

Identification	Subject	DSN 417 Ergonomics 6 ECTS
	Department	Architecture and Design Department
	Program (Undergraduate, Graduate)	Undergraduate
	Term	Fall 2027
	Instructor	Mustafayeva Aygun
	Email:	aygun.mustafayeva@khazar.org
	Classroom/hours	Neftchiler campus
Prerequisites	-	
Language	English	
Compulsory/Elective	Elective	
Textbooks and course materials	1. Tosi, F. (2020). Design for Ergonomics. Springer Series in Design and Innovation, Vol. 2. Springer. 2. Runge, V. F., & Manusevich, Y. P. (2008). Ergonomics in the Design Environment (course edition/translation supplied by the instructor). Moscow: Architecture-S. 3. Openshaw, S., & Taylor, E. (2006). Ergonomics and Design: A Reference Guide. Allsteel Inc. 4. Bridger, R. S. (2018). Introduction to Human Factors and Ergonomics (4th ed.). CRC Press. 5. Pheasant, S., & Haslegrave, C. M. (2006). Bodyspace: Anthropometry, Ergonomics and the Design of Work (3rd ed.). CRC Press. 6. Nussbaumer, L. L. (2018). Human Factors in the Built Environment (2nd ed.). Fairchild Books / Bloomsbury. 7. Rebelo, F., & Soares, M. (Eds.). (2014). Advances in Ergonomics in Design, Usability & Special Populations: Part II. AHFE. 8. T.C. Milli Eğitim Bakanlığı. (2014). İç Mekânda Tasarım ve Ergonomi. Ankara (selected interior-space exercises). 9. Malayev, Z. A. (2018). Ergonomics and Labor Processes. Baku. 10. IEA; ISO 26800:2011; ISO 6385:2016; ISO 7250-1:2017; ISO 15535:2023; ISO 9241-210:2019. 11. Norman, D. A. (2013). The Design of Everyday Things. Basic Books.	
Course description	This course introduces ergonomics / human factors as a design discipline concerned with the interaction between people and products, spaces, information, technology and systems. It combines physical ergonomics (anthropometry, biomechanics, posture and movement), cognitive ergonomics (perception, attention, mental models and usability), environmental ergonomics (light, colour, sound and thermal/visual comfort), and inclusive design. The course is applicable to product, interior, furniture, communication and digital/interface design. Lectures are paired with practical studio exercises so that students measure, observe, analyse, redesign, prototype and evaluate rather than learn dimensions as isolated rules.	

Course objectives	The course aims to: introduce the scope, principles and terminology of ergonomics / human factors and its role in evidence-based design; teach students to use anthropometric data, percentiles, reach, clearance, adjustability and basic biomechanical principles correctly; develop the ability to analyse physical, cognitive, sensory, environmental and inclusive-design requirements; introduce observation, task analysis, checklists, somatography, interviews, scenarios and basic usability testing; enable students to convert user research and ergonomic evidence into design criteria, dimensioned proposals, prototypes and iterative improvements; build a responsible design approach that considers human variability, accessibility, safety, comfort, usability and well-being.	
Learning Outcomes	By the end of the course students should be able to: 1. Explain the main principles and domains of ergonomics / human factors and human-product-environment-system interaction. 2. Select and interpret anthropometric data and apply percentile, reach, clearance and adjustability logic to products, furniture and spaces. 3. Identify common biomechanical and postural risks and propose design changes that reduce force, repetition, awkward posture and fatigue. 4. Evaluate lighting, glare, contrast, colour, noise and thermal/visual comfort as part of a design problem. 5. Apply cognitive ergonomics principles including perception, attention, memory, mental models, affordance/signifiers, mapping, feedback and error prevention. 6. Conduct a basic ergonomic analysis using observation, task analysis, interviews/checklists, somatography/mock-ups and simple usability measures. 7. Integrate universal/inclusive design principles and the needs of children, older adults and people with mobility, sensory or cognitive limitations. 8. Translate ergonomic findings into explicit design requirements and evaluate a redesigned proposal through peer/user testing.	
Teaching methods	Case analysis	x
	Group discussion	x
	Lecture	x
	Simulation	x

