Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Subject

# Human-Computer Systems

as a Bachelor's with 1 major

with the degree "Bachelor of Science"

(180 ECTS credits)

Examination regulations version: 2015
Responsible: Faculty of Human Sciences
Responsible: Institute of Human Computer Media

# Learning Outcomes

German contents and learning outcome available but not translated yet.

**Berufsziele**

Der Bachelorstudiengang Mensch-Computer-Systeme bildet den ersten Teil der Human- Computer Interaction (HCI) Ausbildung an der Universität Würzburg. Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad eines „Bachelor of Science" („B.Sc.") verliehen, der einen ersten berufsqualifizierenden Abschluss darstellt. Mit dem Bachelorabschluss besitzen Studierende die grundlegende Qualifikation für Tätigkeiten in Institutionen und in der Privatwirtschaft. Absolventen und Absolventinnen sind durch ihre interdisziplinäre Ausbildung vielseitig einsetzbar und haben sehr gute Berufschancen, beispielsweise

- in der Industrie und der Logistik
- in der Automobil-Branche
- im Öffentlichem Dienst/Behörden
- im Bereich E-Commerce
- in der Medizin und Pflege
- als User Experience Designer, Usability Engineer oder User Experience Consultant im IT-Bereich

Der Bachelorstudiengang legt aber auch die Grundlagen für den Masterstudiengang, der dann wiederum den Grundstein für eine wissenschaftliche und qualifiziert praktische Tätigkeit legt. Im Pflichtbereich des Bachelorstudiengangs erlangen Studierende Wissen über grundlegende Inhalte und wissenschaftliche Konzepte der verschiedenen Teilgebiete der HCI und erwerben fundierte methodische Kenntnisse, wobei technische Expertise gleichfalls eine wichtige Rolle spielt. Dieses Wissen wird durch anwendungsnahe Angebote ergänzt. Im Wahlpflichtbereich haben Studierende die Möglichkeit, je nach ihren persönlichen Interessen Module auszuwählen und zu vertiefen.

**Qualifikationsziele**

Das Studium der Mensch-Computer-Systeme ist interdisziplinär ausgerichtet und vermittelt neben fachspezifischen Kompetenzen auch Kompetenzen aus der Informatik und der Psychologie. Nach erfolgreichem Abschluss des Studiums verfügen die Studierenden über folgende Kompetenzen:

1. Allgemeine Kompetenzen
   - Kritische Reflexion und Einordnung von wissenschaftlichen Erkenntnissen.
   - Schriftliche und mündliche Präsentation erworbener Kenntnisse.
   - Durchführung eigener wissenschaftlicher & angewandter Projekte.
   - Verfassen wissenschaftlicher Texte nach fachlichen Standards.
   - Teamarbeit
2. Methodische Kompetenzen
   - Analytisches Vorgehen und Abstraktionsvermögen.
   - Algorithmisches Denken und Konstruieren.
   - Verständnis und Strukturierung komplexer Zusammenhange.
   - Analyse-, Design- und Evaluationsmethoden für Mensch-Computer-Systeme.
   - Versuchsplanung, Datenerhebung und Datenauswertung.
3. Inhaltliche Kompetenzen
   - Programmierung und programmiertechnische Verfahren.
   - Softwareentwurf und Softwareanalyse.
   - Schnittstellengestaltung interaktiver Systeme.
   - Interaktionstechniken und -paradigmen.
   - Statistische Verfahren.
   - Physiologische und psychologische Benutzereigenschaften.
   - Technische Grundlagen informatischer Systeme.

- Grundlagen zu Usability, User Experience und Human Factors.

**Wissenschaftliche Befähigung**

- Die Absolvent:innen verfügen über kritisches Verständnis in verschiedenen Teilgebieten der Mensch- Computer-Systeme inklusive Grundlagen der Psychologie und Informatik das den Stand der Fachliteratur sowie einige vertiefte Wissensbestände auf dem aktuellen Stand der Forschung einschließt.
- Die Absolvent:innen besitzen forschungsmethodisches Wissen und die Fähigkeit, wissenschaftliche Erkenntnisse und ausgewählte Literatur zu vergleichen und einzuordnen und an Beispielen zu vertiefen.
- Die Absolvent:innen sind in der Lage exemplarisch/ unter Anleitung, wissenschaftliche Untersuchungen zu planen, durchzuführen und zu bewerten.
- Die Absolvent:innen können die erworbenen methodischen Fähigkeiten einsetzen, um die Ergebnisse empirischer Untersuchungen auszuwerten, zu interpretieren und Schlussfolgerungen daraus zu ziehen.
- Die Absolvent:innen sind in der Lage, sich mit Hilfe von internationaler Fachliteratur in neue Gebiete einzuarbeiten und selbstständig Literatur für bislang neue Fragestellungen zu recherchieren, zu interpretieren und zu bewerten.
- Die Absolvent:innen sind befähigt, sich in neue Themengebiete der Mensch-Computer- Systeme und Fragestellungen durch die Recherche aktueller Forschungsergebnisse einzuarbeiten. Sie können diese Themen- und Fragestellungen unter verschiedenen Zielsetzungen bearbeiten, darstellen und analysieren.
- Die Absolvent:innen sind in der Lage, Probleme und deren Lösungen zielgruppengerecht und (teilweise auch in englischer oder sonstiger Fremdsprache) aufzubereiten und darzustellen (teilweise auch medienunterstützt) und können ihr Wissen und Verstehen auf Tätigkeit und Beruf anwenden sowie Problemlösungen in ihrem Fachgebiet erarbeiten oder weiterentwickeln.

