



TECHNISCHE
UNIVERSITÄT
WIEN

Bachelor

Master

Doctorate

Postgraduate

Curriculum
for the
Master's program
Media and Human-Centered Computing
UE 066 935

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§1 Foundation and Scope

The present curriculum defines and regulates the English-language Master’s program *Media and Human-Centered Computing* in engineering sciences at the Technical University of Vienna. It is based on the Federal Act on the Organisation of Universities and their Studies – Universities Act 2002 UG (BGBl. I Nr. 120/2002 as amended) – and the Study Law Provisions of the Statutes of the Technical University of Vienna in their current version. The program has been structured and designed in alignment with the qualification profile, as detailed in §2.

§2 Qualification Profile

The Master’s program *Media and Human-Centered Computing* provides in-depth, scientifically and methodologically high-quality education focused on long-term knowledge retention. It equips graduates for further qualification, especially within a related doctoral program, and to work in areas such as the following, making them internationally competitive:

- Scientific and industrial research in areas such as Human-Computer Interaction, Augmented Reality, etc.
- Interaction Design/Interactive Media Design
- Design of application-oriented (industrial) multimedia systems
- Conducting usability studies and evaluations
- Critical reflection and technology impact assessment
- User Experience Design and accessible design

Key application areas: E-learning, medical applications, game design, universal access, advertising, visual analytics/information visualization, design of artificial intelligence/augmented reality systems. However, Media and Human-Centered Computing is not limited to these areas but is increasingly used in industrial environments as well.

Graduates of this program often work in one of the following roles: User Experience (UX) Designer, User Interface (UI) Designer, Human Factors Specialist, Usability Analyst, Accessibility Specialist, Mobile App Designer; Human-Centered AI Engineer, Embedded Systems Developer, Game Developer, XR (AR/VR) Developer; Human-Computer Interaction (HCI) Researcher, Multimedia Developer, Digital Media Specialist, Creative Technologist, Virtual/Augmented Reality Designer, Game UX Designer.

Media and Human-Centered Computing combines the engagement with theory and practice of research in human-computer interaction with comprehensive theoretical, methodological, technical, and practical knowledge and skills for the design, implementation, evaluation, and/or critical reflection of complex interactive systems.

In particular, novel forms of interaction between humans and computers are addressed (e.g., tangible computing, virtual and augmented reality, human-centered AI). *Media and Human-Centered Computing* is based on an interdisciplinary approach that integrates,

among other things, computer science, media theory, design science, psychology, and sociology.

Based on professional requirements, the Master's program *Media and Human-Centered Computing* imparts qualifications in the following categories:

Technical competencies

- Theory and practice of design in the context of interactive technological systems
- Scientific engagement with the interaction between humans and machines
- Design and implementation of specialized computer and sensor systems
- Robust understanding of design theory, design thinking, and design practice
- Ability to consider social, cognitive, cultural, and ethical aspects in the design of interactive systems
- Motivation, knowledge, and ability to apply essential conceptual and methodological foundations of RRI (Responsible Research and Innovation)
- Ability to understand and adopt essential values of science: openness, reproducibility, and critical discourse
- Ability to develop systems that accommodate different modes of access

Transversal competencies

- Development and application of theoretical foundations and methods for modeling, problem-solving, and evaluation, as well as knowledge of the limitations of these approaches
- Selection, application, and expansion of qualitative, participatory, and selected social science methods
- Complex interdisciplinary and systems-oriented approaches
- Methodological foundation of approaches to problems, especially in dealing with open/unspecified problem situations
- Mastery of a broad range of design and implementation strategies
- Multidisciplinary teamwork
- Ability to collaborate with future users and to identify their problems
- Creativity and innovation skills
- Self-organization, personal responsibility
- Advanced problem formulation and problem-solving skills
- Responsibility in complex projects or activities
- Awareness of one's own abilities and limitations, critical thinking
- Reflection on one's own work and its consequences in a societal context, as well as the integration of this reflection into design work

A particular focus is placed on both the development of essential additional skills and the special promotion of high creativity and innovation potential.

§3 Time and effort

The workload for the Master's program *Media and Human-Centered Computing* is 120 ECTS points. This corresponds to an intended study duration of 4 semesters as a full-time program.

ECTS credits (ECTS) quantify the students' workload. One academic year comprises 60 ECTS credits, with one ECTS credit corresponding to 25 working hours (according to § 54 Abs. 2 UG).

§4 Admission to the Master's Program

Admission to a master's program requires the completion of a subject-relevant Bachelor's program or another subject-relevant program of at least the same educational level at a recognized domestic or foreign post-secondary educational institution.

A program of study is considered relevant if at least 90 ECTS have been completed in the subject areas of informatics/computer science, including at least

1. 20 ECTS in mathematics and statistics, with the knowledge, skills, and competencies corresponding to the modules *Algebra und Diskrete Mathematik*, *Analysis*, and *Statistik und Wahrscheinlichkeitstheorie* of the bachelor's program *Informatics* at TU Wien;
2. 24 ECTS in algorithms, data structures, and programming, with the knowledge, skills, and competencies corresponding to the modules *Algorithmen und Datenstrukturen* and *Einführung in die Programmierung* of the bachelor's program *Informatics* at TU Wien;
3. 18 ECTS in the theoretical, technical, and practical foundations of computer science, with the knowledge, skills, and competencies corresponding to the modules *Denkweisen der Informatik*, *Einführung in Security*, and *Grundzüge digitaler Systeme* of the bachelor's program *Informatics* at TU Wien;
4. 18 ECTS in Media and Human-Centered Computing, with the knowledge, skills, and competencies corresponding to the modules *Human-Centered Computing* and *Visual Computing* of the bachelor's program *Informatics* at TU Wien.

In any case, without requiring supplementary examinations, graduates of the bachelor's program *Informatics* at TU Wien, provided that the specialization *Human-Centered Computing* was chosen, as well as graduates of the bachelor's programs *Medieninformatik* und *Visual Computing* and *Medizinische Informatik* at TU Wien, are eligible.

To compensate for significant technical differences, supplementary examinations to the maximum extent of 30 ECTS may be prescribed, which must be completed by the end of the second semester of the Master's program at the latest. These may be used to a maximum extent of 4,5 ECTS in the module *Free Electives and Transferable Skills* as free electives, but not as transferable skills. Furthermore, achievements obtained for

acquiring the required knowledge, skills, and competences in the area of *Human-Centered Computing* or *Medieninformatik und Visual Computing* in accordance with Item 4 may be used within the module Extension up to an extent of 12 ECTS as part of the master's program.

The language of instruction is English. Applicants whose first language is not English must provide proof of the required language proficiency. The form of proof is specified in a regulation by the Rectorate.

Some elective courses may be offered in German. For these courses, German language skills at reference level B1 of the Common European Framework of Reference for Languages are recommended.

§5 Structure of the Program

The content and qualifications of the program are delivered through *modules*. A module is a teaching and learning unit characterized by entry and exit qualifications, content, teaching and learning methods, regular workload, and assessment. Modules consist of one or more content related *courses*. Thematically linked modules are grouped into *examination subjects*, whose name, scope, and overall grade are listed on the graduation certificate.

Examination subjects and the associated modules

The Master's program *Media and Human-Centered Computing* consists of the following examination subjects and their assigned modules. The examination subjects *Foundation*, *Free Electives and Transferable Skills*, and *Diploma Thesis* list mandatory modules. From the examination subject *Design and Implementation of Media and Human-Centered Computing*, students must complete modules amounting to at least 60 ECTS.

In the module *Free Electives and Transferable Skills*, students must take enough courses so that their combined credits, together with the diploma thesis and the credits from the other mandatory and elective modules, total 120 ECTS or more.

If the total credits from the elective modules exceed 60 ECTS, the number of credits required in the module *Free Electives and Transferable Skills* may be reduced accordingly. However, at least 4,5 ECTS credits in the area of transferable skills must still be completed within this module.

Foundation

Artifact-based Design (6,0 ECTS)

Responsible Digital Ethics (6,0 ECTS)

User Research Methods (6,0 ECTS)

Seminar Media and Human-Centered Computing (3,0 ECTS)

Design and Implementation of Media and Human-Centered Computing

Assistive Technologies (12,0–18,0 ECTS)

Computer Graphics (6,0 ECTS)

Computer Vision (12,0 ECTS)

Critical Theory and Design (12,0 ECTS)

Design Thinking (12,0–18,0 ECTS)

Gameful Design (12,0–24,00 ECTS)

Embodied Systems: A Human-Drone Interaction Perspective (12,0 ECTS)

Extension (up to 12,0 ECTS)

Human-Centered AI (12,0 ECTS)

Human-Agent Interaction (12,0 ECTS)

Music Production and Music Interface Design (12,0 ECTS)

Advanced Topics in Media & Human-Centered Computing (min. 3,0 ECTS)

Virtual, Augmented and Mixed Reality (12,0–24,0 ECTS)

Visualization (12,0–24,0 ECTS)

Wellbeing Technologies (min. 12,0 ECTS)

Free Electives and Transferable Skills

Free Electives and Transferable Skills (9,0 ECTS)

Diploma Thesis

See Section § 9.

