



# **TANTÁRGYI ADATLAP SUBJECT DATASHEET**

**ERGONOMICS**

**BMEGT52A410**

# I. COURSE DESCRIPTION

## 1. SUBJECT DATA

### Course name

ERGONOMICS

### Course code

BMEGT52A410

Course type contact lessons

### Kurzustípusok és óraszámok

<i>Type</i>	<i>Lessons</i>	<u>Type of assessment</u>	<u>Number of credits</u>
Lecture	2	mid-term	
Practice	0	grade	
Laboratory	1		

### Course leader

<i>Name</i>	<i>Position</i>	<i>Email adress</i>
Dr. Hercegfı Károly	associate professor	hercegfı.karoly@gtk.bme.hu

### Organizational unit for the subject

Department of Ergonomics and Psychology

### Subject website

<https://edu.gtk.bme.hu>

### Language of teaching

magyar - HU , angol - EN

### Curriculum role of the subject, recommended semester

#### Pre-requisites

*strong* Nincs

*weak* Nincs

*paralell* Nincs

*exclusive* Nincs

### 1.13 A tantárgyleírás érvényessége / Validity of the Subject Description

Pre-2017, next review September 2021.

Pre-2017, next review September 2021.

## 2. OBJECTIVES AND LEARNING OUTCOMES

### Objectives

The basic objective of the subject is to acquire the approach of Human Factors and Ergonomics (HFE). Participants become sensitive to the role of requirements from a wide variety of user characteristics during different development processes.

### Learning outcomes

#### Knowledge

1. They have comprehensive knowledge of the most important concepts and connections used in Human Factors and Ergonomics (HFE).
2. They know the methods of user-centred product design, aspects of user group and user characteristics identification.
3. They know the principles of HFE related to the physical and social environment.
4. They know a palette of methods used in ergonomic analysis and design (eg., digital modeling of the human body, computer-aided anthropometric design, testing and evaluation of the ergonomic quality of the user interface, risk analysis and evaluation of industrial workplaces).

#### Ability

1. They identify special professional problems with a multifaceted, interdisciplinary approach, explores and formulates the detailed theoretical and practical background necessary for their solution. Able to understand the relationships between technical and human disciplines.
2. They are able to recognize and identify the role and significance of the human factor in a wide variety of technical topics in the workplace. They identify professional problems with a user-centered approach, explores and formulates the theoretical and practical background needed to solve them.
3. They apply the theories of ergonomics and related terminology in a creative way when solving problems.

#### Attitude

1. They are characterized by sensitivity to human needs. They are characterized by a user-centric thinking and approach.
2. They are characterized by continuous learning skills, broad and thorough education, interdisciplinary interest.
3. They are characterized by a system-level thinking and approach.
4. They are characterized by a strong critical and self-critical sense.

#### Autonomy and responsibility

### Methodology of teaching

Lectures and lab exercises

### Materials supporting learning

- Hercegi K., Izsó L. (szerk.) (2007): Ergonómia. Typotex Kiadó, Budapest.  
<https://www.interkonyv.hu/konyvek/?isbn=978-963-2790-95-4>
- Antalovits M., Hercegi K. (2018): Ergonómia és felhasználói élmény. In: Klein S. (szerk.): Munkapszichológia a 21. században, 719-760. oldal. Edge 2000 Kiadó, Budapest.
- Becker Gy., Kaucsek Gy. (1996): Termérgonómia és termékpszichológia. Tölgyfa Kiadó, Budapest.
- Sanders, M.S., McCormick, E.J. (1993): Human Factors in Engineering and Design. McGraw-Hill, London (7th ed.).

# II. SUBJECT REQUIREMENTS

## TESTING AND ASSESSMENT OF LEARNING PERFORMANCE

### General Rules

The assessment of the learning outcomes set out in point 2.2 is based on two mid-term exams and microcontent assignments.

### Performance evaluation methods

Detailed description of assessments performed during the semester: summative assessment of learning performance: complex, written way of assessment of knowledge and skill types of competence elements of the subject in the form of two mid-term exams..

Microcontent

assignments (case studies) to practice.