**Befähigung zur Aufnahme einer Erwerbstätigkeit**

- Die Absolvent:innen begründen das eigene berufliche Handeln mit theoretischem und methodischem Wissen.
- Die Absolvent:innen können die eigenen Fähigkeiten einschätzen, zudem reflektieren sie autonom sachbezogene Gestaltungs- und Entscheidungsfreiheiten und nutzen diese unter Anleitung, in dem sie ihre Erkenntnisse einem Fachpublikum oder einem Praxispublikum gegenüber darstellen und theoriegeleitet argumentieren.

**Persönlichkeitsentwicklung**

- Die Absolvent:innen kennen die Regeln guter wissenschaftlicher Praxis und reflektieren ihr berufliches Handeln in Bezug auf diese.
- Die Absolvent:innen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten, unterschiedliche und abweichende Ansichten produktiv zur Zielerreichung zu nutzen und auftretende Konflikte zu lösen (Teamfähigkeit).

**Befähigung zum gesellschaftlichen Engagement**

- Die Absolvent:innen können gesellschaftliche Diskussionen auf der Basis selbst recherchierter objektiver Daten bewerten und angemessen diskutieren.
- Die Absolvent:innen können auf der Basis des erworbenen Wissens im gesellschaftlichen Diskurs begründet Position beziehen.
- Die Absolvent:innen haben die Bereitschaft und Fähigkeit entwickelt, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

# Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **S** = seminar, **T** = tutorial, **Ü** = exercise, **V** = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

# Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

# Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

# In accordance with

the general regulations governing the degree subject described in this module catalogue:

**ASPO2015**

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

**09-Sep-2015 (2015-145)**

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.

# The subject is divided into

| Abbreviation | Module title | ECTS credits | Method of grading | page |
|---|---|---|---|---|
| **Compulsory Courses (126 ECTS credits)** | | | | |
| 06-MCS-GL-AP-152-m01 | Foundations of Human-Computer-Systems and Cognitive Psychology | 8 | NUM | 11 |
| 10-I-EinP-152-m01 | Introduction to Programming | 5 | NUM | 35 |
| 06-PSY-STAT-1-152-m01 | Statistics 1 | 6 | NUM | 31 |
| 10-I-ADS-152-m01 | Algorithms and data structures | 10 | NUM | 33 |
| 06-PSY-STAT-2-152-m01 | Statistics 2 | 6 | NUM | 32 |
| 10-I-ST-152-m01 | Software Technology | 10 | NUM | 37 |
| 10-I-PP-152-m01 | Practical Course in Programming | 10 | B/NB | 36 |
| 06-MCS-SGP-152-m01 | Selected Areas of Psychology | 5 | NUM | 22 |
| 10-MCS-SPSE-152-m01 | Programming Course Interface Development | 10 | NUM | 47 |
| 10-MCS-SQ-152-m01 | Software Quality | 5 | NUM | 48 |
| 06-MCS-Usab-152-m01 | Usability and Software Ergonomics | 10 | NUM | 24 |
| 06-MCS-Meth-1-152-m01 | Research Methods | 5 | NUM | 18 |
| 06-MCS-Meth-2-152-m01 | Experience as a tester or subject in experiments | 1 | B/NB | 19 |
| 10-MCS-ICGV-152-m01 | Interactive Computer Graphics | 5 | NUM | 41 |
| 10-MCS-ICGT-152-m01 | Interactive Computer Graphics Exercise | 5 | NUM | 40 |
| 06-MCS-MBG-152-m01 | Methods for User-Centered Design | 10 | NUM | 16 |
| 06-MCS-IDA-152-m01 | Inclusive Design & Accessibility | 5 | NUM | 13 |
| 06-MCS-AT-152-m01 | Current Trends of Human-Computer Systems | 5 | NUM | 8 |
| 06-MCS-IGL-152-m01 | Interaction Guidelines | 5 | NUM | 14 |
| **Compulsory Electives (22 ECTS credits)**<br>One of the following modules must be taken: MCS-Projekt Psychologie (MCS Project Psychology), MCS-Projekt Informatik (MCS Project Computer Science), MCS-Projekt Interdisziplinär (MCS Project Interdisciplinary). | | | | |
| 06-MCS-V1-152-m01 | Specialization MCS 1 | 5 | NUM | 25 |
| 06-MCS-V2-152-m01 | Specialization MCS 2 | 5 | NUM | 26 |
| 10-MCS-IS1-152-m01 | Interactive Systems 1 | 5 | NUM | 42 |
| 10-MCS-IS2-152-m01 | Interactive Systems 2 | 5 | NUM | 43 |
| 10-MCS-IS3-152-m01 | Interactive Systems 3 | 5 | NUM | 44 |
| 10-MCS-Med-152-m01 | Media Informatics for MCS | 5 | NUM | 45 |
| 10-MCS-AKI-152-m01 | Selected topics of Computer Science | 5 | NUM | 39 |
| 06-MCS-Inst-152-m01 | Instructional Psychology for MCS | 5 | NUM | 15 |
| 06-MCS-VUsab-152-m01 | Specialisation Usability | 5 | NUM | 28 |
| 06-MCS-VUsEx-152-m01 | Specialisation User Experience | 5 | NUM | 29 |
| 06-MCS-VHuFa-152-m01 | Specialisation Human Factors | 5 | NUM | 27 |
| 06-MCS-MedPsy-152-m01 | Media Psychology for MCS | 5 | NUM | 17 |
| 06-MCS-Proj-Psy-152-m01 | MCS Project Psychology | 12 | NUM | 21 |
| 10-MCS-Proj-Info-152-m01 | MCS Project Computer Science | 12 | NUM | 46 |
| 06-MCS-Proj-Int-152-m01 | MCS Project Interdisciplinary | 12 | NUM | 20 |
| **Key Skills Area (20 ECTS credits)** | | | | |
| **General Key Skills (5 ECTS credits)** | | | | |

