COURSE DESCRIPTION CARD - SYLLABUS

Course name
Reconfigurable manufacturing systems [N2ZiIP2>RSP]

Course

Field of study
Management and Production Engineering

Year/Semester
2/4

Area of study (specialization)
Quality Engineering and Management

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
8

Laboratory classes
8

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Krzysztof Żywicki
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Lecturers

Prerequisites

Basic knowledge of production techniques, production organization, automation, skills logical thinking, using information obtained from the library and the Internet, understanding the need to learn and acquire new knowledge. Has basic knowledge of production management.

Course objective

The aim of the course is to familiarize the student with the essence of reconfigurable manufacturing systems.

Course-related learning outcomes

Knowledge:
The student has structured, theoretically based, detailed knowledge related to the organization of production processes
The student has extended knowledge of designing production systems
The student has theoretically based, detailed knowledge of enterprise management and production processes
The student has structured, theoretically based knowledge of trends in improving the organization of

control and supervision of production processes

Skills:
The student is able to organize production taking into account customer demand and production resources
The student is able to plan and carry out design work related to the organization of the production system.
The student is able to develop forecasts regarding the effectiveness and efficiency of production processes
The student is able to notice and identify problems occurring in systems and production processes, and select and use methods and tools appropriate to solve them.

Social competences:
The student understands the need for continuous learning; can inspire and organize the learning process of team members.
The student is able to think and act in a creative and entrepreneurial way.
The student is aware of the effects of engineering activities in both technical and non-technical areas.
The student is aware of the consequences of decisions made and responsibility for decisions made.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Knowledge and skills acquired during lectures will be verified on the basis of a colloquium including definitional and problem questions. The test consists of 8-10 open questions and 2-4 computational tasks. The passing threshold is 50%. Passing the lecture if obtaining at least 50.1% correct answers. Up to 50.0% - ndst, from 50.1% to 60.0% - dst, from 60.1% to 70.0% - dst+, from 70.1 to 80 - db, from 80.1% to 90 .0% - db+, from 90.1% - very good.
Laboratory: pass based on the preparation of a report.

Programme content

Customer requirements and the production system. The structure and characteristics of reconfigurable manufacturing systems. The role of automation and robotics in reconfigurable manufacturing systems.

Course topics

Lecture: Customer requirements and the production system (customization, personalization - flexibility, reconfiguration) Construction and characteristics of reconfigurable manufacturing systems. Features of reconfigurable systems: modularity, integrity, interchangeability, scalability. Reconfigurability: production structure, machines and devices. Control processes and their adaptation in reconfigurable manufacturing systems. The role of automation and robotization in reconfigurable manufacturing systems. Production flexibility.
Laboratory: The subject of the laboratory is to become familiar with the reconfigurable demonstration line. The laboratory covers topics related to the analysis of the flexibility of manufacturing systems and shortening machine changeover times.

Teaching methods

Lecture: multimedia presentation illustrated with examples, solving tasks, discussion
Laboratory: solving practical problems, teamwork, simulation, discussion.

Bibliography

Basic:
Lewandowski J., Skołud B., Plinta D., Organizacja systemów produkcyjnych, PWE, Warszawa, 2014
Pająk E., Zarządzanie produkcją. Produkt, technologia, organizacja, Wydawnictwo Naukowe PWN, Warszawa, 2021
Honczarenko J., Elastyczna automatyzacja wytwarzania. Obrabiarki i systemy obróbkowe, WNT, Warszawa, 2000
Zdanowicz R., Robotyzacja procesów technologicznych, WPŚ, Gliwice, 2001
Panasiuk J., Kaczmarek W., Robotization of production processes, WN PWN, 2019

Appleton, E., Williams D. J., Industrial Robot Applications, Springer, 1987
Chryssolouris G., Manufacturing Systems: Theory and Practice, Springer Science & Business Media, 2013
Kost G., Węsierski L., Łebkowski P., Automatyzacja i robotyzacja procesów produkcyjnych, PWN 2018
Gola A., Kost G., Zając J., Integracja zautomatyzowanych i zrobotyzowanych systemów wytwarzania, PWE, 2022.

Additional:
Wilson M., Implementation of robot systems: an introduction to robotics, automation, and sucesssful systems integration in manufacturing, But-Hein, 2015, ISBN: 9780124047334

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	34	1,50