SYLLABUS

1. Information about the study program

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electrical Engineering
1.3 Department	Electrotechnics and Measurements
1.4 Field of study	Electrical Engineering
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Specialization	Electrical System/ Engineering
1.7 Form of education	Full-time
1.8 Subject code	32.00

2. Information about the subject

2.1 Subject name				Ergonomics	
2.2 Course responsible/lecturer				assoc. prof. Ionut-Dorin Stanciu (ionut.stanciu@dppd.utcluj.ro)	
2.3 Teachers in charge of seminars				- - -	
2.4 Year of study	2	2.5 Semester	2	2.6 Assessment	C
2.7 Subject category				Formative category	DC
				Optionality	DI

3. Estimated total time

3.1 Number of hours per week	1	of which	3.2 Course	1	3.3 Seminar	0	3.3 Laboratory	-	3.3 Project	-
3.4 Total hours in the curriculum	14	of which	3.5 Course	-	3.6 Seminar	-	3.6 Laboratory	-	3.6 Project	-

3.7 Individual study:	
(a) Textbooks, lecture material and notes, bibliography	4
(b) Supplementary study in the library, online and in the field	0
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	3
(d) Tutoring	3
(e) Exams and tests	1
(f) Other activities	-
3.8 Total hours of individual study (sum (3.7(a)…3.7(f)))	11
3.9 Total hours per semester (3.4+3.8)	25
3.10 Number of credit points	1

4. Pre-requisites (where appropriate)

4.1 Curriculum	-
4.2 Competence	Computer operation at a beginner level (user): a. Use of Office-type software (e.g., Microsoft Word, Open Office, Libre Office); b. Internet browsing at a beginner level.

5. Requirements (where appropriate)

5.1 For the course	For online teaching: Adequate LMS (e.g., MS Teams, Moodle, Canvas, Blackboard, etc.); Internet access; access to compatible audio-video communication technology.
5.2 For the applications Seminar / Laboratory / Project	For onsite teaching: Classroom, projector and projection screen, speakers, board (classic or interactive), sound system, flip chart.

6. Specific competences

Professional competences	Theoretical Knowledge (What they need to know): - In relation to the professional skills specific to the study program, the discipline "Ergonomics" introduces theoretical knowledge useful for developing the following competencies: C1 (1. 2, 1. 3, 1. 4, 1. 5), C2 (2. 1, 2. 3, 2. 4, 2. 5), C3 (3. 1, 3. 4), C4 (4. 1–4. 5), C5 (5. 2–5. 5), and C6 (6. 2–6. 5). Theoretical knowledge includes the following: - Understanding and using specific terminology; - Knowing the role and importance of human factors in engineering design; - Familiarity with major theories, principles, and models specific to ergonomics that conceptualize and guide user-centered design; - Awareness of specific design requirements for special cases; - Mastering the fundamentals of user needs analysis; - Understand the basic automation with R and/or Python; - Recognizing the negative effects of neglecting ergonomics in engineering design and professional activities (from individual to organizational levels). Although the discipline Ergonomics does not directly provide specialized technical knowledge related to the above-mentioned competencies, it: 1. Facilitates and enhances understanding of these competencies through associated notions; 2. Emphasizes the importance of developing the aforementioned competencies in profile-specific disciplines; and 3. Contributes to their effective application in professional practice. Specifically, the knowledge acquired after completing the Ergonomics course is interdisciplinary in nature and underpins the understanding of relationships between engineering sciences, institutional organization (e. g. , organizational culture), operational workflows, psychology, physiology, anthropometry, robotics, and economics. Acquired Skills (How to do it and what tools to use): General Skills: - Understand interdisciplinary technical documentation; - Contribute to the preparation of technical documentation; - Identify the segments of activities, actions, and operations corresponding to objectives and goals in interdisciplinary engineering design projects; - Use mockup, wireframing, and strategic planning software tools at an introductory level (e. g. , Mockingbird, Lovely Charts, Cacoo, Mockflow, Balsamiq, FluidUI, FlyingLogic, VUE, or similar); - Use open-source programs for information and knowledge management (e. g. , Obsidian, Logseq, Zettlr, etc.). Specific Skills (in relation to the discipline): - Use appropriate, discipline-specific terminology; - Appreciate and integrate the role and importance of human factors in the engineering design process; - Prioritize and organize the engineering design process by incorporating cost-benefit analyses of user-centered design.
Cross competences	The main targeted transversal competencies are: - CT2: “Identifying roles and responsibilities within a multidisciplinary team and applying techniques for effective teamwork and collaboration within the team.” - CT3: “Effectively using informational sources and communication resources for professional training (Internet portals, specialized software applications, databases, online courses, etc.) in both Romanian and an internationally used language.” Development of competencies aimed at improving user-centered and optimized engineering design, focusing on the psychological characteristics, individual preferences, and psychophysiological traits of the end user.

