



Handbook of Modules for the Degree Programme

Usability Engineering, M.Sc.

Faculty of Communication and Environment

Version 2.0

18.01.2024

Dokumentenhistorie

Hinweis zu Versionen

- Jede Änderung führt zu einer neuen Version. Sobald Module ausgetauscht werden, inhaltlich neu ausgerichtet werden oder sich der Name des Moduls ändert, wird die Version um 1 erhöht. Alle kleinen Änderungen führen um eine Erhöhung rechts vom Komma.
- Die Modulnummer ist mit dem Modulnamen verknüpft. Sollte ein Modul wegfallen, so kann die Modulnummer nicht erneut vergeben werden.

Version	Datum	Verantw.	Bemerkung
1.0			Version für die Akkreditierung
1.1	19.01.2015	AR	Überschrift geändert (Degree Programm)
1.2	29.05.2018	KN	Anpassung der Module im Rahmen der Reakkreditierung.
1.3	21.08.2019	KN	Aktualisierung Datum, nach erfolgreicher Akkreditierung
2.0	04.03.2024	KN	Aktualisierung der Module: - M-UE_04 HCI I – Scientific Foundations and Skills - M-UE_10 HCI II – Current Topics and Developments - M-UE_06 Rapid Agile Design Project - M-UE_12 User Centred Design Research Project - Aktualisierung des Inhaltsverzeichnisses - Aktualisierung des Curriculums & der Module gemäß neuer Modulcodes; - Änderung der Aufwände in „Teaching Units“ (TU)

Index

Curriculum of the Master Degree Programme Usability Engineering, M.Sc.	3
9711 User Experience Design	5
9712 Psychology for UX Practitioners	7
9713 User Research and Testing	9
9717 HCI I - Scientific Foundations and Skills	11
9715 Strategic Usability Engineering	13
9718 Rapid Agile Design Project	16
9721 UX Project Management	17
9722 Digital Fabrication for Human-Interface Design	19
9723 Innovation and Design Thinking	21
9724 HCI II - Current Topics and Developments in UE	23
9725 Applied Interaction Design	25
9726 User Centred Design Research Project	27
9701 and 9702 Master Thesis and Colloquium	28

Curriculum of the Master Degree Programme Usability Engineering, M.Sc.

Code No (Kennnummer)	Module	SW (SWS)	Type (Veranstaltungsart)							TE (Prü)	CP (CP)	WS1	SS2	WS3	
			L (V)	SL (SL)	S (S)	Ex (Ü)	PT (Pra)	Pro (Pro)	V/N						
9711	User Experience Design	5	2	1		2			75	P	5	5			
9712	Psychology for UX Practitioners	5	3			2			75	P	5	5			
9713	User Research and Testing	5	2			1	2		75	P	5	5			
9717	HCI I – Scientific Foundations and Skills	4		2		2			60	P	5	4			
9715	Strategic Usability Engineering	4	2		1	1			60	P	5	4			
9718	Rapid Agile Design Project	4					4		60	P	5	4			
9721	UX Project Management	3	2			1			45	P	5		3		
9722	Digital Fabrication for Human-Interface Design	5	2		1		2		75	P	5		5		
9723	Innovation and Design Thinking	3	1				2		45	P	5		3		
9727	HCI II – Current Topics and Developments in UE	4		2		2			60	P	5		4		
9725	Applied Interaction Design	4	2			2			60	P	5		4		
9728	User Centred Design Research Project	4					4		60	P	5		4		
9701	Master Thesis	27								P				27	
9702	Colloquium	3								P				3	
		80									60	27	23	30	

List of abbreviations

TU	Teaching Unit
SW	Semester hours per week (Semesterwochenstunden)
L	Lecture (Vorlesung)
SL	Seminaristic lecture (Seminaristische Lehrveranstaltung)
S	Seminar (Seminar)
Ex	Exercise (Übung)
PT	Practical training (Praktikum)
Pro	Project (Projekt)
TE	Type of examination (Prüfungsform)
CP	Credit Points
WS	Winter semester (Wintersemester)
SS	Summer semester (Sommersemester)
E	Examination (Prüfung)
C	Certificate (Testat)

9711 User Experience Design

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9711	150 h	5 CP	1 st semester	Winter semester	1 semester
Courses Lecture: 30 TU / 2 SWS Exercise: 30 TU / 2 SWS Seminar lecture: 15 TU / 1 SWS		Teaching time 75 TU / 5 SWS	Self-study 93,75 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students are familiar with terms and concepts in the field of user experience design. They can understand the importance and relevance of human capabilities in the process of system design. General principles and practice of usability, user experience and human-centred design were taught as the basis for an explicit understanding of users, their tasks and their environment and the corresponding conceptualization of designs focused on users' needs and requirements. This enables students to develop and evaluate solutions focusing on human-centred quality. The exercises have trained students to perform a complete project life cycle, from the context of use and requirements analysis to project definition, conceptualization, evaluation and phase-out.					
Content • Usability, user experience, human-centred quality and user centred-design principles • Properties of human capabilities • Analysis and definition of the context of use • Derivation of user needs • Specification of user requirements • Specification of user interaction • Conceptualization and prototyping (paper- and tool-based) • Usability testing • Orchestration and use of methods					
Teaching methods Tuition in lectures, seminars lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs) Digital Media (as elective)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					

Additional information

Benyon, D. (2019). Designing Interactive Systems: A Guide to HCI, UX and Interaction Design (4th ed.). Pearson. ISBN: 9781292155517.

