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EUROPEAN UNIVERSITY
OF TECHNOLOGY

Anlage 5

Modulhandbuch des Studiengangs

Augmented and Virtual Reality Design
Bachelor of Arts

des Fachbereichs Media

der Hochschule Darmstadt – University of Applied Sciences

vom 18.07.2023

Zugrundeliegende BBPO vom 18.07.2023 (Amtliche Mitteilungen Jahr 2024)

INHALTSVERZEICHNIS

§ 0 Vorbemerkungen

(1) Sämtliche Module werden im Sinne des § 1 Abs.7 ABPO durch folgende Punkte beschrieben:

1. Die Inhalte (Indicative Module Contents);
2. Die Lern- und Qualifikationsziele (Learning Outcomes) im Sinne von zu erwerbenden Kompetenzen (Competencies);
3. Die Lehrveranstaltungen (Type of Course) mit den Lehr- und Lernformen (Teaching Methods);
4. Den nach den Lehrveranstaltungen und Lernformen des Moduls aufgeschlüsselten Arbeitsaufwand (Workload) und die Zahl der vergebenen Punkte (CP);
5. Die Voraussetzungen für die Zulassung zu dem Modul (Prerequisites Subjects)
6. Die Dauer (Duration) und zeitliche Gliederung (Semester) sowie die Häufigkeit des Angebots (Module Frequency);
7. Die Verwendbarkeit des Moduls in verschiedenen Studiengängen (Used in other Courses);
8. Die Beschreibung der im Modul zu erbringenden Prüfungsvorleistungen und Prüfungen (Assessment Methods), sowie gegebenenfalls weitere Voraussetzungen für den erfolgreichen Abschluss des Moduls (Prerequisites for CP).

(2) Die Übersicht über die Module in Anlage 1 der BBPO enthält:

1. Den nach den Lehrveranstaltungen und Lernformen des Moduls aufgeschlüsselten Arbeitsaufwand (workload) und die Zahl der vergebenen Punkte (CP);
2. Die Dauer des Angebots (Duration);
3. Die Art und Form der im Modul zu erbringenden Prüfungen.

(3) Die Zulassungsvoraussetzungen zum Bachelormodul sind in § 12 BBPO, zu allen anderen Modulen in § 11 BBPO geregelt. Darüber hinaus sind eventuelle weitere Zulassungsvoraussetzungen in den Modulbeschreibungen aufgeführt.

(4) Die Wahlpflichtmodule sind in Anlage 2 der BBPO aufgeführt und beschrieben.

§ 1 The Principle of Project Based Learning Workshops

Preconditions

Facing the rise of complexity

Media-Projects are characterized by a two-dimensional multi-disciplinarity: They are on first hand a combination of Media Design, Media Management, Media Technology (the "classical" disciplines) and on the other hand more and more often a combination of the diverse but meanwhile highly specific media genres with linear and/or interactive modalities like animation, game, installations, video, film, sound, augmented and virtual reality. Teaching should correspond to the exposure of complexity by accentuating respective methods how to handle this rising complexity.

Facing new concepts of work

The change from an industrial to a knowledge-oriented society has a deep impact on contemporary and future work patterns. Moreover, the half-life period of tools and software becomes increasingly shorter. For the individual worker this means an increase of self-directed work, self-motivation, self-organisation, lifelong learning and beyond this – teamwork in international (which means multi-cultural) settings. This requires teaching methods, which help students to reach the qualifications necessary in these fields.

Supporting constructivist learning

In the traditional sense, learning means to memorize and to recall facts. Thus, declarative knowledge will be acquired in a static way, which is suitable in complex situations to only a limited extent. The future media developer rather needs practical methodological skills and problem-solving competencies. Therefore, a change from an instructional to a constructivist

view of teaching is helpful. In this sense learning means to incorporate the persistent fundamentals on the one hand and to actively construct thought-patterns on the other hand.

Supporting active learning

Constructivist learning means the change from reproduction to production, from gaining knowledge to developing competencies, from examination to facilitation, from teaching to coaching. These requirements can be fulfilled by an adequate link between theory and practice.

Supporting to learn how to learn

Knowledge management is a central task of our knowledge society. Until today the idea of mainly explicit exchange of knowledge prevails. But especially in the media industry a change from codified knowledge (externalized knowledge) to tacit knowledge (implied/implicit knowledge) is necessary.

Definition

Project-based learning (PBL) is a student-centred pedagogical strategy, applied to the study courses, in which students learn about the given indicative subjects in the context of complex, multifaceted, and realistic problems. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. The role of the instructor is that of a facilitator of learning who provides an appropriate framework of that process by (for example), asking probing questions, providing appropriate resources, and leading class discussions, as well as designing student assessments.

Implementation into the study programme

This form of teaching should embrace the disciplines Technology and Computer Science, Design for Extended Reality, Methodology and Science as inherent parts of a workshop module with a given semester's topic. The module will follow the timeline of a real-life situation including the steps:
Research, Concept and Development (e.g. Prototyping, Production and Implementation), Publishing, Evaluation and Documentation.

Way of teaching

From a constructivist perspective in a project-based learning strategy, the role of the instructor is to guide the learning process rather than to provide. In this perspective, feedback and reflection on the learning process and group dynamics are essential components of PBL. Students are considered to be active agents who engage in social knowledge construction. Nevertheless, a professional and reliable input-framework is necessary.

Teaching methods in the workshops can be:
- Seminar
- Impulse keynote talk
- Coaching
- Discussion

General learning outcomes

In detail PBL develops the following skills:
- Ability for critical thinking
- Analytical and methodological skills, i.e. transferable skills
- Research skills
- Problem solving skills

- Project management skills
- Communication, negotiation and conflict resolution skills
- Acquisition of knowledge that is flexibly usable
- Development of interdisciplinary competencies
- Social competency
- Capacity for teamwork
- Lifelong learning skills

Project phases

(Basic grid, to be adapted to focal-point-specific workshops)

- Define rules of work
- Analyse situation
- Define problem
- Design and technological research & distribute work
- Research/work
- Share results & analyse results
- Conclusion

Benefits of PBL compared to traditional lecture teaching

- With a given project/workshop/production context, students want to learn to a greater extent than in pure lecture scenarios
- Students take ownership of the need to learn
- Students learn by doing – practice, trial-and-error, repetition, experimenting
- Making sense of what is being learned is more obvious – 'getting one's head around it'
- Better effects by learning from feedback: other people's reactions, seeing the results
- Deepening one's learning by explaining it to others, teaching, coaching
- Further deepening one's learning, by making informed judgements on one's own
- Work and on others' work – self- and peer-assessing

§ 2 Modulbeschreibungen der Pflichtmodule im 1. Semester

1	**Modulname (Module name)** Basic Principles of Design in Extended Reality
1.1	**Modulkürzel (Shorthand symbol)** AVRD-D1
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Basic Principles of Design and Extended Reality
1.4	**Semester (Semester)** 1st Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description This module covers theoretical and practical aspects and provides a broad foundation for conceptual and practical design processes in the field of Extended Reality. The learner will gain a factual and conceptual knowledge base with emphasis on design principles condensed from traditional disciplines like motion pictures, animation, game, theatre, sculpture, painting, scenography, architecture or sound and music. In addition, an insight is given into fundamental aspects of world building and simulation related to human perception in Extended Reality. The module encourages students to develop and discuss an analytic, creative, critical and ethical approach to visual literacy in the field. Indicative Module Content

