SYLLABUS

DESIGN OF INTERACTIVE SOFTWARE SYSTEMS

University year 2025-2026

1. Information regarding the programme

1.1. Higher education institution	Babes-Bolyai University
1.2. Faculty	Mathematics and Computer Science
1.3. Department	Computer Science
1.4. Field of study	Computer Science
1.5. Study cycle	Master
1.6. Study programme/Qualification	Data Science
1.7. Form of education	Full Time

2. Information regarding the discipline

2.1. Name of the discipline	Design of Interactive Software Systems					Discipline code	MME8024
2.2. Course coordinator					PhD. Assoc. Prof. Adriana-Mihaela Guran		
2.3. Seminar coordinator					PhD. Assoc. Prof. Adriana-Mihaela Guran		
2.4. Year of study	1	2.5. Semester	2	2.6. Type of evaluation	E	2.7. Discipline regime	optional

3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	4	of which: 3.2 course	2	3.3 seminar/laboratory/project	1/0/1
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laboratory/project	14/0/14

Time allotment for individual study (ID) and self-study activities (SA)	**hours**
Learning using manual, course support, bibliography, course notes (SA)	30
Additional documentation (in libraries, on electronic platforms, field documentation)	35
Preparation for seminars/labs, homework, papers, portfolios and essays	40
Tutorship	10
Evaluations	4
Other activities:	

3.7. Total individual study hours	119
3.8. Total hours per semester	175
3.9. Number of ECTS credits	7

4. Prerequisites (if necessary)

4.1. curriculum	• Software Systems Engineering, Object Oriented Programming, Web Programming
4.2. competencies	• understanding and working with basic concepts in software engineering; • analysis, design, and implementation of software systems;

5. Conditions (if necessary)

5.1. for the course	A room with Internet access and presentation devices
5.2. for the seminar /lab activities	A room with computers and Internet access

6.1. Specific competencies acquired [1]

Professional /essential competencies	• capability of analysis and synthesis; • modeling and solving real-life problems; • proficient use of methodologies and tools specific to programming languages and software systems; • organization of software production processes.
Transversal competencies	• ethic and fair behavior, committment to professional deontology; • team work capabilities; able to fulfill different roles; • professional communication skills; concise and precise description, both oral and written, of professional results , negociation abilities; • good English communication skills.

6.2. Learning outcomes

Knowledge	• The graduate knows the software processes and can integrate them in the organisational culture of a software company • The graduate possesses the fundamental knowledge for modelling, being able to analyse real life problems and to translate them in concrete requirements and to design a corresponding software model • The graduate knows and respects the ethical and legal principles and rules in scientific research
Skills	• The graduate proofs working skills in professional teams an interdisciplinary in order to efficiently implement programmes and research programmes in computer science • The graduate can use specific language and terminology for software engineering being able to communicate and interact with members of a team
Responsibility and autonomy:	• The graduate has the ability to follow the entire life cycle of software system development • The graduate has the ability of interdisciplinary vision between computer science subdomains in order to combine them in a software system

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• To understand and approach problems of modeling nature from other sciences • To design/develop usable systems • To be able to evaluate the usability of a system and to be able to find improvement methods regarding the usability of a system • To be aware of accessibility issues in systems design • To be able to develop multiplatform applications

[1] One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

• **7.2 Specific objective of the discipline**	• At the end of the semester students must be able to: o understand the human capacities in interaction with software systems o achieve knowledge of psychological aspects of human-computer interaction o understand the importance of real users in the development of interactive systems o identify the best communication methods with the clients o use knowledge and models form sociological sciences to improve the communications with clients o be able to apply user centered design o achieve usability related notions o be able to apply automatic usability evaluation methods o design and develop groupware systems o apply interaction design patterns

8. Content

8.1 Course	Teaching methods	Remarks
1. Interaction Design • What is ID? • HCI and ID • UCD and ID • Professions in ID	Presentation, discussions, case studies, problem solving	
2. Basics of Human-Computer Interaction • Human factor in HCI • Input/output channels • Capacities, limitations • Computer Output devices • Virtual reality and 3D devices • Non-conventional interaction devices • Usability • Errors	Presentation, discussions, case studies, problem solving	
3. Interaction Design Process • Interaction design lifecycle models • Needs and requirements • Interaction models • Interaction style	Presentation, discussions, case studies, problem solving	
4. Task Analysis • Fundamentals of task analysis • Task analysis methods: HTA, GTA • Task analysis tools:EUTERPE, CTTE • The Bridge Method	Presentation, discussions, case studies, problem solving	
5. Interdisciplinary approaches in Usability Engineering – a focus on user needs analysis • Qualitative vs quantitative approaches • A framework for early usability integration in the development of interactive softweare systems	Presentation, discussions, case studies, problem solving	
6. Conceptual Models in Interaction Design • Conceptual models • Metaphors	Presentation, discussions, case studies, problem solving	

