SYLLABUS

Name: Robotics in Industry 4.0
Name in Polish: Robotyzacja w przemyśle 4.0
Name in English: Robotics in Industry 4.0

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Master's degree/~~Bechelor's degree~~, Full-time
Term:	summer semester 2023/2024
Coordinator of course edition:	Magdalena Palacz, Ph.D., D.Sc.

Default type of course examination report:

credit

Language:

English

Course homepage:

[link]

ECTS

2

Short description:

The subject Modelling and Analysis of Production Processes is aimed at providing structured knowledge in the field of production process modelling, as well as the use of simulation tools to analyse the operation of modelled processes. This knowledge allows, among other things, to solve problems in the field of production process optimisation, production process planning, use of IT systems for advanced production planning and scheduling. The content presented in the lectures is also intended to provide students with the knowledge necessary for the laboratory classes.

It is assumed that the student has knowledge of: Automated Manufacturing Systems, Production Control.

Description:

Proposed lecture content:
1. Modern enterprise at a market – the aims.
2. Mechanisation, automation, robotisation – general information.
3. How automation, robotisation and modern production are connected.
4. ASTORINO Kawasaki Robot for educational purposes.
5. Industrial robot structure based on Astorino.
6. The design of a robotised production system.
7. Normative regulations of a safety rules for robotised production system.

Proposed laboratory content:
1. Astorino as an industrial robot in a class
2. Learning how to program an Astorino robot.
3. Perform of proposed programs.

Forms of teaching, including the number of teaching hours:
Lecture/Laboratory - 15/15h.

Number of hours with direct participation of academic teachers or other instructors: 30
Number of hours devoted to students' own work:
Preparation of the project to be used in the laboratory: 20 h
Preparation of various materials: 10 h
Total number of hours: 60
Number of ECTS credits: 2
of which
Number of ECTS credits obtained through classes with direct participation of academic teachers or other
instructors and students: 1

Bibliography:

Basic literature:
Durlik I.: Management engineering. Strategy and design of production systems. Cz. I, II. Gdańsk-Warszawa. 1996-2004.
Durlik I.: Technical and organisational design of industrial plants. PG, Gdańsk 1992.
Lis S., Santarek K.: Designing the arrangement of workstations. PWN, Warszawa, 1980.
Lewandowski J., Skołud B., Plinta D.: Organisation of production systems, PWE, Warszawa 2010
Supplementary literature:
Borkowski S., Ulewicz. R.: Zarządzanie produkcją. Production systems. Humanitas, Sosnowiec, 2009.
Beaverstock M., Greenwood A., Nordgreen W.: Applied Simulation. Modelling and Analysis using FlexSim. Orem, 2017

Brzeziński M. (ed): Production organisation and control: design of production systems and production control processes, PLACET, Warsaw, 2002
Martyniak. Modern methods of production management. AGH, Cracow, 1996
Pająk E.: Production management: product, technology, organisation. PWN, Warsaw, 2009
Web link of the tutorial [link 01].
instructors and students: 1,5

Learning outcomes:

Outcome description	Symbol	Method of verification	Form of classes
Student knows and understands at an extended level selected facts, objects, and phenomena, as well as methods, theories and conditions explaining the complex relationships between them and constituting advanced general knowledge in the field of mechanical engineering in connection with other fields.	K2A_W01	activity during classes	lecture
Student knows and understands ordered and theoretically grounded key issues in the field of decision-support and CAx systems in connection to robotisation	K2A_W06	activity during classes	lecture
Student can design in accordance with a given specification - and make a simple technical system; implement a technological process using appropriately selected methods, techniques, tools, and materials.	K2A_U05	project	laboratory
Student can choose decision-support methods and use CAx systems for production engineering with robotic system.	K2A_U09	project	laboratory
Student is ready to critical evaluation of the acquired knowledge and received content of the field of robotisation in industry 4.0.	K2A_K01	project	laboratory

Assessment methods and assessment criteria:

Lecture: Students participate in class by learning the subsequent teaching content according to the course syllabus. Students should ask questions and clarify doubts on an ongoing basis. Audio-visual recording of the lecture requires the consent of the instructor. In addition, students solve a subject test prepared for the supplementary content in the Remote Learning Platform.
Laboratory: students develop a project and present the results of a variant analysis of the developed production system according to the instructor's guidelines. The credit is given based on a written project being the result of activities performed during classes.

A prerequisite for passing the course is obtaining a positive test result from the theoretical (lecture) part and written project as a summary of laboratory classes. The subject assessment is carried out in accordance with the criteria specified in the Quality Assurance Book of the Silesian University of Technology. Both the content part, the editing part and the so-called soft competences are evaluated.

Practical placement:

Not applicable