SUBJECT DATASHEET

ERGONOMICS

BMEGT52AT20

I. SUBJECT DESCRIPTION

1. SUBJECT DATA

Subject name
ERGONOMICS

ID (subject code)	BMEGT52AT20

Type of subject
contact lessons

Course types and lessons

Type	*Lessons*
Lecture	2
Practice	1
Laboratory	0

Type of assessment
exam

Number of credits
4

Subject Coordinator

Name	*Position*	*Contact details*
Dr. Pataki-Bittó Fruzsina	assistant professor	pataki.bitto.fruzsina@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

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

Direct prerequisites

Strong	None
Weak	None
Parallel	None
Exclusion	BMEGT52A021 Ergonómia, BMEGT52A410 Ergonómia

Validity of the Subject Description
Approved by the Faculty Board of Faculty of Economic and Social Sciences, Decree No: 580515/8/2024 registration number. Valid from: 26.06.2024.

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 basics of anthropometry, understanding the design requirements arising from body sizes, movements and posture.
3. They know the principles of HFE related to the physical environment (lighting, noise, vibrations, climate) and the basics of human perception and cognition,
4. They know the criteria for identifying the user group and define user characteristics.
5. They know the following methods used in ergonomic analysis and design: computer-aided anthropometric design, testing and evaluation of the ergonomic quality of the user interface, risk analysis and evaluation of industrial workplaces.
6. They know and understand the basic concepts and design principles of accessible design, universal design and Design for All.

Skills

1. 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.
3. They apply the theories of ergonomics and related terminology in a creative way when solving problems.
4. They can formulate the revealed ergonomic problems and their suggestions accurately.
5. They can choose the appropriate design strategy for sizing the products.

Attitude

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

Independence and responsibility

1. They work independently to identify ergonomic problems and to find user-centered solutions.
2. They mobilize their theoretical and practical knowledge and skills in cooperation with other students.
3. They welcome well-founded critical comments.

Teaching methodology

Both the lectures and the practical sessions linked to the lectures support students to complete the three-part individual exercise.

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.): Mun-kapszichológia a 21. században, 719-760. oldal. Edge 2000 Kiadó, Budapest.
- Becker Gy., Kaucsek Gy. (1996): Termékergonómia és termékpszichológia. Tölgyfa Kiadó, Buda-pest.
- 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 an individual or teamwork-based complex (multi-part) assignment
and an oral exam.

Performance assessment methods

Detailed description of assessments performed during the semester: a complex (multi-part) assignment. Assessment in exam period: Oral
performance evaluation (oral exam): oral examination on the basis of the list of lectures.

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

- **Assignment**: 50

Percentage of exam elements within the rating

- **oral exam**: 50
- **calculating the mid-semester results**: 50
- **sum**: 100

Conditions for obtaining a signature, validity of the signature

The requirement for obtaining the signature is that the students have to achieve at least 50% of the points obtain-able in both mid-semester
exams declared in 3.3. Participating in at least the 60% of the exercises is mandatory. The obtained signature is valid for the period according to the general rules of the university.

Issuing grades

Excellent	90
Very good	85–89
Good	75-84
Satisfactory	65-74
Pass	50-64
Fail	0-49

Retake and late completion

The assignment can be replenished until the end of the supplementary week, deducting their score by 5% weekly (max. 20%). The oral exams can be amended according to the general rules of the university.

Coursework required for the completion of the subject

részvétel az előadásokon – participating in lectures	28
részvétel a gyakorlatokon – participating in exercises	12
házi feladat elkészítése – assignments	52
készülés a szóbeli vizsgára – preparing for the oral exam	28
összesen	120

Approval and validity of subject requirements

Consulted with the Faculty Student Representative Committee, approved by the Vice Dean for Education, valid from: 03.06.2024.

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 Topics of the lectures

2 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.

3 Basic requirements for ergonomic (human-centred) design. Basic approaches to product ergonomics.

4 Human characteristics to be considered in design 1:

5 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.

6 Human characteristics to be considered during design 2:

7 Special issues of standing and sitting posture. Ergonomic requirements for the design of seated (screen-using) workplaces.

8 Ergonomic principles related to the physical environment:

9 Physiological effects of physical environmental factors (lighting, noise, vibrations, climate, air quality) on humans and the resulting design guidelines, norms and standards.

10 Human characteristics to be considered in design 3:

11 Human sensation. General characteristics of sensation. Design guidelines derived from the basics of vision, contrast enhancement, motion enhancement, and colour sensation.

12 Human characteristics to be considered in design 4:

13 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.

14 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.

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

16 Office ergonomics. Small and large offices. Applying ergonomic aspects of the social environment: influencing social relationships and communication by setting up work environments.

17 Introduction to software ergonomics. General guidelines for user interface design. Mental work. Usability evaluation.

18 Topics of the exercises

19 User Profile. Anthropometric fit of machine and human sizes.

Additional lecturers

Babicsné Horváth Mária	tanársegéd (assistant lecturer)	babicsne.horvath.maria@gtk.bme.hu
Dr. Hercegfi Károly	docens (associate professor)	hercegfi.karoly@gtk.bme.hu
Pulay Márk	tanársegéd (assistant lecturer)	pulay.mark@gtk.bme.hu
Boros Dávid Pál	Ph.D.hallgató (PhD student)	boros.david@gtk.bme.hu

Approval and validity of subject requirements