Evaluation Criteria		Methods	Date/deadlines	Percentage (%)
		Attendance		5
		Activity		15
		Midterm exam		30
		Assignment		15
		Final exam		35
		Final		100
Class Policy		Lecture, seminar and practical studio work. Weekly exercises form the Activity grade and are completed during the scheduled lesson or by the stated deadline. Students should bring the tools required for measurement, sketching and digital work when requested. CAD/graphics software may be used, but ergonomic reasoning and evidence are assessed rather than software complexity. “Standard dimensions” must be cited and interpreted for the relevant user group; designs should not be based only on the statistical average. Peer testing and observation must be conducted respectfully and with participant consent. Assignment - Ergonomic Audit & Redesign Project (15%): Each student selects one existing product, furniture element, workstation, interior zone, signage/wayfinding element or physical/digital interface and develops an ergonomic redesign dossier including: user/context definition; documented ergonomic audit; physical/cognitive/environmental/inclusive requirements as relevant; dimensioned redesign drawings/diagrams/prototype; a small peer/user test or checklist validation; at least one documented iteration; and a concise evidence-based presentation. Students must follow the University’s attendance, academic integrity, ethical conduct and examination rules. The maximum attendance score is 5 points; Activity is 15 points; Midterm 30 points; Final 35 points. A total course score of 60% or above is required to complete the course.		
Tentative Schedule				
Week	Date/Day (tentative)	Topics	Textbook/Assignments	
1.		Foundations of Ergonomics / Human Factors for Designers IEA definition and scope of ergonomics/human factors; the human-product/space-environment-system interaction model; physical, cognitive, organizational and environmental branches of ergonomics; the link between ergonomics and design quality (safety, comfort, usability, well-being, performance); a brief history of the discipline; the role of precedent study in ergonomic design literacy.	1. Design for Ergonomics, 2020, F. Tosi, pp. 3-46. 2. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich —pp. 12-28. 3. Advances in Ergonomics in Design, Usability & Special Populations: Part II, 2014, F. Rebelo & M. Soares (Eds.) — one benchmark precedent case (selected). 4. Definition of Ergonomics, International Ergonomics Association (IEA); ISO 26800:2011, Ergonomics - General approach, principles and requirements, International Organization for Standardization —	

			overview.
2.		Human-Centred Design, Context of Use and Ergonomic Research Methods Users, activities/tasks, goals and physical/social/organizational context of use; from the 'average user' to human variability; the human-centred design cycle (understand context, specify requirements, produce solutions, evaluate); core ergonomic-analysis methods - observation, task analysis, link/layout analysis, heuristic review, checklists, questionnaires, interviews, thinking-aloud and scenarios.	1. Design for Ergonomics, 2020, F. Tosi , pp. 47-128 2. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 104-123. 3. ISO 9241-210:2019, Ergonomics of human-system interaction - Human-centred design for interactive systems, International Organization for Standardization.
3.		Anthropometry I - Human Dimensions and Percentiles Static and dynamic anthropometry; body-dimension databases and their limits; the 5th/50th/95th percentile logic; designing for reach (small users), clearance (large users) and fit/adjustability; why 'design for the average user' fails.	1. Design for Ergonomics, 2020, F. Tosi , pp. 185-232. 2. Ergonomics and Design: A Reference Guide, 2006, S. Openshaw & E. Taylor — pp. 5-10. 3. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich , pp. 67-84. 4. ISO 7250-1:2017, Basic human body measurements for technological design, International Organization for Standardization; ISO 15535:2023, General requirements for establishing anthropometric databases, International Organization for Standardization.
4.		Anthropometry II, Biomechanics and Postural Risk Assessment Neutral posture and postural risk zones; standing, sitting, reaching and moving envelopes; force, repetition, duration and fatigue as risk factors; basic biomechanics of the musculoskeletal system; somatography and scaled human figures; introduction to structured postural risk-assessment tools (RULA, REBA, OWAS) for scoring awkward posture objectively.	1. Design for Ergonomics, 2020, F. Tosi, pp. 233-264 (esp. Posture pp. 252-259). 2. Ergonomics and Design: A Reference Guide, 2006, S. Openshaw & E. Taylor — pp. 11-20. 3. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 85-103. 4. Introduction to Human Factors and Ergonomics, 2018, R. S. Bridger — selected chapter on postural risk-assessment methods (RULA/REBA/OWAS). 5. Bodyspace: Anthropometry, Ergonomics and the Design of Work, 2006, S. Pheasant & C. M. Haslegrave — selected chapters on posture, reach

