



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ergonomics-oriented Design

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### Course

Field of study

Engineering Management

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

II/4

Profile of study

general academic

Course offered in

polish

Requirements

elective

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### Number of hours

Lecture

15

Tutorials

15

Laboratory classes

Projects/seminars

Other (e.g. online)

### Number of credit points

2

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### Lecturers

Responsible for the course/lecturer:

dr hab. Eng. Marcin Butlewski

Responsible for the course/lecturer:

Department of Ergonomics Applications

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### 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

has basic knowledge of the life cycle of socio-technical systems needed in the design of technical / organizational solutions

has basic knowledge of the life cycle of industrial products

knows the basic methods, techniques, tools and materials used to solve simple engineering tasks in the field of machine construction and operation in the context of ergonomic design

knows typical industrial technologies and knows the technologies of machine construction and operation and their effect in the context of ergonomic design

has the basic knowledge necessary to understand the non-technical determinants of engineering activities; knows the basic principles of ergonomics and hygiene of work in force in the machine building industry

### Skills

can use to formulate and solve engineering tasks analytical, simulation and experimental methods in the context of ergonomic design

can - when formulating and solving engineering tasks - perceive their systemic, socio-technical, organizational, economic and non-technical aspects

can make a preliminary economic analysis of engineering activities undertaken in the context of ergonomic design

is able to identify design tasks and solve simple design tasks in the field of machine construction and operation

can apply typical methods for solving simple problems in the field of machine construction and operation

is able to design the construction and technology of simple machine parts and subassemblies, and design the organization of first-degree complexity production units. is able to identify changes in requirements, standards, regulations, technical progress and the reality of the labor market, and based on them determine the needs to supplement own and other knowledge [P7S\_UU\_01]

### Social competences

is aware that creating products that meet the needs of users requires a systematic approach taking into



account technical, economic, marketing, legal, organizational and financial issues in the context of ergonomic design

is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the associated responsibility for the decisions taken

### 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 Górska, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 1998.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	60	2
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	30	1,0

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