



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ergonomics in Technology

### Course

Field of study

Safety Engineering

Area of study (specialization)

Ergonomics and Work Safety

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

8

Laboratory classes

0

Other (e.g. online)

0

Tutorials

10

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

prof. dr hab. inż. Edwin Tytyk

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tel. (61) 665-33-77 (Secretary: -74)

Faculty of Engineering Management

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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 ergonomics, macroergonomics and occupational safety as well as design methodologies including safety principles
- 2- knows issues related to the area of ergonomics and occupational safety
- 3- knows the issues of costs and insurance systems in the field of ergonomics and occupational safety as well as related legal provisions.

#### Skills

##### Student:

- 1- can properly choose the sources and information from them, make an assessment, critically analyze and synthesize this information, formulate conclusions and comprehensively justify the opinion
- 2- can see and formulate system and non-technical aspects in engineering tasks, as well as socio-technical, organizational and economic
- 3- can prepare the necessary resources to work in an industrial environment and knows the safety rules associated with this work and is able to enforce their application in practice
- 4- able to make a critical analysis of the way it functions and assess - in conjunction with Safety Engineering - existing technical solutions, in particular machinery, equipment, facilities, systems, processes and services
- 5- can present the problem within the framework of ergonomics and occupational safety by means of properly selected means
- 6- can plan and conduct experiments, including computer measurements and simulations, interpret obtained results and draw conclusions.

#### Social competences

##### Student:

- 1- is aware of the recognition of cause-and-effect relationships in achieving the set goals and ranking the importance of alternative or competitive tasks
- 2- can initiate activities related to the formulation and transfer of information and collaboration in society in the field of security engineering.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Formative assessment:

- a) in the scope of exercises: ongoing checking of knowledge and skills during exercises using analytical methods of ergonomic testing, assessment of individual tasks

#### Summative rating:

- a) in terms of exercises: based on the average of partial grades of the forming phase
- b) in the scope of lectures: passing the theoretical part in the form of a written test.



## Programme content

Ergonomic aspects of the functioning of the human-machine system. Areas of issues of safety, occupational hygiene and ergonomics. The concept of work safety culture and ergonomics. Nuisance and harmfulness of working conditions. Physiology of work: physiological cost of work, overload prevention. Health effects of excessive and insufficient loads. Information and decision-making processes in controlling machines and technical devices. Principles of analysis and assessment of mental load. Anthropometric foundations for shaping technical objects and work spaces. Factors of the physico-chemical environment of human work - assessment and development. Ergonomic diagnosis methods (apparatus measurements, checklists). Basics of ergonomic design. The economic importance of ergonomic quality of products and working conditions.

## Teaching methods

Lectures with multimedia presentations  
Accounting and designing exercises on topics related to lectures.

## Bibliography

### Basic

1. Horst W. (red), Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy, Wyd. Politechniki Poznańskiej, Poznań, 2011
2. Olszewski J., Podstawy ergonomii i fizjologii pracy. Wyd. Akademii Ekonomicznej, Poznań, 1997
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. Normy i akty prawne wskazane na zajęciach
2. Koradecka D., (red), Bezpieczeństwo pracy i ergonomia, Wyd. CIOP, Warszawa, 1999
3. Górka E., Ergonomia. Projektowanie, 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	50	2,0
Classes requiring direct contact with the teacher	18	1,0
Student's own work (literature studies, preparation for classes, preparation for accounting and designing exercises, preparation for tests/exam) <sup>1</sup>	32	1,0

<sup>1</sup> delete or add other activities as appropriate