In addition to the modules listed below, students may also take modules offered by JMU as part of the pool of general transferable skills (ASQ).

| | | | | |
|---|---|---|---|---|
| **General Key Skills (subject-specific)** | | | | |
| 06-MCS-ASQ-152-m01 | Work experience as a research and teaching assistant | 5 | B/NB | 7 |
| **Subject-specific Key Skills (15 ECTS credits)** | | | | |
| 06-MCS-Exhib-152-m01 | Exhibition MCS Thesis | 5 | B/NB | 10 |
| 06-MCS-BPrakt-152-m01 | Practice/Job-oriented Internship | 10 | B/NB | 9 |
| **Thesis (12 ECTS credits)** | | | | |
| 06-MCS-Thesis-152-m01 | Bachelor's Thesis | 12 | NUM | 23 |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Work experience as a research and teaching assistant** | | | 06-MCS-ASQ-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The students work as tutors (research and/or teaching assistants) in the context of the Bachelor's program Human-Computer Systems (HCI) and/or the Master's program Human-Computer Interaction (HCI, German: Mensch-Computer-Interaktion). The work tasks are determined individually and include typical activities from the academic work environment.

**Intended learning outcomes**

After participating in this module, students will be able to moderate learning processes, lead discussions and conduct results-oriented conversations with students. They are able to recognize progress and stagnation of individual project groups or project participants and provide assistance or offer problem-solving strategies. Competencies are taught in two areas. In the course of working as a teacher, participants will learn to teach others in topics related to the field of HCI. They will gain a better understanding of the problems students encounter in learning. While working as a research assistant, participants will gain hands-on experience with the methods of scientific work.

**Courses** (type, number of weekly contact hours, language — if other than German)

P (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Experience report (approx. 2 pages)

**Allocation of places**

--

**Additional information**

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**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Current Trends of Human-Computer Systems** | | | 06-MCS-AT-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Bachelor's degree programme Mensch-Computer-Systeme (Human-Computer Systems) | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides an introduction to typical scientific research work with a focus on human-computer systems topics. Content includes the use of scientific media (conference proceedings, journals, books, etc.) and the presentation of scientific content. Students search for and analyze scientific publications in relation to a specific research question. Analysis involves identifying relevant content, synthesizing it into coherent arguments, and critiquing it. Students present the results of their analysis to other participants with an oral presentation.

**Intended learning outcomes**

After participating in the module courses, students will be able to understand relevant information from scientific texts and identify and interpret the important key points. They will be able to summarize these and compare and evaluate them with other results and present the overall results to a specialized audience.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

presentation (approx. 20 minutes) with handout (approx. 5 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Master's degree (1 major) Media Communication (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)
Master's degree (1 major) Media Entertainment (2022)
Master's degree (1 major) Psychology of digital media (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practice/Job-oriented Internship** | | | 06-MCS-BPrakt-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides insights into the professional activities of experts for user experience, user interface development, usability and/or human factors in institutions related to the subject and/or in the private sector. Students apply the knowledge acquired during their studies in practice and deepen it.

**Intended learning outcomes**

After participating in the module courses, students are able to apply subject content and methods of the field of study in new and practical tasks. Students will be able to develop problem-solving proposals in work environments new to them and communicate in teams. They make their first contacts with the professional world, create a basis for their later career choice and improve their employability.

**Courses** (type, number of weekly contact hours, language — if other than German)

P (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

report on practical course (approx. 2 pages)

**Allocation of places**

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**Additional information**

Additional information on module duration: no less than 10 weeks.

**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Exhibition MCS Thesis** | | | 06-MCS-Exhib-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Presentation and communication are important skills for application-oriented and practical aspects of various sciences. This is specifically true for Human-Computer Interaction (HCI). This course requires the participants to present the results of an associated thesis to a larger audience in a and exhibition-like setup.

**Intended learning outcomes**

The participants will learn how to present their own work to a larger audience, how to plan, design and set-up the different parts of an own exhibition booth, and how to react individually to questions from the audience.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

presentation of results of Bachelor's thesis (approx. 15 minutes)
Language of assessment: German and/or English

**Allocation of places**

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**Additional information**

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**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | Abbreviation |
|---|---|
| **Foundations of Human-Computer-Systems and Cognitive Psychology** | 06-MCS-GL-AP-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| chairperson of examination committee of the Bachelor's degree programme Mensch-Computer-Systeme (Human-Computer Systems) | Institute of Human Computer Media |

| ECTS | Method of grading | Only after succ. compl. of module(s) |
|---|---|---|
| 8 | numerical grade | -- |

| Duration | Module level | Other prerequisites |
|---|---|---|
| 1 semester | undergraduate | -- |

**Contents**

The module provides a comprehensive insight into the contents and methods of human-computer interaction. The entire cycle consisting of design, implementation and evaluation of interactive computer systems is considered. Input/output processing techniques and important and typical interaction metaphors, from text-based input to graphical desktop applications to multimodal interfaces, are introduced and prominent evaluation methods are explained. The module provides insights into basic functioning of modern computer systems as well as basic human capabilities and limitations in cognition (perception, cognition, memory, attention, decision making) and physical ergonomics (anthropometry, biomechanics). Accompanying practical tasks in the exercise teach students typical methods of needs analysis, prototype development and evaluation.