Holtzblatt, K., & Beyer, H. (2016). Contextual Design: Design for Life (2nd ed.). Morgan Kaufmann. ISBN: 9780128011362.

Brown, D. M. (2010). Communicating Design: Developing Web Site Documentation for Design and Planning (2nd ed.). New Riders. ISBN: 9780321712462.

Buxton, B. (2010). Sketching User Experiences: Getting the Design Right and the Right Design (1st ed.). Elsevier Science. ISBN: 9780080552903.

Cockburn, A. (2001). Writing Effective Use Cases (1st ed.). Addison-Wesley Professional PTG. ISBN: 9780201702255.

Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About Face: The Essentials of Interaction Design (4th ed.). Wiley. ISBN: 9781118766576.

Baxter, K., Courage, C., & Caine, K. (2015). Understanding Your Users: A Practical Guide to User Research Methods (2nd ed.). Morgan Kaufmann. ISBN: 9780128006092.

Dix, A., Finlay, J. E., Abowd, G. D., & Beale, R. (2003). Human-Computer Interaction (3rd ed.). Pearson Education. ISBN: 9780130461094.

Garrett, J. J. (2010). The Elements of User Experience: User-Centered Design for the Web and Beyond (2nd ed.). New Riders. ISBN: 9780321683687.

ISO 9241-110:2020. Ergonomics of human-system interaction - Part 110: Interaction principles. 2nd ed. ISO, 2020.

ISO 9241-210:2019. Ergonomics of human-system interaction - Part 210: Human-centred design for interactive systems. 2nd ed. ISO, 2019.

ISO/IEC TR 25060:2010. Systems and software engineering — Systems and software product Quality Requirements and Evaluation (SQuaRE) — Common Industry Format (CIF) for usability: General framework for usability-related information. ISO, 2010.

Mayhew, D. J. (1999). The Usability Engineering Lifecycle: A Practitioner's Handbook for User Interface Design (1st ed.). Elsevier Science. ISBN: 9781558605619.

Moggridge, B. (2006). Designing Interactions (1st ed.). The MIT Press. ISBN: 9780262134743.

Pruitt, J., & Adlin, T. (2006). The Persona Lifecycle: Keeping People in Mind Throughout Product Design (1st ed.). Morgan Kaufmann Publishers.

Rogers, Y., Sharp, H., & Preece, J. (2023). Interaction Design: Beyond Human-Computer Interaction (6th ed.). John Wiley & Sons P&T. ISBN: 9781119901099.

Stanton, N. A., Salmon, P. M., Rafferty, L. A., Walker, G. H., Baber, C., & Jenkins, D. P. (2013). Human Factors Methods: A Practical Guide for Engineering and Design (2nd ed.). CRC Press. ISBN: 9781409457541.

9712 Psychology for UX Practitioners

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9712	150 h	5 CP	1 st semester	Winter semester	1 semester
Courses Lecture: 45 TU / 3 SWS Exercise: 30 TU / 2 SWS		Teaching time 75 TU / 5 SWS	Self-study 93,75 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students know the main underlying principles of human cognitive abilities and skills, such as perception, learning, memory, information processing, decision making and motor action. They are able to apply this knowledge to the field of usability engineering and human-computer interaction (HCI) (e.g. in the usability lab) to design products and (technical) interfaces to the cognitive abilities of users. They also know about psychological methods with which they can evaluate the appropriateness of their design proposals or implementations in advance (e.g. eye tracking, EEG). Students will also learn how to design, apply and statistically analyse psychological survey and user evaluation methods in the field of UX and HCI, including analysis, statistics, and questionnaire design. This knowledge will enable students to pave the way for the design of new building blocks for more natural and intuitive human-machine/ human-product interaction according to user's needs and abilities, e.g. in everyday applications or modern working environments.					
Content • Learn about the underlying psychological principles of human cognitive abilities and skills (perception, learning, memory, information processing, decision making and motor action) and their importance for the UX and Design Field (e.g. UX Psychology). • Principles of Interaction design from the point of cognitive psychology (affordances, human motoric, memory and perceptual skills). • Application-based learning of psychological methods (such as eye tracking and EEG) for the research and evaluation of user interfaces and interaction designs. • Practice in observation and survey methods: How to design, perform and analyse evaluation studies, e.g. how to select the adequate (psychological) study design and methods. • Basic knowledge on commonly applied statistical methods, such as t-test and ANOVA. Including on how to calculate statistics with common statistical programs (such as JASP, SPSS or R) and how to interpret the results adequately. • Carrying out a psychological user study in group work to apply what has been learned in practice.					
Teaching methods Tuition in lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually an oral examination, details to be announced at the beginning of the lectures by the Examination Board					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					

Weight towards final grade

5,42%

Person in charge of module

Prof. Dr. Kai Essig

Additional information

A. Baddeley, A., Eysenck, M. W., & Anderson, M. C. (2020). Memory (3rd ed.). Routledge. ISBN: 9781138326095.

B. Goldstein, E. B., Brockmole, J., & Cacciamani, L. (2022). Sensation and Perception (11th ed.). Cengage. ISBN: 9780357446478.

