



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Programming of robots and machine tools

Course

Field of study

Management and Production Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4/8

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

10

Laboratory classes

8

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

PhD Marcin Wiśniewski

email: marcin.wisniewski@put.poznan.pl

ph. 61 665 22 61

Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań, room 641

Responsible for the course/lecturer:

PhD Wojciech Ptaszyński

email: wojciech.ptaszynski@put.poznan.pl

ph. 61 665 2743

Faculty of Mechanical Engineering

Piotrowo 3 60-965 Poznań

Prerequisites

Knowledge:

Basic knowledge of robotics, computer science, machine building technology and control of industrial robots and numerically controlled machine tools (NC and CNC) - the core curriculum for the 1st degree in mechanics and machine construction

Skills:

The ability to solve elementary problems in the field of building control algorithms (programming principles) based on the possessed knowledge and the ability to obtain information from indicated sources



Social competence:

Understanding the need to expand your competences, readiness to cooperate as part of the team.

Course objective

1. Getting to know the theoretical foundations (assumptions, algorithms) in the field of control and programming of industrial robots and numerically controlled machine tools
2. Acquiring practical skills of programming robots using the teaching technique (on-line, teach in) for typical manipulation tasks
3. Developing students' ability to solve simple problems and perform simple experiments as well as to analyze the results based on the acquired knowledge
4. Shaping students' teamwork skills

Course-related learning outcomes

Knowledge

1. Explain issues related to various methods (including technical aspects) of control and programming of industrial robots as well as NC and CNC machine tools
2. Select appropriate programming instructions for building a control algorithm for a specific task in the field of programming industrial robots and numerically controlled machine tools

Skills

1. Identify a technical problem, determine its complexity, and then propose a solution (algorithm) taking into account the final goal (effect)
2. Develop control programs for industrial robots and numerically controlled machine tools and carry out tests of the control program taking into account the initial and final conditions

Social competences

1. Actively engage in solving the problems posed, independently develop and expand your competences, and cooperate in a team
2. Properly define the priorities for the implementation of the tasks set by yourself or others
3. Be entrepreneurial and creative (innovative)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formulating assessment:

- laboratory: based on the assessment of the current progress in the implementation of laboratory tasks,
- lecture: on the basis of answers to questions about the material discussed in previous lectures.

Summative assessment:



- laboratory: pass on the basis of an oral or written answer concerning the content of each performed laboratory exercise, a report on each laboratory exercise according to the guidelines set out in the guide to exercises and indications of the laboratory teacher. In order to pass the laboratories, all exercises must be passed (positive grade from answers and reports).

- lecture: exam in the form of a test consisting of open or closed questions scored on a 0-4 scale; the exam is passed after obtaining at least 55% of the points. Discussion of the exam results.

Programme content

Programming robots

Lecture

Construction and tasks of modules (the so-called architecture) of the industrial robot control system; Methods of programming industrial robots (on- and off-line); Theoretical basis for the development of the robot control system work algorithm with the use of basic programming instructions and cooperation with technical and technological equipment.

Lab

Practical exercises in the field of principles and methods of programming educational and industrial robots and numerically controlled machine tools

Introduction. Programming of conditional instructions, system input /outputs of the IRB-140T industrial robot. Testing the repeatability of the positioning of the IRB140T robot. Application of the Signal Analyzer function in the programming of the IRB140T robot

Teaching methods

1. Lecture: presentation illustrated with examples given on the blackboard, solving problems.
2. Lab: problem analysis, conducting experiments, solving problems, discussion.

Bibliography

Basic

1. Żurek J., Podstawy Robotyzacji - Laboratorium., WPP, Poznań, 2006
2. Gołda G., Kost G., Świder J., Zdanowicz R., Programowanie robotów on-line, WPŚ, Gliwice, 2008
3. Podręczniki programowania robotów: ABB, Fanuc, Panasonic

Additional

1. Kozłowski K., Dutkiewicz P., Wróblewski W., Planowanie zadań i programowanie robotów, WPP, Poznań, 19993. Olszewski M., Barczyk J., i inni, Manipulatory i roboty przemysłowe, WNT, 1992
2. Podręczniki obsługi RobotStudio



3. Podręczniki programowania robotów ABB w języku RAPID

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	40	1,5

¹ delete or add other activities as appropriate