	• Basic conceptual design and prototyping for Extended Reality • Spatial design and spatial vision • Principles and concepts of ambient design • Worldbuilding concepts using computer generated images and animation • Basic principles of cinematography and visual storytelling in film, games and animation • Basic principles of 3D modelling and 3D-animation • Basic elements and principles of game play design • Introduction to basic design methods (idea generation, research, concept development and prototyping) • Introduction to analysis and critique of existing concepts in the field of Extended Reality • Principles of design and audio-visual composition. • Introduction to basic design principles of cinematography, scenography, sound design, animation, game design, theatre • Volumetric film • Basic concepts of virtual worlds • Introduction to animation
3	**Ziele (Learning Outcomes)** After successful completion students shall demonstrate the following skills: 1_Knowledge & Understanding: • Identify and describe basic aesthetic, structural and dramaturgical elements of time-based and interactive scenarios and experiences. • Demonstrate awareness of ethical issues and history in current areas of Extended Reality and ability to discuss these in relation to personal beliefs and values. • Understand and demonstrate knowledge of basic principles and methods of conceptual and practical design and their impact on Extended Reality. 2_Intellectual skills: • Analyse and describe Extended Reality in terms of their usage of space, time, motion, sound and interaction. • Identify key elements of existing design concepts for Extended Reality from an aesthetic point of view. • Demonstrate an awareness of genre languages and conventions typically applied to Extended Reality. • Apply basic tools and methods of design accurately and carefully to a well-defined problem and appreciate the complexity of Extended Reality. 3_Competences and Practical & Professional skills: • Identify and apply basic methods of generating, developing and visualizing ideas in the context of an Extended Reality production. • Develop and document basic visual research for scenarios in Extended Reality. • Develop simple Extended Reality concepts focusing on visual languages, narrative styles and experiences specific for the genre. • Select and apply tools and methods to build and introduce 360^0 environments, virtual worlds and time-based experiences. • Pitch and evaluate design concepts in regards and relevance to the field of Extended Reality projects.

	4_Transferable skills: • Evaluate own strengths and weakness within criteria largely set by others. • Take responsibility for own learning with appropriate support. • Communicate effectively in a format appropriate to the media disciplines and report and document practical procedures in a clear and concise manner.
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 10 CP a) 2 SWS/32 h b) 5 SWS/80 h Self-Study: 188 h Workload: 300 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The examination form is based on coursework (Studienarbeit) in accordance with § 13 Abs 2. ABPO with a duration of approx. 10 weeks (50% of the final mark), a homework (Hausarbeit) in accordance with § 13 Abs. 2 ABPO with a duration of approx. 4 weeks (30% of the final mark) and a presentation (Präsentation) in accordance with § 13 Abs 5 ABPO) with a duration of 20 minutes (20% of the final mark). The final mark determines the participation with or without success. The lecturer announces the form of examination according to §10 Abs 3 ABPO in the first week of the lecture period. Opportunities to repeat the examination are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt

9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 5 (Ü) SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Christopher W. Totten: An Architectural Approach to Level Design, A K Peters 2014 Francis D.K. Ching: Architecture: Form, Space, & Order: Form, Space, and Order, Wiley 2014 Further literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Fundamentals of Technology in Extended Reality
1.1	**Modulkürzel (Shorthand symbol)** AVRD-T1
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Fundamentals of Technology in Extended Reality
1.4	**Semester (Semester)** 1st Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description This module provides a fundamental understanding of computer technology and basic programming skills. The students should deepen their knowledge and gain practical experience in media technology and with formats such as digital images, video, sound and computer generated 2D and 3D-environments. Indicative Module Content • Profound understanding of data and information • Basic understanding of audio-visual technology and capture devices • Introduction to state-of-the-art game engines as development environment • Computer as a tool (e.g. I/O operations, hard- and software interfaces) • Fundamentals of Computer Graphics • Introduction to computer science and programming (methods, programming environments) • Understanding and application of control structures, loops and functions • Introduction to algorithms and data structures • Basics of logic and logical operations

	• Introduction to Object-Oriented-Programming (OOP)
3	**Ziele (Learning Outcomes)** After successful completion students shall demonstrate the following skills: 1_Knowledge & Understanding: • Understand the meaning and use of analog and digital data in computer science. • Demonstrate understanding of syntax, data and knowledge. • Show understanding of the different forms of audio-visual media and their representation in computer science. • Understand and use basic audio-visual capture devices. • Understand and use the computer and related media hardware as a tool to design and create applications in the field of Extended Reality. • Describe and apply basic software architectures, data structures, algorithms in the field of 2D/3D computer graphics and applications. • Describe the role of computer science and technology in different media areas. 2_Intellectual skills: • Understand and make use of basic concepts, structures and methods for software development. • Analyse, understand and develop algorithms. 3_Competenes and Practical & Professional skills: • Demonstrate basic programming skills. • Gain and apply a profound understanding of computer graphics • Apply basic knowledge in applied mathematics. 4_Transferable skills: • Understand to role of technology in society and as driver for creative innovations. • The use of computer science and programming in different field of extended realities.
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 10 CP a) 2 SWS/32 h b) 5 SWS/80 h Self-Study: 188 h Workload: 300 h

6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as a written exam (Schriftliche Klausurprüfung) in accordance with § 12 ABPO (50% of the final mark) and a practical examination (Praktische Prüfung) §13 Abs.1 ABPO (50% of the final mark), the duration of each is 90 minutes. Alternatively, the written exam can be replaced with an oral examination (Mündliche Prüfung) with 20 minutes duration in accordance with §11 ABPO. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 5 (Ü) SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Daniel Shiffman: Learning Processing, ISBN-13: 978-0123944436, Morgan Kaufmann (2015) Processing: A Programming Handbook for Visual Designers and Artists, MIT Press(2014) , ISBN-13: 978-0262028288 Grokking Algorithms, Aditya Bhargava (Author) , Manning (2016), ISBN-13 : 978-1617292231 Further literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Applied Sciences 1
1.1	**Modulkürzel (Shorthand symbol)** AVRD-S1
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Applied Sciences 1
1.4	**Semester (Semester)** 1st Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description The Augmented and Virtual Reality Design module *Applied Science 1* follows an interdisciplinary approach to human sciences, cognitive sciences and natural sciences. It provides the students with fundamental knowledge in STEM (Science, Technology, Engineering and Mathematics) related fields of science and research and their role and importance in extended realities. Another major goal is to convey and understand the role of cognitive science, physiology, psychology and human perception in the field of Extended Reality. Indicative Module Content • Profound understanding of human senses • Knowledge of human physiology • Knowledge and awareness of cognitive science and psychology in the field of Extended Reality • The role of STEM (Science, Technology, Engineering, and Mathematics) in Extended Reality • Emerging technologies and their influence for Extended Reality

3	**Ziele (Learning Outcomes)** On successful completion of this module the students shall be able to or to demonstrate the following skills: 1_Knowledge & Understanding: • Show knowledge in the principles and limitations of human perception (visual, acoustical, tactile, etc.). • Demonstrate basic knowledge of human physiology. 2_Intellectual skills: • Understanding cognitive science and psychology in the field of extended realities. • Understand the role of mathematics, physics and technology in the field of extended realities. 3_ Competences and Practical & Professional skills: • Understand the role of STEM (Science, Technology, Engineering, and Mathematics) and apply it in further research and project development.
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP a) 2 SWS/32 h b) 2 SWS/32 h Self-Study: 86 h Workload: 150 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as a written exam (Schriftliche Klausurprüfung) with 60 minutes duration in accordance with § 12 ABPO (70% of the final mark) and a presentation with approx. 20 minutes duration in accordance with § 13 Abs. 5 ABPO (30% of the final mark). Alternatively, the written exam can be replaced with an oral examination (Mündliche Prüfung) with 20 minutes duration in accordance with §11 ABPO. Opportunities to repeat the examinations are provided in the following semester. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period.