**Intended learning outcomes**

After participating in the module courses, students have acquired basic professional skills. They remember specific methods and procedures. They are able to identify relevant use-cases and recognize possible issues and tasks and compare different solution options. They are able to solve first prototypical tasks, organize the solution process, implement the individual steps of the solution process, interpret and compare the results.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + V (3) + Ü (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

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**Additional information**

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**Workload**

240 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Inclusive Design & Accessibility** | | | 06-MCS-IDA-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

In this module, fundamentals of accessibility and inclusive design from a human-computer interaction perspective are covered and practiced. Central topics are design for important target groups (e.g. people with visual impairments, elderly people, people with dementia), methods for estimating exclusion, basic technologies for increasing accessibility, principles of universal design and approaches of inclusive design. The content will be taught interactively and applied in a small accompanying project.

**Intended learning outcomes**

After participating in the module events, students are able to characterize user groups with diverse abilities and limitations. The students are able to independently compile, summarize and evaluate relevant excerpts from the specialist literature. In the project they generate user-oriented design solutions. They develop their communicative competencies and their own values in relation to their fellow human beings with special needs.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

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**Additional information**

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**Workload**

150 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interaction Guidelines** | | | 06-MCS-IGL-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Usability guidelines often sound logical, but their implementation is often more difficult than expected. In this module, students learn basic guidelines for the design of e.g. texts, graphics and forms as well as special guidelines from different application domains e.g. web, natural user interfaces and language interaction and apply them prototypically.

**Intended learning outcomes**

After participating in this module, students will be able to explain basic rules of good user interface design using examples, recognize typical usage problems, and apply rules to avoid them.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

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**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Instructional Psychology for MCS** | | | 06-MCS-Inst-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Instructional Psychology and New Media | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides deeper knowledge of central topics, theories and findings of instructional psychology and its relation to digital media. The lecture gives an overview of current approaches in research about learning and instruction, above all in instructional design.

**Intended learning outcomes**

Students will acquire expertise and practical skills that will be useful for both their academic and their professional lives. This includes a more in-depth knowledge of theories, methods and findings of instructional psychology as well as a basic knowledge of the application of instructional psychology. The skills acquired in this course will also be useful in many ways for their future careers.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 110 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Methods for User-Centered Design** | | | 06-MCS-MBG-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module is about teaching methods of requirements analysis and the design of user interfaces of interactive products. The methods are introduced in the lecture part of the course. Selected methods are tested by the students on examples in the exercise part of the course. In a team, they develop a product concept and carry out the first phases of a user-centered design process from context of use and requirements analysis to the design of design solutions and a tested low-fidelity prototype

**Intended learning outcomes**

After participating in the module courses, students are able to apply selected methods for context of use and requirements analysis as well as for the design of human-technology interaction. They will be able to contrast the methods and assess the usefulness of individual methods for specific goals and apply the methods to the design of an interactive system. Project work promotes independent planning, communication and cooperation in groups as well as the ability to resolve conflicts.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

project report (approx. 12 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Media Psychology for MCS** | | | 06-MCS-MedPsy-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Media Psychology | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Media psychology deals with human experiences and behaviour while interacting with media. Media psychology develops theories and tests these in empirical studies. This introductory module aims to equip students with fundamental knowledge about the subject of media psychology (e. g. traditional media and mass media) as well as its theories, findings, and methods. The module focuses on the introduction to a) the subject itself, theories, and findings of media psychology b) research fields and current problems in media psychology c) methods in media psychology.

**Intended learning outcomes**

Students should be familiar with central concepts and methods of media psychology. They should have a basic knowledge of the subject-specific questions and should understand the relevance and importance of a psychological perspective as well as the relevance of questions in the field of the social sciences. Thus, a basis is provided for academic work as well as for acquiring practically relevant (vocationally oriented) media skills.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 50 minutes) or b) oral examination of one candidate each (approx. 20 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Research Methods** | | | 06-MCS-Meth-1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides basic knowledge about methods of gaining knowledge in human-computer systems. These include scientific theoretical basics, identification of questions, formulation of hypotheses, securing suitable measurement methods, selection of research paradigms and data collection methods, as well as evaluation and interpretation of research results. In the exercise, the above points are practiced practically by means of tasks such as smaller experiments, data evaluation and the preparation of a research report.

**Intended learning outcomes**

After participating in the module courses, students are able to investigate empirical questions in human-computer systems using the appropriate scientific methods. The students are able to reproduce basic terms and methods, formulate and comprehend questions, and decide on and apply suitable survey and evaluation methods. The students are able to critically examine the methods of others and their own work and have knowledge of the structure and writing of scientific reports.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Experience as a tester or subject in experiments** | | | 06-MCS-Meth-2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 1 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Empirical studies and controlled experiments are the central methods of scientific procedure. Typically, students learn to design and execute experiments from the perspective of the person conducting the experiment. In this module, students switch sides and participate in experiments, not as leaders, but as subjects.
Detailed information on the distribution of subject hours among the various work areas of the Institute Human-Computer Media can be found on the degree program's website.

**Intended learning outcomes**

After participating in the module courses, students will be able to recognize how subjects perceive empirical studies. They can deduce which positive and negative aspects an empirical study can have from the perspective of a test subject.

**Courses** (type, number of weekly contact hours, language — if other than German)

P (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Acting as a participant in experiments (30 hours)

**Allocation of places**

--

**Additional information**

--

**Workload**

30 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **MCS Project Interdisciplinary** | | | 06-MCS-Proj-Int-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 12 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Hands-on experience is a necessary skill for application-oriented aspects of human-computer interaction (HCI). In this course, groups of students work on a well-specified project or work task, which they are expected to solve mainly independently. The topic is drawn from the interdisciplinary psychological-informational aspects of human-computer interaction and may include design, evaluation, and research aspects.

**Intended learning outcomes**

After participating in the module courses, students will be able to apply their methodological and content knowledge with an interdisciplinary informatics and psychology focus. They are able to work in a team according to structured processes and develop their methodological competence, communicative competence, cooperation skills and ability to deal with conflicts.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

report (approx. 10 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

360 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **MCS Project Psychology** | | | 06-MCS-Proj-Psy-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 12 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Hands-on experience is a necessary skill for application-oriented aspects of human-computer interaction (HCI). In this course, groups of students work on a well-specified project or work task, which they are expected to solve mainly independently. The topic comes from the psychological aspects of human-computer interaction and may include design, evaluation, and research aspects.

**Intended learning outcomes**

After participating in the module events, students can apply their methodological and content knowledge with a psychological focus. They are able to work in a team according to structured processes and develop their methodological competence, communicative competence, cooperation skills and ability to deal with conflicts.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

report (approx. 10 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

360 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Selected Areas of Psychology** | | | 06-MCS-SGP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

In the lecture, the module for human-computer systems studies teaches fundamentals of psychology in the sub-aspects: Emotional and Motivational Psychology, Social Psychology, Personality and Differential Psychology, and Organizational Psychology. In the exercise, examples are given of how this knowledge can be applied or researched in human-computer interaction.

**Intended learning outcomes**

After participating in the module courses, the students are able to reproduce the basics of the sub-aspects of psychology and to delineate the individual sub-aspects. Furthermore, the students are able to recognize and evaluate the relevance of the sub-aspects in a human-computer system. The exercise enables the students to present and discuss the contents.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bachelor's Thesis** | | | 06-MCS-Thesis-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Master's degree programme Human-Computer Interaction | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 12 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Students work independently on an assigned problem from the research area of human-computer interaction (HCI) and document their results according to scientific standards.

**Intended learning outcomes**

After participation in the module, participants are able to independently apply scientific methods of human-computer interaction to a thematically defined problem. They recognize and interpret subject-specific questions of the problem. They compare, interpret and evaluate analogous problems and remember the necessary methods to answer them. They organize and implement a structured processing and solution process. They document and illustrate their solution process and interpret the results.

**Courses** (type, number of weekly contact hours, language — if other than German)

No courses assigned to module

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Bachelor's thesis (approx. 30 pages)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

Time to complete: 12 weeks.

**Workload**

360 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Usability and Software Ergonomics** | | | 06-MCS-Usab-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module is about teaching and applying analytical and empirical evaluation methods for usability and user experience of interactive products. The methods are introduced in the lecture part of the course. Selected methods are tested by the students on examples in the exercise part of the course. Furthermore, the students evaluate two interactive products independently in small groups. The task consists of planning, conducting, evaluating and presenting the results of a usability study and includes a critical comparison of methods.

**Intended learning outcomes**

After participating in the module courses, students will be able to apply analytical and empirical methods for evaluating interactive products, present them in writing and critically evaluate them. They will be able to plan, conduct and evaluate evaluation studies. From the analysis of the results, they develop suggestions for the revision of interactive products. Through project work in small groups, their general problem-solving ability, communicative competence, cooperation skills and self-competence to develop their own willingness to perform.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

project report (approx. 12 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

3 places. The indicated number of places will be allocated to students of the subject Digital Humanities (Master of Arts with 120 ECTS credits). Places will be allocated primarily according to the number of subject semesters; among applicants with the same number of subject semesters, places will be allocated by lot.

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Master's degree (1 major) Digital Humanities (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Specialization MCS 1** | | | 06-MCS-V1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee of the Bachelor's degree programme Mensch-Computer-Systeme (Human-Computer Systems) | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

In this module, the contents of the degree courses are deepened and references to neighboring sciences are made, which expand and deepen the skills already acquired, e.g. media communication, business informatics, interaction design, sociology of technology, psychology, computer science, museology, digital humanities, geography, etc.

**Intended learning outcomes**

After participating in this module, students will be able to name and explain typical problems and methods in their own subject as well as in related fields of science and application. They develop methodological competence, communicative competence, cooperation skills and the ability to deal with conflicts in interdisciplinary cooperation.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Module studies (Bachelor) Human-Computer Systems (2019)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | Abbreviation |
|---|---|
| **Specialization MCS 2** | 06-MCS-V2-152-m01 |

| Module coordinator | Module offered by |
|---|---|
| chairperson of examination committee of the Bachelor's degree programme Mensch-Computer-Systeme (Human-Computer Systems) | Institute of Human Computer Media |

| ECTS | Method of grading | Only after succ. compl. of module(s) |
|---|---|---|
| 5 | numerical grade | -- |

| Duration | Module level | Other prerequisites |
|---|---|---|
| 1 semester | undergraduate | -- |

**Contents**

In this module, the contents of the degree courses are deepened and references to neighboring sciences are made, which expand and deepen the skills already acquired, e.g. media communication, business informatics, interaction design, sociology of technology, psychology, computer science, museology, digital humanities, geography, etc.