Focus Areas

To assist in making an informed decision within the examination subject *Design and Implementation of Media and Human-Centered Computing*, we propose three areas of focus that students can use for guidance:

- *Smart Interaction*
 - Design Thinking
 - Embodied Systems: A Human-Drone Interaction Perspective
 - Human-Centered AI
 - Wellbeing Technologies
- *Immersive Technologies*
 - Computer Graphics
 - Computer Vision
 - Gameful Design

- Virtual, Augmented and Mixed Reality
- Visualization
- *Inclusive Design*
 - Assistive Technologies
 - Critical Theory and Design
 - Human-Agent Interaction
 - Wellbeing Technologies

Brief description of the modules

This section briefly characterizes the modules of the Master's program *Media and Human-Centered Computing*. A detailed description is available in Appendix A.

Artifact-based Design (6,0 ECTS) By engaging in hands-on prototyping, testing, and iterative design, students will develop skills in designing and implementing tangible and digital artifacts that reflect user needs and societal contexts. Through lectures, collaborative projects, and reflective critiques, participants will learn to develop artifacts as tools for understanding problems, communicating ideas, and evaluating concepts. This module emphasizes a practical, research-oriented approach to design, enabling students to translate theoretical knowledge into meaningful and impactful integrated physical-digital concepts.

Assistive Technologies (12,0–18,0 ECTS) This module deals with the general principles and applied methods of assistive technologies (AT) that are prerequisite for being able to offer and make devices, systems and services available to disabled and elderly people in an appropriate manner. It covers the basic knowledge required to create a general barrier-free ICT landscape designed according to the principles of universal design, and to develop special solutions to support and promote disabled and elderly people. Students should be interested in the social implications of computer science and have a basic knowledge of anatomy and physiology (high school level). After completing this module, students will have a comprehensive overview of the field of assistive technologies in general, its practical application (assistive systems) and the sub-field of web accessibility), which is particularly important for students of this module, with the theoretical knowledge being deepened in practical exercises and case studies.

Computer Graphics (6,0 ECTS) The module covers the methodology for solving problems in computer graphics, including interactive and real-time rendering, computer animation, simulation, and photorealistic rendering.

Computer Vision (12,0 ECTS) This module is designed for students interested in computer vision, artificial intelligence, or machine learning. It offers a thorough introduction to the field, addressing key challenges, foundational theories, essential mathematical concepts, and practical algorithms. Students will have numerous opportunities to apply their knowledge through hands-on exercises.

Critical Theory and Design (12,0 ECTS) This module enables students to develop an understanding of technology and media in society through a critical theory lens. A

philosophical foundation is provided, discussing a wide range of thinkers and their central ideas. Students will be able to discuss cutting edge trends in digital technology and media along perspectives such as power, oppression, meaning, culture and the political dimensions of technology. They will further learn how to translate such critical thinking into a future oriented design practice to develop alternative technological futures.

Design Thinking (12,0–18,0 ECTS) This module deals with an evaluative implementation of an interactive and tangible system. The complexity of a design process is understood in a predefined project setting. Several research and creative methods are learned and applied, which are necessary to carry out creative design teamwork during the whole semester. After successful completion of the module, students are able to develop iteratively and user-centered an executable innovative prototype and present the results of this explorative prototyping process in groups. The students can apply several design thinking methods to achieve their goals. Methodologies applied in the module: Literature review, interviews with experts, cultural probes or provocative requisites, design games, scenarios, design workshops, sketches, wireframes, (video) mockups, technology probes, prototyping, and product development with Corporate Identity. This module deals with an evaluative implementation of an interactive and tangible system. The complexity of a design process is understood in a predefined project setting. Several research and creative methods are learned and applied, which are necessary to carry out creative design teamwork during the whole term.

Embodied Systems: A Human-Drone Interaction Perspective (12,0 ECTS) This module offers a cutting-edge exploration of how humans and intelligent embodied systems—such as robots, autonomous vehicles, and drones—interact in shared physical environments. Rooted in human-centered AI and human-robot interaction, the class provides a deep dive into the design and technical challenges of enabling intuitive and effective collaboration between humans and machines. Students will investigate how humans and drones perceive and respond to one another, focusing on key topics such as sensors, autonomy, and behavior. Through engaging lectures, hands-on technical exercises, and projects, students will develop the expertise to design and study intelligent systems that are not only able to perform efficiently but that can further improve the lives of people around them. Whether you're passionate about robotics, autonomous systems, or cutting-edge interaction design, this module provides the tools and insights to shape the future of human-machine collaboration.

Extension (up to 12,0 ECTS) This module allows students to extend their profile either by choosing courses from other Master curricula that fit the qualification profile of *Media and Human-Centered Computing*.

Free Electives and Transferable Skills (9,0 ECTS) The courses of this module serve to deepen the subject and to acquire additional non-subject-specific knowledge, skills, and competences.

Gameful Design (12,0–24,00 ECTS) The goal of this module is to understand and experiment with the use of game mechanics and game dynamics in non-game contexts. By designing and implementing a series of prototypes that are then evaluated and

reflected, students gain deep knowledge about the applicability of game design principles in non-game areas.

Human-Agent Interaction (12,0 ECTS) This module explores the research field of Human-Agent Interaction (HAI) from a human-centered perspective. It examines the socio-technical complexities of interacting with systems with apparent agency, such as robots, chatbots, and other intelligent systems. Students explore how humans perceive and interact with these agents, the design of engaging and effective interactions, and evaluation methods from a human-centered perspective. Topics include embodiment, anthropomorphism, socio-morphism, agent design, multimodal communication, and real-world applications. The module integrates lectures, critical readings, discussions, and practical user research techniques.

Human-Centered AI (12,0 ECTS) This module provides foundational knowledge of user interfaces, “human in the loop” systems, and artificial intelligence, including supervised and unsupervised learning, as well as reinforcement learning. Students will explore key domains of human-AI interaction, such as recommender systems, chatbots, intelligent text entry, explainable AI, user modeling, and personalized and adaptive user interfaces.

Music Production and Music Interface Design (12,0 ECTS) The module *Music Production and Music Interface Design* connects artistic sound creation with technical proficiency in digital music production and interactive control. It reflects current developments in music production, including the influence of artificial intelligence on production workflows, spectral analysis, and transformation. Students learn to understand these technologies, evaluate them critically, and integrate them into their own creative production and design processes. The module bridges composition, sound research, and media-based performance practice.

Responsible Digital Ethics (6,0 ECTS) This module addresses the critical importance of responsible digital ethics in the age of pervasive digital systems and increasing regulatory requirements. Students explore foundational concepts such as trust, fairness, accountability, digital rights, and ethical design principles. Through lectures, interactive seminars, and student-led activities, participants engage with real-world challenges and diverse literature to develop a nuanced, experiential understanding of digital ethics and their role in fostering ethical digital practices.

Advanced Topics in Media & Human-Centered Computing (min. 3,0 ECTS) This module deepens knowledge in selected areas of media & human-centered computing.

Seminar Media and Human-Centered Computing (3,0 ECTS) The seminar covers methods, theories and approaches that contribute to our understanding of the relationship between people and digital technologies with the aim to inform the design, development and evaluation of human-centered, interactive systems.

User Research Methods (6,0 ECTS) The module consists of a group project where students conduct two studies and report the results, focusing on how these findings impact the design process. The emphasis is on empirical accuracy rather than design

quality. The primary objective is the correct application of research methods and the interpretation of results within the context of the project.

Virtual, Augmented and Mixed Reality (12,0–24,0 ECTS) This area introduces Virtual, Augmented, and Mixed Reality (VR/AR/MR). Students gain basic knowledge about VR/AR/MR hardware and software, 3D input, output methods, and user-specific aspects. In addition, psychological and basic neurosciences aspects are presented to help students understanding the importance of human factors in the design of VR/AR/MR systems. The area includes an overview of current research areas and applications in order to provide students with the technical and scientific skills to design and develop VR/AR/MR applications. The area also aims to provide a deeper understanding of design methods, production methods, reception, and use of concrete forms of VR/AR/MR systems. In combination to VR/AR/MR technologies, multimodal interfaces such as haptics (tangible user interfaces and objects), mobile devices and infrastructures, ubiquitous computing, embedded sensors and screens, large multi-touch systems or interaction using gestures are covered.

Visualization (12,0–24,0 ECTS) This module focuses on visualization and visual analytics. Modern information systems generate and store enormous amounts of information and data. One of the biggest challenges of the emerging information age is to make these data sets efficiently usable. The human perceptual system is exceptionally powerful in processing visual stimuli. Therefore, information design, visualization, and visual analytics are well-suited for understanding data, exploring complex information spaces, or recognizing patterns and relationships in the data.

Wellbeing Technologies (min. 12,0 ECTS) This module explores the design and evaluation of technologies that promote wellbeing and a healthy lifestyle. Students learn theoretical foundations of wellbeing, personal informatics, and physical activity, and gain hands-on experience in designing and prototyping interfaces that foster wellbeing. The module incorporates an ethics component, focusing on the responsibilities of designers working with health-related technologies, and addresses the challenges of creating technologies that support positive behaviour change. Through interactive lectures, workshops, and a project, participants work with sports sensors, motion tracking, and physiological sensing to develop and evaluate technologies aimed at enhancing quality of life. The module is highly design-driven, emphasising practical application and showcasing numerous examples.

§6 Courses

The subject areas of the modules are conveyed through courses. The courses of each module are specified in the respective module description in Appendix A. Courses are assessed through examinations as defined in the UG. The types of course assessments are defined in the examination regulations (Paragraph § 7).