7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 2 (Ü) SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Sensation & Perception, E. Bruce Goldstein (Author), Cengage Learning; 9. Edition (2013), ISBN-13: 978-1133958499 Further lecture to be announced at the beginning of the lecture period.

1	**Modulname (Module name)** Technical Arts 1: Basics of Technical Arts and 3D Graphics
1.1	**Modulkürzel (Shorthand symbol)** AVRD-TA1
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Basics of Technical Arts and 3D Graphics
1.4	**Semester (Semester)** 1st Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Paul Grimm
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description The module Technical Arts I teaches fundamentals of 3D graphics and asset creation for Extended Reality applications, such as modelling, texturing, shading, lighting and data-handling. Students shall be able to list, describe and work with different technologies of all those working fields. They will be able to operate basic tools of a modelling and animation software, organize data in project structures and transfer assets to games engines. Indicative Module Content • Describe and evaluate project data structures • Differentiate between transformation and deformation • List and describe different modelling-tools and methods • Apply textures to 3D geometry • List and describe different digital light-types • Apply digital light-setups • Apply data-transfer between different software

	• Solve basic error-handling and troubleshooting • Face and overcome uncertainty towards technical challenges
3	**Ziele (**Learning Outcomes) After successful completion of the module Media Studies learners will be able to: **1_Knowledge & Understanding:** • Demonstrate basic knowledge of the technological and artistical role of technical arts in extended realities. • Understand the use of 3D geometries, textures, lights, shaders • Understand the rendering pipeline **2_Intellectual skills:** • Understand and make use of basic concepts, structures and methods 3d graphics • Analyse, understand and develop 3D scenes **3_Competences and Practical & Professional skills:** • Demonstrate basic modelling and animation skills • Gain and apply a profound understanding of 3D rendering pipeline
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP a) 2 SWS/32 h b) 2 SWS/32 h Self-Study: 86 h Workload: 150 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The examination is a presentation in accordance with § 13 Abs. 5 with a duration of 2-5 minutes, with the result of either participation with or without success. The lecturer announces exemptions in the form of examination according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester. In the case of a last possible repetition, the presentation will be evaluated by two examiners.

7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 2 (Ü) SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung: Virtual and Augmented Reality (VR/AR) - Foundations and Methods of Extended Realities (XR), Springer, 2022, https://doi.org/10.1007/978-3-030-79062-2, https://link.springer.com/book/10.1007/978-3-030-79062-2 Further literature to be announced mainly at the beginning of the lecture period.

§ 3 Modulbeschreibungen der Pflichtmodule im 2. Semester

1	**Modulname (Module name)** Principles of Design in Extended Reality
1.1	**Modulkürzel (Shorthand symbol)** AVRD-D2
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Principles of Design and Extended Realities
1.4	**Semester (Semester)** 2nd Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description This module will focus on the role of the self and immersion in Extended Reality. When creating and designing new realities observation, simulation, evaluation and a deep understanding of perception will be driving forces and tools in the process. The learner is encouraged to adopt a critically informed, analytic and creative approach to the iterative resolution of design challenges related to media information, entertainment products and industrial applications in the field of Extended Reality. Indicative Module Content • Basic principles and methods of character creation development and design • Introduction to user-centered design methods and experience design • Basics of interaction design, mental models and metaphors

	• Introduction to creative methods and strategies (e.g. Moodboards, Kanban, Design Thinking) • General methods and strategies of visual storytelling, cinematography and dramaturgy for Extended Reality • Tools and forms of storytelling like archetypes, rhythm, empathy, structure, genres, serials • Methods of observation and analysis of human behaviours • Prototyping in three-dimensional spaces • Psychology of user experience and behaviour • Principles of motion and navigation in virtual worlds • Principles of control attention and orientation in 360^0 environments like light, movement, gaze, sound, ambient design etc. • Introduction to analysis and critique of existing concepts in the field of Extended Reality • Introduction to sound design for virtual worlds (e.g. ambient sound, spatial audio, binaural sound) • Introduction to analysis and critique of existing concepts in the field of Extended Reality • Extended Reality as prototyping environment • Extended Reality in industrial and social applications and experiences • Extended Reality methods in education and science
3	**Ziele (Learning Outcomes)** After successful completion students shall demonstrate the following skills: 1_Knowledge & Understanding • Demonstrate critical understanding of fundamental theories, methods and practices involved with creating design concepts for Extended Reality. • Identify and describe typical elements and characteristics of ludic and narrative scenarios with regard to genre languages. • Demonstrate a deep knowledge and understanding of the various roles of the user(s) in Extended Reality regarding immersion, interaction and experience. 2_ Intellectual skills • Demonstrate an awareness and analytical reflection of genre specific historical and contemporary developments as well as current trends in the field of Extended Reality. • Recognize and evaluate processes and conceptualisations of immersion, engagement, interaction, representation, experience and identification in Extended Reality. • Interpret and critique design concepts for applications and experiences in the field of Extended Reality with regard to their functional and aesthetic qualities. 3_Competences and Practical & Professional Skills • Understand and apply concepts of visual, auditive and narrative storytelling and their implication in Extended Reality • Identify and apply principles of character creation and design in context of agency, presence, behaviour and storytelling in Extended Reality. • Understand and use different roles of users like player, audience or explorer and their impact on the social and emotional structure of the experience. • Identify and apply standard methods of iteration and prototyping in the context of Extended Reality. • Define and apply key principles of human-human and human-machine interaction simulating behaviour and nonverbal communication like gestures, gaze, voice or sense of locality. • Generate and document structured conceptual research for Extended Reality scenarios

	• Shape believable and consistent audio-visual representations of action, emotion and mood by employing principles of animation, character performance, environment and game design. **4_Transferable skills** • Apply relevant criteria to articulate, discuss and evaluate creative decisions. • Demonstrate effective methods in self-directed work. • Show confidence in application of own criteria of judgement and challenge received opinion as well as reflect on action.
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 10 CP a) 2 SWS/32 h b) 5 SWS/80 h Self-Study: 188 h Workload: 300 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The examination form is based on coursework (Studienarbeit) in accordance with § 13 Abs 2. ABPO with a duration of approx. 10 weeks (50% of the final mark), a homework (Hausarbeit) in accordance with § 13 Abs. 2 ABPO with a duration of approx. 4 weeks (30% of the final mark) and a presentation in accordance with § 13 Abs 5 ABPO with a duration of 20 minutes (20% of the final mark). The lecturer announces the form of examination according to §10 Abs 3 ABPO in the first week of the lecture period. Opportunities to repeat the examination are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt

9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 5 (Ü) SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Don Norman: The Design of Everyday Things, Basic Books (2013) Michael Lewrick: The Design Thinking Playbook, Wiley (2018) Jason Jerald: The VR Book: Human-Centered Design for Virtual Reality, ACM Books (2015)

1	**Modulname (Module name)** Technology in Extended Reality
1.1	**Modulkürzel (Shorthand symbol)** AVRD-T2
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung** Technology in Extended Reality
1.4	**Semester (Semester)** 2nd Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description To design and develop applications in the field of extended realities a profound knowledge and extensive programming skillset is needed. This module provides a fundamental understanding in programming in state-of-the-art 3D game engines, software architecture concepts like Object Oriented Programming and Design Pattern, basic 2D- and 3D graphics programming. Part of the module is also basic numerical- and vector mathematics and how to apply them in 3D game engines. The students will learn how to break down an application concept (e.g. 3D game) and how to approach the implementation. The students will gain a basic understanding of the technology of head mounted displays (HMD) for virtual reality applications and how to implement them in a typical game engine. Indicative Module Content • Programming state-of-the-art game engines • Rendering technologies- and pipelines • Design pattern for software architecture • OOP (object-oriented programming) and advanced data structures • Software architecture tools and methods