D.G. Elmes, B.H. Kantovitz, and H.L. Roediger. Research Methods in Psychology. Brooks/Cole; Auflage: 6th ,1998.

H.M. Reid. Introduction to Statistics: Fundamental Concepts and Procedures of Data Analysis, 1st Edition SAGE Publications, Inc, 2013.

J.P.J. Pinel and S. Barnes. Biopsychology - Global Edition. Pearson Education Limited; Edition: 10 ed, 2017.

Eysenck, M. W., & Keane, M. T. (2020). Cognitive Psychology: A Student's Handbook (8th ed.). Psychology Press. ISBN: 9781138482234.

Carlson, N. R., & Birkett, M. A. (2021). Physiology of Behavior (13th ed.). Pearson. ISBN: 9780137499519.

O. Huber. Das psychologische Experiment - Eine Einführung. Huber, Bern, 2005.

Nestor, P. G., & Schutt, R. K. (2019). Research Methods in Psychology: Investigating Human Behavior (3rd ed.). SAGE Publications, Inc. ISBN: 9781544323770.

R.J. Gerring and Zimbardo, P.G. . Psychology and Life. 18th Edition. Pearson, 2007.

U. Kuckartz, S. Rädiker, T. Ebert, and J. Schehl. Statistik: Eine verständliche Einführung Taschenbuch. VS Verlag für Sozialwissenschaften, 2013.

9713 User Research and Testing

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9713	150 h	5 CP	1 st semester	Winter semester	1 semester
Courses Lecture: 30 TU / 2 SWS Exercise: 15 TU / 1 SWS Seminar: 30 TU / 2 SWS		Teaching time 75 TU / 5 SWS	Self-study 93,75 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile The students have gained extensive theoretical knowledge about several analysis and evaluation methods and are trained to apply them in practice. They know which method to choose, depending on where in the user centred design process they are being performed most sufficiently, which research goals are being addressed and which resources need to be available. The students will also learn about current trends and popular methods in User Research and Testing Methods. Furthermore, students have learned and practised fundamental qualitative research methods, like interviewing techniques and qualitative content analysis. Within several case studies, students have learned to apply and document those methods in various professional contexts.					
Content • Qualitative and quantitative User Research and Testing Methods (e.g. formative vs. summative usability testing, expert reviews, focus groups, heuristic evaluation, questionnaires, interviews, etc.) • Design, conduct, analyse and document user surveys • Formulate and report results and criteria for optimization • Current trends and popular methods in User Research and Testing Methods • Advanced research methods (e.g. eye tracking, valence method, user experience testing, etc.) • Practical exercises will be carried out in the fully equipped Usability Laboratory					
Teaching methods Tuition in lectures, seminars and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a written examination, details to be announced at the beginning of the lectures by the Examination Board					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information Duchowski, A. T. (2007). Eye Tracking Methodology - Theory and Practice (2nd ed.). Springer.					

- Hambling, B., & van Goethem, P. (2013). User Acceptance Testing: A Step-By-Step Guide. BCS, The Chartered Institute for IT. ISBN: 9781780171692.
- Brandt et al. (2007). Lowering the Burden for Diary Studies Under Mobile Conditions.
- Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., & Diakopoulos, N. (2021). Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th ed.). Pearson. ISBN: 9780137503889.
- Hansen, J. (2017). How to Jumpstart User Testing: 16 Tools to Craft Better Products. Independently Published.
- Lazar, J., Feng, J. H., & Hochheiser, H. (2017). Research Methods in Human-Computer Interaction (2nd ed.). Morgan Kaufmann. ISBN: 9780128093436.
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- Holmqvist, K., et al. (2011). Eye Tracking - A Comprehensive Guide to Methods and Measures. Oxford University Press.
- Kuniavsky, M., Moed, A., & Goodman, E. (2012). Observing The User Experience - A Practitioner's Guide to User Research (2nd ed.). Morgan Kaufmann Publishers.
- Krueger, R. A., & Casey, M. A. (2000). Focus Groups - A Practical Guide for Applied Research. Sage Publications.
- Wolpers, S. (2015). Lean User Testing: A Pragmatic Step-by-Step Guide to User Tests. Berlin Product People GmbH.
- Tomitsch et al. (2006). Using Diaries for Evaluating Interactive Products: The Relevance of Form and Context.
- Nunnally, B., & Farkas, D. (2016). UX Research: Practical Techniques for Designing Better Products. O'Reilly UK Ltd.
- Pannafino, J., & McNeill, P. (2017). UX Methods: A Quick Guide to User Experience Research Methods. CDUXP LLC.
- Baxter, K., Courage, C., & Caine, K. (2015). Understanding Your Users: A Practical Guide to User Research Methods (Interactive Technologies) (2nd ed.). Elsevier Ltd, Oxford.

