



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ergonomics-oriented Design

### 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

Polish

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

### 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 and management

### Course objective

The aim of the lectures is to familiarize students with the basic issues of the methodology of human-oriented design as an operator and as a service worker of machines and other technical devices. The purpose of the exercises is to convey the skills of designing human - technical object systems during practical design work on specific, detailed design tasks, defined from an anthropocentric point of view.

### Course-related learning outcomes

Knowledge



The student describes the paradigm of ergonomic design, including the human-technical object system and the ergonomic design process [P6S\_WG\_13].

The student lists and explains decision criteria used in the ergonomic design process, in the context of the industrial product life cycle [P6S\_WG\_15].

The student identifies methods, techniques, tools, and materials used in ergonomic design, considering the technology of construction and operation of machines [P6S\_WG\_16].

The student characterizes non-technical conditions of engineering activities, including principles of safety and occupational hygiene [P6S\_WG\_18].

#### Skills

The student applies analytical, simulation, and experimental methods to formulate and solve design tasks in the field of ergonomics [P6S\_UW\_10].

The student analyzes engineering tasks in terms of systemic, socio-technical, organizational, and economic aspects [P6S\_UW\_11].

The student conducts a preliminary economic analysis of the designed ergonomic solutions [P6S\_UW\_12].

The student identifies and solves design tasks related to ergonomics, designing workspace and information-control processes [P6S\_UW\_14].

The student applies methods for solving problems in ergonomic design, including in the context of designing for people with disabilities [P6S\_UW\_15].

#### Social competences

The student is aware of the importance of a systemic approach in ergonomic design, considering the diverse requirements of users and the socio-economic context [P6S\_KO\_02].

The student explains and considers non-technical aspects of engineering activities, including the impact of ergonomic design on the environment and society [P6S\_KR\_01].

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

Learning outcomes presented above are verified as follows:

Forming assessment: lectures: Written exam (test), at least 55% of correct answers required.

Exercises: Credit for the grade on the basis of: active participation in classes and the implementation of individual tasks

Summative rating issued from the whole

#### Programme content

The origin of design science and definitions. Designing system and design system. Engineering design: goals, tasks, process structure. The ergonomic design paradigm. The human-technical system as an



object of design, decision criteria, structure of the ergonomic design process. Designing: work process, work space, information and control processes, sources of work environment factors - practical examples. Economic and social advantages of ergonomic design. Computer and heuristic design support. Design for disabled people.

### Teaching methods

Teaching methods: Conversational lecture

Exercises: Classical problem method, Didactic games,

### Bibliography

#### Basic

Projektowanie ergonomiczne (Ergonomic design); Edwin Tytyk, Wyd. Naukowe PWN, Warszawa-Poznań, 2001

Ergonomia produktu. Ergonomiczne zasady projektowania produktów (Product ergonomics. Ergonomic design principles of the product; Jan Jabłoński (red.), Wydawnictwo Politechniki Poznańskiej, Poznań, 2006

Butlewski M., Projektowanie i ocena wyrobów. - Poznań: Wydaw. Politechniki Poznańskiej, 2013. - 106 s. 121 podręcznik

Atlas miar człowieka. Dane do projektowania i oceny ergonomicznej (Atlas of human measure. The data for the design and evaluation of ergonomic evaluation); Adam Gedliczka, Wyd. CIOP, 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

Makroergonomia (Macroergonomics); Leszek Pacholski, Aleksandra Jasiak, Wydawnictwo Politechniki Poznańskiej, Poznań, 2011

Zabłocki, M., Butlewski, M., Sydor, M. (2017). Ergonomiczne rozwiązania techniczne dla osób z niepełnosprawnościami stosowane w transporcie zbiorowym. *Bezpieczeństwo Pracy ? Nauka i Praktyka*, 553(10), 15-19.

Sydor, M., Zabłocki, M., Butlewski, M. (2017). Ergonomiczne wymagania stawiane pojazdom samochodowym dla osób z niepełnosprawnościami. *Bezpieczeństwo Pracy ? Nauka i Praktyka*, 553(10), 10-14.

Butlewski M., Misztal A., Belu N., An analysis of the benefits of Ethnography Design methods for product modeling, *IOP Conf. Series: Materials Science and Engineering* 145 (2016) 042023, IOP Publishing.



Butlewski M., Indirect Estimation Method of Data for Ergonomic Design on the Base of Disability Research in Polish 2011 Census, p. 454-462, [in]: Advances in Social and Organizational Factors, Edited by Peter Vink, CRC Press, Taylor and Francis Group, Boca Raton, London, New York, 2012, ISBN 978-1-4398-8

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

Kalemba A., & Butlewski, M. (2016). "Ergonomic design of store shelving for the elderly applying universal design with a focus on health and safety". Occupational Safety and Hygiene IV, .iczna stanowisk pracy, Ewa Górská, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 1998.

### 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