	• Real-time effects, particle systems and shaders • Sound sources and effects into 3D environments • Basic 3D game mechanics • Applied vector-mathematics • Introduction to head mounted display (HMD) technology for VR- and AR Applications
3	**Ziele (Learning Outcomes)** After successful completion students shall demonstrate the following skills: 1_Knowledge & Understanding: • Attain basic knowledge of basic design pattern for software architecture. • Demonstrate a basic understanding in the workflow and development in state-of-the-art game engine environments. • Show understanding of rendering technologies- and pipelines. • Gain and apply basic knowledge in game mechanics and technical art. 2_Intellectual skills: • Understanding of technological requirements for applications in the field of extended realities. • Demonstrate the ability to analyse complex tasks and implement them as algorithms. 3_Competences and Practical & Professional skills: • Understand the advantages and the use state-of-the-art software architecture tools and methods. • Gain basic knowledge in collaborative software development environments. • Use concepts like OOP (object-oriented programming) and advanced data structures practically. • Using visual real-time effects, particle systems and shaders. • Demonstrate the integration of sound sources into 3D environments. • Understand and apply basic rigging and animation technologies. 4_Transferable skills: • Understand technology and computer science as tools and sources for the creative process.
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 10 CP a) 2 SWS/32 h

	b) 5 SWS/80 h Self-Study: 188 h Workload: 300 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as a written exam (Schriftliche Klausurprüfung) with 60 minutes duration in accordance with § 12 ABPO (40% of the final mark) and a practical coursework (Studienarbeit) with a duration of approx. 10 weeks in accordance with § 13 Abs. 2 ABPO (60% of the final mark). Alternatively, the written exam can be replaced with an oral examination (Mündliche Prüfung) with 20 minutes duration in accordance with §11 ABPO. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 5(Ü) SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Clean Code: A Handbook of Agile Software Craftsmanship, Robert C. Martin (Author), Pearson; 1. Edition (2008), ISBN-13: 978-0132350884 Head First Design Patterns: Building Extensible and Maintainable Object-Oriented Software, O'Reilly Media; 2. Edition (2020), ISBN-13: 978-1492078005 Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung: Virtual and Augmented Reality (VR/AR) - Foundations and Methods of Extended Realities (XR), Springer, 2022, https://doi.org/10.1007/978-3-030-79062-2, https://link.springer.com/book/10.1007/978-3-030-79062-2 The VR Book: Human-Centered Design for Virtual Reality, ACM Books, English Edition, 1. September 2015) ISBN-10 : 1970001151, ISBN-13 : 978-1970001150 Further literature to be announced at the beginning of the lecture period.

1	**Modulname (Module name)** Applied Sciences 2
1.1	**Modulkürzel (Shorthand symbol)** AVRD-S2
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Applied Sciences 2
1.4	**Semester (Semester)** 2. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Paul Grimm
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description The Augmented and Virtual Reality Design module *Applied Science 2:* Sub-module *Scientific Work Process* provides the students with fundamental knowledge in the scientific work process. Main emphasis of the module is the imparting of theoretical foundations for independent scientific work. The learner will understand and apply different scientific research methods. Furthermore, the module provides the students with fundamental knowledge of how to approach a scientific publication and how to conduct a profound literature research. The students will learn how to use information management techniques and read and write scientific publications. Indicative Module Content • Purpose and goals of scientific work • Different forms and structures of artistic research • Basic structure of a research projects • Science theory

	• Scientific research methods • Inductive and deductive research logic • Objectivity in the research process • Founding and management of research projects • Scientific talks and presentation
3	**Ziele (Learning Outcomes)** On successful completion of this module the students shall be able to or to demonstrate the following skills: **1_Knowledge & Understanding:** • Understand the purpose and goals of scientific work. • Show understanding of the basic structure of a research project. • Understand different forms and structure of artistic research. • Understand important concepts of science theory. • Understand the limits of objectivity in the research process. • Understand and apply different scientific research methods. • Understand and apply form and structure of scientific papers. • Understand and apply the requirements of a scientific bibliography. **2_Intellectual skills:** • Apply principles of scientific theory. • Apply the requirements of scientific hypotheses. **3_Competenes and Practical & Professional skills:** • Develop a correct formulation of scientific hypotheses. • Make use of information management techniques. • Prepare and perform a scientific talk/presentation. • Explain and apply techniques for scientific writing, and research methodology to prepare the writing of a scientific report, poster, paper or degree project. • Conduct a profound literature research, work on the Internet. • Make use of information management techniques
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) / Seminar (Sem) b) Practical sessions (Ü)

	Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP a) 2 SWS/32 h b) 1 SWS/16 h Self-Study: 102 h Workload: 150 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The part of pre-examinations at the final mark in form of a presentation (Präsentation) in accordance with § 13 Abs 5 ABPO is one third. The module exam is conducted as a coursework (Studienarbeit) in accordance with § 13 Abs 2 ABPO, the duration is approx. 8 weeks. Its part the final mark is two thirds. The lecturer announces exemptions in the form of examination according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester. In the case of a last possible repetition, the presentation as well as the coursework will be evaluated by two examiners.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 (V) + 1 (Ü) SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Methodologies 2: Extended Reality Studies
1.1	**Modulkürzel (Shorthand symbol)** AVRD-M2
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Methodologies 2: Extended Reality Studies
1.4	**Semester (Semester)** 2nd Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier, Prof. Dr. Paul Grimm, Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description The *Methodologies Strand* complements the student's understanding of contexts and development methods within the field of Extended Reality production with a holistic, knowledge-based methodical approach. It aims to strengthen the student's organization and communication skills, their critical, quality oriented thinking and their awareness for audiences and users. The module *Extended Reality Studies* provides the students with relevant methodical knowledge and skills to analyse and critique extended realities productions with regard to characteristics of format, genre and audio-visual language and narration (story-telling). It provides learners with common concepts and strategies to identify and describe the historic, cultural, ethical and social and economic dimensions of related productions. It provides a foundation for communication and cooperation in extended realities project teams and a knowledge summary in the core disciplines. The students are introduced to theories, methods and practices typically involved in the development, production and distribution of applications in the field of Extended Reality.

	Indicative Module Content • Extended Reality studies: key terms, concepts, perspectives and milestones • Studies of narratology and storytelling for Extended Reality • Studies of cinematography, animation and sound in Extended Reality • Studies of content, genres, genre languages, formats, styles and audio-visual language in Extended Reality • Notions and concepts of space, time, environment and architecture in virtual environments • Audiences and users: concepts and theories of media perception, media effects and media usage • Experiment and Avant-garde in Extended Reality
3	**Ziele (Learning Outcomes)** After successful completion of the module *Extended Reality Studies* learners will be able to: **1_Knowledge & Understanding:** • Exhibit a basic understanding of relevant concepts, methods and practices involved with creating and producing media in the field of extended realities. • Demonstrate knowledge of elementary concepts and theories related to art history and visual culture and apply them to productions in the field of extended realities. • Display an understanding of storytelling fundamentals and character development **2_Intellectual skills:** • Analyse and critically evaluate productions in the field of extended realities with regard to content, formal structure and audio-visual language. • Identify and describe genres, formats, styles and genre languages in the field of extended realities. • Identify and describe typical roles and workflows in the related industries. **3_Competences and Practical & Professional skills:** • Explain and apply key terms and perspectives of extended realities studies. • Carry out basic research under supervision; document and present research results in a structured manner. • Understand and explore the role and behaviour of users and audiences. • Developing basic story concepts and understanding the role of narration in media experiences • Identify and describe relevant conceptual models, methods and practices in the development process of projects
4	**Lehr- und Lernformen (Teaching Methods)** a) Lecture (V) / Seminar (Sem) b) Practical sessions (Ü) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.