Requirements for courses and examinations from the Federal Act on the Organisation of Universities and their Studies (Universities Act 2002 – UG)

Before the start of each semester, an electronic directory of courses must be published (title, name of the lecturer, type, form including location and dates of the course). This directory is to be continuously updated. In addition to the published directory, the lecturers of a course must inform the students - before the start of each semester - in an appropriate manner about the objectives, form, content, dates, and methods of their courses as well as the content, form, methods, dates, assessment criteria, and assessment standards of the examinations. For examinations conducted as a single examination event, at least three examination dates per semester must be scheduled (according to the statute at the beginning, middle, and end), and students must be informed about the content, form, methods, dates, assessment criteria, and assessment standards of the examinations before the start of each semester. For examinations conducted using electronic communication tools, proper conduct of the examination must be ensured, in addition to the general examination regulations, the following minimum requirements must be met:

- Prior to the beginning of the semester, students must be informed about the technical standards that their equipment must meet to participate in these examinations.
- To ensure the independent completion of the examination by the student, technical or organizational measures must be implemented.
- If technical problems occur not caused by the student, the examination must be aborted and not counted towards the permissible number of examination attempts.

Guidelines for Courses from the Statutes of TU Wien

In the following context, SSB stands for *Satzung der TU Wien, Studienrechtliche Bestimmungen* (*Statutes of TU Wien, Study Law Provisions*)

- The scope of the course must be specified in ECTS credits and semester hours. cf. § 9 (2) SSB - Modules and Courses
- Courses can be held as “block courses” with the approval of the governing body responsible for study matters. cf. § 9 (3) SSB - Modules and Courses
- Courses and exams can be conducted in a foreign language with the approval of the governing body responsible for study matters. cf. § 11 (1) SSB - Foreign Languages
- Course exams serve as proof of the learning outcomes conveyed by an individual course. cf. § 12 (1) SSB - Course Exam
- Course exams must be conducted by the course instructor. If necessary, the governing body responsible for study matters can appoint another suitable examiner. cf. § 12 (2) SSB - Course Exam

- For exams ending in a single examination act, three exam dates must be set for the beginning, middle, and end of each semester. These dates must be announced before the start of the semester. cf. § 15 (1) SSB - Exam Dates
- Exams can be conducted at the beginning and end of non-teaching periods. cf. § 15 (1) SSB - Exam Dates
- Exam dates must be announced in an appropriate manner. cf. § 15 (1) SSB - Exam Dates

Description of Course Types

VO (Lecture): Courses where the content and methods of a subject are presented, focusing on specific issues, concepts, and solutions. Exams are conducted in a single act. The exam type (written, oral, or both) must be specified in the module description. No attendance requirement, but achievement of learning outcomes must still be ensured.

EX (Excursion): Courses held outside TU Wien. They aim to deepen the learning content in the respective local context.

LU (Laboratory Exercise): Courses where students solve experimental tasks either individually or in groups under the guidance of a supervisor, in order to learn how to handle equipment and materials as well as the experimental methodology of the subject. The experimental facilities and workplaces are provided.

PR (Project): Courses where students deepen and complement their understanding of specific areas by solving concrete experimental, numerical, theoretical, or artistic tasks. Projects are aligned with the qualification profile of the programme and supplement professional or scientific training.

SE (Seminar): Courses where students work on a given topic or project using scientific methods, involving reflection on problem-solving and scientific discourse.

UE (Exercise): Courses where students work on specific tasks (e.g., computational, constructive, artistic, or experimental) under professional guidance to develop their skills and abilities in applying knowledge to concrete tasks.

VU (Lecture with Integrated Exercise): Courses combining lecture and exercise, where the exercise and lecture parts must each constitute at least a quarter of the total course content. The exercise part is always continuously assessed, while the lecture part can be assessed through a single exam act or continuously. It is not permissible to assess the entirety of the course in a single examination act.

Course and Exam Descriptions in the Information System for Studies and Teaching

- Course type (VO, EX, LU, PR, SE, UE, VU)

- Form (Presence, Online, Hybrid, Blended)
- Dates (Including necessary attendance for successful completion)
- Contents (Description of contents, prerequisites)
- Literature references
- Learning Outcomes (Comprehensive description of learning outcomes)
- Methods (Description of methods in alignment with learning outcomes and performance assessment)
- Performance Assessment (In alignment with learning outcomes and methods)
 - Indication of partial achievements, indicating which can be retaken. This point does not apply to VO courses.
- Exams:
 - Contents (Description of contents, literature)
 - Form (Presence, Online)
 - Exam Type and Mode:
 - * Type VO: Written, oral, or both;
 - * Other types: Indication of partial achievements including type and mode related to the course's pursued learning outcomes.
 - Dates (Indication of dates)
 - Assessment Criteria and Standards

§7 Examination Regulations

For the completion of the Master's program, the following are required:

1. the successful completion of the modules prescribed in the curriculum, where a module is considered successfully completed if the courses attributable to it have been successfully completed according to the module description,
2. the completion of a successfully evaluated diploma thesis, and
3. the successful completion of the course *Seminar für Diplomand_innen* as well as of the committee-based final exam, which is conducted orally before an examination committee pursuant to § 13 and §19 of the Study Law Provisions of the Statutes of TU Wien. It serves to present and defend the diploma thesis and to demonstrate the candidate's command of the relevant scientific field. Particular emphasis should be placed on understanding and overview knowledge. The prerequisites for registering for the committee-based final exam pursuant to § 17 Abs.1 of the Study Law Provisions of the Statutes of TU Wien are fulfilled if items 1 and 2 have been completed.

The final certificate includes:

- (a) the exam subjects with their respective scope in ECTS credits and grades,

- (b) the topic and grade of the diploma thesis,
- (c) the grade of the committee-based final exam,
- (d) the overall assessment, and
- (e) upon request, the overall grade of the completed program according to § 72a UG.

The grade for the subject “Diploma Thesis” is derived from the grade of the thesis. The grade for each other exam subject is calculated as the weighted average of the grades from the courses assigned to the subject through the corresponding modules. The weighting is based on the ECTS credits of each course. If the resulting average includes a decimal of 0.5 or less, it is rounded down; if it is greater than 0.5, it is rounded up. If no exam subject is graded worse than “good” and at least half are graded “very good,” the overall assessment is “passed with distinction”; otherwise, the assessment is “passed.”

Courses of type VO are assessed based on a final oral and/or written exam. All other courses have continuous assessment, i.e., ongoing performance checks and optionally a final partial exam.

The successful completion of exams and scientific as well as artistic works is graded as “very good” (1), “good” (2), “satisfactory” (3), or “sufficient” (4), whereas failure is graded as “unsatisfactory” (5). For courses where a differentiated grade is not applicable, the assessment is recorded as either “successfully participated” (E) or “unsuccessfully participated” (O).

§ 8 Feasibility of Studies and Mobility

Students in the Master’s program *Media and Human-Centered Computing* should be able to complete the programme within the prescribed period with a reasonable amount of effort.

Students are advised to follow the recommended semester plan provided in the appendix C.

The assessment and attendance modalities for courses of types UE, LU, PR, VU, SE, and EX are to be established within the framework of teaching agreements with the governing body responsible for study matters and published in the information system for studies and teaching in an appropriate form. With regard to the repeatability of partial assessments, reference is made to the academic regulations in the university statutes.

In accordance with UG § 58 para. 8, every course with limited number of participants, where a student’s intended participation cannot be accommodated and this has the potential to delay the student’s progress, must be listed in the curriculum along with the number of available places and the allocation procedure. The courses affected, as well as the number of places and the allocation process, must be determined by the Study Committee and clearly and understandably presented to students in the module descriptions.

Courses subject to resource-related restrictions on the number of participants are marked accordingly in the information system for studies and teaching. In addition, the number of available places and the procedure for allocating these places must be specified.

The recognition of academic achievements completed abroad is to be carried out by the governing body responsible for study matters (Dean of Studies).

The options listed in Statutes - Study Law Provisions § 27 Abs. 1 bis 3 are available to facilitate mobility. In individual cases, these provisions can also be used to improve the feasibility of studies.

ECTS credits earned as part of a mobility program can be used to fulfill the required transferable skills in the module “Free Electives and Transferable Skills” to the appropriate extent. In particular, they can also be assigned to the topic pool technology assessment, technology genesis, scientific ethics, gender mainstreaming and diversity management.

If a course without an explicitly regulated admission procedure faces an unexpected surge in demand, the course instructor may impose participation restrictions in consultation with the academic authority. Students admitted to the Master’s programme *Media and Human-Centered Computing* who would face a delay in their studies due to non-participation must in any case be accepted. The allocation of any remaining places shall be governed by the following criteria (in descending order of priority):

- Students who meet the formal and substantive prerequisites shall be given priority. The substantive prerequisites may be verified, for example, on the basis of examinations already completed or by means of an entrance test.
- Among these students, using the course as a mandatory course has priority over using it as an elective, and using it as an elective has priority over using it as a free elective.
- Within each of these three groups, students who were rejected in an earlier semester despite meeting all prerequisites shall be given preference.

Students must be informed of this as soon as possible.

§ 9 Diploma Thesis

The thesis is an artistic-scientific work that serves to demonstrate the ability to work on a scientific topic independently in a manner that is sound in terms of content and methodology.

The topic of the thesis is freely chosen by the student and must be in line with the qualification profile. The examination subject of the diploma thesis encompasses 30

ECTS credits and includes, in any case, the scientific work (thesis) evaluated at 27 ECTS credits, a seminar for thesis candidates worth 1,5 ECTS-credits and the committee final examination worth 1,5 ECTS-credits.