			and strength.
5.		Product, Furniture and Workstation Ergonomics Fit and function of seating, desks/worksurfaces, storage, handles, controls and accessories; reach zones and adjustability; designing for repetitive or prolonged use.	1. Design for Ergonomics, 2020, F. Tosi , pp. 297-328 (esp. Tables p.304, Chairs p.306, Handles p.317, Controls p.319). 2. Ergonomics and Design: A Reference Guide, 2006, S. Openshaw & E. Taylor, pp. 21-32. 3. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 124-133.
6.		Prototyping, Mock-ups and Ergonomic Testing Methods Why designers test with mock-ups before finalising dimensions; low-fidelity mock-up materials and construction (cardboard, foam, 3D-printed test rigs); combining scaled human figures/somatography with a physical mock-up; simple comfort and usability testing protocols; documenting a design iteration (before, test, after).	1. Design for Ergonomics, 2020, F. Tosi 7.3.2 'The Co-design Workshop: From Conception to Prototyping', p. 139, and p. 117. 2. Advances in Ergonomics in Design, Usability & Special Populations: Part II, 2014, F. Rebelo & M. Soares (Eds.) — selected prototyping and testing case examples.
7.		Environmental Ergonomics Lighting quality, glare and contrast; colour and its perceptual/psychological effects; noise and acoustic comfort; thermal and visual comfort; the relationship between sensory conditions, performance, mood and health.	1. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 37-66. 2. Ergonomics and Labor Processes, 2018, Z. A. Malayev — selected sections on microclimate and sensory comfort.
8.		Midterm exam	
9.		Residential Ergonomics and Furniture Ergonomic planning of entrance, kitchen, bathroom, living/dining, bedroom and children's/youth spaces; activity zones, circulation, reach, storage and furniture dimensions; the golden-section proportion as a complementary design tool.	1. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 124-167. 2. İç Mekanda Tasarım ve Ergonomi, 2014, T.C. Millî Eğitim Bakanlığı — pp. 26-61
10.		Public, Workplace and Learning Environments Office, educational, retail, hospitality and healthcare settings; circulation, proxemics, queuing and group-use patterns; work/task zones and furniture layout in shared spaces.	1. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 168-186. 2. Human Factors in the Built Environment, 2018, L. L. Nussbaumer — selected chapters on commercial and institutional interiors.
11.		Universal and Inclusive Design	1. Design for Ergonomics, 2020, F. Tosi, pp. 161-183.

		Design for human diversity across the life span and range of ability; accessible routes; wheelchair reach and turning circles; controls, handles and furniture for users with mobility, sensory or cognitive limitations.	2. Ergonomics and Design: A Reference Guide, 2006, S. Openshaw & E. Taylor, pp. 33-41. 3. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 187-209
12.		Cognitive Ergonomics and Perception Perception, attention and memory; mental models, affordance and signifiers; mapping, feedback and cognitive load; Gestalt principles; perceptual/optical distortions and their correction in design.	1. Design for Ergonomics, 2020, F. Tosi, pp. 265-296. 2. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 210-238, and pp. 260-283. 3. The Design of Everyday Things, 2013, D. A. Norman — selected chapters on affordances and mental models.
13.		Information, Wayfinding and Interface Ergonomics Legibility, symbols and information coding; signage and wayfinding systems; displays and controls; consistency, feedback and error tolerance in physical and digital interfaces.	1. Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 239-259 2. Design for Ergonomics, 2020, F. Tosi, pp. 329-348 3. ISO 9241-210:2019, Ergonomics of human-system interaction, International Organization for Standardization.
14.		Integrating Ergonomics into the Design Process From user research and ergonomic evidence to explicit, measurable design requirements; prioritisation and trade-offs; co-design and design-thinking tools; prototyping, verification, validation and iteration; benchmarking a redesign against the precedent identified in Week 1.	1. Design for Ergonomics, 2020, F. Tosi, pp. 129-160, and pp. 349-357. 2 Ergonomics in the Design Environment, 2008, V. F. Runge & Y. P. Manusevich, pp. 307-320. 3. ISO 26800:2011 and ISO 9241-210:2019, International Organization for Standardization.
15.		Synthesis, Project Presentation and Review Presentation of the Ergonomic Audit & Redesign Project; evidence-based design rationale; user/peer-test results and documented iteration; course synthesis and final-exam preparation.	All course materials, selected according to each student's project topic.
Final Exam			