5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP a) 1 SWS/16 h b) 1 SWS/16 h Self-Study: 118 h Workload: 150 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as coursework (Studienarbeit) over the whole lecture period in accordance with § 13 Abs. 2 ABPO (70% of the final mark) and a presentation in accordance with § 13 Abs. 5 (30% of the final mark) with a duration of 20 minutes. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 1 (V) + 1 (Ü) SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** The VR Book: Human-Centered Design for Virtual Reality, ACM Books, English Edition, 1. September 2015) ISBN-10 : 1970001151, ISBN-13 : 978-1970001150 The Hero with a Thousand Faces, Joseph Campbell, New World Library; Third Edition (2008), ISBN-13: 978-1577315933 Further literature to be announced at the beginning of the lecture period.

§ 4 Modulbeschreibungen der Pflichtmodule im 3. bis 7. Semester

1	**Modulname (Module name)** Project 3: Discover Space and Time
1.1	**Modulkürzel (Shorthand symbol)** AVRD-P3
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Project 3: Discover Space and Time
1.4	**Semester (Semester)** 3. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description "**Discover space and time**" – this is the leitmotif of this interdisciplinary first project of the study course. In this first project students are familiarized with the aesthetic and technological implications related to the creation three-dimensional interactive immersive (virtual) worlds. They are encouraged to integrate fundamental concepts of interaction, storytelling, cinematography and gameplay. The students get introduced to the standard project stages of ideation, concept development, planning, preproduction, production and testing, thus gaining first producing skills. They are encouraged to take responsibility for self-directed, group-oriented learning processes and to explore individual and collective methods of problem solving. Furthermore, they take different roles and functions in the production process to find and develop their own strength and artistic voice.

	In producing a simple three-dimensional virtual experience, the students are exposed to the dynamics of the various disciplines and roles that contribute to productions in the field of Extended Reality. They become confronted with fist essential practice and will explore their creative potential. They gain an increasing awareness of the aesthetic specificities of genres, formats and constraints, which will guide them in their creative decision-making. Indicative Module Content • Basics of object oriented software development • Basic principles of computer graphics • Basics of application testing and quality assurance in software development • Basics of computer generated graphics: modelling, rigging, texturing/shading, animation, lighting/rendering, asset-creation • Proper structuring and formatting to support code maintenance and reuse • Software architectures of game engines, computer games and computer generated 3D environments • Interface technology and human-machine interaction (HMI) • Implementations of simple interaction models • HMD (Head mounted displays) for VR- and AR Applications • Controller technology and interaction principles for virtual environments • Techniques and strategies of idea generation, concept development and concept presentation • Introduction to design methods (research/design heuristics, iteration, design documentation basics) and analysis of existing Extended Reality concepts • Basic visualization and prototyping (e.g. Design-Thinking) • Introduction to interaction design • Introduction to user-centred design and usability • Introduction to storytelling for Extended Reality (principles of linear and non-linear storytelling and dramaturgy) • Introduction to sound design: the role of sound for virtual environments • Introduction to team management • Introduction to project management
3	**Ziele (Learning Outcomes)** **1_Knowledge & Understanding:** • Understand and experience key characteristics of team based projects and related communication processes. • Understand and apply basic methods of project management. • Understand and apply basic methods of team management. **2_Intellectual skills:** • Identify basic concepts and models of culture and communication and apply them to the field of Extended Reality production and reception.

	• Demonstrate methodical and practical skills in creating, visualizing and evaluating ideas and concepts related to Extended Reality. 3_Competences and Practical & Professional skills: • Document the project development and the deliverables of the project management. • Apply and document basic principles of research to relevant areas of a project task, such as: project topic, audience/user, existing products, social and cultural environment, functional and technical conditions. • Produce and evaluate a prototype of simple three-dimensional virtual experience in an appropriate media language and with necessary technical skills.
4	**Lehr- und Lernformen (Teaching Methods)** Main Module: Project based learning (Pro) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 15 CP 8 SWS/128 h Self-Study: 322 h Workload: 450 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** Each of the three project phases Research, Concept, Realisation, and an accompanying documentation is part of the final mark. The grading for each phase is equally based on the individual development and learning outcomes in the three main elements of an interdisciplinary project: Media Technology, Media Design, and Methodologies. The examination form for the research phase is a homework in accordance with ABPO § 13 Abs. 3. It has to be completed within approx. 3 weeks and its part for the final mark is 20%. The examination form for the concept phase is a presentation of 20 minutes in accordance with ABPO § 13 Abs. 5. Its part for the final mark is 30%. The examination form for the realisation phase is a coursework (Studienarbeit) in accordance with ABPO § 13 Abs. 2. It has to be completed within approx. 6 weeks and its part for the final mark is 40%. The examination form for the documentation is a project documentation (Projektbericht) over the whole semester in accordance with ABPO § 13 Abs. 3. Its part for the final mark is 10%. The examination can be extended by an optional graded oral exam. Its part for the final mark is 25%. Alternatively a learning portfolio (Lernportfolio according to BBPO § 13 Abs. 1) documents individual development and learning outcomes of each project phase. It can be extended by an optional oral exam. The part of the research phase at the final mark is 20%, the part of the concept phase at the final mark is 30%, the part of the realization phase is 40%, and the part of the documentation phase is 10%. The lecturer announces the form of the examination and exemptions according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.

7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 8 SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Prototyping for Designers, Kathryn McElroy (Author), O'Reilly Media (2017), ISBN-13 : 978-1491954089 Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung: Virtual and Augmented Reality (VR/AR) - Foundations and Methods of Extended Realities (XR), Springer, 2022, https://doi.org/10.1007/978-3-030-79062-2, https://link.springer.com/book/10.1007/978-3-030-79062-2 The VR Book: Human-Centered Design for Virtual Reality, ACM Books, English Edition, 1. September 2015) ISBN-10 : 1970001151, ISBN-13 : 978-1970001150 The Design Thinking Playbook, Michael Lewrick (Author), Wiley (2018), ISBN-13: 978-1119467472 Further literature to be announced at the beginning of the lecture period.

1	**Modulname (Module name)** Methodologies 3: Creative Methods and Producing
1.1	**Modulkürzel (Shorthand symbol)** AVRD-M3
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Methodologies 3: Creative Methods and Producing
1.4	**Semester (Semester)** 3. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier, Prof. Dr. Grimm, Prof. Dr. Frank Gabler
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description The *Methodologies Strand* complements the student's understanding of contexts and development methods within the field of extended realities production with a holistic, knowledge-based methodical approach. It aims to strengthen the student's organization and communication skills, their critical, quality oriented thinking and their awareness for audiences and users. The module *Creative Methods and Producing* provides learners with the knowledge, skills, competencies and methods required to develop concepts and productions in the field of extended realities. By encouraging a diverse approach to idea generation and prototyping learners expand their development processes and adopt a creative approach to problem solving. Indicative Module Content Introductions into: • Introduction to theories of creativity, convergent thinking and innovation • Techniques and strategies of creative idea generation and development