§ 10 Academic Degree

Graduates of the Master's program *Media and Human-Centered Computing* are awarded the academic degree "Diplom-Ingenieur"/"Diplom-Ingenieurin" – abbreviated as "Dipl.-Ing." or "DI" (internationally comparable to "Master of Science").

§ 11 Quality Management

The quality management of the Master's program *Media and Human-Centered Computing* ensures that the program is designed consistently in accordance with the study-related quality objectives of TU Wien and is executed efficiently and effectively as well as regularly reviewed. The program's quality management follows the Plan-Do-Check-Act model based on standardized processes and is designed to be target-group-oriented. The target groups of quality management are, internally, the students and the teaching staff, and externally, society, economy, and administration, including the labor market for graduates.

Taking into account the defined target groups, six objectives are established for the quality of academic programs at TU Wien: (1) Ensuring the relevance of the qualification profile for society and the labor market. (2) Appropriately designed learning outcomes in the modules of the curriculum, supporting the qualification profile. (3) Appropriately selected learning activities and methods to achieve learning outcomes. (4) Appropriate assessment methods to verify the achievement of learning outcomes. (5) Ensuring conditions for the feasibility of study plans. (6) Ensuring that the teaching staff possesses the subject-specific and time resources to ensure high-quality teaching.

To ensure the quality of the academic programs, progress in planning, development, and assurance of all six quality objectives is collected separately and published. Quality assurance verifies the achievement of these objectives. For the assessment of the first and second quality objectives, the study committee (Studienkommission) conducts at least one review of the qualification profile and module descriptions per term of office. Ongoing evaluations by students, as well as individual feedback on the academic operation to the governing body responsible for study matters, provide a comprehensive picture of the curriculum implementation. Ongoing review also helps identify critical courses, for which appropriate adjustments are derived and implemented in coordination between the governing body responsible for study matters, study committee, and course instructors. The sixth quality objective is covered by quality-assurance instruments in the personnel area. In addition to internal quality assurance, external evaluation of the studies is conducted every seven years.

Each module has a module coordinator responsible for the content coherence and quality of the courses assigned to the module. This responsibility is ensured through cyclical checks, content alignment with preceding and subsequent modules, and comparison with similar courses or modules at other universities, both domestic and international.

Course Capacities

To ensure the quality of course delivery, the following group sizes serve as a guideline for the different types of courses (see page 13):

Course Type	Group Size	
	per Lecturer	per Tutor
VO	100	
UE with Tutors	30	15
UE	15	
LU with Tutors	20	8
LU	8	
EX, PR, SE	10	

For courses of type VU, the group sizes for VO and UE are applied to the lecture and exercise parts, respectively. The assignment of instructors is made according to the actual course delivery.

Gender, Ethics and Diversity

Context: To create teaching and learning environments in which all students — regardless of gender, origin, abilities, or social background — are equally valued, supported, and challenged, inclusive teaching based on diversity-sensitive didactics is required. This cannot be handled in separate, standalone courses but must be implemented at all levels of the program — as an “Embedded Gender, Ethics and Diversity” approach.

This includes the integration of ethical and societal topics into the curriculum, as well as engagement with these topics in every course. In this way, conditions can be created that enable a discrimination-free learning environment. This also includes measures against discrimination and harassment, for example through explicit codes of conduct.

Curriculum content: Inclusivity and diversity are promoted by incorporating different perspectives in all courses, drawing on a wide spectrum of authors and role models. Ethical reflection of core areas is embedded in all courses by addressing and considering ethical aspects and social impacts in lectures and exercises, for example through discussions of these topics. Additionally, reference is made to the offerings of the TU Wien Department for Gender Competence, which issues the certificate *Gender and Diversity Competence* for completing an additional course catalog.

Teaching methods: Teaching methods promote gender inclusivity and diversity and create a learning environment in which all students feel equally welcome. This includes, among other things, the use of inclusive, bias-free language to avoid reinforcing stereotypes; teaching materials with examples, case studies, or visual materials that reflect our diverse society; conducting courses in a format suitable for people with different abilities to ensure equal participation; and the inclusion of guest speakers from diverse backgrounds.

§ 12 Entry into Force

This curriculum enters into force on 1 October 2026.

§ 13 Transitional Provisions

All valid transitional provisions are listed in Appendix B of the curriculum.

A Module Descriptions

The lectures associated with the modules are listed in the following format:

9,9/9,9 XX Titel of the course

Where the first number represents the scope of the course in ECTS credits, and the second number represents its extent in semester hours. ECTS credits measure the student's workload, with one academic year comprising 60 ECTS credits, and one ECTS credit equivalent to 25 hours of 60 minutes each. A semester hour corresponds to as many teaching units as the semester has weeks of instruction. Each teaching unit lasts 45 minutes. The type of lecture (XX) is explained in detail in the paragraph §6 on page 13.

Artifact-based Design

Workload for the module: 6,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- apply iterative design methodologies, including prototyping, testing, and refinement, to create tangible and digital artifacts
- understand the concepts of ubiquitous computing describing the deployment and integration of computing technology into everyday objects and environments
- understand and apply the relevant concepts and fundamental technologies (e.g., context-awareness, localization and sensing technologies, machine learning on the edge, microprocessor programming, and design of ubiquitous computing applications)
- understand the specific topics of activity recognition, privacy concerns and preserving approaches, business applications, and related business models
- apply your theoretical knowledge from the class to develop a specific ubiquitous computing project
- investigate working principles of sensors and their application for context detection

Non-technical competencies:

- analyze user needs and societal challenges to identify design opportunities
- evaluate the effectiveness of design solutions through testing and iteration
- synthesize theoretical frameworks with hands-on design practices to develop impactful artifacts
- demonstrate critical thinking in balancing user requirements, technical feasibility, and societal impact
- collaborate effectively in interdisciplinary teams to address complex design problems
- reflect on the societal implications of their design work and make informed, ethical decisions
- communicate design concepts and processes clearly and persuasively to diverse audiences

- adapt to feedback and iterative processes with resilience and a growth mindset

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. Students will cultivate the ability to design and implement both tangible and digital artifacts that are informed by user needs and broader societal contexts. Through analyzing user requirements and societal challenges, they will identify meaningful design opportunities and demonstrate critical thinking by balancing user expectations, technical feasibility, and potential societal impact. Ethical reflection will play a key role, as students consider the broader implications of their work, including privacy-related concerns, and make responsible design choices. Additionally, they will learn to communicate their design concepts and processes clearly and persuasively to a variety of audiences.

Content:

- introduction to artifact-based computing, the history of computing disappearing into the background and serving the user's needs proactively; critical review of the vision of ubiquitous computing in the context of today's developments.
- notion of context-aware computing, the principle of integrating implicit input from the user and environment for providing more meaningful services to the user.
- investigation of working principles of sensors and their application for context detection.
- review of location technologies, discussion of privacy-preserving approaches.
- data models and standards for resource-constrained devices.
- revisiting design, prototyping, and evaluation methods.
- review of Internet of Things business models.
- discussion of privacy-related implications.
- state of the art of (physical) fabrication technologies.
- outlook on emerging technologies.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Artifact-based Design

Assistive Technologies

Workload for the module: 12,0–18,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- apply the necessary knowledge of anatomy and physiology to understand disabilities and technical solutions, as well as knowledge of the causes and effects of physical disabilities and age-related functional limitations.
- understand models of disabilities, basic rehabilitation technology and gerontechnology
- communicate with disabled people (alternative and augmentative communication)
- compare social and assistive robots
- describe aspects of HCI/HRI in the area of assistive systems, proxemics
- explain ambient/active assisted living (AAL) and smart environment technologies
- plan and to apply participatory user involvement, data protection and ethics
- give examples for relevant support tools for disabled and elderly people
- refer to guidelines for barrier-free web content and web sites
- use partially automated tools for checking websites and web content

Non-technical competencies:

- select suitable methods for abstraction, solution finding and evaluation
- apply interdisciplinary and system-oriented approaches and flexible ways of thinking
- handle technologies, software tools and standards
- precisely write documentation of solutions
- provide convincing technical presentations and communication in an interdisciplinary environment
- raise awareness of the challenges faced by people with disabilities and older people, as well as the importance of accessible design for technical products.
- understand challenges arising from disability and age
- interact and cooperate with disabled and elderly people
- assess impact and evaluate ethics
- increase individual creativity and innovation potential
- communicate and accept criticism
- reflect their own abilities and limitations

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. This includes, among other things, aspects such as access to assistive technology as a right, issues of distributive justice and gender equality in the provision of assistive technology, consideration of diversity beyond disability, and the demand for appropriate diversity in design teams.

Content:

- terms, classifications and definitions of disability and aging
- medical basics, primarily physiology of the sensory organs and their damage
- demographic aspects of disability and aging
- theoretical basics and methodology of assistive technologies
- special aspects of HCI for disabled and elderly people
- design and use of technical aids (e.g. orientation aids and everyday aids for blind and visually impaired people, special aids and techniques for deaf-blind people,

electronic systems for people with mobility and movement disabilities), case studies and social/economic aspects

- basics of communication technology and special features of alternative and augmentative communication (vocal, auditory, motor and visual communication disabilities)
- systematics of communication aids and methods of alternative and augmentative communication (tactile representations, speech synthesis, image and symbol languages, visual and tactile languages)
- assistive technologies in the use of media and mass media
- introduction to the functional principles of socially assistive robots (SAR), assisted living and smart environments and sensor based systems
- examples of current developments and trends in SAR and AAL
- introduction to special interaction aspects of autonomous assistive systems, multi-modal communication with autonomous systems
- introduction to guidelines for creating accessible web pages and web content
- introduction to using semi-automated tools to check websites and web content

Expected prerequisites:

- basic knowledge of anatomy and physiology
- basic knowledge of HTML and CSS

These prerequisites are taught in the modules *Access Computing* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Assistive Technologies

* 6,0/4,0 PR Assistive Technologies

* 6,0/4,0 VU Accessible Internet

Computer Graphics

Workload for the module: 6,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students can

- describe advanced concepts of interactive computer graphics and real-time rendering as used in virtual reality applications or in computer games.
- explain the theoretical and mathematical background of computer graphics effects.
- implement a computer graphics system based on a low-level graphics API that shows advanced computer graphics effects.

- analyze and improve the performance of a computer graphics application.
- if chosen, explain and describe advanced techniques in computer animation, simulation and photorealistic rendering.

Non-technical competencies: In this module, students learn to

- tap their creative potential
- communicate effectively in a team
- present a software application to a large group

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. This includes aspects such as gender representations in 3D applications, energy efficiency in rendering algorithms, the ability of computer graphics algorithms to depict human features across diverse groups, and the design of graphics systems that accommodate different user needs, such as color blindness or visual impairments.

Content:

- Architecture of graphics hardware
- Performance optimization for graphics hardware
- Advanced lighting and shading (including physically based shading, normal mapping, ambient occlusion)
- Shading languages
- Graphics programming
- Shadows (hard and soft, rasterization and ray-tracing-based)
- Culling and visibility
- Levels of detail und terrain rendering
- Image-based rendering
- Perceptual aspects of rendering
- Screenspace effects
- Temporal coherence
- Real-time global illumination
- 3D Gaussian splatting
- Computer Animation and Simulation
- Photorealistic Rendering techniques

Expected prerequisites: Students should have programming skills in C++ as well as experience with a 3D API like OpenGL or Vulkan, and basic computer graphics knowledge.

These prerequisites are taught in the module *Grundlagen der Computergraphik*.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Computer Graphics

* 6,0/4,0 VU Rendering

* 6,0/4,0 VU Computer Animation and Simulation

* 6,0/4,0 PR Project in Visual Computing 1

Computer Vision

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- identify, explain and contrast the most important theories, principles, concepts and algorithms of computer vision. Their knowledge and understanding corresponds to the state of the art literature in the field of computer vision. They are able to apply appropriate formal-mathematical methods for modeling, abstraction, solution finding and evaluation, and gain problem-formulation and problem-solving skills

Non-technical competencies:

- apply scientific analysis, design, and implementation strategies (inclusion of the state of the art, critical evaluation, and reflection of solutions)
- select suitable formal mathematical methods for modeling, abstraction, solution finding, and evaluation
- approach problems in an interdisciplinary and system-oriented way
- practice a flexible way of thinking
- work goal-oriented and methodologically
- handle technologies, software tools, and standards
- write precise documentation of solutions
- provide convincing technical presentations and communication in an interdisciplinary environment.
- self-organize, realize initiative, and personal responsibility
- increase individual creativity and innovation potential (curiosity)
- formulate and solve problems
- communicate and accept criticism
- reflect their own abilities and limitations
- take responsibility in complex team projects
- make decisions responsibly, exercise leadership skills in complex projects or activities
- assess impact, evaluate ethics
- think and plan strategically

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. The computer vision module underscores the significant implications of EGD, particularly how algorithms can

either reflect or exacerbate societal biases. For instance, facial recognition technology often demonstrates reduced accuracy for underrepresented groups, such as women and people of color, largely because of skewed datasets that predominantly feature white male faces. Students will cultivate skills to tackle these challenges by diversifying training data, thereby avoiding the reinforcement of gender stereotypes. Recognition systems must also account for non-binary identities and cultural diversity, as models trained primarily on Western norms may misinterpret traditional attire. Ultimately, students will learn to take responsibility for the impacts of EGD and ensure the accountable application of computer vision systems.

Content: The module begins by defining the field and its core concepts, emphasizing the interpretation of visual data from images and videos. It starts with a discussion on the Structure of Images, which includes topics such as image formation, texture, scenes, and context. The module then advances to Local and Multiscale Representations and Image Analysis, where techniques for processing and comprehending image content are examined. Subsequently, Scene Analysis and machine learning methods for computer vision, including deep learning, are introduced. Finally, the module explores advanced topics such as Depth Perception, Reconstruction Techniques, and Multiview Geometry, with a focus on 3D understanding and its applications.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Computer Vision

6,0/4,0 VU 3D Vision

Critical Theory and Design

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- name and explain historical and current day approaches to critical theories as presented in class
- assess technologies using critical lenses regarding different axes of power such as gender, class, race, disability & colonialism
- explain classical work of critical and speculative design
- assess different goals and methods of critical design
- analyse and discuss the potential societal effects and impacts of technologies
- plan and construct technological artifacts and/or audiovisual media by applying critical design as a form of answering such questions

Non-technical competencies:

- identify and argue for design changes to technological development in front of a technical audience
- assess and position academic and general media publications critiquing technologies
- present their assessment in a written manner that is grounded in the literature presented in class
- articulate valid critical questions concerning the future of technology in society

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content:

- introduction to epistemologies in computer science
- discussion of different critical theories along different schools of thoughts
- connecting theoretical concepts to design activities
- focused discussion and analysis of changing topics along current topics relevant to informatics (e.g., emerging technologies and their assessment)
- practical exercises to develop a critical reflexive practice
- critical design investigations

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Critical Theory and Design

6,0/4,0 PR Critical Theory and Design

Design Thinking

Workload for the module: 12,0–18,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- develop iteratively and user-centered an executable innovative prototype and present the results of this explorative prototyping process in groups. The students can apply several design thinking methods to achieve their goals
- prepare and present the results as well as reflect on the methodologies and design processes

Non-technical competencies:

- apply several design thinking methods and approaches in a real design project in a design team

- reflect on several design thinking methods and approaches by considering the current design challenges
- select and evaluate several design thinking methods and approaches in a given design context
- develop and communicate their ideas within a group
- be creative in design-based project work
- present the ideas within a design project
- organize and coordinate workload within a group

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content: The module consists of method-based group work throughout a subject for two semesters. The lecturers will give input and additional material to each of the methods and techniques on a regular basis, by stressing out the application areas and providing explanatory examples. Students work in groups of max. 4-5 members. During the module the intermediaries and other artifacts created will be presented, evaluated, and accompanied by a reflection of methods applied. The module contains the following methods and activities: identifying the subject/theme of the project per group, literature review, interviews with experts, cultural probes or provocative requisites, design games, scenarios, narrative posters, design workshops, sketches, wireframes, (video) mockups, technology probes, prototyping, product development with Corporate Identity.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Design Thinking: Ideation

6,0/4,0 VU Design Thinking: Explorative Prototyping

* 6,0/4,0 VU Design Studies

Embodied Systems: A Human-Drone Interaction Perspective

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- design a robot that can successfully interact with humans, including non-verbal robot behavior
- develop physical prototypes of embodied systems that can support collaborative decision-making
- implement interaction techniques for intelligent embodied systems, integrating hardware and software components

- design experiments to assess and improve human-machine interaction in shared environments
- conduct a scientifically rigorous human-subject research to test for HRI-related (human-robot interaction) research questions and hypotheses
- apply interdisciplinary approaches to address challenges in human-centered AI and robotics

Non-technical competencies:

- solve complex design and technical challenges by integrating principles from interaction design and human-machine interaction
- evaluate and compare the performance of embodied systems in terms of criteria such as: efficiency and usability
- adapt and iterate design solutions based on study participants' feedback and empirical findings from human-robot interaction studies
- critically assess the impact of intelligent embodied systems in real-world applications, including ethical considerations
- collaborate effectively in interdisciplinary teams to address technical and societal challenges in embodied systems design
- communicate complex concepts in human-robot interaction to diverse audiences
- reflect on their own learning processes and approaches, fostering continuous personal and professional development in the field of intelligent systems
- demonstrate sensitivity to cultural, ethical, and societal considerations when designing and deploying embodied systems
- take responsibility for shaping the future of human-machine collaboration with a focus on human well-being and societal benefit

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content:

- fundamentals of human-centered AI and intelligent embodied systems
- contexts and shared physical environments
- humans and their needs : users and non-users
- human-machine perception: sensing and feedback
- decision-making in human-machine teams
- design and prototyping of intuitive robotic behaviors and communication strategies
- evaluation of human-embodied system interactions
- applications of embodied systems in real-world scenarios
- hands-on prototyping and evaluation with users and non-users
- final project integrating design, implementation, and evaluation of an interactive embodied system

Expected prerequisites:

- Programming in C

These prerequisites are taught in the module *Betriebssysteme* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Embodied Systems: A Human-Drone Interaction Perspective

6,0/4,0 PR Embodied Systems: A Human-Drone Interaction Perspective

Extension

Workload for the module: up to 12,0 ECTS

Learning Outcomes: This module allows students to extend their profile by choosing courses from other Master curricula that fit the qualification profile of *Media and Human-Centered Computing* and from Bachelor curricula that contain knowledge required for successfully completing the modules in this curriculum as specified below.

Technical competencies: Depends on the chosen courses.

Non-technical competencies: Depends on the chosen courses.

Content: Depends on the chosen courses.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: The courses in this module can be chosen freely from other Master curricula, provided they fit the qualification profile. Courses from other Informatics Master Curricula at TU Wien can always be chosen. Courses from Bachelor curricula can be chosen if they contain necessary prerequisites for modules of *Media and Human-Centered Computing* and correspond to modules explicitly listed in item 4 in § 4.

