COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic of robotics

Course

Field of study

Mechatronics

Year/Semester

3/6

Area of study (specialization)

-

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

12

Laboratory classes

12

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Prof. Assoc. Olaf Ciszak

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Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznan, room 638

Responsible for the course/lecturer:

Prerequisites

The student starting this subject should have a basic knowledge of the fundamentals in physics, mechanics and technics (automatics, control and programming) from technical secondary school level. Also ability to solve elementary problems in the scope of development control algorithms (programming rules) and automatics based on their knowledge. Student should also be able to obtain information from specified sources and be ready to cooperate in a team.

Course objective

To provide students with theoretical and practical issues related to robotics, construction, programming and application of robots to the extent specified by the program content relevant to the field of study. Developing student’s skills in solving simple problems and perform experiments and analyze results based on the gained knowledge and student's teamwork skills.

Course-related learning outcomes

Knowledge

The student has knowledge about:

- construction, role and principles of operation of the basic construction units of the manipulator and the control system of an industrial robot and it's technical and technological equipment

- the meaning and role of basic programming (control) instructions

- selection of appropriate programming instructions for a specific task in the field of programming industrial robots

- identification of exploitation and diagnostics of industrial robots, including their life cycle and work safety.

Skills

The student should be able to:

- identify a technical problem, determine its complexity, then propose a solution that takes into account the final goal (effect)

- develop algorithms and control programs for industrial robots working in the field of manipulation and conduct tests of the control program taking into account the initial and final conditions.

Social competences

Students should be able to cooperate in a group, express their assessment and justify it, follow ethical principles.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The knowledge acquired in the lecture is verified by the test (approx. 20 questions). Passing threshold 50%.

Laboratory: to pass on oral or written answers in the scope of each laboratory exercise, report on each laboratory exercise according to the guidelines set out in the guide for exercises and guidance for conducting laboratory exercises. To qualify for laboratories all exercises must be credited (positive feedback and report).

Programme content

Lecture: Basic concepts: definition, classification and application of robots; Construction of robots and manipulators (drive systems, transmission and control); Kinematic chains (open, closed, 2D and 3D, serial and parallel, kinematic joints, number of degrees of freedom and mobility, designation of a kinematic structure); Coordinate systems; Working spaces; Transformation simple and reverse; Fundamentals of programming industrial robots; Basic equipment of industrial robots (grippers, technological heads, internal and external sensors); Health and safety at work with industrial robots.

Laboratory: Practical exercises in the field of the principles and methods of programming robots educational and industrial with cooperation with technological equipment. Work with the computer aided engineering system to design, programming and analysis of robotic cells (e.g. RobotStudio, RoboGuide) - practical exercises in developing a robotic cell design for a specific manipulation or technological task.

Teaching methods

Lecture: multimedia presentation illustrated with video clips, problem discussion.

Laboratory: solving practical problems, searching for and using knowledge sources, teamwork, discussion.

Bibliography

Basic

- Żurek J., Podstawy Robotyzacji - Laboratorium., WPP, Poznań, 2006

- Szkodny T., Podstawy robotyki, WPŚ, Gliwice, 2011

- Zdanowicz R. Podstawy robotyki, WPŚ, Gliwice, 2011

- Honczarenko J., Roboty przemysłowe. Budowa i Zastosowanie, WNT, Warszawa, 2010

- Wrotny T., Robotyka i elastycznie zautomatyzowana produkcja, WNT, Warszawa, 1991

- Olszewski M., Barczyk J., i inni, Manipulatory i roboty przemysłowe, WNT, 1992

- Podręczniki programowania robotów ABB, Fanuc, Panasonic

Additional

- Zdanowicz R., Robotyzacja dyskretnych procesów produkcyjnych, WPŚ, Gliwice, 2011

- Zdanowicz R., Robotyzacja procesów technologicznych, WPŚ, Gliwice, 2001

- Gołda G., Kost G. (red.), Swider J. (red.), Zdanowicz R., Programowanie robotów online, WPŚ, Gliwice, 2011

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate