SYLLABUS

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

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bachelor's degree, Full-time
Term:	winter semester 2023/2024
Coordinator of course edition:	Dr Kinga Stecuła

Default type of course examination report:

EXAM

Language:

English

Course homepage:

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

ECTS

5 ECTS

Short description:

Objective: Obtaining structured knowledge on management and production engineering in human activity.

Description:

Objective: Obtaining structured knowledge on management and production engineering in human activity. Acquiring knowledge on the product life cycle, the basics of engineering of needs, quality and work environment, the basic problems related to the environmental, economic and social effects of the use of technical means. Acquiring of skills in identifying issues related to production engineering and obtaining information from various sources, integrating and interpreting them, as well as drawing conclusions on topics related to human technical activity. Understand the general issues related to manufacturing techniques and operation of machines and equipment.

Contemporary challenges for engineering activities, especially these related to the functioning of engineers in areas such as the currently ongoing deep transformation of the functioning of technical systems, related to the so-called the fourth scientific and technological revolution (often referred to as "Industry 4.0") are discussed during lectures. The social conditions for work of engineers, as well as the necessary personality traits of a modern engineer are characterized. The lecture also discusses the role of needs identification and analysis as an element initiating engineering activities. The student obtains basic knowledge about the means and methods of implementing engineering tasks in areas such as design, construction, production and exploitation (operation) of machines and devices. The lectures also includes a discussion of problems related to the production and use of machines and devices, such as environmental protection issues, including the work environment.

Lectures:
- detailed program content:
1. Introduction. Technology as an area of creative human activity. Selected problems of the philosophy of technology. Basic concepts (technique, technology, process, optimization, etc.).
2. Features of the engineering manager of the 21st century.
3. The model of the process of satisfying the needs as the basis for the thinking and acting of an engineer. Discussion of its stages.
4. Product life cycle.
5. Production engineering areas.
6. Industrial revolutions - from Industry 1.0 to Industry 4.0. Discussion of the most important inventions and technical achievements.
7. Basic technologies and manufacturing techniques.
8. IT support for production.

Laboratory:
During laboratory, students:
- solve problems using quality management tools
- solve tasks related to technical mean, including those related to Industry 4.0 and scientific research
- prepare work on the analysis of a selected technical mean (in terms of the purpose and application of the technical mean, issues related to the construction of the technical mean, technical and non-technical problems and the effects of the production, operation of the selected technical mean, the impact of the technical mean on society, the potential development and future of the technical mean)
- prepare a presentation about the selected technical means and present it to the group
- prepare questions for group discussion on the topic of their presentation

NUMBER OF HOURS
Number of hours of classes with direct participation of academic teachers or other people conducting classes and students
- Lecture: 30 h
- Laboratory: 15 h
Number of hours allocated to the student's own work: 105 h, including:
- Preparation to exam: 40
- Acquaintance with literature: 15 h
- Preparation for project and preparation of a final paper: 50 h
Total number of hours: 150 h

Bibliography:

Aspects of production engineering and management / ed. Piotr Łebkowski. - Krakow : AGH University of Science and Technology Press, 2011.
Production management and engineering : an engineer's guide to professional communication in English / Agnieszka Majka-Pauli, Kamila Wójcik. - Kraków : Studium Praktycznej Nauki Języków Obcych Politechniki Krakowskiej, 2014.
Production engineering : Quality Production Improvement / pod redakcją Robert Ulewicz, Manuela Ingaldi. - Częstochowa : Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji, 2018.
K.C. Jain, A.K. Chitale "Textbook of Production Engineering", PHI Learning Private Limited, Delhi 2014, ISBN-978- 81-203-4749-6
P.D.T. O'Connor "The Practice of Engineering Management: A New Approach", John Wiley&Sons, Chichester, UK, 1994
W. Cholewa, J. Kaźmierczak , "Data Processing and Reasoning in Technical Diagnostics", WNT, Warszawa, 1995.
Kaźmierczak J., Stecuła K., Problem of Preparing Students to Study in the Field of „Management and Production Engineering" in the Field of Basic Technical Knowledge – Case Study, [w:] Systemy wspomagania w inżynierii produkcji. Inżynieria systemów technicznych, [red.:] Brodny J., Kaźmierczak J., Volume 6, Issue 6, Gliwice 2017, ISBN 978-83-65265-17-3, e-ISSN 2391-9361.
Stecuła K., Application of Virtual Reality for Education at Technical University, Proceedings of ICERI2019 CONFERENCE 11th-13th November 2019, Seville Spain, p. 7437-7444. ISBN 978-84-09-14755-7, ISSN: 2340-1095, DOI: 10.21125/iceri.2019.1775.

Learning outcomes:

KNOWLEDGE: knows and understands:
Basic engineering processes and technologies in the life cycle of technical equipment, objects and systems and ways of solving typical engineering tasks, particularly in relation to the organization of production processes and production management - in the field of production engineering. K1A _W3
Fundamental problems of contemporary civilization relevant to the production engineering – in the context of production engineering. K1A _W7

SKILLS: is able to:
Identify, formulate and solve complex and unusual engineering problems related to the field of management and production engineering by applying the principles of engineering, science and mathematics, as well as perform tasks under conditions that are not fully predictable - in the field of production engineering. K1A _U1
When identifying and formulating specifications for engineering tasks and solving them:
-select and use analytical, simulation and experimental methods, including computer-aided methods,
-recognize their system and non-technical aspects, including ethical aspects
-make preliminary economic assessment of the proposed solutions and engineering actions taken,
-analyze technology transfer and innovation
in the field of production engineering K1A _U4
Make a critical analysis of the functioning of existing technical and technological solutions in production systems function, evaluate these solutions and suggest appropriate improvements and innovations in this regard - in the field of production engineering. K1A _U5

SOCIAL COMPETENCE: is ready for:
Responsible performance of professional roles, compliance with the rules of professional ethics and requiring it from others, care for the achievements and traditions of the profession; is aware of the importance and understands non-technical aspects and effects of engineering activities - in the field of production engineering. K1A _K3

Assessment methods and assessment criteria:

Passing the lectures:
Exam.

Passing the laboratory:
Completing all tasks
Preparation of work (essay) on the analysis of a selected technical measure.
Presentation of the mentioned work about the selected technical mean.

Final grade: 50% exam grade, 50% laboratory grade.

Practical placement:

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