COURSE DESCRIPTION CARD - SYLLABUS

Course name
Flexible manufacturing systems

Course

Field of study
Management and Production Engineering

Year/Semester
1 / 1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
PhD., Eng. Krzysztof Żywicki

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Faculty of Mechanical Engineering

Piotrowo street 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of manufacturing techniques, machine tool construction, automation, logical thinking skills, using information obtained from the library and the Internet, understanding the need for learning and acquiring new knowledge

Course objective

In-depth knowledge of the problems related to the essence of flexibility in production systems

Course-related learning outcomes

Knowledge

1. Student knows the essence, aims and the domain of the elastic automation of production systems - [K2_W02, K2_W05]

2. Student knows the technical means of the elastic automation and their possibilities - [K2_W02]

3. Student knows the fundamentals of the systems theory in using to the elastic production - [K2_W02,K2_W05,K2_W11]

4. Student knows structure (subsystems) of flexible system - [K2_W02]

5. Student knows the principle of the modular design of the system and technical means - [K2_W02]

Skills

1. Student is able to allocate subsystems of the flexible system appropriately to the tasks and the structure - [K2_U08, K2_U09]

2. Student is able to determine the methodology of the selection and to select groups of technical means of the flexible system - [K2_U08, K2_U09]

3. Student is able to determine the scope of the system flexibility appropriately to needs - [K2_U08, K2_U09]

Social competences

1. Student is aware to undertake the cooperation in the team - [K2_K03]

2. student is conscious of the role of flexible systems in the contemporary economy and for the society - [K2_K02, K2_K07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

a) in the scope of lectures, verification of assumed learning outcomes is carried out by:

assessment of knowledge and skills demonstrated at the written test;

b) in the scope of laboratories: verification of assumed learning outcomes is carried out by:

assessment of student's preparation for individual classes and assessment of skills related to the implementation of exercises,continuous assessment, during each class (oral answers), rewarding the increase in the ability to use known principles and methods,

Programme content

Lecture:

Flexible prduction systems. The concept, essence and scope of flexibility. Flexibility of technical means, technological process, production volume, product structure. Factors affecting the flexibility of the production system. Organization of production processes to achieve flexibility. Basic functional subsystems of flexible manufacturing systems. Scope and rationale for applying flexible manufacturing automation; flow of objects and tools, diagnostics and control, technical and organizational aspects of flexible manufacturing systems.

Laboratory - exercises in a flexible robotic system:

Exercise 1. Building a robotic assembly line

Exercise 2 - Programming of automated assembly line

Exercise 3. Preparation and start-up of production in a flexible manufacturing system

Exercise 6 - Programming collaborative robot

Exercise 7. Application of vision system

Teaching methods

1. lecture: multimedia presentation, examples illustrated with examples - films, discussion and problem analysis.

2. laboratory exercises: practical exercises, problem solving, discussion, teamwork.

Bibliography

Basic

1. Honczarenko J., Elastyczna automatyzacja wytwarzania. Obrabiarki i systemy obróbkowe, WNT Warszawa 2000,

2. Mazurczak Jerzy, Projektowanie struktur systemów produkcyjnych, Politechnika Poznańska, Poznań,

2002.

3. Edward Pająk, Zarządzanie produkcją. Produkt, technologia, organizacja, PWN, Warszawa, 2006

4. Krzyżanowski J., Wprowadzenie do elastycznych systemów wytwórczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005

Additional

1. Kosmol J., Automatyzacja obrabiarek i obróbki skrawaniem. WNT Warszawa 2000

2. Lis S., Santarek K., Strzelczyk S., Organizacja elastycznych systemów produkcyjnych, PWN, Warszawa 1994

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	38	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)[1]	37	1,5

[1] delete or add other activities as appropriate