9717 HCI I – Scientific Foundations and Skills

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9717	150 h	5 CP	1 st semester	Winter semester	1 semester
Courses Seminar lectures: 30 TU / 2 SWS Exercise: 30 TU / 2 SWS		Teaching time 60 TU / 4 SWS	Self-study 105 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students have learned to communicate scientific outcomes and experimental findings appropriately and understandably. They have internalised the fundamentals of effective writing and presentation, as well as practised and learned proper ways for scientific communication. Students have learned about the basic structure of a paper/Master Thesis as well as the adequate content of the single sections of the paper (e.g. Introduction). They have deepened their knowledge of how to write and revise (technical) reports, papers and manuals and have practised their skills by completing different hands-on assignments. Students have learned to plan and edit documentation materials and to estimate the effort needed to include proper illustrations, photographs, charts and diagrams. Furthermore, they received a general introduction into Human Computer Interaction and apply what they have learned in this course by writing an overview paper on the chosen project topic for HCI II. In addition to the ability to communicate technical knowledge students know how to plan and conduct experimental designs (e.g. usability tests, eye-tracking studies etc) and how to analyse and document the findings in adequate ways (e.g. to write a scientific paper or Master Thesis).					
Content • Principles and practice of the various modes and forms of scientific writing and communication (e.g. scientific papers, technical reports, and presentations, talks, etc.). • Analysing and documenting user studies and findings properly (i.e. as a scientific presentation or paper) • Paper/Thesis structure and content • Presenting an existing and current HCI paper of one own's choice • Current studies from the HCI literature • Write and Submit an overview paper • A simulated conference overview paper submission and review process will complement the course • Project presentations from HCI work-practice (external presenter)					
Teaching methods Tuition in seminars, lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					

Weight towards final grade

5,42%

Person in charge of module

Prof. Dr. Kai Essig

Additional information

Albers, M. J., & Mazur, M. B. (2003). Content and Complexity: The Role of Content in Information Design. Routledge.

Alley, M. (1998). The Craft of Scientific Writing (3rd ed.). Springer.

Anderson, P. V. (2018). Technical Communication: A Reader-centered Approach (9th ed.). Cengage Learning. ISBN: 9781337633796.

Agarwal, B. L. (2010). Theory & Analysis of Experimental Designs. CBS Publishers & Distributors Private Limited.

Cairns, P., & Cox, A. L. (2008). Research Methods for Human-Computer Interaction. Cambridge University Press.

Cargill, M., & O'Connor, P. (2013). Writing Scientific Research Articles: Strategy and Steps. Wiley-Blackwell.

Field, A., & Hole, G. (2014). How to Design and Report Experiments. SAGE Publications, Limited.

Flick, U. (2023). An Introduction to Qualitative Research (7th ed.). SAGE Publications Ltd.

Hofmann, A. H. (2020). Scientific Writing and Communication: Papers, Proposals, and Presentations (4th ed.). Oxford University Press.

Katz, M. J. (2016). From Research to Manuscript: A Guide to Scientific Writing (2nd ed.). Springer.

Lazar, J., Feng, J. H., & Hochheiser, H. (2017). Research Methods in Human-Computer Interaction (2nd ed.). Morgan Kaufmann. ISBN: 9780128093436. Miller, F. P., Vandome, A. F., & McBrewster, J. (2010). Illustration: Information Drawing, Painting, Photograph, Art, Technical illustration. Alphascript Publishing.

Olson, J. S., & Kellogg, W. A. (2014). Ways of Knowing in HCI. Springer.

Raman, M., & Sharma, S. (2012). Technical Communication: Principles and Practice, 2e (2nd ed.). OUP India.

Rodden, T., Harper, R., & Sellen, A. (2008). Being Human: Human-Computer Interaction in the Year 2020. Microsoft Research Ltd.

Rogers, Y. (2012). HCI Theory: Classical, Modern, and Contemporary. Morgan & Claypool Publishers.

Surhone, L. M., Timpelton, M. T., & Marseken, S. F. (2010). Technical Illustration: Technical Drawing, Diagram, Line Drawing, Exploded View Drawing, Cutaway Drawing, Clip-Art, Parallel Projection, Perspective Projection. Betascript Publishing.