Free Electives and Transferable Skills

Workload for the module: 9,0 ECTS

Learning Outcomes: The courses of this module serve to deepen the subject and to acquire additional non-subject-specific knowledge, skills, and competences.

Content: Depending on the chosen courses.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: The courses of this module can be freely chosen from the scientific and artistic courses offered by all recognised Austrian and foreign post-secondary educational institutions that serve to deepen the subject or to acquire additional non-subject-specific knowledge, skills, and competences, with the restriction that at least 4,5 ECTS must be chosen from the topic areas of transferable skills. For the topic areas of transferable skills, courses from the catalogue of electives “Transferable Skills” of the Faculty of Informatics (Appendix E) and from the central catalogue of electives of TU Wien for “Transferable Skills” are particularly recommended.

Gameful Design

Workload for the module: 12,0–24,00 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- understand the potentials, recognize the limits, and identify the pitfalls of gamification
- know how to conduct a methodologically sound evaluation of gameful design solutions
- understand the value of game mechanics and game dynamics in non-game contexts

Non-technical competencies:

- design game elements into non-game applications
- apply modern iterative, agile design and development methodologies
- recognize their strengths and weaknesses regarding these processes
- unlock creativity and learn to evaluate ideas

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module’s content. In this module, aspects of Gender, Ethics and Diversity are included by raising suitable questions, and fostering the inclusion of relevant considerations in the design of gameful interactions and systems. Additionally, Gender and Diversity are included through a focus on equal treatment of the participants.

Content: The module addresses current topics and issues in gameful design. Theoretical backgrounds from the fields of serious games, gamification, and game-based learning are learned and reflected upon in the context of the practical application of game design methods (e.g., exploratory design, prototyping, modding, and rapid game development).

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Gameful Design

6,0/4,0 PR Gameful Design

* 6,0/4,0 VU Game Design

* 6,0/4,0 PR Game Production

Human-Agent Interaction

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- explain foundational concepts in Human-Agent Interaction, including embodiment, anthropomorphism, socio-morphism, trust and authenticity
- critically evaluate the effectiveness of agent interactions through user research methods
- synthesize findings on human perception of agency to create conceptual prototypes and define detailed system requirements
- analyze human perceptions of and responses to agents across different contexts
- plan, execute, and interpret user studies of multimodal Human-Agent Interaction
- communicate design processes and evaluation findings to diverse audiences

Non-technical competencies:

- recognize and understand the impact of design cues that foster apparent agency
- evaluate and reflect on the societal and ethical implications of integrating technology with apparent agency into everyday life

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. Ethics, Gender, and Diversity in Human-Agent Interaction are addressed through critical reflection on the societal implications of agent technologies, with emphasis on user perceptions across diverse contexts. Students learn to identify, articulate, and discuss ethical issues related to agency, trust, and inclusivity in design. The module integrates ethical analysis and inclusive design principles into the evaluation and development of human-centered agent systems.

Content:

- Introduction to HAI: Overview of intelligent systems with agency and their integration into daily life.

- Key Concepts: Embodiment, anthropomorphism, socio-morphism, agent design, multimodal communication, trust, and authenticity
- Human Perception and Emergent Interaction: Understanding how humans perceive and interact with agents in various roles (e.g., assistants, teammates, companions).
- Designing for HAI: Principles for creating engaging, effective, and human-centered interactions.
- Evaluation Methods: Utilize and adapt diverse user research methods to evaluate Human-Agent Interaction in terms of usability, acceptance, engagement, and likability
- Application Contexts: Real-world uses of HAI in fields such as healthcare, education, customer service, and entertainment.

Expected prerequisites:

- Experience in conducting quantitative and qualitative user studies
- Basic knowledge of descriptive and inferential statistics

These prerequisites are taught in the module *User Research Methods*.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Human-Agent Interaction

6,0/4,0 PR Human-Agent Interaction

Human-Centered AI

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- explain user interface basics and AI system design principles;
- describe fundamentals of supervised, unsupervised, and reinforcement learning;
- explain and apply gesture recognition (sequence classification, Markov property, gesture and pose detection from video);
- implement adaptive user interfaces (automated optimization based on human factor parameters); and
- work with tools and frameworks (TensorFlow, Unity ML-Agents).

Non-technical competencies: After successful completion of the module, students are able to:

- analyze parameter estimation and model selection to suit specific scenarios;

- evaluate human-AI interaction from a human-centered perspective;
- demonstrate critical thinking in balancing user requirements, technical feasibility, and societal impact;
- collaborate effectively in interdisciplinary teams to address complex design problems;
- design AI systems that effectively support or cooperate with human users;
- communicate design concepts and processes clearly and persuasively to diverse audiences; and
- adapt to feedback and iterative processes with resilience and a growth mindset.

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. Ethics, gender, and diversity are core topics of the Human-Centered AI module. Students critically examine how AI systems can reinforce or mitigate social inequalities, with focused discussions on algorithmic bias, fairness, and inclusive design. The module emphasizes the importance of considering diverse user perspectives. Through case studies, ethical frameworks, and participatory design methods, students learn to build AI systems that are not only effective, but also equitable and socially responsible.

Content:

- Basics of AI systems: supervised, unsupervised, and reinforcement learning.
- Recommender systems: definitions, collaborative filtering, similarity measures.
- Natural language processing: syntax, semantics, tokenization, normalization, stemming, chatbot interaction.
- Gesture recognition: sequence classification, Markov property, gesture and pose recognition from video.
- Adaptive user interfaces: automated optimization based on human factor parameters.
- Explainable AI: local and global interpretability, LIME, SHAP, automated rationale generation.

Expected prerequisites:

- Probability Theory

These prerequisites are taught in the module *Statistik und Wahrscheinlichkeitstheorie* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Human-Centered AI

6,0/4,0 VU Beyond the desktop: from concepts to implementation

Music Production and Music Interface Design

Workload for the module: 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- understand and apply the technical and artistic workflow of music production;
- analyse room-acoustic characteristics and make appropriate adjustments;
- identify and correct feedback, DC offset, aliasing, and sub-bass behaviour;
- perform complex sound transformations (e.g., convolution reverb, spectral processes);
- set up and use stereophonic, binaural, and ambisonic production environments;
- aurally identify and interpret spectral and spatial features of sounds;
- explain and apply principles of electronic instrument design and tangible user interfaces;
- develop interaction and mapping strategies between physical controllers and digital sound engines;
- apply synthesis methods (additive, subtractive, granular, convolution) in a musical context.

Non-technical competencies:

- recognise and integrate perspectives from artistic and technical fields
- reflect on the implications of new technologies (including artificial intelligence) in artistic work

Furthermore, they develop awareness of the cultural and social impact of their practices and adopt a responsible and sustainable approach to the use of technology in artistic contexts.

Content:

- planning and configuring audio production environments (DAW setup, signal flow, room acoustics)
- spectral, dynamic, and spatial transformations and related listening strategies
- ear training focused on frequency and formant recognition, comparative listening of transformations, and auditory judgement for mixing and mastering
- application of digital synthesis and transformation tools (e.g., Pure Data, SuperCollider, GRM Player, cataRT)
- development and application of tangible user interfaces; mapping of control data (MIDI, MPE, OSC) to sound parameters
- project work with documentation, presentation, and reflection.

Expected prerequisites:

- Basic DAW skills

Applied teaching and learning methods and appropriate performance assessment:

The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Music Production

6,0/4,0 VU Music Interface Design

Responsible Digital Ethics

Workload for the module: 6,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- understand key concepts of digital ethics, including trust, fairness, accountability, and digital rights
- recognize and apply regulatory frameworks and their implications for ethical digital practices
- evaluate ethical design principles in the development and deployment of digital systems

Non-technical competencies:

- analyze real-world digital ethics challenges using case studies and scholarly literature
- critically evaluate ethical trade-offs in complex technological environments
- create actionable strategies to incorporate ethical principles into the design, audit, and deployment of digital systems
- understand and reflect on personal and professional responsibilities as practitioners shaping the digital landscape
- apply effective communication strategies about ethical challenges and solutions to diverse audiences
- Design and implement frameworks for ethical practices in interdisciplinary and organizational contexts

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content. Ethics, Gender, and Diversity in Responsible Digital Ethics are addressed through the exploration of fairness, accountability, and digital rights in technological systems. The module equips students with the ability to evaluate ethical trade-offs, regulatory frameworks, and biases, ensuring inclusive and responsible digital practices. Case studies and ethical design principles help students develop strategies for embedding ethical considerations into real-world digital systems.

Content:

- Introduction to Digital Ethics: The rise of digital systems and the imperative for ethical practices.
- Core Principles: Trust, fairness, accountability, transparency, and digital rights.
- Ethical Design: Principles and methodologies for designing ethical systems.
- Regulatory Landscapes: Overview of regulatory efforts and their impact on system performance and ethical audits.
- Practical Challenges: Case studies on ethical dilemmas in digital technology (e.g., AI bias, privacy concerns, algorithmic accountability).
- Roles and Responsibilities: The critical role of practitioners in fostering responsible digital ethics.

Expected prerequisites:

- Basic knowledge of ethical theories and frameworks
- Basic knowledge of regulatory frameworks and policies

These prerequisites are taught in the module *Denkweisen der Informatik* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU Responsible Digital Ethics

Advanced Topics in Media & Human-Centered Computing

Workload for the module: min. 3,0 ECTS

Learning Outcomes: The module provides in-depth knowledge and understanding of important sub-areas of media & human-centered computing.

