COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ergonomics in Work Safety

Course

Field of study
Safety Engineering

Year/Semester
1/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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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

Student:

1- knows issues in the field of technical safety, security systems, health and safety as well as threats and their effects

2- knows issues in the field of threats and their consequences, risk assessment in the work environment as well as occupational accidents and diseases

3- knows issues of ergonomics, human ecology and environmental protection

4- knows the issues of quality engineering in relation to products and processes

5- knows development trends and best practices in the field of security engineering.

Skills

Student:

1- is able to prepare the necessary resources to work in an industrial environment and knows the safety rules associated with this work and is able to force their application in practice

2- can critically analyze the functioning and evaluate - in conjunction with the Safety Engineering existing technical solutions, in particular machines, devices, objects, systems, processes and services

3- can design an object, system or process that meets the requirements of safety engineering using appropriate methods and techniques

4- can plan and carry out experiments, including computer measurements and simulations, interpret obtained results and draw conclusions

5- is able to identify changes in requirements, standards, regulations and technical progress and the reality of the labor market, and based on them determine the need to supplement knowledge.

Social competences

Student:

1- can see the cause-and-effect relationships in achieving the goals and rank the importance of alternative or competitive tasks

2- is aware of the recognition of the importance of knowledge in solving problems in the field of security engineering and continuous improvement

3- is aware of the responsibility for own work and readiness to comply with the principles of teamwork and taking responsibility for jointly implemented tasks.

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
- 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. Horst W. (red), Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy, Wyd. Politechniki Poznańskiej, Poznań, 2011
2. Mrugalska B. (ed.), Human factors in economics and organizational design. Wyd. Politechniki Poznańskiej, Poznań, 2013.
3. Tytyk E., Butlewski M. Ergonomia w technice. Wyd. Politechniki Poznańskiej, Poznań, 2011
4. Tytyk E., Projektowanie ergonomiczne, Wyd. PWN, Warszawa 2001
5. Wejman M., Diagnozowanie środowiska pracy, Wyd. Politechniki Poznańskiej, Poznań 2012

Additional

1. Norms and Low Acts recomended on lectures and labor exercises
2. Koradecka D., (red), Bezpieczeństwo pracy i ergonomia, Wyd. CIOP, Warszawa, 1999
3. Górska E., Ergonomia. Projektowamie, diagnoza, eksperymenty. Oficyna Wydawnicza Politechniki Warszawskiej, 2002
4. Rabenda A., Kowal E., Oddziaływanie szkodliwości przemysłowych na organizm człowieka. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, 2008

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	65 (30wyk, 30lab, 5egz)	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	60	2,0

[1] delete or add other activities as appropriate