



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Product Ergonomics

### Course

Field of study

Engineering Management

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

English

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

Tutorials

15

Projects/seminars

Other (e.g. online)

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Ph.D., D.Sc., Eng. Marcin Butlewski, University

Professor

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Responsible for the course/lecturer:

### Prerequisites

The student has basic knowledge in the field of ergonomics

### Course objective

The aim of the course is to provide practical skills in the ergonomic and design of products - better consideration of human needs in design solutions

### Course-related learning outcomes

Knowledge

The student defines product ergonomics, explaining ergonomic evaluation criteria and its impact on the life cycle of industrial products [P6S\_WG\_15].



The student identifies methods, techniques, tools, and materials used in ergonomic design, including aspects of safety and occupational hygiene [P6S\_WG\_16].

The student characterizes industrial technologies used in ergonomic design [P6S\_WG\_17].

The student describes non-technical conditions of engineering activities, considering the impact of product ergonomics on the work environment [P6S\_WG\_18].

#### Skills

The student applies analytical, simulation, and experimental methods in ergonomic design, including in the analysis of requirements and morphological analysis [P6S\_UW\_10].

The student integrates systemic, socio-technical, organizational, and economic aspects in the process of ergonomic design [P6S\_UW\_11].

The student conducts an economic analysis in ergonomic design, using methods such as ergonomic TRIZ [P6S\_UW\_12].

The student identifies and designs ergonomic solutions, considering user comfort and product safety [P6S\_UW\_14].

#### Social competences

The student integrates technical, economic, marketing, legal, organizational, and financial requirements in the process of creating ergonomic products [P6S\_KO\_02].

The student considers responsibility for ergonomic aspects of products and their significance for users and the environment [P6S\_KR\_01].

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

- a) exercises: current assessment (on a scale of 2 to 5 points) of tasks ordered,
- b) lectures: answers to questions about the material discussed in previous lectures.

Summative rating:

- a) exercises: the final grade is the average of partial tasks; exercises passed after obtaining at least average 3.0,
- b) lectures: written colloquium from the content presented in the lecture (form: open and problem questions)

#### Programme content

Product concept and product ergonomics. Criteria for assessing the product, including the industrial product. Ergonomic design. Laws and standards in ergonomic design. The tasks of product ergonomics:



adapting technical objects to human dimensions and shapes, ensuring the functionality of a technical object (e.g. efficiency, suitability of form, function, reliability, susceptibility to repair regulations, ease of disposal after use), ensuring safety and comfort of using a technical object, eliminating negative the impact of the product on human environmental conditions, care for the aesthetics and colors of the technical object. Benefits of product ergonomics. Losses resulting from low ergonomics of technical facilities. Test methods and assessment of product ergonomics. Industrial ergonomics and design.

Exercises: the use of analyzes that allow achieving better ergonomic quality of the product, analysis of requirements, morphological analysis, home of quality for the purposes of an ergonomic product, ergonomic TRIZ.

### Teaching methods

Teaching methods:

Conversational lecture

exercises:

The classic problem method

Case method

The staging method

Idea exchange (brainstorming)

### Bibliography

Basic

Jabłoński J. (red.), Ergonomia produktu. Ergonomiczne zasady projektowania produktów, Wyd. Politechniki Poznańskiej, Poznań, 2006

Butlewski M., Projektowanie i ocena wyrobów. - Poznań: Wydaw. Politechniki Poznańskiej, 2013. - 106 s.

Butlewski M., Heuristic Methods Aiding Ergonomic Design, Universal Access in Human-Computer Interaction. Design Methods, Tools, and Interaction Techniques for eInclusion, Lecture Notes in Computer Science Volume 8009, 2013, pp 13-20

Butlewski M., The issue of product safety in contemporary design. in: Safety of the system, Technical, organizational and human work safety determinants. Red. Szymon Salamon. Wyd. PCzést. Częstochowa 2012. ISBN 978-83-63500-13-9, ISSN 1428-1600, pp. 112-120

Tytyk E., Projektowanie ergonomiczne, Wydawnictwo Naukowe PWN, Warszawa, 2001



Butlewski M., Projektowanie ergonomiczne wobec dynamiki deficytu zasobów ludzkich / Marcin Butlewski (WIZ) / red. Krystyna Bubacz - Poznań, Polska : Wydawnictwo Politechniki Poznańskiej, 2018 - 255 s.

Additional

Butlewski M., Tytyk E., Inżynieria ergonomiczna dla aktywizacji osób starszych, Praca i Zabezpieczenie Społeczne, 50 - 59

Butlewski, M., Jasiulewicz-Kaczmarek, M., Misztal, A., Sławińska, M., Design methods of reducing human error in practice, (2015) Safety and Reliability: Methodology and Applications - Proceedings of the European Safety and Reliability Conference, ESREL 2014, pp. 1101-1106.

Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic Books (AZ).

Norman, D. A. (2004). Emotional design: Why we love (or hate) everyday things. Basic Civitas Books.

Królak, P., & Butlewski, M. (2016). Application of the TRIZ method in design oriented to the various needs of people with disabilities. Occupational Safety and Hygiene IV, 275

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests, project preparation) <sup>1</sup>	20	1,0

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