9715 Strategic Usability Engineering

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9715	150 h	5 CP	1 st semester	Winter semester	1 semester
Courses Lecture: 30 TU / 2 SWS Seminar: 15 TU / 1 SWS Exercise: 15 TU / 1 SWS		Teaching time 60 TU / 4 SWS	Self-study 93,75 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students are qualified to link the different perspectives and principles of both software engineering and usability engineering and have learned to utilise this knowledge in practice. Students have advanced their knowledge in process models and development lifecycles, as well as gained extensive knowledge of international standards for both disciplines. They can apply their knowledge of general guidelines for the development of human-centred products and the process of their design in practice. They are able to contrast current trends in system development management. This code of practice will enable the students to assess and analyse pre-existing processes, define and specify human-centred design processes and to select the appropriate usability methods for use in practice.					
Content • Software engineering process and management models • Human-centred design and management models • Current trends in software and product development management (e.g. agile, lean UX, lean startup, jobs-to-be-done, design sprints) • Standards in software engineering and usability engineering (e.g. ISO/IEC/IEE 12207, ISO/IEC/IEE 15288, ISO 9241-110, ISO 9241-210, ISO 9241-220, ISO/TR 16982) • Systems and software product quality based on ISO/IEC TR 25060 (and associated documents) • Requirements engineering (including usability requirements) • Assessment and capability models for software engineering and usability engineering (e.g. CMMI or ISO/IEC 15504, ISO/TS 18152, ISO/TR 18529, ISO 9241-221, ISO 9241-222, KESSU, etc.) • Legal aspects, accessibility and universal design					
Teaching methods Tuition in lectures, seminars and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a written examination, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					

Person in charge of module

Prof. Dr. Karsten Nebe

Additional information

Cooper, Alan, Robert Reimann, and David Cronin. About Face 3: The Essentials of Interaction Design. 4th ed. Wiley, 2014.

Dix, Alan, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. Human-Computer Interaction. 3rd ed. Prentice Hall, 2003.

International Organization for Standardization. (2017). *ISO/IEC/IEEE 12207:2017 Systems and software engineering — Software life cycle processes*. ISO.

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International Organization for Standardization. (2002). *ISO/TR 16982:2002 Ergonomics of human-system interaction — Usability methods supporting human-centred design*. ISO.

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International Organization for Standardization. (2020). *ISO 9241-110:2020 Ergonomics of human-system interaction — Part 110: Interaction principles*. ISO.

International Organization for Standardization. (2008). *ISO 9241-171:2008 Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*. ISO.

International Organization for Standardization. (2019). *ISO 9241-210:2019 Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems*. ISO.

International Organization for Standardization. (2019). *ISO 9241-220:2019 Ergonomics of human-system interaction — Part 220: Processes for enabling, executing and assessing human-centred design within organizations*. ISO.

International Organization for Standardization. (2023). *ISO 9241-221:2023 Ergonomics of human-system interaction — Part 221: Human-centred design process assessment model*. ISO.

Mayhew, Deborah J. The Usability Engineering Lifecycle: A Practitioner's Handbook for User Interface Design. Morgan Kaufmann, 1999.

Schaffer, Eric & Apala Lahiri. Institutionalisation of UX: A Step-by-Step Guide to a User Experience Practice. 2nd ed. Addison Wesley, 2013.

Sommerville, I. (2015). Software Engineering (10th ed.). Pearson. ISBN: 9780137503148.

9718 Rapid Agile Design Project

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9718	150 h	5 CP	2 nd semester	Summer semester	1 semester
Courses Practical Training: 60 TU / 4 SWS		Teaching time 60 TU / 4 SWS	Self-study 105 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students will emerge from this course with a robust set of skills, including mastery over the design thinking process, the ability to execute an agile design project (e.g. such as the Google Ventures Design Sprint) from start to finish, enhanced team collaboration and stakeholder communication skills, along with adeptness in rapid prototyping, user testing, and agile project management. These competences prepare students for effective problem-solving and project management in any dynamic work environment.					
Content This module comprehensively covers the fundamentals of design thinking, the step-by-step process of conducting a design sprint, and strategies for effective client engagement and team collaboration. It also delves into rapid prototyping techniques and methodologies for conducting meaningful user testing, ensuring students are well-equipped to tackle real-world challenges with innovative solutions.					
Teaching methods A blend of a real-client project, moderated methods, team activities, and reflective learning forms the core of the teaching methods employed in this course. This diverse educational approach is designed to not only impart theoretical knowledge but also to offer extensive practical experience, thereby enhancing students' ability to apply what they've learned in real-world settings efficiently. Feedback sessions with the instructor and the client further refine students' skills and project outcomes, ensuring a well-rounded learning experience.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information Knapp, J., Zeratsky, J., & Kowitz, B. (2016). Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days. Simon & Schuster.					

Brown, T. (2009). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. HarperBusiness.

Liedtka, J., & Ogilvie, T. (2011). Designing for Growth: A Design Thinking Tool Kit for Managers. Columbia University Press.

Plattner, H., Meinel, C., & Leifer, L. (Eds.). (2011). Design Thinking: Understand – Improve – Apply. Springer.

