COURSE DESCRIPTION CARD - SYLLABUS

Course name
Designing industrial plants [S1IZarz1E>PZP]

Course

Field of study
Engineering Management

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student starting this subject should have basic knowledge in the field of production and service management, should be able to apply the tools and techniques of designing production units of the first degree of complexity, should also be able to obtain information from the indicated sources and be willing to cooperate within a team.

Course objective

To provide students with basic theoretical and practical knowledge related to the design of production systems as well as basic methods and techniques used in this process.

Course-related learning outcomes

Knowledge:
The student describes and analyzes organizational behaviors and norms, understanding their impact on shaping organizational structures [P6S_WG_03].
The student identifies and applies methods and tools for designing production structures [P6S_WG_07].
The student recognizes and characterizes the life cycle of socio-technical systems [P6S_WG_13].
The student explains the basic methods, techniques, tools, and materials used in production engineering

[P6S_WG_16].
The student classifies and describes typical industrial technologies, with particular emphasis on technologies for the construction and operation of machinery [P6S_WG_17].
The student explains the basic principles of safety and hygiene at work in the machinery construction industry [P6S_WG_18].

Skills:
The student plans and conducts experiments, including measurements and computer simulations, interpreting the results obtained [P6S_UW_09].
The student uses analytical, simulation, and experimental methods to solve engineering tasks [P6S_UW_10].
The student analyzes systemic, socio-technical, organizational, and economic aspects of industrial plant design [P6S_UW_11].
The student conducts a preliminary economic analysis of industrial plant projects [P6S_UW_12].
The student critically analyzes technological processes of machine production and organization of production systems [P6S_UW_13].
The student identifies and implements project tasks related to the construction and operation of machinery [P6S_UW_14].
The student uses typical methods for solving technical problems in construction and operation of machinery [P6S_UW_15].
The student designs the structure and technology of simple parts and subassemblies of machinery and organization of production units [P6S_UW_16].
The student takes responsibility for their own work and teamwork [P6S_UO_01].

Social competences:
The student analyzes and assesses cause-and-effect relationships in the design of industrial plants [P6S_KK_02].
The student prepares and implements business ventures related to the design of industrial plants [P6S_KO_03].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
a) in the scope of projects - based on the current progress of project task implementation
b) in terms of lectures based on answers to questions about the material discussed in previous lectures, half test.
Summative rating:
a) in the scope of projects based on the presentation of the implementation of the project task and answers to questions regarding the implementation of the project task and solutions used in the project task
b) in the scope of lectures (1) written exam in the field of lecture content; each question is scored on a scale of 0 to 1; the exam is passed after obtaining at least 60% of the points; the student can take the exam after passing the project; (2) discussion of exam results

Programme content

Enterprice. Determining the design situation (modernization or design of new systems). Algorithm for designing technical and economic assumptions. Project documentation.. New directions and trends in the design of production systems.

Course topics

Lecture: Basics of production system design. Enterprise as a system. Determining the design situation (modernization or design of new systems). Product implementation process. Algorithm for designing technical and economic assumptions for the preparation of product manufacture. Design issues: production system structures, production launch, spatial organization of production processes. Project documentation. General plan, location of the enterprise. System design assessment. New directions and trends in the design of production systems. Robotization. Automation in production systems.
Project: Separation of complexity level I production units with the use of IT tools Parametric

characteristics of separate production units with an index evaluation. Analysis of separated production units, selection of the number of positions, calculation of the number of employees, evaluation of effectiveness. Calculation of the number of non-productive workers of the designed production system. Calculation of the area of the designed production system, with the division into production and auxiliary area. Designing support services and economies (tools, renovation, material and storage, transport, quality control) in terms of the organizational structure, planned tasks, tools and methods used. Development of the organizational structure of the designed production system and the production department Distribution of the designed system of production units and auxiliary economies in the production hall on a scale of 1: 100.

Teaching methods

- Informative (conventional) lecture (information transfer in a systematic way) of a monographic nature, in the form of a multimedia presentation.
- Project method (individual or team implementation of a large, multi-stage cognitive or practical task, the effect of which is the creation of a work).

Bibliography

Basic:
1. Brzeziński M. (red.), Organizacja i sterowanie produkcją, AW Placet, Warszawa, 2002.
2. Lewandowski J., Skołud B., Plinta D., Organizacja systemów produkcyjnych, PWE, Warszawa 2014.
3. Gawlik J., Plichta J., Świć A., Procesy produkcyjne, PWE, Warszawa 2013.
4. Mazurczak J., Projektowanie struktur systemów produkcyjnych, WPP, Poznań, 2001.
5. Automatyzacja i robotyzacja procesów produkcyjnych,Domińczuk J., Kost G. Łebkowski P.,Polskie Wydawnictwo Ekonomiczne, 2021.
6. Technologie, procesy i systemy produkcyjne Rysiński J.,Więcek D., ; Akademia Techniczno-Humanistyczna w Bielsku-Białej. Wydział Budowy Maszyn i Informatyki, Wydawnictwo Naukowe Akademii Techniczno-Humanistycznej w Bielsku-Białej, 2021,
7. Jackowicz R., Lis S, Podstawy projektowania struktur przedsiębiorstw przemysłowych, WPW,Warszawa 1987,
8. Mazurczak, J., Gania, I., 2008. Kryteria klasyfikacji warunków organizowania systemów produkcyjnych,[red.] Fertsch Marek, Grzybowska Katarzyna, Stachowiak Agnieszka, Poznań, Politechnika Poznańska, Instytut Inżynierii Zarządzania, str. 175 - 186.
9. Lis S., Organizacja i ekonomika procesów produkcyjnych w przemyśle maszynowym, PWN, Warszawa 1984.

Additional:
1. Pająk E., Klimkiewicz M., Kosieradzka A., Zarządzanie produkcją i usługami, PWE, Warszawa 2014.
2. Muhlemann A., Oakland J., Lockyer K, Zarządzanie. Produkcja i usługi, PWN, Warszawa 2001.
3. Pająk E., Zarządzania produkcją, Wydawnictwo Naukowe PWN, Warszawa 2017.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
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)	45	2,00