SUBJECT DATASHEET

Ergonomics

BMEGT52A412

I. SUBJECT DESCRIPTION

1. SUBJECT DATA

Subject name
Ergonomics

ID (subject code)	BMEGT52A412

Type of subject
contact lessons

Course types and lessons

Type	*Lessons*
Lecture	1
Practice	1
Laboratory	0

Type of assessment
mid-term grade

Number of credits
3

Subject Coordinator

Name	*Position*	*Contact details*
Dr. Hercegfi Károly	associate professor	hercegfi.karoly@gtk.bme.hu

Educational organisational unit for the subject
Department of Ergonomics and Psychology

Subject website
https://edu.gtk.bme.hu/

Language of the subject
magyar - HU, angol - EN

Curricular role of the subject, recommended number of terms
Programme: **BSc in Mechatronics Engineering**
Subject Role: **Compulsory**
Recommended semester: **2**

Direct prerequisites

Strong	None
Weak	None
Parallel	None
Exclusion	None

Validity of the Subject Description
Approved by the Faculty Board of Faculty of Economic and Social Sciences, Decree No: 5881478/13/2024 registration number. Valid from: 11.12.2024.

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.

Academic results

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).

Skills

1. . They identify special professional problems with a multifaceted, interdisciplinary approach, explores and formulates
2. the detailed theoretical and practical background necessary for their solution. Able to under-stand the relationships
3. between technical and human disciplines.
4. 2. They are able to recognize and identify the role and significance of the human factor in a wide variety of technical
5. topics in the workplace. They identify professional problems with a user-centered approach, explores and formulates
6. the theoretical and practical background needed to solve them.

Attitude

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

Independence and responsibility

1. Critical thinking.

Teaching methodology

Lectures and exercises (partly in lab)

Materials supporting learning

- Hercegfi K., Izsó L. (szerk.) (2007): Ergonómia. Typotex Kiadó, Budapest. https://www.interkonyv.hu/konyvek/?isbn=978-963-2790-95-4
- Antalovits M., Hercegfi 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): Termékergonómia 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 a mid-term exam and two microcontent assignments.

Performance assessment 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 a mid-term exam. Microcontent assignments
(case studies) to practice.

Percentage of performance assessments, conducted during the study period, within the rating

- **mid-term exam**: 72
- **1st microcontent assignment**: 14
- **2st micocontent assignment**: 14

Percentage of exam elements within the rating

Conditions for obtaining a signature, validity of the signature

Issuing grades

Excellent	90
Very good	80-89
Good	70-79
Satisfactory	60-69
Pass	40-59
Fail	0-39

Retake and late completion

The mid-term exam has to reach 40%. The mid-term exam can be replenished by the supplementary exam held in the last study week and
the supplementary-supplementary exam held in the replacement period. 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 2-2.

Coursework required for the completion of the subject

részvétel az előadásokon	14
participating in exercises	10
preparation for the summative performance evaluations	24
assignments	42
összesen	90

Approval and validity of subject requirements

Consulted with the Faculty Student Representative Committee, approved by the Vice Dean for Education, valid from: 04.11.2024.

III. COURSE CURRICULUM

THEMATIC UNITS AND FURTHER DETAILS

Topics covered during the term

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 goals of ergonomics. Man-Machine systems. User interface. Main stages of the history of ergonomics. The basic requirements of human centered design.

2 Human characteristics to be taken into account in design 1: Human body dimensions and range of motion. Static and dynamic anthropometry. Validation of anthropometric aspects during ergonomic analysis and design. Digital modeling of the human body. Computer-aided anthropometric design.

3 Human characteristics to be taken into account in design 2: Special issues of standing and sitting posture. Ergonomic requirements for sitting (screen) workplaces.

4 Principles of ergonomics related to the physical environment: Physiological effects of physical environmental factors (illumination, noise, vibrations, climate, air quality) on humans and the resulting design guidelines.

5 Human characteristics to be taken into account in design 3-4: Human perception. General characteristics of sensing. Design guidelines derived from the basic functioning of vision, contrast enhancement and motion enhancement, and color perception. Design requirements from the psychological foundations of human cognition: selection choices for novice and experienced users; signs and symbols; adapting the technical environment to users with different cognitive styles.

6 Principles and methods of ergonomic design of industrial workplaces. Risk analysis and assessment of industrial workplaces.

7 Introduction to software ergonomics. General guidelines for user interface design. Mental work. Usability testing.

8 Exercise: User profile. Fitting machine and human dimensions.

9 Laboratory exercise: Office chair evaluation.

10 Exercise: Risk assessment of industrial workplaces.

11 Laboratory exercise: Usability test with eye tracking

Additional lecturers

Pataki-Bittó Fruzsina	adjunktus/assistant professor	pataki.bitto.fruzsina@gtk.bme.hu
Boros Dávid Pál	tanársegéd/assistant lecturer	boros.david@gtk.bme.hu

Approval and validity of subject requirements