COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ergonomics [N1IZarz1>ERG]

Course

Field of study
Engineering Management

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
14

Laboratory classes
14

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Student has basic knowledge of mathematics, physics, chemistry, knows the basic technologies of production processes, understands the basic concepts of organization and management sciences and the basics of work safety management.

Course objective

Providing students with theoretical and practical knowledge in the field of shaping safe and ergonomic working conditions, especially in enterprises - industrial and service enterprises in manufacturing and logistics processes. To teach measuring techniques for assessing the most important ergonomic factors. Developing skills of critical observation of work processes in terms of safety and ergonomics, as well as the ability to design changes in the design of equipment and work organization, ensuring ergonomics and safety.

Course-related learning outcomes

Knowledge:
The student names and describes the genesis of ergonomics against the backdrop of technological and scientific development and the constituent sciences that define the character of ergonomics.

[P6S_WG_13]
The student recognizes economic aspects related to occupational safety and health (OSH) and indicates their significance in an ergonomic context. [P6S_WG_13]
The student defines the human-technical object system and its environment, interpreting the system as a workstation. [P6S_WG_17]
The student describes the purpose and scope of ergonomic activity and identifies contemporary trends in ergonomic research. [P6S_WG_13]
The student names and describes typical methods of ergonomic diagnosis and analysis of workloads, both physical and psychological. [P6S_WG_13]

Skills:
The student performs a critical analysis of technological processes in machine production and the organization of production systems. [P6S_UW_13]
The student identifies design tasks and solves simple design tasks in the field of machine construction and operation. [P6S_UW_14]
The student applies typical methods for solving simple problems in the field of machine construction and operation. [P6S_UW_15]

Social competences:
The student is aware that creating products that satisfy user needs requires a systemic approach considering technical, economic, marketing, legal, organizational, and financial issues. [P6S_KO_02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
a) in the scope of laboratory exercises: ongoing checking of knowledge and skills during exercises using laboratory apparatus for ergonomic tests, evaluation of individual laboratory tasks
b) in the scope of lectures: based on a discussion of the material learned in previous lectures; bonus attendance at lectures.
Summative rating:
a) in the scope of laboratory exercises: based on the average of partial grades of the forming phase
b) in the scope of lectures: an exam in the form of a written test.

Programme content

The origin of ergonomics against the backdrop of the development of technology and science. Components sciences and the nature of ergonomics. Ergonomics and health and safety - economic aspects. Human system - technical object and its surroundings. Interpretation of the system as a work-place. The purpose and scope of ergonomic activity. Contemporary trends in ergonomic research. Ergonomic diagnosis methods. Analysis of physical workloads and body heat management. Analysis of work-related psychological burdens. Principles of load optimization. Perception and information proces-sing processes. Selection rules for signaling and control devices. Shaping the spatial parameters of the workplace and manual machines and tools based on anthropometric data. Assessment and shaping of the working environment (mechanical vibrations, noise, microclimate, lighting, harmful radiation, air pollution). Principles of ergonomic design. Examples of ergonomic design of machining, assembly, dispatching and computer stations. Ergonomics of the elderly and the disabled.
Basic contents of laboratory exercises:
• Physical fitness of the body and BMI.
• Human anthropometric features
• Visual work in changing lighting conditions.
• Criteria for seat selection for the user.
• Acoustic conditions of the room
• Feeling of mechanical vibrations.
• Simple and complex reactions.

Course topics

The origin of ergonomics against the backdrop of the development of technology and science.
Ergonomic diagnosis methods.

Analysis of physical workloads and body heat management.
Analysis of work-related psychological burdens.
Selection rules for signaling and control devices.
Shaping the spatial parameters of the workplace and manual machines and tools based on anthropometric data.
Assessment and shaping of the working environment (mechanical vibrations, noise, mi-croclimate, lighting, harmful radiation, air pollution).

Laboratory exercises:
• Physical fitness of the body and BMI.
• Human anthropometric features
• Visual work in changing lighting conditions.
• Absolute hearing threshold.
• Criteria for seat selection for the user.
• Acoustic conditions of the room
• Selected parameterselectric lighting.
• Feeling of mechanical vibrations.
• Simple and complex reactions.
• Sound and visual stimuli and making mistakes.
• Selected psychophysical possibilities.

Teaching methods

Lectures with multimedia presentation
Laboratory exercises with the use of apparatus for ergonomic measurements.

Bibliography

Basic:
1. Karwowski W., Mrugalska B., Human Factors in Challenging Environments: From Thermal Comfort to G-Force Exposure, Taylor & Francis, 2026.
2. Mrugalska B., Karwowski W., Anthropometry: Human Body Measurements and How to Use Them, Taylor & Francis, 2024.
3. Horst W. (red), Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy, Wyd. Politechniki Poznańskiej, Poznań, 2011
4. Olszewski J., Podstawy ergonomii i fizjologii pracy. Wyd. Akademii Ekonomicznej, Poznań, 1997
5. Tytyk E., Butlewski M. Ergonomia w technice. Wyd. Politechniki Poznańskiej, Poznań, 2011
6. Tytyk E., Projektowanie ergonomiczne, Wyd. PWN, Warszawa 2001
7. Wejman M., Diagnozowanie środowiska pracy, Wyd. Politechniki Poznańskiej, Poznań, 2012

Additional:
1. Tytyk E., Współczesne uwarunkowania rozwoju ergonomii w dobie wielkoskalowości i globalizacji działań, [w]: Maciej Złowodzki, Edwin Tytyk, Manezha Dost, Ergonomia wobec wyzwań masowości i globalizacji - aksjologia i kierunek zmian. Wyd. Politechnika Krakowska i Polska Akademia Umiejętnosci, Kraków, 2019, str. 37-56, ISBN 978-83-65991-89-8
2. Górska E., Ergonomia. Projektowanie, diagnoza, eksperymenty. Oficyna Wydawnicza Politechniki Warszawskiej, 2002
3. Jabłoński J. (red.), Ergonomia produktu. Ergonomiczne zasady projektowania produktów, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006
4. Koradecka D., (red), Bezpieczeństwo pracy i ergonomia, Wyd. CIOP, Warszawa, 1999
5. Nowak E., Atlas antropometryczny populacji polskiej, Wydawnictwo Instytutu Wzornictwa Przemysłowego, Warszawa, 2000
6. Norms and Law Rules recommended during the lectures.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	35	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	90	3,50