7. Expected learning outcomes

Knowledge	The student/graduate describes, identifies, summarizes elementary concepts and methods regarding the policies and legislation applicable in a given field.
Abilities	The student/graduate uses databases, standards, codes of good practice and safety regulations. The student/graduate evaluates the impact of engineering solutions in a social environment, also integrating the environmental context.

Responsibility and autonomy	The student/graduate acts in accordance with the professional principles and standards of engineering practice.

8. Discipline objectives (as results from the *key competences gained*)

8.1 General objective	Development of competencies aimed at improving user-centered and optimized engineering design, focusing on the psychological characteristics, individual preferences, and psychophysiological traits of the end user.
8.2 Specific objectives	Development of competencies that pertain to: - Identifying and evaluating the ergonomic characteristics of objects, equipment, and professional environments; - Including human factors in optimizing engineering design, appropriately aligned with engineering specialization, but also integratively, with other specializations and interdisciplinary domains (e.g., management, legal, medical, etc.); - Finding solutions to eliminate, mitigate, or provide alternatives for risky situations or those characterized by low ergonomics.

9. Contents

9.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
Fundamental Concepts and Basics of Ergonomics/Human Factors. - Part 1: Basic terminology, definitions, and the interdisciplinary nature of ergonomics. - Part 2: Types of design and models of human performance. - Part 3: Fundamentals of anthropometry and biomechanics.	2	Interactive course: - Exposition; - Enhanced lecture; - Explanation; - Heuristic conversation; - Problematization; - Debate; - Case study; - Role-play.	-
Health and Safety in the Workplace. - Part 1: Occupational stress and related comorbidities. - Part 2: Cognitive biases and logical fallacies relevant to workplace health, safety, and well-being.	2		
Intelligent and Participatory Industrial Design. - Part 1: User-centered design and participatory design methodologies. - Part 2: User Experience (UX) and User Interaction (UI): Principles, best practices, and relevant psychological concepts.	2		
Human-Computer Interaction and Artificial Intelligence. - Part 1: Basic terminology, classifications, and relevant case studies, including psychological insights (e.g., uncanny valley, anthropomorphism). - Part 2: Anticipatory governance and ethical considerations.	2		
Tools for Personal Productivity Optimization. - Automation tools for personal use (e.g., CV automation, dynamic website updates). - Personal knowledge management and information management software.	4		
Costs Associated with Poor Workplace Ergonomics. - Part 1: Direct costs. - Part 2: Indirect costs.	2		
-	-		

Bibliografie curs:
Lecture Notes (published by TUCN)