Gothelf, J., & Seiden, J. (2013). Lean UX: Applying Lean Principles to Improve User Experience. O'Reilly Media.

9721 UX Project Management

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9721	150 h	5 CP	2 nd semester	Summer semester	1 semester
Courses Lecture: 30 TU / 2 SWS Exercise: 15 TU / 1 SWS		Teaching time 45 TU / 3 SWS	Self-study 116,25 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile User Experience is growing to become an integral quality aspect of software development, but it is not only an attribute of the generated product; it is also a fundamental attribute for the development process itself. Students have explored theory and practice of negotiating, with an emphasis on the improvement of processes as well as opportunities for marketing. Students are able to plan and perform project acquisition, manage human-centered design activities and to set up documentation processes in various organisational contexts. Students know techniques to estimate and control project costs, to set up schedules and to measure performance and success focusing on usability engineering.					
Content • Project acquisition, management and -documentation • Roles, activities and responsibilities and their interplay (e.g. analyst, developer, interaction designer, information architect, graphical designer, marketing, product management, etc.) • Setting up communication, research and design processes • Artefacts (style-guides, requirements, specifications, prototypes, assets, etc.) • Managing human-centered design in cross-disciplinary teams • Cost justifying usability and success measurement (KPIs and OKRs) • Indicate possibilities to put in to practise what students have learnt, e.g. by showing funding possibilities and experiences to become self-employed or to set up a spin-off company					
Teaching methods Tuition in lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information Berkun, S. (2008). Making Things Happen: Mastering Project Management. O'Reilly Media. Davis, B. (2009). 97 Things Every Project Manager Should Know: Collective Wisdom from the Experts. O'Reilly Media.					

Gray, D., Brown, S., & Macanuso, J. (2010). *Gamestorming: A Playbook for Innovators, Rulebreakers, and Changemakers*. O'Reilly Media.

Project Management Institute. (2021). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (7th ed.)*. Project Management Institute.

Schrader, M. (2017). *Transformational Products: The code behind digital products that are shaping our lives and revolutionizing our economics*. Next Factory Ottensen.

Cagan, M. (2018). *Inspired: How to Create Tech Products Customers Love (2nd ed.)*. Wiley.

9722 Digital Fabrication for Human-Interface Design

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9722	150 h	5 CP	2 nd semester	Summer semester	1 semester
Courses Lecture: 30 TU / 2 SWS Seminar: 15 TU / 1 SWS Practical Training: 30 TU / 2 SWS		Teaching time 75 TU / 5 SWS	Self-study 93,75 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students have been introduced to the latest trends and techniques of digital fabrication. They have gained practical experiences in applying techniques used for prototyping of physical human-interfaces. They are able to create interactive prototypes that include physical input (sensors) and actuators to provide multi-modal (e.g. visual, tactile, auditive) feedback to the user. Students are able to test the prototypes with users according to their needs.					
Content • 2D and 3D-Design of physical objects for digital fabrication • Production techniques (i.e. Laser-Cutting, 3D-Printing, CNC milling) • Electronics for interaction design • Learn similarities and differences between prototyping for physical and digital products • Know what fidelity level is needed for different prototypes • Get best practices for prototyping in a variety of mediums, and choose which prototyping software or components to use • Learn electronics prototyping basics and resources for getting started • Write basic pseudocode and translate it into usable code for Arduino • Conduct user tests to gain insights from prototypes					
Teaching methods Tuition in lectures, seminars and (partially self-organised) practical training (in the FabLab). Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information					

- Adenauer, J., Petruschat, J., & Petruschat, A. (2012). *Prototype!: Physical, virtual, hybrid, smart: Tackling new challenges in design and engineering*. Form + Zweck.
- Anderson, C. (2014). *Makers*. Random House USA.
- Bell, C. A. (2013). *Beginning sensor networks with Arduino and Raspberry Pi*. Apress.
- Blum, J. (2013). *Exploring Arduino: Tools and techniques for engineering wizardry*. Wiley.
- Gershenfeld, N. (2008). *Fab: The Coming Revolution on Your Desktop--from Personal Computers to Personal Fabrication*. Basic Books.
- Gupta, G. S. (2010). *Embedded Microcontroller Interfacing: Designing Integrated Projects*. Springer-Verlag Berlin Heidelberg.
- Hoskins, S. (2018). *3D Printing for Artists, Designers, and Makers*. Bloomsbury Publishing.
- Karvinen, T. (2014). *Make: Sensors: Projects and experiments to measure the world with Arduino and Raspberry Pi*. O'Reilly.
- Lipson, H., & Kurman, M. (2013). *Fabricated: The New World of 3D Printing*. John Wiley & Sons.
- McElroy, K. (2017). *Prototyping for Designers: Developing the Best Digital and Physical Products*. O'Reilly Media.
- Noble, J. (2012). *Programming Interactivity*. O'Reilly Media.
- Schwartz, M. (2014). *Internet of Things with the Arduino Yún: Projects to help you build a world of smarter things*. Packt Publishing.
- Shiffman, D. (2015). *Learning Processing: A beginner's guide to programming images, animation, and interaction*. Morgan Kaufmann.
- Walter-Herrmann, J., & Büching, C. (2013). *FabLab: Of Machines, Makers, and Inventors*. Transcript.