**Intended learning outcomes**

After participating in this module, students will be able to name and explain typical problems and methods in their own subject as well as in related fields of science and application. They develop methodological competence, communicative competence, cooperation skills and the ability to deal with conflicts in interdisciplinary cooperation.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Module studies (Bachelor) Human-Computer Systems (2019)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Specialisation Human Factors** | | | 06-MCS-VHuFa-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

In this module, students are introduced to safety-critical and complex work areas in which human factors play a major role (e.g. aviation, acute medicine, traffic). For this purpose, (1) a work area with its specific requirements for the design of the human-machine interface is introduced, (2) current problems and research topics in this area are discussed and (3) possibilities and limits are discussed on applying HCI knowledge and research to solving problems in this domain. Excursions to safety-critical work places are also planned as part of the seminar.

**Intended learning outcomes**

After participating in this module, students will be able to assess how human-machine interfaces must be designed in context through insight and contacts in safety-critical socio-technical work areas. Furthermore, students will be able to analyze these interfaces from a safety-critical point of view and taking into account work area-specific features, and to incorporate these results into designs of new interfaces. The excursions offer an insight into fields in which internships or project and thesis work are relevant and also represent a potential professional field.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Specialisation Usability** | | | 06-MCS-VUsab-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

In this module, the content, methods and applications of usability research are taught in depth, i.e. the design of human-computer systems along the criteria of effectiveness, efficiency and satisfaction during use. Examples of application come from industrial use, public and private space.

**Intended learning outcomes**

After participating in this module, students will be able to name the principles of selected usability methods and domains and will be able to design user interfaces themselves as well as conduct studies to investigate issues in the field of human-system interaction. Furthermore, they are able to explain the advantages and disadvantages of different usability methods, analyze and evaluate empirical studies as well as design solutions.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Specialisation User Experience** | | | 06-MCS-VUsEx-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Psychological Ergonomics | | Institute of Human Computer Media | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module provides in-depth content, methods and applications of user experience research, i.e. the design of human-computer systems with regard to a good user experience. Examples of application come from the public and private spheres and include, for example, customer satisfaction, persuasive interfaces, aesthetic design and service design.

**Intended learning outcomes**

After participating in this module, students will be able to name the principles of selected user experience methods and domains and will be able to design user interfaces themselves as well as conduct studies to investigate corresponding questions from the field of human-system interaction. Furthermore, they will be able to explain the advantages and disadvantages of different user experience methods, analyze and evaluate empirical studies as well as design solutions.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Master's degree (1 major) Media Communication (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Master's degree (1 major) Media Communication (2016)
Master's degree (1 major) Media Communication (2018)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Master's degree (1 major) Media Communication (2019)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| |
|---|
| Master's degree (1 major) Media Entertainment (2022) |
| Master's degree (1 major) Psychology of digital media (2022) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Statistics 1** | | | 06-PSY-STAT-1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Psychological Research Methods | | Institute of Psychology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 6 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The course gives an introduction to univariate and bivariate descriptive statistics and probability theory (descriptive statistics, graphic representations of data, probability theory, Bayes, distributions, binomial test, linear, nonlinear and multiple regression, correlation) as well as statistical methods of evaluation research. The application of computer-based data collection and -analysis is trained in exercises and explicitly tested in the exam.

**Intended learning outcomes**

Students acquire knowledge of various procedures of descriptive statistics and probability theory and their foundations as well as the ability to select adequate statistical methods for testing empirical questions, perform the procedures correctly with using computer-based data analysis, display the results reasonably and interpret them correctly.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 120 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

180 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Media Communication (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Statistics 2** | | | 06-PSY-STAT-2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Psychological Research Methods | | Institute of Psychology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 6 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The course gives an introduction to univariate and bivariate descriptive statistics and probability theory (descriptive statistics, graphic representations of data, probability theory, Bayes, distributions, binomial test, linear, nonlinear and multiple regression, correlation) as well as statistical methods of evaluation research. The application of computer-based data collection and -analysis is trained in exercises and explicitly tested in the exam.

**Intended learning outcomes**

Students acquire knowledge of various procedures of descriptive statistics and probability theory and their foundations as well as the ability to select adequate statistical methods for testing empirical questions, perform the procedures correctly with using computer-based data analysis, display the results reasonably and interpret them correctly.

**Courses** (type, number of weekly contact hours, language — if other than German)

S (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 120 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

180 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Media Communication (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Algorithms and data structures** | | | 10-I-ADS-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Design and analysis of algorithms, recursion vs. iteration, sort and search methods, data structures, abstract data types, lists, trees, graphs, basic graph algorithms, programming in Java.

**Intended learning outcomes**

Students are proficient in independently designing, precisely describing and analyzing algorithms. The students know the basic paradigms for the design of algorithms and can implement them in practical programs. Students are able to estimate the runtime behavior of algorithms and prove the correctness of algorithms.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 49 I Nr. 1a
§ 69 I Nr. 1a

**Module appears in**

Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Economathematics (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor' degree (1 major) Aerospace Computer Science (2017)
Bachelor' degree (1 major) Computer Science (2017)
Bachelor' degree (1 major) Computer Science (2019)

Bachelor' degree (1 major) Aerospace Computer Science (2020)
Bachelor' degree (1 major) Computer Science und Sustainability (2021)
Bachelor' degree (1 major) Mathematics (2023)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Introduction to Programming** | | | 10-I-EinP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science II | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Data types, control structures, foundations of procedural programming, selected topics of C, introduction to object orientation in Java, selected topics of C++, further Java concepts, digression: scripting languages.