	• Methods and practices of a professional project management in the creative industries and in Extended Reality • Roles and workflows in producing media, tools and devices for in Extended Reality • Risk-Management in development of in Extended Reality • Introduction to business models for in Extended Reality • Introduction to media and entertainment law as basis for productions in the field of in Extended Reality • Intellectual property rights management and information security
3	**Ziele (Learning Outcomes)** After successful completion of the module *Creative Methods and Producing* learners will be able to: **1_Knowledge & Understanding:** • Identify principle theories of creativity and their potential for holistic design, interdisciplinary development and communication strategies. • Understand and develop business models for in Extended Reality • Identify and apply media and entertainment laws **2_Intellectual skills:** • Describe and understand a variety of creative and analytical methods of idea generation and development steps. • Describe and understand professional methods of presentation, simulation and prototyping Extended Reality. • Describe and understand concepts, methods and practices of project management in the creative industries and in Extended Reality. • Describe and understand typical roles and workflows in Extended Reality. **3_Competences and Practical & Professional skills:** • Apply a variety of creative and analytical methods of idea generation and development steps. • Apply professional methods of presentation, simulation and prototyping of Extended Reality. • Apply concepts, methods and practices of project management in the creative industries and in Extended Reality. • Apply typical roles and workflows in Extended Reality.
4	**Lehr- und Lernformen (Teaching Methods)** Seminar (Sem) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP 3 SWS/48 h Self-Study: 102 h Workload: 150 h

6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as coursework (Studienarbeit) over the whole lecture period in accordance with ABPO § 13 Abs. 2 (70% of the final mark) and a presentation in accordance with ABPO § 13 Abs. 5 (30% of the final mark) with a duration of 20 minutes. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 3 SWS (Sem), Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Corporate Think Tanks, Sven Poguntke (Author), Springer Gabler (2019), ISBN-13 : 978-3658256623 The Design Thinking Playbook, Michael Lewrick (Author), Wiley (2018), ISBN-13: 978-1119467472 Prototyping for Designers, Kathryn McElroy (Author), O'Reilly Media (2017), ISBN-13 : 978-1491954089 Further literature to be announced at the beginning of the lecture period.

	Modulname (Module name) Project 4: Expand Realities
1.1	**Modulkürzel (Shorthand symbol)** AVRD-P4
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Project 4: Expand Realities
1.4	**Semester (Semester)** 4. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Paul Grimm, Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description "Expand Realities" – this is the leitmotif of this interdisciplinary project of the study course. In this project students are familiarized with the aesthetic and technological implications related to the creation of interactive experiences and/or applications in an expanded environment (e.g. augmented reality). This project focuses on the development of a working prototype on design and technical level for a defined target group and platform. The students are encouraged to integrate industrial standard production methods and practices. They will acquire and apply advanced skills in problem solving and quality assurance, budgeting and project management in order to conceive and produce a marketable product. Based on scientific methods they establish branding, marketing objectives. They will explore and apply advanced methodical tools of analysis and evaluation with regard to audience/user-centred design. They will be exposed to advanced media technologies like platforms, distribution channels and input devices. By creating a product for a defined platform and user group, the students learn to generate ideas, concepts and solutions in response to identified market, industrial and scientific needs. Indicative Module Content

	• Introduction to financing and funding of expanded realities products • Legal aspects of production and distribution • Ideation and creative methods (e.g. Design Thinking) • Creating, documenting and presenting design concepts • Basics of visual branding, intellectual property and visual communication for expanded realities • Immergence, presence and agency in expanded realities • Environment and world design, digital scenography • Interaction design for expanded realities, introduction to concepts and methods of user-centered design • Storytelling and dramaturgy for linear and non-linear formats in expanded realities • Game design (level design, game balancing, game mechanics) • Design methods: iteration, prototyping and pre-visualization, implementation) • Basics of sound design, music and dialogue writing for animations and games • Intermediate game mechanics and game engine-based computer graphics, animation, simulation and lighting techniques. • Advanced software architectures and principles in state-of-the-art game engines (also cross platform and mobile applications) • Introduction to artificial intelligence for expanded realities • Intermediate physics programming in game engines • Introduction to user interfaces for expanded realities • Advanced tools and technologies for prototyping and pre-visualisation • Testing and usability analysis • Introduction to frameworks (SDK, API) for expanded realities (e.g. augmented and mixed reality) experiences and applications. • Introduction to technology for expanded /mixed reality applications like (e.g. HMDs, glasses)
3	**Ziele (Learning Outcomes)** On successful completion of this module the student will be able to: **1_Knowledge & Understanding:** • Show a profound understanding of the user as recipient in an Extended Reality experience. **2_Intellectual skills:** • Develop a detailed and targeted design concept, which answers a creative brief and envisions a defined user/audience. • Demonstrate standard techniques and methods of an iterative design process. **3_Competences and Practical & Professional skills:** • Demonstrate the use of appropriate research and presentation methods in the development and implementation of a project. • Apply an appropriate range of specialised software and hardware tools in the execution and completion of a project. • Develop and demonstrate the use of state-of-the-art technology for expanded/mixed reality devices for experiences and applications. • Apply modern techniques and methods of software development.

4	**Lehr- und Lernformen (Teaching Methods)** Main Module: Project based learning (Pro) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 17,5 CP 9 SWS/144 h Self-Study: 381 h Workload: 525 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** Each of the three project phases Research, Concept, Realisation, and an accompanying documentation is part of the final mark. The grading for each phase is equally based on the individual development and learning outcomes in the three main elements of an interdisciplinary project: Media Technology, Media Design, and Methodologies. The examination form for the research phase is a homework in accordance with ABPO § 13 Abs. 3. It has to be completed within approx. 3 weeks and its part for the final mark is 20%. The examination form for the concept phase is a presentation of 20 minutes in accordance with ABPO § 13 Abs. 5. Its part for the final mark is 30%. The examination form for the realisation phase is a coursework (Studienarbeit) in accordance with ABPO § 13 Abs. 2. It has to be completed within approx. 6 weeks and its part for the final mark is 40%. The examination form for the documentation is a project documentation (Projektbericht) over the whole semester in accordance with ABPO § 13 Abs. 3. Its part for the final mark is 10%. The examination can be extended by an optional oral exam. Its part for the final mark is 25%. Alternatively a learning portfolio (Lernportfolio according to BBPO § 13 Abs. 1) documents individual development and learning outcomes of each project phase. It can be extended by an optional oral exam. The part of the research phase at the final mark is 20%, the part of the concept phase at the final mark is 30%, the part of the realization phase is 40%, and the part of the documentation phase is 10%. The lecturer announces the form of the examination and exemptions according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt

9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 9 SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung: Virtual and Augmented Reality (VR/AR) - Foundations and Methods of Extended Realities (XR), Springer, 2022, https://doi.org/10.1007/978-3-030-79062-2, https://link.springer.com/book/10.1007/978-3-030-79062-2 Further literature to be announced at the beginning of the lecture period.

Modulname (Module name)

Industrial Placement

Modulkürzel (Shorthand symbol)

AVRD-IP

Art (Kind)

Mandatory module

Lehrveranstaltung (Lecture)

Internship module

Semester (Semester)

5. Semester

Modulverantwortliche(r) (Module responsible)

Prof. Dr. Paul Grimm

Weitere Lehrende (Other teachers)

N.N. (associate lecturers)

Studiengangsniveau (Degree level)

Bachelor

Lehrsprache (Teaching language)

English

Inhalt (Content)

General Description

The industrial placement takes five months. There will be accompanying studies at university before the placement and after the placement. The course before the placement gives information about industrial places and about the organisation of the placement. In the course after the placement the students give a presentation about their projects in the placement and about their experiences. Students have to produce a detailed report about their projects.