Technical competencies:

- Students can name, explain and contrast the most important theories, principles, concepts and methods in specific topics of media & human-centered computing. Their knowledge and understanding corresponds to the state of the art in media & human-centered computing literature.

In particular, students can

- collect, develop, evaluate and interpret information relevant to media & human-centered computing,
- determine requirements and constraints in different areas of media & human-centered computing, and

- practically apply the acquired knowledge in complex media & human-centered computing tasks, work out and further design, develop and evaluate solutions to problems and argue for these solutions.

Non-technical competencies:

- Students are able to deepen their knowledge independently.

Content: This module deepens knowledge in selected areas of media & human-centered computing. The exact selection of topics varies from term to term.

Expected prerequisites: The expected competencies and knowledge depend on the chosen courses.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: The courses for this module are announced before each term.

Seminar Media and Human-Centered Computing

Workload for the module: 3,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the seminar, students are able to:

- develop a deeper critical understanding of issues related to media and human-centered computing
- understand and critically discuss different approaches to media and human-centered computing
- understand the key debates about different approaches
- identify the strengths, weaknesses and theoretical alignments of different approaches
- be able to make principled choices matching methods, theories and approaches to contexts

Non-technical competencies:

- read and understand scientific literature from media and human-centered computing
- present scientific information in a structured and comprehensible way
- discuss scientific content critically
- write a simple scientific paper
- partake in group discussions
- determination, individual responsibility

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content: Selected topics from media and human-centered computing.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

3,0/2,0 SE Seminar Media and Human-Centered Computing

User Research Methods

Workload for the module: 6,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- describe key qualities of correctly designed qualitative, quantitative, and mixed-method studies
- explain the differences between different evaluation strategies and predict their impact on the interaction design process

Non-technical competencies:

- apply standard evaluation methods to studies in the interaction design process
- plan and organize user requirements gathering and subsequent analysis in an interaction design process
- test hypotheses in quantitative and mixed-method studies of interactive artifacts
- implement an effective and ethical evaluation strategy in a design process
- report and interpret results of studies according to academic professional standards
- select design alternatives based on interpreting study results
- assess designs of interactive artifacts based on study results
- explain the advantages and the limitations of different evaluation strategies in an interaction design process
- design effective formative and summative evaluation studies
- formulate ethical requirements for empirical studies

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content:

- quantitative research methods: the module provides a strong foundation in quantitative research methods, with multiple sessions focused on statistical analysis. Students learn to test hypotheses, analyze data, and apply quantitative techniques to evaluate interaction design processes.

- qualitative research methods: alongside quantitative methods, the module emphasizes qualitative research, including an introduction to qualitative methods, qualitative data analysis (QDA), and workshops that equip students with the skills to gather and interpret qualitative data effectively.
- ethics in research: ethical considerations are a critical part of the module. A dedicated session on ethics ensures that students understand the importance of ethical research practices, enabling them to design and conduct studies that meet professional and academic standards. Theoretical sessions (lectures) are focused on new theory and understanding general principles behind the methods. These methods are later applied in study designs. Students are expected to attend all sessions.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module:

6,0/4,0 VU User Research Methods

Virtual, Augmented and Mixed Reality

Workload for the module: 12,0–24,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- understand the basics of human sensory perception and the perception-action loop to consider the human in the loop in VR/AR/MR systems
- provide new ways of interaction, new interfaces, emergent technologies in the field of post-desktop interaction
- use various multi-sensory technologies in different application areas, and understand their implications for humans and society

Non-technical competencies:

- understand the basic concepts such as tracking, stereo, rendering techniques, distributed graphics, 3D input and output
- design, implement and evaluate VR/AR/MR applications with innovative 3D interfaces
- compare and assess alternative implementations in different areas of ubiquitous computing with regard to relevance, adequacy and usability
- develop state-of-the-art collaborative and distributed VR/AR/MR applications with modern 3D input and output devices

- choose the relevant use of VR/AR/MR technologies in different contexts and its implications
- formulate problems and have problem-solving competence in VR/AR/MR systems
- provide efficient communication and critical ability regarding VR/AR/MR systems
- work as a team and have assumption of responsibility in complex VR/AR/MR projects
- understanding ethical, gender, and diversity considerations in the design of VR/AR system and 3D interactions, such as gender effects in cybersickness, human factors during immersion in virtual environments, improving accessibility in VR/AR interfaces and the risk of some sensors in the design of multimodal interfaces.

Content: This module provides advanced knowledge in the area of Virtual, Augmented and Mixed Reality (VR/AR/MR). Students learn about VR/AR/MR hardware and software, input and output technologies and devices, user specific aspects, usability and psychological aspects. Knowledge in all these areas is needed when designing VR/AR/MR applications. An overview of current areas of research is given as well.

- Virtual Reality and the related areas Augmented Reality, Mixed Reality
- Application areas and current areas of research (incl. medical applications)
- 3D graphics hardware
- VR/AR/MR hardware: Input & Output Devices: Tracking and display technologies, interaction devices
- VR/AR/MR software: 3D graphics toolkits & standards
- User interfaces and 3D interaction
- Psychological aspects for VR/AR/MR (Presence, Immersion, ...)
- Basics of human perception for interacting with VR/AR/MR systems

Expected prerequisites:

- Basics of object-oriented programming
- Basics of computer graphics

These prerequisites are taught in the module *Einführung in Visual Computing* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Virtual and Augmented Reality

* 6,0/4,0 VU Multimodal Interfaces

* 6,0/4,0 VU Mixed Reality Lab

* 6,0/4,0 PR Advanced Topics in Virtual Reality

Visualization

Workload for the module: 12,0–24,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- understand the theory and concepts of visualization and visual analytics including interaction methods
- understand and apply the basics of human visual perception and cognition
- design and implement interactive visualization and visual analytics solutions using different reference models and taxonomies
- evaluate different visualization and visual analytics methods and solutions, their characteristics, and their suitability for different contexts

Non-technical competencies:

- analyze complex real-world problems by applying visualization and visual analytics theory and concepts
- critically evaluate visualization and visual analytics theory and concepts
- create actionable strategies to design, develop, and evaluate visualization and visual analytics concepts and solutions
- reflect on the strengths and weaknesses of visualization and visual analytics concepts and solutions
- formulate visualization-related points of view and solutions
- design and implement visualization and visual analytics concepts and solutions
- deepen their knowledge in the field on their own independently
- critically reflect on their own work, on other contributions as well as on issues concerning ethics, gender, and diversity

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content:

- Fundamentals of visualization and visual analytics.
- Fundamentals of human visual perception and cognition.
- Design methodology, taxonomies, and models.
- Qualitative and quantitative evaluation methods.
- Various application areas, like medicine, and other disciplines of natural, social, and economic sciences

Expected prerequisites:

- Basics of visualization
- Programming techniques for visual computing

These prerequisites are taught in the module *Grundlagen der Visualisierung* of the *Informatics* bachelor program.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Information Visualization

6,0/4,0 VU Medical Visualization and Visual Analytics

* 3,0/2,0 SE Seminar in Visualization

* 6,0/4,0 PR Visualization 1

* 6,0/4,0 PR Visualization 2

Wellbeing Technologies

Workload for the module: min. 12,0 ECTS

Learning Outcomes:

Technical competencies: After successful completion of the module, students are able to:

- apply design and evaluation methods tailored to wellbeing technologies
- prototype interfaces that foster physical and mental wellbeing
- utilise sports sensors, motion tracking, and physiological sensing in the development of wellbeing technologies
- address ethical considerations in the design and deployment of health-related technologies

Non-technical competencies:

- analyse and integrate theoretical concepts of wellbeing, personal informatics, and physical activity into technology design
- critically evaluate the impact of technology on wellbeing, with a focus on ethical implications and user needs
- Develop innovative, user-centred solutions for promoting healthy behaviours
- understand the complexities and responsibilities associated with designing technologies for health and wellbeing
- reflect on their own role as designers of technologies that influence wellbeing and lifestyle choices
- collaborate effectively in interdisciplinary teams to address design challenges related to wellbeing
- communicate design concepts, ethical considerations, and evaluation outcomes to diverse audiences

Furthermore, students will be able to identify, articulate, and discuss issues concerning ethics, gender, and diversity in the context of the module's content.

Content:

- Introduction to Wellbeing Technologies: Foundations of wellbeing, personal informatics, and healthy lifestyles.
- Design Principles: Methods and strategies for designing technologies that promote wellbeing.
- Ethics and Responsibility: Exploring ethical frameworks and the responsibilities of designers working with health-related technologies.
- Evaluation Methods: Approaches to assessing the impact and ethical implications of wellbeing technologies.
- Prototyping and Tools: Hands-on work with sports sensors, motion tracking, and physiological sensing.
- Practical Challenges: Case studies and examples of wellbeing technologies, focusing on their design, ethical implications, and use.
- Applications: Exploring technologies that encourage physical activity, healthy habits, and mental wellbeing.

Expected prerequisites:

- Experience with design tools and prototyping of interactive systems
- Fundamentals of ubiquitous computing
- Experience in conducting quantitative and qualitative user studies

These prerequisites are taught in the module *Artifact-based Design*.

Applied teaching and learning methods and appropriate performance assessment: The applied teaching and learning methods must be indicated in the information system for studies and teaching for each lecture before the start of the semester; the examination modalities must also be specified.

Lectures of the Module: Courses marked with asterisk (*) are optional.