**Intended learning outcomes**

The students possess a fundamental knowledge about programming languages (in particular Java, C and C++) and are able to independently develop average to high level Java programs.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 49 I Nr. 1b
§ 69 I Nr. 1b

**Module appears in**

Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Business Information Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor' degree (1 major) Business Information Systems (2016)
Bachelor' degree (1 major) Business Information Systems (2019)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical Course in Programming** | | | 10-I-PP-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| | undergraduate | -- | |

**Contents**

The programming language Java. Independent creation of small to middle-sized, high-quality Java programs.

**Intended learning outcomes**

The students are able to independently develop small to middle-sized, high-quality Java programs.

**Courses** (type, number of weekly contact hours, language — if other than German)

P (6)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

**Allocation of places**

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**Additional information**

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**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 49 I Nr. 1c
§ 69 I Nr. 1d

**Module appears in**

Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Master's degree (1 major) Functional Materials (2016)
Bachelor' degree (1 major) Computer Science (2017)
Master's degree (1 major) Functional Materials (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Software Technology** | | | 10-I-ST-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Object-oriented software development with UML, development of graphical user interfaces, foundations of databases and object-relational mapping, foundations of web programming (HTML, XML), software development processes, unified process, agile software development, project management, quality assurance.

**Intended learning outcomes**

The students possess a fundamental theoretical and practical knowledge on the design and development of software systems.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

300 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 49 I Nr. 1b
§ 69 I Nr. 1b

**Module appears in**

Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Economathematics (2015)
Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Aerospace Computer Science (2015)
First state examination for the teaching degree Realschule Computer Science (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
Bachelor' degree (1 major) Business Information Systems (2016)
Bachelor' degree (1 major) Aerospace Computer Science (2017)
Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Computer Science (2017)
Bachelor' degree (1 major) Computer Science (2019)
Bachelor' degree (1 major) Business Information Systems (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Bachelor' degree (1 major) Business Information Systems (2020)
Bachelor' degree (1 major) Aerospace Computer Science (2020)
Bachelor' degree (1 major) Computer Science und Sustainability (2021)
Bachelor' degree (1 major) Business Information Systems (2021)
Bachelor' degree (1 major) Economathematics (2021)
Bachelor' degree (1 major) Economathematics (2022)
Bachelor' degree (1 major) Mathematics (2023)
Bachelor' degree (1 major) Business Information Systems (2023)
Bachelor' degree (1 major) Economathematics (2023)
Bachelor' degree (1 major) Business Information Systems (2024)
Bachelor' degree (1 major) Economathematics (2024)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Selected topics of Computer Science** | | | 10-MCS-AKI-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| Dean of Studies Informatik (Computer Science) | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Selected topics in computer science.

**Intended learning outcomes**

The students are able to understand the solutions to complex problems in computer science and to transfer them to related questions.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Computer Graphics Exercise** | | | 10-MCS-ICGT-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides fundamental knowledge of the development process of a rendering framework for digital synthesis and manipulation of visual content in the context of interactive 3D computer graphics. This includes light-matter interaction, illumination models, image formats, data representation, mathematical formulations of motion and projections, and texturing techniques. The required activities are performed independently in groups of 3 students. Accompanying exercises, software assignments, and discussions assist students in using typical graphics software packages and languages such as WebGL, OpenGL, GLSL, and/or DirectX, as well as organizing the project as a whole.

**Intended learning outcomes**

After participating in the module courses, students will be able to independently develop key components for digital synthesis and manipulation of visual content in the context of interactive 3D computer graphics. Students will have a sound understanding of the operation of modern software packages for digital synthesis and manipulation of visual content.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (1) + T (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

presentation of project results (approx. 20 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Computer Graphics** | | | 10-MCS-ICGV-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module teaches basic methods for digital synthesis and manipulation of visual content in the context of interactive 3D computer graphics. This includes principles of modeling light-matter interaction, illumination models, image formats, data representations, the mathematical formulations of motion and projections, and texturing techniques. Theoretical aspects of the ray-tracing and raster pipeline substeps and their extension by algorithmic approaches to interactive image synthesis using computer systems will be taught. The WebGL pipeline will be used to practically illustrate the concepts of modern renderers. Typical application areas for interactive 3D computer graphics are contemporary and novel graphical human-computer interfaces, for example in the areas of virtual and augmented reality, the visualization of complex data in scientific and industrial applications, or the economically growing segment of computer games.

**Intended learning outcomes**

After participating in the module courses, students know basic concepts of digital synthesis and manipulation of visual content. They can recall, summarize and explain principle methods and implement them.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Systems 1** | | | 10-MCS-IS1-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module teaches basic requirements, concepts and practical solutions in the field of interactive systems. A special focus is on systems for the realization of human-computer interaction, in which user and computer form a common system in a closed input-output loop and requirements of different degrees of reactivity up to real-time are crucial. Possible examples include classical graphical interfaces, web-based solutions, and virtual and augmented reality systems.

**Intended learning outcomes**

After participating in the module courses, students are able to identify basic capabilities and properties of today's computer systems with regard to their interactivity and to derive technical measures for their realization. Students will be able to select and evaluate suitable solution approaches and tools for tasks in the field of interactive systems development. Furthermore, students are able to develop alternative approaches for future interactive systems.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Systems 2** | | | 10-MCS-IS2-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module teaches basic requirements, concepts and practical solutions in the field of interactive systems. A special focus is on systems for the realization of human-computer interaction, in which user and computer form a common system in a closed input-output loop and requirements of different degrees of reactivity up to real-time are crucial. Possible examples include classical graphical interfaces, web-based solutions, and virtual and augmented reality systems.