Indicative Module Content

The students work in the fields of:

- Concept, planning and / or production and / or postproduction of movie, animation, video, TV and AV projects in the field of Extended Reality (e.g. VR-Film)
- Concept, planning and / or production of multimedia projects (preferably in the field of Extended Reality)
- Concept, planning and / or production of games in field of Extended Reality (e.g. VR/AR/MR-game)
- Concept, planning and / or production of simulations in field of Extended Reality
- Concept, planning and / or production of audio applications (e.g. 360° or 3D audio)
- Concept, planning and / or production of media systems (preferably in the field of Extended Reality)
- Management and marketing of multimedia products and media systems

Ziele (Learning Outcomes)

On successful completion of this subject the student will be able to:

1_Knowledge & Understanding:

- Understand and reflect the practical work of a designer, producer, developer in the field of extended realities

2_Intellectual skills:

- Reflect new fields of application and new professional methods

3_Competences and Practical & Professional skills:

- Integrate needs of practice in coming projects
- Integrate methods of practice in coming projects

Lehr- und Lernformen (Teaching Methods)

a) Lectures (V)

b) Tutorials, group discussions and peer reviews, Presentation (Ü)

c) Industrial placement (IP)

Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.

Arbeitsaufwand und Credit Points (Workload and Credits)

30 CP

a) 2 SWS/30 h

b) 2 SWS/30 h

c) Self-Study: 840 h

Workload: 900 h

Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)

The examination is based on the mandatory participation in the BBP accompanying seminar, IP-Report, and the approx. 10 minutes presentation of IP-Report with a part of 100%

The lecturer announces exemptions in the form of examination according to §10 ABPO in the first week of the lecture period.

Notwendige Kenntnisse (Prerequisite Subjects)

Not applicable / entfällt

Empfohlene Kenntnisse (Recommended Subjects)

Not applicable / entfällt

Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer) 2 (V) +2 (Ü) SWS + Industrial Placement, Summer Term
Verwendbarkeit des Moduls (Usability of the module) Not applicable / entfällt
Literatur (Literature) Literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Project 6: Expand Experience and Expectation
1.1	**Modulkürzel (Shorthand symbol)** AVRD-P6
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Project 6: Expand Experience and Expectation
1.4	**Semester (Semester)** 6. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Dr. Grimm. Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** General Description **"Expand Experience and Expectation"** – this is the leitmotif of this interdisciplinary project of the study course. The aim of the Project is to ideate, develop, produce and implement a fully functional highly immersive product in the field of extended realities, which fathoms out the possibilities of state-of-the-art technology and appropriate design- and interaction concepts. The immersion of the user and principles of interaction in extended realities applications and/or experiences take the central role. The students will make use of creative methods and strategies (e.g. Design Thinking) to experience the full live circle of development from brief through presentation, iteration/testing and conceptual work to final production. Students are encouraged to explore the potential of cross-format, cross-platform and transmedia concepts in the field of extended realities. A particularly strong focus will be on detailed preproduction according to leading industry standards. The study and critical reflection of advanced subjects in media design and media technology will enable them to transcend common aesthetic standards and established models of user/audience participation. The project work will integrate advanced project management aspects, which enable students to develop scenarios for emerging or future technological environments and market conditions where their project might be

	successfully used or applied. They will be asked to self-reflect their conceptual work at all stages and to evaluate decisions made in the conceptual process in order to optimize the results. The students learn how to set up modern business start-ups in the field of media. Indicative Module Content • Agile management, rapid prototyping • Business models in the entertainment industry, distribution and marketing of extended realities products, strategies for online distribution • Keeping a vision through the development and realisation of a project • Advanced project management skills including project plan, work breakdown structure, project management software, asset management • Learning from the avant-garde: current design topics in Extended Reality • Creativity and experiment: examples from art, design and cinematography • Expanded realities culture (advanced level): concepts, practices and ethical frameworks • Introduction to Art Direction for Extended Reality • Databases and cloud based data storage for applications and experiences in Extended Reality • Distributed and/or parallel computing and advanced network technologies and topologies • Advanced application (e.g. game) development principles and practice: writing clear, efficient and highly performing code, structured testing and quality assurance • Advanced Artificial Intelligence in Extended Reality • Advanced HCI (human computer interaction) in Extended Reality • Creating and documenting advanced design concepts and develop and devise programmes, art bibles and design bibles • Sound design, music and dialogue for Extended Reality
3	**Ziele (Learning Outcomes)** On successful completion of this module the student will be able to: 1_Knowledge & Understanding: • Understand the requirements and structures if to setup and fund a start-up business. • Gain and demonstrate a broadened understanding of linear and nonlinear design structures and strategies. • Gain and demonstrate confident use of production tools and design strategies in conceptual and technical development of media productions. • Understand, discuss and apply emerging interaction technologies in Extended Reality (e.g. artificial intelligence). 2_Intellectual skills: • Gain ability for critical thinking concerning innovation, new formats and technologies. • Demonstrate creativity, independence and inventiveness in the approach and methods used to develop, direct and implement a project. • Make informed choices through a critical approach to information gained through appropriate research methods in the development and implementation of ideas for a project. 3_Competences and Practical & Professional skills: • Manage a self-initiated project from brief through preproduction, iteration/testing to production and presentation. • Ability to transfer and reflect technical innovation into cultural and/or social innovations. • Demonstrate a self-reflective and self-critique in creation of a highly immersive application or experience. • Perform advanced software architecture and programming in the field of Extended Reality.

4	**Lehr- und Lernformen (Teaching Methods)** Main Module: Project based learning (Pro) Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 20 CP 10 SWS/160 h Self-Study: 440 h Workload: 600 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** Each of the three project phases Research, Concept, Realisation, and an accompanying documentation is part of the final mark. The grading for each phase is equally based on the individual development and learning outcomes in the three main elements of an interdisciplinary project: Media Technology, Media Design, and Methodologies. The examination form for the research phase is a homework in accordance with ABPO § 13 Abs. 3. It has to be completed within approx. 3 weeks and its part for the final mark is 20%. The examination form for the concept phase is a presentation of 20 minutes in accordance with ABPO § 13 Abs. 5. Its part for the final mark is 30%. The examination form for the realisation phase is a coursework (Studienarbeit) in accordance with ABPO § 13 Abs. 2. It has to be completed within approx. 6 weeks and its part for the final mark is 40%. The examination form for the documentation is a project documentation (Projektbericht) over the whole semester in accordance with ABPO § 13 Abs. 3. Its part for the final mark is 10%. The examination can be extended by an optional oral exam. Its part for the final mark is 25%. Alternatively a learning portfolio (Lernportfolio according to BBPO § 13 Abs. 1) documents individual development and learning outcomes of each project phase. It can be extended by an optional oral exam. The part of the research phase at the final mark is 20%, the part of the concept phase at the final mark is 30%, the part of the realization phase is 40%, and the part of the documentation phase is 10%. The lecturer announces the form of the examination and exemptions according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt

9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 10 SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung: Virtual and Augmented Reality (VR/AR) - Foundations and Methods of Extended Realities (XR), Springer, 2022, https://doi.org/10.1007/978-3-030-79062-2, https://link.springer.com/book/10.1007/978-3-030-79062-2 Further literature to be announced at the beginning of the lecture period.