9723 Innovation and Design Thinking

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9723	150 h	5 CP	2nd semester	Summer semester	1 semester
Courses Lecture: 15 TU / 1 SWS Practical Training: 30 TU / 2 SWS		Teaching time 45 TU / 3 SWS	Self-study 116,25 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile In this practical course, the students understand design thinking as a human-centred process of innovation. Working on some real-world challenges, students collaborate with fellow students toward innovative solutions. They are able to identify opportunities and to transform these opportunities into requirements and concepts for future products that aim to achieve an optimum balance between usability and desirability from all stakeholders' perspectives. The students can apply techniques from design thinking and synthesis, are able to balance different design alternatives and can communicate the design rationales appropriately. Students are familiar with the strategy, process and implementation of design thinking and design management. They have gained knowledge of the breadth of principles, methods and practices of design management across the different design disciplines.					
Content • Strategic management and design management • Design thinking and creativity methods • Open innovation and user-centred innovation • Innovative business models for new markets and digital culture					
Teaching methods Tuition in lectures and (partially self-organised) practical training. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information Ambrose, G., & Harris, P. (2010). Basics Design 08: Design Thinking. AVA Publishing. Brown, T. (2019). Change by Design, Revised and Updated: How Design Thinking Transforms Organizations and Inspires Innovation. HarperCollins Publishers.					

- Cooper, R., Junginger, S., & Lockwood, T. (Eds.). (2011). The Handbook of Design Management. Berg Publishers.
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- Merholz, P., Wilkens, T., Schauer, B., & Verba, D. (2008). Subject To Change: Creating Great Products & Services for an Uncertain World. O'Reilly Media.
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- Verganti, R. (2009). Design Driven Innovation: Changing the Rules of Competition by Radically Innovating What Things Mean. Harvard Business Press.

9724 HCI II - Current Topics and Developments in UE

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9724	150 h	5 CP	2 nd semester	Summer semester	1 semester
Courses Seminar lecture: 30 TU / 2 SWS Exercise: 30 TU / 2 SWS		Teaching time 60 TU / 4 SWS	Self-study 105 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students have learnt about the latest trends and developments in HCI with a focus on their importance/relevance and application in usability engineering, such as Chatbots, AI, VR/AR, Cognitive Robotics, Internet of Things. They also have learned to apply, adapt and extend the techniques taught in the course "HCI I Scientific Foundation and Skills" within the scope of a larger research project in the field of HCI. Additionally, students have internalised the fundamentals of scientific working and research practice, as well as how to design and realise their own ideas within (potentially praxis-related) relevant topics in HCI. Students have chosen a current topic in HCI and either extend an existing approach by their own and original ideas or to come up with their individual project proposals. While designing and realising their ideas, students have learned how to select, perform and analyse appropriate UE methods to evaluate their own ideas according to user needs. Students have further practised how to present and communicate their own work and results in an adequate academic form, as well as how to classify, explain and defend it in context of existing research. Where applicable the project can be conducted and implemented together with companies, research institutes, or other working/research groups.					
Content - Depending on the respective focus topics in HCI related to UX, such as: - Machine Intelligence and AI - Chatbots and ChatGPT - VR-/AR-Techniques - Robotics and Assistive Technologies in privat and working environments - HCI Techniques in the context of Industry 4.0 and Internet of the Things - Extend an existing approach or to come up with own project ideas - Select adequate domain and task specific research methods - Design and create a Prototype for the chosen HCI project - Planning, designing, and conducting experimental (comparative) user studies - Practice, adapt and extend the various modes and forms of scientific writing and communication skills learned in the course "HCI I Scientific Foundation and Skills". - Classify, explain and defend own scientific findings in context of existing research - Analysing and documenting user studies and findings properly (i.e. as a scientific presentation or paper) - Depending on the progress and the outcomes the course will be complemented by a paper submission to a HCI conference.					
Teaching methods Tuition in seminars, lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					

Types of assessment

Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.

Requirements for the award of credit points

Passed assessment

Use of module (in other study programs)
Weight towards final grade

5,42 %

Person in charge of module

Prof. Dr. Kai Essig

Additional information

Literature will be provided, depending on the focus of the course.