**Intended learning outcomes**

After participating in the module courses, students are able to identify basic capabilities and properties of today's computer systems with regard to their interactivity and to derive technical measures for their realization. Students will be able to select and evaluate suitable solution approaches and tools for tasks in the field of interactive systems development. Furthermore, students are able to develop alternative approaches for future interactive systems.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Interactive Systems 3** | | | 10-MCS-IS3-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module teaches basic requirements, concepts and practical solutions in the field of interactive systems. A special focus is on systems for the realization of human-computer interaction, in which user and computer form a common system in a closed input-output loop and requirements of different degrees of reactivity up to real-time are crucial. Possible examples include classical graphical interfaces, web-based solutions, and virtual and augmented reality systems.

**Intended learning outcomes**

After participating in the module courses, students are able to identify basic capabilities and properties of today's computer systems with regard to their interactivity and to derive technical measures for their realization. Students will be able to select and evaluate suitable solution approaches and tools for tasks in the field of interactive systems development. Furthermore, students are able to develop alternative approaches for future interactive systems.

**Courses** (type, number of weekly contact hours, language — if other than German)

R (0)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

Unless otherwise specified, the following methods can be chosen from for assessment in the specialisations Human-Computer Systems: a) written examination (approx. 90 minutes), b) presentation (approx. 20 minutes) and handout (approx. 5 pages), c) presentation of project results (approx. 30 minutes), d) presentation (approx. 45 minutes), e) oral examination of one candidate each (approx. 30 minutes) or f) term paper (approx. 10 pages).
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

--

**Workload**

150 h

**Teaching cycle**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--

**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Media Informatics for MCS** | | | 10-MCS-Med-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Practical experience is a necessary skill for application-oriented aspects of various sciences. This is specifically true for human-computer interaction (HCI) which incorporates engineering as well as empirical work skills. This course assigns a well-defined project or task to (teams of) students which they have to solve largely on their own. The topic will be in the area of human-computer interaction with a strong focus on the engineering, aka computer science, part of HCI.

**Intended learning outcomes**

At the end of the course, the participants will have gained a good understanding of how to solve a coherent problem, using typical HCI skills. They will have learned how to collaborate with colleagues and to define, distribute and execute individual work packages.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (approx. 60 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) term paper (approx. 20 pages) or d) portfolio (approx. 20 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

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**Additional information**

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**Workload**

150 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **MCS Project Computer Science** | | | 10-MCS-Proj-Info-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 12 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides basic knowledge of the collaborative development process of software. This includes both the creation and execution of requirements analyses, the design of the software architecture, its implementation and evaluation. The necessary activities are carried out independently in groups of 8-10 students. Presentations and discussions help the student groups improve their teamwork skills, become familiar with the required technologies and activities, and organize the project as a whole.

**Intended learning outcomes**

After participating in the module courses, students are able to develop software collaboratively. They can elicit, specify, analyze, and validate software requirements. Students are able to independently familiarize themselves with new software technologies and frameworks and use them to develop software. In addition to these technical and methodological competencies, students will be able to apply best practices for effective teamwork, such as evaluation methods, communicating expectations, and dealing with problems.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

report (approx. 10 pages)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

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**Additional information**

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**Workload**

360 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Programming Course Interface Development** | | | 10-MCS-SPSE-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module provides basic knowledge about the collaborative development process of software with a focus on graphical user interfaces. This includes the creation and execution of requirements analyses, the design of the software architecture, its implementation and the testing of the developed software. The necessary activities are carried out independently in groups of 4-5 students. Presentations, exercises and discussions help the student groups to improve their teamwork skills, to become familiar with the required technologies and activities, and to organize the project as a whole. The technologies used are regularly adapted and currently include Git, HTML, CSS, JavaScript, Java, the Play framework, SQL, JDBC and JUnit.

**Intended learning outcomes**

After participating in the module courses, students are able to develop software collaboratively. They can elicit, specify, analyze, and validate software requirements. Students are able to independently familiarize themselves with new software technologies and frameworks and use them to develop graphical user interfaces. In addition to these technical and methodological skills, students will be able to apply best practices for effective teamwork, such as evaluation methods, communicating expectations, and dealing with problems.

**Courses** (type, number of weekly contact hours, language — if other than German)

Ü (4)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

presentation of project results (approx. 20 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

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**Workload**

300 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Software Quality** | | | 10-MCS-SQ-152-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Computer Science IX | | Institute of Computer Science | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

The module teaches techniques and practices for creating high-quality software. Specifically, principles of typical software requirements such as reliability, testability, accuracy, security, reusability, maintainability, and efficiency in terms of runtime behavior and resource consumption are presented and discussed. Programming guidelines and source code examples are used to teach concepts, techniques and tools for creating professional quality code and high quality software products.

**Intended learning outcomes**

After participating in the module courses, students will be able to recall, summarize, explain, and implement theory and methods for creating high-quality software products. Students will be able to compare, describe, and develop testing techniques and software requirements specifications.

**Courses** (type, number of weekly contact hours, language — if other than German)

V (2)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)
Language of assessment: German and/or English
creditable for bonus

**Allocation of places**

--

**Additional information**

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**Workload**

150 h

**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Human-Computer Systems (2015)
Bachelor' degree (1 major) Human-Computer Systems (2016)
Bachelor' degree (1 major) Human-Computer Systems (2018)
Bachelor' degree (1 major) Human-Computer Systems (2022)