SYLLABUS

Name: Production systems engineering
Name in Polish: Inżynieria systemów produkcji
Name in English: Production systems engineering

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bechelor's degree, Full-time
Term:	winter semester 2026/2027
Coordinator of course edition:	dr hab. inż. Magdalena Palacz

Default type of course examination report:

Passing the course

Language:

English

Course homepage:

https://platforma.polsl.pl/roz/

ECTS

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Short description:

The subject of manufacturing systems engineering covers topics such as the design, development and management of systems and processes related to manufacturing and production.

Description:

Proposed lecture content:
01 - process design - sequence of operations, selection of machinery and equipment and material flow to optimise production.
02 - process automation - automated systems, robots and computer-controlled machines.
03 - quality control - quality control methods and systems to monitor and maintain product quality in the production process.
04 - supply chain management - optimising the flow of materials, information, and products from suppliers to customers, aiming to reduce lead times and costs.
05 - minimising waste - Lean Manufacturing to streamline operations.
06 - inventory management: inventory control strategies to optimise costs and ensure product availability.
07 - production planning and scheduling: methods for planning and scheduling production activities to efficiently meet customer demand and avoid bottlenecks or delays.
08 - environmental sustainability: implementation of environmentally friendly practices and technologies to reduce the environmental impact of production processes.
09 - quality assurance: quality assurance procedures and certifications to demonstrate compliance.
10 - cost management: cost structures, process optimisation and potential cost saving measures to improve profitability.
11 - continuous improvement: methods.

Proposed laboratory content: Economic forecasts, Selection of technology and production equipment, Selection of quantity and size of production equipment comparative analysis, Basic types of equipment layout, Quantitative and qualitative analyses of machinery and equipment layout, Balance sheets of production lines, Technical and economic analysis of the establishment of an enterprise for the production of a specific product - issues analysed using FlexSim type process modelling tools

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

Form of classes: Lecture/Laboratory: 15/15h
Number of hours with direct participation of academic teachers or other instructors: 30
Number of hours allocated to students' own work:
Preparation of project to be used in laboratory: 20 h
Preparation of presentation: 5 h
Total number of hours: 60
Number of ECTS credits: 2
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Number of ECTS credits for activities carried out with the direct participation of academic teachers or other instructors and students: 1

Bibliography:

Del Mar D.: Operations and industrial management. McGraw-Hill Co. London,1985.
Schroeder R.G.: Operations management. McGraw-Hill Co. London,1985.
Markowski W.: ABC of small business. Marcus s.c., W-wa 2004.
Pawlak Z.: Biznes plan. Zastosowania i przykłady. Poltext, W-wa 2004.
Internet link of the tutorial [link 01].

Durlik I.: Inżynieria zarządzania tom 1 i 2. Agencja Wydawnicza "Placet". W-wa, 1996.

Learning outcomes:

Knowledge: the student knows and understands
K1A _W3: Basic engineering processes and technologies occurring in the life cycle of technical equipment, objects and systems, and ways of solving typical engineering tasks, in particular in relation to the organisation of production processes and production management.
K1A _W7: Fundamental problems of modern civilisation relevant to production management and engineering.
Skills: the student is able to:
K1A _U4: When identifying and formulating specifications of engineering tasks and solving them:
- select and use analytical, simulation and experimental methods, including computer-aided methods,
- recognise their system and non-technical aspects, including ethical aspects,
- make a preliminary economic assessment of proposed solutions and engineering actions taken,
- make an analysis of technology transfer and innovation."
K1A _U6: Design - according to a given specification - new and supervise existing production and operational facilities, processes and systems, using appropriate methods, techniques, tools and materials.
K1A _U9: Select and use appropriate techniques, skills and modern engineering tools in relation to production engineering systems.
Social competence: the student is willing to:
K1A _K3: Perform professional roles responsibly, observe the principles of professional ethics and require this of others, care for the achievements and traditions of the profession; is aware of the importance and understanding of the non-technical aspects and consequences of engineering activities in the area of production engineering systems

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.

Laboratories: students develop a project and present the results of a variant analysis of the developed production system according to the instructor's guidelines.

A prerequisite for passing the course is a positive test result from the theoretical (lecture) part and a presentation of the project during the last class. Project 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