1.1. Gungor, C. (2010). Company Size and Human Factors and Ergonomics Awareness. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 54, pp. 1282–1286). SAGE Publications. Retrieved from http://pro.sagepub.com/content/54/17/1282.short
1.2. Helander, M., & Helander, M. (2006). *A guide to human factors and ergonomics*. Boca Raton, FL: CRC Taylor & Francis.
1.3. Hignett, S., Carayon, P., Buckle, P., & Catchpole, K. (2013). State of science: human factors and ergonomics in healthcare. *Ergonomics*, *56*(10), 1491–1503.
1.4. Jacobs, K. (2008). *Ergonomics for therapists*. Elsevier Health sciences.
1.5. Karwowski, W., & Marras, W. S. (Eds.). (2003). *Occupational ergonomics: design and management of work systems*. Boca Raton: CRC Press.
1.6. Kroemer, K. H. E. (2006). *"Extra-ordinary" ergonomics: how to accommodate small and big persons, the disabled and elderly, expectant mothers and children*. Boca Raton, FL: Taylor & Francis.
1.7. Kroemer, K. H. E. (2008). *Fitting the Human Introduction to Ergonomics, Sixth Edition.* Retrieved from http://public.eblib.com/choice/publicfullrecord.aspx?p=1446813
1.8. Kumar, S. (Ed.). (1999). *Biomechanics in ergonomics*. London ; Philadelphia, PA: Taylor & Francis.
1.9. Levi, L. (Ed.). (2000). *Guidance on work-related stress: spice of life or kiss of death?* Luxembourg : Lanham, Md: Office for Official Publications of the European Communities ; Bernan Associates.
1.10. Proctor, R. W., & Chen, J. (2015). The Role of Human Factors/Ergonomics in the Science of Security Decision Making and Action Selection in Cyberspace. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 18720815585906.
1.11. Szalma, J. L. (2014). On the Application of Motivation Theory to Human Factors/Ergonomics Motivational Design Principles for Human–Technology Interaction. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, *56*(8), 1453–1471.
1.12. Zare, M., Croq, M., Hossein-Arabi, F., Brunet, R., & Roquelaure, Y. (2016). Does Ergonomics Improve Product Quality and Reduce Costs? A Review Article: Ergonomics and Product Quality. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *26*(2), 205–223. https://doi.org/10.1002/hfm.20623

10. Bridging the course contents with the expectations of the community, professional associations, and potential employers

All engineering fields, whether applied or theoretical (including research and teaching), can benefit from the inclusion and integration of ergonomics specialists. The design, production, and distribution of the results of engineering activities take into account constraints related to human and material resources, including technological (available technologies and equipment), financial (investment availability and capital flow), and, essentially, constraints concerning the characteristics of the human user.
Specifically, electrical engineering plays a major role in the development and research of robotics, and electrical engineers make significant contributions to the field of Human-Robot Interaction (HRI).
Their education, which includes knowledge and skills in programming as well as knowledge and skills related to mechanical engineering and materials science, makes them competitive in developing hybrid systems, where complex actuations, servo-electric systems, and programmable or numerically controlled systems for autonomous behavior (as is the case in robotics) are essential. From this perspective, understanding and considering human factors in design provide electrical engineers with a competitive advantage and additional expertise in interdisciplinary and complex fields.
In its essence as an interdisciplinary scientific discipline, which aims to adapt tasks, work environments, and engineering products to the characteristics of the user, the study of ergonomics provides competencies that directly lead to: 1) a better understanding and organization of professional engineering activities, 2) optimization of work and increased profitability, and 3) improved interdisciplinary collaboration among professionals with different educational backgrounds.

11. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Problem-solving and responses to theoretical topics (evaluation criteria will include accuracy, completeness, conciseness, fluency, and clarity in addressing the assessment tasks). Assessment of performance during class activities (the ongoing assignments will include collaborative and individual projects related to the covered topics and relevant for skill development and the acquisition of targeted knowledge). Includes ongoing evaluation.	Written tests (e.g., multiple-choice tests/quizzes) and an individual portfolio (a selection of references).	100%
10.5 Seminar/ Laboratory/Project	-	-	-
10.6 Minimum standard of performance			
The final total weighted score must account for 5/10 of the final grade. Each assignment (allocated task) must receive a score of at least 50% of the total possible points.			

Date of filling in:		**Title First Name Last Name**	**Signature**
15.09.2025	Lecturer	conf. dr. psih. Ionut-Dorin Stanciu	-
	Teachers in charge of application	- -	-

Date of approval in the department	Head of department
Jan 2026	Prof. Eng. Dan Doru MICU, PhD
_________________________	_________________________
Date of approval in the faculty	Dean
Feb 2026	Assoc. Prof. Eng. Andrei Cristinel CZIKER, PhD
_________________________	_________________________