### Proportion of performance evaluations performed during the diligence period in the rating

- 1st mid-term exam: 35%
- 2nd mid-term exam: 35%
- Microcontent assignments : 30%
- sum: 100%

### Proportion of examination elements in the rating

- :

### The condition for obtaining the signature, validity of the signature

#### Grading

Excellent	> 90
Very good	80–89
Good	70-79
Satisfactory	60-69
Pass	40-59
Fail	< 40

#### Correction and retake

Each mid-term exam has to reach 40%. The mid-term exams can be replenished by the supplementary exam held in the last study week and

the supplementary-supplementary exam held in the replacement period. In the event of a supplementary exam, only one of the two exams

can be replenished (however, in the case of fulfillment of neither of exams, one exam can be replenished in the supplementary exam, the other exam can be replenished in the supplementary-supplementary exam). The supplementary exam can also be written for correction,

if other-wise both exams are fulfilled. In case of correction, the later score shall be taken into account. The microcontent assignments can be replenished until the end of the supplementary week, deducting their score by 20%.

#### Study work required to complete the course

2 14

2 5

42

40

120

#### Approval and validity of subject requirements

Pre-2017, next review September 2021.

# III. COURSE CURRICULUM

## THEMATIC UNITS AND FURTHER DETAILS

### Topics discussed during the semester

To achieve the learning outcomes specified in section, 2.2, the subject consists of the following thematic blocks. The syllabus of the specific course announced in each semester shall schedule these elements of topics according to the calendar and other circums.

- 1 Basic concepts and main optimization objectives of Human Factors and Ergonomics (HFE). Man-Machine Systems. User interface. The main stages of the formation / development of HFE.
- 2 Basic requirements for ergonomic (human-centred) design. Basic approaches to product ergonomics.
- 3 Human characteristics to be considered in design 1:
- 4 Human body dimensions and ranges of movement. Static and dynamic anthropometry. Asserting anthropometric considerations in ergonomic analysis and design. Digital modelling of the human body. Computer Aided Anthropometric Design.
- 5 Human characteristics to be considered during design 2:
- 6 Special issues of standing and sitting posture. Ergonomic requirements for the design of seated (screen-using) workplaces.
- 7 Ergonomic principles related to the physical environment:
- 8 Physiological effects of physical environmental factors (lighting, noise, vibrations, climate, air quality) on humans and the resulting design guidelines, norms and standards.
- 9 Human characteristics to be considered in design 3:
- 10 Human sensation. General characteristics of sensation. Design guidelines derived from the basics of vision, contrast enhancement, motion enhancement, and colour sensation.
- 11 Human characteristics to be considered in design 4:
- 12 Design requirements derived from the psychological basis of human cognition: general aspects of designing choices for novice and experienced users; ergonomic aspects of the choice of signs and symbols; adapting technological / economic environment to users of various cognitive styles.
- 13 Design for All. Design for special segments of users. Principles and requirements. Methods and practical solutions. Design of the physical environment (including offices, classrooms, and their wider environment) and vehicles for special segments of users. Accessibility.
- 14 Principles and methods of ergonomic design of industrial workplaces. Risk analysis and assessment of industrial workplaces.
- 15 Office ergonomics. Small and large offices. Applying ergonomic aspects of the social environment: influencing social relationships and communication by setting up work environments.
- 16 Introduction to software ergonomics. General guidelines for user interface design. Mental work. Usability evaluation.
- 17 User Profile. Anthropometric fit of machine and human sizes.
- 18 Quality of office chairs and how to adjust them.
- 19 Risk assessment of industrial workplaces.
- 20 Applying Digital Human Modelling.
- 21 Usability testing by eye-tracking.

### Lecturers participating in teaching

Pulay Márk	tanársegéd	pulay.mark@gtk.bme.hu
Pataki-Bittó Fruzsina	tanársegéd	pataki.bitto.fruzsina@gtk.bme.hu
Boros Dávid Pál	Ph.D. hallgató	boros.david@gtk.bme.hu
Szabó Bálint	tanársegéd	szabo.balint@gtk.bme.hu
Babicsné Horváth Mária	tanársegéd	babicsne.horvath.maria@gtk.bme.hu

### Approval and validity of subject requirements

Beyond Part I and II of the Subject Datasheet, Part III is approved by the head of the Department of Ergonomics and Psychology indicated in section 1.8 in consultation with the director(s) of the programme(s) concerned.