6,0/4,0 VU Wellbeing Technologies

6,0/4,0 PR Wellbeing Technologies

B Transitional provisions

1. Unless otherwise specified, the term “study” in the following refers to *master’s program Media and Human-Centered Computing (Studienkennzahl UE 066 935)*. The term “new curriculum” refers to the curriculum valid from Oct. 1, 2025 for this study program at the Technical University of Vienna, and “old curriculum” refers to curricula valid until then. Accordingly, “new” or “old” courses refer to those of the new or old curriculum. The term “governing body responsible for study matters” refers to the governing body responsible for master’s program Media and Human-Centered Computing
2. The transitional provisions apply to students who submit their degree according to the new curriculum at the Technical University of Vienna and who were enrolled at the master’s program Media and Human-Centered Computing at the Technical University of Vienna before July 1, 2025. The extent of the use of transitional provisions is optional for these students.
3. Upon request of the student, the governing body responsible for study matters may modify the transitional provisions individually or extend them to students not covered by Paragraph 2.
4. Certificates for courses that are equivalent in content cannot be submitted simultaneously for the degree. In case of doubt, the governing body responsible for study matters decides on the equivalence.
5. Certificates for old courses can, unless otherwise specified below, always be used for the degree if the course was completed by the student in the summer semester 2025 or earlier.
6. Excess ECTS credits from the mandatory modules may be used as a substitute for required achievements in elective modules as well as for Free Electives and/or Transferable Skills. Excess ECTS credits from the elective modules may be used as a substitute for required achievements in the Free Electives and/or Transferable Skills.
7. In the following, each course (*old* or *new*) is described by its ECTS credits (first number) and semester hours (second number), its type, and its title. The number of ECTS credits of the course actually completed is decisive.
 - Courses of the old module *Foundations of Ubiquitous Computing and IoT* can be used instead of *Artifact-based Design* in the examination subject *Foundations*.
 - Courses of the old module *Responsible Research and Innovation* can be used instead of *Responsible Digital Ethics* in the examination subject *Foundations*.
 - All courses that in the old curriculum were part of the modules *Interactive Media*, *Interaction Design*, *Vision & Visualisation* and *Critical Reflection* can

be used to fulfill the requirements of the examination subject *Design and Implementation of Media and Human-Centered Computing*.

- Courses of the old module *Theories of Perception, Interaction & Visualization* can also be used to fulfill the requirements of the examination subject *Design and Implementation of Media and Human-Centered Computing*.
- The old module *HCI & Health Care* can also be used to fulfill the requirements of the examination subject *Design and Implementation of Media and Human-Centered Computing*.
- *3,0/2,0 VU Kommunikations- u. Medientheorien* and *3,0/2,0 VU Design Studies* can be used instead of the module *Artifact-based Design*. In this case, the course *6,0/4,0 VU Foundations of Ubiquitous Computing and IoT* can be used to fulfill the requirements of the examination subject *Design and Implementation of Media and Human-Centered Computing*.

C Semester Scheduling of the courses

It is recommended to complete the courses of the mandatory modules in the following order. Courses marked with an asterisk are recommended for the second or third semester. The third semester is recommended as a mobility semester.

1. Term (WS)

6,0 VU User Research Methods
6,0 VU Artifact-based Design
6,0 VU Responsible Digital Ethics

2. Term (SS)

* 3,0 SE Seminar Media and Human-Centered Computing

D Examination Subjects with the Assigned Modules and Courses

The modules in *Foundation*, *Free Electives and Transferable Skills*, and *Diploma Thesis* are mandatory. All other modules are elective.

Examination Subject “Foundation”

Module “Artifact-based Design” (6,0 ECTS)

6,0/4,0 VU Artifact-based Design

Module “Responsible Digital Ethics” (6,0 ECTS)

6,0/4,0 VU Responsible Digital Ethics

Module “User Research Methods” (6,0 ECTS)

6,0/4,0 VU User Research Methods

Module “Seminar Media and Human-Centered Computing” (3,0 ECTS)

3,0/2,0 SE Seminar Media and Human-Centered Computing

Examination Subject “Design and Implementation of Media and Human-Centered Computing”

Module “Assistive Technologies” (12,0–18,0 ECTS)

6,0/4,0 VU Assistive Technologies

6,0/4,0 PR Assistive Technologies

6,0/4,0 VU Accessible Internet

Module “Computer Graphics” (6,0 ECTS)

6,0/4,0 VU Computer Graphics

6,0/4,0 VU Rendering

6,0/4,0 VU Computer Animation and Simulation

6,0/4,0 PR Project in Visual Computing 1

Module “Computer Vision” (12,0 ECTS)

6,0/4,0 VU Computer Vision

6,0/4,0 VU 3D Vision

Module “Critical Theory and Design” (12,0 ECTS)

6,0/4,0 VU Critical Theory and Design

6,0/4,0 PR Critical Theory and Design

Module “Design Thinking” (12,0–18,0 ECTS)

6,0/4,0 VU Design Thinking: Ideation

6,0/4,0 VU Design Thinking: Explorative Prototyping
6,0/4,0 VU Design Studies

Module “Gameful Design” (12,0–24,00 ECTS)

6,0/4,0 VU Gameful Design
6,0/4,0 PR Gameful Design
6,0/4,0 VU Game Design
6,0/4,0 PR Game Production

Module “Embodied Systems: A Human-Drone Interaction Perspective” (12,0 ECTS)

6,0/4,0 VU Embodied Systems: A Human-Drone Interaction Perspective
6,0/4,0 PR Embodied Systems: A Human-Drone Interaction Perspective

Module “Extension” (up to 12,0 ECTS)

Module “Human-Centered AI” (12,0 ECTS)

6,0/4,0 VU Human-Centered AI
6,0/4,0 VU Beyond the desktop: from concepts to implementation

Module “Human-Agent Interaction” (12,0 ECTS)

6,0/4,0 VU Human-Agent Interaction
6,0/4,0 PR Human-Agent Interaction

Module “Music Production and Music Interface Design” (12,0 ECTS)

6,0/4,0 VU Music Production
6,0/4,0 VU Music Interface Design

Module “Advanced Topics in Media & Human-Centered Computing” (min. 3,0 ECTS)

Module “Virtual, Augmented and Mixed Reality” (12,0–24,0 ECTS)

6,0/4,0 VU Virtual and Augmented Reality
6,0/4,0 VU Multimodal Interfaces
6,0/4,0 VU Mixed Reality Lab
6,0/4,0 PR Advanced Topics in Virtual Reality

Module “Visualization” (12,0–24,0 ECTS)

6,0/4,0 VU Information Visualization
6,0/4,0 VU Medical Visualization and Visual Analytics
3,0/2,0 SE Seminar in Visualization
6,0/4,0 PR Visualization 1
6,0/4,0 PR Visualization 2

Module “Wellbeing Technologies” (min. 12,0 ECTS)

6,0/4,0 VU Wellbeing Technologies
6,0/4,0 PR Wellbeing Technologies

Examination Subject “Free Electives and Transferable Skills”

Module “Free Electives and Transferable Skills” (9,0 ECTS)

Examination Subject “Diploma Thesis”

1,5/1,0 SE Seminar für Diplomand_innen
27,0 ECTS Diploma Thesis
1,5 ECTS Committee-based Final Examination

E Elective Catalog “Transferable Skills”

The courses to be chosen within the module *Free Electives and Transferable Skills* from the topic area “Transferable Skills” may be selected, among others, from the following catalog.

- 3,0/2,0 SE Coaching als Führungsinstrument 1
- 3,0/2,0 SE Coaching als Führungsinstrument 2
- 3,0/2,0 SE Didaktik in der Informatik
- 1,5/1,0 VO EDV-Vertragsrecht
- 3,0/2,0 VO Einführung in die Wissenschaftstheorie I
- 3,0/2,0 VO Einführung in Technik und Gesellschaft
- 3,0/2,0 SE Folgenabschätzung von Informationstechnologien
- 3,0/2,0 VU Forschungsmethoden
- 3,0/2,0 VO Frauen in Naturwissenschaft und Technik
- 3,0/2,0 SE Gruppendynamik
- 3,0/2,0 VU Kommunikation und Moderation
- 3,0/2,0 SE Kommunikation und Rhetorik
- 1,5/1,0 SE Kommunikationstechnik
- 3,0/2,0 VU Kooperatives Arbeiten
- 3,0/2,0 VU Präsentation und Moderation
- 1,5/1,0 VO Präsentation, Moderation und Mediation
- 3,0/2,0 UE Präsentation, Moderation und Mediation
- 3,0/2,0 VU Präsentations- und Verhandlungstechnik
- 4,0/4,0 SE Privatissimum aus Fachdidaktik Informatik
- 3,0/2,0 VU Rhetorik, Körpersprache, Argumentationstraining
- 3,0/2,0 VU Softskills für TechnikerInnen
- 3,0/2,0 VU Techniksoziologie und Technikpsychologie
- 3,0/2,0 VO Theorie und Praxis der Gruppenarbeit
- 3,0/2,0 VO Zwischen Karriere und Barriere

F Innovation Supplementary Program

Students who wish to apply the competencies acquired in the master's program to founding a startup, managing a company, or participating in university projects can acquire the additional skills required for these activities through the supplementary program *Innovation*, which can be completed alongside the master's program.

The (additional) workload for the English-language supplementary program *Innovation* amounts to 30 ECTS credits (equivalent to one semester). The completion of the supplementary program *Innovation* can also take place after finishing the master's program.