



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Reconfigurable manufacturing systems [S2ZiIP2>RSP]

### Course

Field of study

Management and Production Engineering

Year/Semester

2/3

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

full-time

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. 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. Assignment of grades to percentage ranges of results: <90–100> very good; <80–90> good plus; <70–80> good; <60–70> satisfactory plus; <50–60> satisfactory; <0–50> unsatisfactory.

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

Pajak 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  
 Chrysosolouris 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 successful 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                                                                                       | 30    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 20    | 1,00 |