

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Flexible Manufacturing Systems</b>		Code <b>1011101451011110225</b>
Field of study <b>Logistics - Full-time studies - First-cycle studies</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>elective</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b> dr inż. Ireneusz Gania email: ireneusz.gania@put.poznan.pl tel. 616653385 Faculty of Engineering Management ul. Strzelecka 11 60-965 Poznań		<b>Responsible for subject / lecturer:</b> dr hab. Marek Fertsch, prof. PP email: marek.fertsch@put.poznan.pl tel. 61 665 34 16 Faculty of Engineering Management ul. Strzelecka 11 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Student knows the basic concepts related to construction, design, implementation, operation of flexible manufacturing systems in the engineering industry companies.
2	<b>Skills</b>	Student has the ability to perceive, association, interpretation of the phenomena occurring in the sphere of production and organization of both conventional.
3	<b>Social competencies</b>	Student understands and is prepared to take on social responsibility for decisions related to the design and implementation
<b>Assumptions and objectives of the course:</b> Acquaint students with the nature, scope and methods of design and implementation of flexible manufacturing systems.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. He knows the general principles of organizational development in the area of flexible manufacturing systems - [K2A_W03] 2. He has deepened knowledge of organizational relationships especially in the area of functional subsystems of flexible manufacturing systems - [K2A_W05] 3. He knows the methods and tools for modeling decision making processes in the area of production systems - [K2A_W09] 4. He has deepened knowledge of the mechanisms of formation and alteration of production structures - [K2A_W14, K2A_W15]		
<b>Skills:</b>		
1. He can make proper use of theoretical knowledge to analyze and evaluate the flexible manufacturing system - [K2A_U02, K2A_U06] 2. Knowledgeable of how independently propose specific solutions to the problem of the management and implementation procedures for taking decisions in this area - [K2A_U07] 3. Knowledgeable of how use their knowledge in various areas and forms, enhanced by a critical analysis of the effectiveness and suitability of applied knowledge - [K2A_U03] 4. He uses efficiently the standards, rules and criteria to create the flexible manufacturing system in the enterprise - [K2A_U05]		
<b>Social competencies:</b>		

1. He has sense of responsibility for their own work and the willingness to work in accordance with the principles of teamwork and responsibility for performed jointly tasks - [K2A\_K02]
2. He can notice depending on cause and effect in achieving the set goals and give rank of significance of alternative or competing tasks - [K2A\_K03]
3. He is aware interdisciplinary knowledge and skills in the field of flexible manufacturing system - [K2A\_K06]

### Assessment methods of study outcomes

Formative assessment:

a) For the project: on the basis of progress in the implementation stages of the project, and knowledge of the issues necessary to carry b) for the lecture: on the basis of answers to questions about the topics covered in previous lectures

Recapitulative assessment:

a) For the project: on the basis of (1) the quality of the project (2) answers to questions about the project b) for the lecture: on the basis of colloquium - written work on the issues discussed during the lecture. The exam can be applied after obtaining the ratings of the project . The exam is passed, after giving the correct answers to most questions

### Course description

Flexibility

The concept and development of flexibility

Flexible automation of production

Construction of flexible manufacturing systems

Functional subsystems ESP

Machines with ESP

Position control with ESP

Auxiliaries

Designing flexible manufacturing systems

Design methods ESP

Designing functional subsystems ESP

Rating flexible manufacturing systems?

Assessment methods ESP

Evaluation of the effects of irrational ESP

The development of flexible manufacturing systems

Development of ESP in Poland

Development of ESP in the world

Teaching methods

- Information lecture (conventional) (information transfer in a systematic way) monographic (specialist).

- Project method (individual or team implementation of large, multi-stage

cognitive or practical task resulting in the creation of a work).

#### Basic bibliography:

1. Lis S., Santarek K.: Strzelczak S., Organizacja elastycznych systemów produkcyjnych, Państwowe Wydawnictwa Naukowe, Warszawa 1994.

2. Świć A.: Elastyczne systemy produkcyjne. Technologiczno-organizacyjne aspekty projektowania i eksploatacji. Wydawnictwo Politechniki Lubelskiej, Lublin 1998

3. Gania, I., 2003. Elastyczne Systemy Produkcyjne, w. Logistyka Produkcji pod red. M. Fertscha Wydawnictwo ILiM, Poznań, s. 121 ? 135

#### Additional bibliography:

1. Sawik T., Łebkowski P.: Elastyczne systemy produkcyjne, Wydawnictwo Akademii Górniczo-Hutniczej, Kraków 1992.

2. Zawadzka L.: Podstawy projektowania elastycznych systemów sterowania produkcją. Problemy techniczno-ekonomiczne. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2000.

### Result of average student's workload

Activity	Time (working hours)
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1. Participation in class lecture	15	
2. Stand alone development project	15	
3. Preparing to written project	10	
4. Consultation of project	5	
5. Preparing to written test	5	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	50	2
Contact hours	35	1
Practical activities	25	1