• Interaction modes • AI in building conceptual models		
7. Prototyping vs. Pretotyping • prototyping • pretotyping • case studies • AI in prototyping	Presentation, discussions, case studies, problem solving	
8. Graphic elements in user interfaces • Basic graphic elements in UIs • Criteria and recommendations for graphic elements • Focus, flow and layout in UI design • AI support in building GUIs	Presentation, discussions, case studies, problem solving	
9. Usability engineering & User experience • What is usability? • Designing for usability • Usability engineering lifecycle • Usability metrics • Measuring user experience	Presentation, discussions, case studies, problem solving	
10. Web Usability& Mobile Usability • Designing for web • Designing for mobile • AI support in Web/mobile design	Presentation, discussions, case studies, problem solving	
11. Designing for accessibility • Disabilities • Accessibility • Accessibility APIs • Accessibility evaluation • AI and accessibility	Presentation, discussions, case studies, problem solving	
12. Designing Gestural Interfaces • Gesture definition • Gesture in everyday life • Designing interactive gestures • Interface conventions	Presentation, discussions, case studies, problem solving	
13. Designing Social Interfaces • History of computer mediated interaction • Social network vs. social media	Presentation, discussions, case studies, problem solving	
14. User Interface Testing • GUI Testing • Model-based testing • Web applications testing • AI in UI testing	Presentation, discussions, case studies, problem solving	
Bibliography [1] J. Preece, Y. Rogers, and H. Sharp, *Interaction Design: Beyond Human-Computer Interaction*, 5th ed. Chichester, UK: John Wiley & Sons, 2019.		

[2] D. Norman, *The Design of Everyday Things*. New York, NY, USA: Basic Books, 2013.

[3] B. Laurel, Ed., *The Art of Human-Computer Interface Design*. Reading, MA, USA: Addison-Wesley, 1990.

[4] A. Cooper, R. Reimann, and D. Cronin, *About Face 3: The Essentials of Interaction Design*. Indianapolis, IN, USA: Wiley, 2007.

[5] J. Nielsen, "Usability 101: Introduction to Usability," *Nielsen Norman Group*, Jan. 6, 2003. [Online]. Available: https://www.nngroup.com/articles/usability-101-introduction-to-usability/. [Accessed: Apr. 7, 2025].

[6] Interaction Design Foundation, "What is Interaction Design?" *Interaction Design Foundation*, 2025. [Online]. Available: https://www.interaction-design.org/literature/topics/interaction-design. [Accessed: Apr. 7, 2025].

[7] M. Hassenzahl, "User Experience (UX): Towards an Experiential Perspective on Product Quality," in *Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct*, Barcelona, Spain, 2018, pp. 540-543.

[8] S. Krug, *Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability*, 3rd ed. Berkeley, CA, USA: New Riders, 2014.

[9] H. Beyer and K. Holtzblatt, *Contextual Design: Defining Customer-Centered Systems*. San Francisco, CA, USA: Morgan Kaufmann Publishers, 1998.

[10] B. Shneiderman and C. Plaisant, *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, 6th ed. Boston, MA, USA: Pearson, 2016.

[11] A. Savoia, *Pretotyping: Doing the Right Thing Before Building It*. Mountain View, CA, USA: Lean Startup Press, 2011.

[12] T. Tullis, W. Albert – Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics. Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, 2008

8.2 Seminar / laboratory	Teaching methods	Remarks
Students will have to choose a project subject refering a medium size application that will be developed using a user centered approach (week 4). The project willl be developed in teams of 3-5 members	Discussions, case studies, problem solving	
Project design and development : 1. Users identification 2. Justify the need for the proposed product 3. Functionalities identification (Week 4-Week 6) 4. Building the conceptual model 5. Creating protoypes 6. Evaluating prototypes (Week 8) 7. Applying the required changes to the prototype 8. Usability testing (Week 11) 9. Applying changes to the developed product in order to be used by people with disabilities/ designing an non-conventional interaction method to the product (Week 14)	Discussions, case studies, problem solving	

Bibliography		

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- Students will be able to design interaction based on a user centred approach and to evaluate the quality of their prototypes, enhancing the quality of the developed products

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course			
10.5 Seminar/laboratory	Project – students will be graded based on the quality of their projects	Grading will be done based on the following criteria: • Use of appropriate methods to identify user needs (20%) • Use of design principles (20%) • Usability of the application (measured using a method from the literature) (30%) • Accessibility (15%) • Project demo (15%) (60% ofthe final grade) During the semester students will be graded for the on-time delivery and appropriateness of project assignments (30% of the final grade). Students will optionally prepare a technical report on a subject related to Interaction Design and will give an oral presentation (10% of the final grade).	100%
10.6 Minimum standard of performance			
• Students have to deliver a working software product that satisfies the client requirements.			

- Each student must obtain at least an average grade 5 for project deliveries, otherwise student will take a written examination
- Each student must be able to prove his/her involvement in the project design and implementation phases by delivering presentations of the documentation or code for the project
- The technical reports on subjects from Interaction Design domain should prove they have consulted at least 5 scientific articles to write their report (at least 5 research articles)
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11. Labels ODD (Sustainable Development Goals)[2]

Not applicable.

Date:
07.04.2025

Signature of course coordinator

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Signature of seminar coordinator

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Date of approval:
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Signature of the head of department

Assoc.prof.phd. Adrian STERCA

[2] Keep only the labels that, according to the *Procedure for applying ODD labels in the academic process*, suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable*.".