9725 Applied Interaction Design

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9725	150 h	5 CP	2 nd semester	Summer semester	1 semester
Courses Lecture: 30 TU / 2 SWS Exercise: 30 TU / 2 SWS		Teaching time 60 TU / 4 SWS	Self-study 105 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students have gained knowledge of design principles and design elements for visual interface design. They understand the relationships between forms, shapes and colours, and the ways in which humans understand and perceive these relationships. The students have learned how to use this general knowledge in order to create interfaces for interactive systems. They know how to develop interfaces in a systematic way: starting with concepts based on requirements, through the development of wireframes and information architecture, specification of the design until its implementation as interactive prototypes. Students have gained practical experience in using various tools for prototyping and are able to reflect critically on the appropriateness of such tools in different project contexts.					
Content • Design principles and design elements • Visual interface design and Sketching • Communication of objectives, methods and concepts for the typical development phases • Design methodology: requirements, concepts, wireframes, information architecture, design & specification, testing • Prototyping for different platforms (e.g. desktop, mobile, physical hardware interfaces, web & responsive, etc.) • examples from research and industry illustrate how new forms of interaction interfaces can be designed by an interdisciplinary approach					
Teaching methods Tuition in lectures and (partially self-organised) exercises. Students work individually and in teams.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Karsten Nebe					
Additional information Buxton, B. (2007). Sketching User Experiences: Getting the Design Right and the Right Design. Morgan Kaufmann.					

Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About Face: The Essentials of Interaction Design (4th ed.). Wiley.

Crawford, C. (2002). The Art of Interactive Design: A Euphonious and Illuminating Guide to Building Successful Software. No Starch Press.

Goodwin, K. (2009). Designing for the Digital Age: How to Create Human-Centered Products and Services. Wiley.

Morville, P., & Rosenfeld, L. (2008). Information Architecture for the World Wide Web: Designing Large-Scale Web Sites (3rd ed.). O'Reilly Media.

Mullet, K., & Sano, D. (1995). Designing Visual Interfaces. Sunsoft Press.

Preece, J., Rogers, Y., & Sharp, H. (2007). Interaction Design. Wiley & Sons.

9728 User Centred Design Research Project

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9728	150 h	5 CP	1st semester	Winter semester	1 semester
Courses Practical Training: 60 TU / 4 SWS		Teaching time 60 TU / 4 SWS	Self-study 105 h		Planned group size 20 students
Learning outcomes / Competences and qualifications profile Students have learned to apply the knowledge they have gained in other courses to their project work. They know how to do research and how to gather information by using different sources like literature, Internet or experts. They are able to develop a prototype according to the Usability Engineering Life cycle, write a convincing project report fulfilling scientific standards and to present project results in a professional way. They understand and practise how to conduct user studies with the target groups, to analyse the results adequately and to come up with suitable optimization criteria. Additionally, students will learn suitable time and project management skills and how to develop marketing strategies for their ideas and prototypes. Due to this project experience students have improved their soft skills and their ability to work in a team.					
Content Students have to plan, realise, document and present their own projects by applying the knowledge they have gained in accompanying courses. The projects students choose could be related to current research projects of the faculty, be realised by doing industrial internships or on Human-System Interaction in general. The focus of the chosen User Centred Research Project A is on analytical methods used in Usability Engineering and their application, as well as suitable document and presentation methods. The system should be realised as a prototype.					
Teaching methods At the beginning of the semester the different project ideas are presented and teams are built. Project kick-offs and regular meetings will be initiated by the professors in charge who will also supervise the projects and will be available in case of problems and questions.					
Entry requirements None					
Types of assessment Graded examination, usually a project work, details to be announced at the beginning of the lectures by the Examination Board.					
Requirements for the award of credit points Passed assessment					
Use of module (in other study programs)					
Weight towards final grade 5,42%					
Person in charge of module Prof. Dr. Kai Essig					
Additional information Literature depending on project					

9701 and 9702 Master Thesis and Colloquium

Code	Workload	Credits	Level of module	Frequency of offer	Duration
9701 9702	900 h	30 CP	3rd semester	Winter semester	1 semester
Courses Master Thesis: 27 CP Colloquium: 3 CP		Teaching time Depending on individual needs	Self-study		Planned group size
Learning outcomes / Competences and qualifications profile Students have worked on a research topic of their interest in the scientific field of Usability Engineering. They have conducted intensive studies on literature and developed their research question. Students have developed appropriate methodological strategies concerning that question. They have conducted the approach focussing on specific details of the questions, have analysed the results and transferred their findings to the broader perspective of the field. They have reflected their work and findings critically and have come up with some further research questions. Students have proven that they are able to analyse a complex field of work, find specific new research questions as well as have been able to answer and document them. During the colloquium students have presented their work and have proven their expertise in the field of work. They have been able to defend the topic and to reflect on its impact on real-life problems in a professional way.					
Content Researching and evaluating literature Developing a research question and deriving hypotheses Analysing methodological strengths and weaknesses of different research approaches Developing research designs Conducting the studies Evaluating and documenting the results Writing the thesis Presenting and defending the findings					
Teaching methods Individual supervision and support					
Entry requirements 60 credits points achieved in other courses of the curriculum					
Types of assessment Written Master thesis and oral disputation					
Requirements for the award of credit points Passed Master thesis and disputation as well as successful completion of all other modules of the curriculum					
Use of module (in other study programs)					
Weight towards final grade 35%					
Person in charge of module					

All professors of the faculty

Additional information
