., dodr.]. - Gdańsk : Uniwersytet Gdański, 2001.
2. Metodologia nauk, Jerzy Apanowicz. - Toruń : Towarzystwo Naukowe Organizacji i Kierownictwa Dom Organizatora, 2003.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00