1	**Modulname (Module name)** Project 7: Research-Project
1.1	**Modulkürzel (Shorthand symbol)** AVRD-P7R
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Project 7: Research-Project
1.4	**Semester (Semester)** 7. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** Indicative Module Content The student(s) submits a briefing document for a linear and/or interactive to a desired project-coach. Once this brief has been accepted, the student then writes a planning document, containing: • A project proposal • The results of the necessary research, developing the project • The description of a developed rough concept for the project • A project plan Project Schedule: • Application with briefing document • Agreement on deliverables according to chosen subject with coach • Delivery of research- and concept-plan • Discussion sessions and review of preliminary results (group/peer reviews) • Final Presentation (assessment)

3	**Ziele (Learning Outcomes)** On successful completion of this subject the student will be able to: 1_Knowledge & Understanding: • Understand the importance of profound and professional research as ground for advanced project development. 2_Intellectual skills: • Use appropriate methodologies with regard to research for technology or product development. • Identify and design for the cultural environment in which a product will be used or experienced. • Use appropriate methodologies with regard to market research. • Use appropriate research methodologies with regard to Extended Reality studies. • Use appropriate research methodologies with regard to cultural, historical, ethical or aesthetic aspects of extended realities. • Use appropriate methodologies with regard to product concept and development. • Use appropriate methodologies to plan the project organisation and financing of a media-project • Use appropriate methodologies to explore the topic for an interactive and/or linear product in the field of Extended Reality. 3_Competences and Practical & Professional skills: • Carry out extensive and detailed user/audience research for a product.
4	**Lehr- und Lernformen (Teaching Methods)** • Coaching • Tutorials, group discussions and peer reviews • Presentation and demonstration Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 15 CP 4 SWS/64 h Self-Study: 386 h Workload: 450 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The form of the examination is conducted as a homework consisting of a research documentation and poster in accordance with ABPO § 12 Abs. 3 with a duration of approx. 8 weeks (80% of the final mark), and a presentation in accordance with ABPO § 13 Abs. 5 with a duration of 20 minutes (20% of the final mark). The lecturer announces exemptions in the form of examination according to §10 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.

7	**Notwendige Kenntnisse (Prerequisite Subjects)** Successful completion of all modules of semester 1-5, except two elective modules
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 4 SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Final Module incl. Colloquium
1.1	**Modulkürzel (Shorthand symbol)** AVRD-P7B
1.2	**Art (Kind)** Mandatory module
1.3	**Lehrveranstaltung (Lecture)** Bachelor Module incl. Colloquium
1.4	**Semester (Semester)** 7. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** All professors of Augmented and Virtual Reality Design study program
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** Indicative Module Content Students may develop and realise a media system or media product, such as an Extended Reality application, Extended Reality experience or a digital media installation. The work should demonstrate a deep understanding of how to apply a range of methods and tools in arriving at a professional solution. Students may explore a concept from a cultural or market perspective that they wish to develop as a proposal to industry. Students developing ideas should cater for the cultural, technical, aesthetic and business aspects of a particular idea and explore all these aspects through sound research methods. Students should be able to create and present a prototype that has a sound technological basis as well as a clear focus with regard to the needs of a target group. Such projects should demonstrate an awareness of the market in which the proposed project will operate or be displayed. Prototypes may be aimed at business, cultural, academic or community-based environments. Projects can be the product of individual or team effort and in the case of teamwork the project proposed should outline clearly the areas of responsibility for each member of the team. Project Schedule: • Discussion sessions and review of preliminary ideas

	• Student presentation of ideas (seminars; individual and group reviews) • Rapid Prototyping (group/peer reviews) • Prototype Presentation (group/peer reviews) • Final Presentation (assessment)
3	**Ziele (Learning Outcomes)** On successful completion of this subject the student will be able to **1_Knowledge & Understanding:** • Show a profound understanding of all aspects concerning content, users, design, cultural context and technology in extended realities environments and experiences. **2_Intellectual skills:** • Discuss the design, cultural, technical and economic issues related to the project • Show appropriate use of project management skills and tools in application of project resources and in meeting project milestones on time and to specifications **3_Competences and Practical & Professional skills:** • Demonstrate judgement in the application of appropriate research and design methods in arriving at final solution(s) for the proposed project • Demonstrate specialised technical, creative or conceptual skills and tools in the development, completion and presentation of the project outcomes • Show critical personal reflection and accountability in relation to learning from successful and unsuccessful project outcomes
4	**Lehr- und Lernformen (Teaching Methods)** • Coaching • Tutorials, group discussions and peer reviews • Presentation and demonstration Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 15 CP 4 SWS/64 h Self-Study: 386 h Workload: 450 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** In accordance with § 12 BBPO the part of the Bachelor Project at the final mark is 75% and the part of the Colloquium at the final mark is 25% .

7	**Notwendige Kenntnisse (Prerequisite Subjects)** Successful completion of all modules of semester 1-5 (including IP), except two elective modules
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 4 SWS, Winter Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period

§ 5 Modulbeschreibung der Electives im 3. und 4. Semester

1	**Modulname (Module name)** Elective in Extended Reality,
1.1	**Modulkürzel (Shorthand symbol)** AVRD-E (3.1,3.2,4.1,4.2)
1.2	**Art (Kind)** Elective module
1.3	**Lehrveranstaltung (Lecture)** Elective in Extended Reality
1.4	**Semester (Semester)** 3., 4. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** **General Description** The learners broaden their knowledge and competencies in specialised media fields related to Extended Reality. They work in genre-spanning teams and contexts and/or gain and deepen knowledge from other media foci. Topics would commonly address relevant fields to Extended Reality such as Design in XR (TV/film, animation, games, sound, interfaces, storytelling, virtual worlds, et.al.), Technology in XR (VR/AR/MR systems, media systems, mobile systems, interfaces, networks, programming, et.al.) and Media Studies. They may incorporate mind-sets and methods from different disciplines: design, cinema, TV, game, digital technology, computer science, media culture, psychology, social studies, marketing and management. Indicative Module Content

	The electives may be chosen from the following fields or topics: • Technology and Computer Science • Design for Extended Realities • Methodologies for Extended Reality • Research and Development • Animation & Game • Interactive Media Design • Motion Pictures • Sound and Music Production
3	**Ziele (Learning Outcomes)** On successful completion of these modules the student shall be able to: **1_Knowledge & Understanding:** • Deepen the knowledge and understanding in the field of the offered elective. **2_Intellectual skills:** • Develop and describe media concepts in a broad cultural and social horizon as well as in adaption to the eventually addressed media genre. • Develop and include strategies of connected medial fields such as storytelling, cinematography, play, sound and interaction to extended reality productions. **3_Competences and Practical & Professional skills:** • Use design abilities to achieve a professional media product. • Use technical abilities and skills to achieve a professional media product. • Evaluate and assess the product from the success and functionality of the design, the technical, but also from a cultural perspective. • Integrate different media and different techniques to a complex product.
4	**Lehr- und Lernformen (Teaching Methods)** • Lecture (V), • Seminar, practical (Ü)(L), • Presentation and demonstration Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP 3 SWS/48 h Self-Study: 102 h Workload: 150 h

6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as coursework (Studienarbeit) over the whole lecture period in accordance with ABPO § 13 Abs. 2 (70% of the final mark) and a presentation in accordance with ABPO § 13 Abs. 5 (30% of the final mark) with a duration of 20 minutes. The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 3 SWS, Winter Term, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period

1	**Modulname (Module name)** Elective in Social- and Cultural Sciences (SuK)
1.1	**Modulkürzel (Shorthand symbol)** AVRD-SuK4
1.2	**Art (Kind)** Elective module
1.3	**Lehrveranstaltung (Lecture)** Elective in Social- and Cultural Sciences (SuK)
1.4	**Semester (Semester)** 4. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** Teachers of the Social- and Cultural Sciences (SuK)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** **General Description** With the accompanying study program "Social and Cultural Sciences (SuK)", Darmstadt University of Applied Sciences implements the idea of an interdisciplinary complementary education to the main courses of study. The accompanying study program imparts competences at scientifically and practically significant interfaces of society, economy, politics, law, technology, science and culture, law, technology, science and culture. It imparts broad factual, orientational and reflective knowledge and an interdisciplinary approach to current issues. Indicative Module Content - Introduction into the topics of diversity, gender and interculturality from a historical as well as from a contemporary perspective. - Specification and exemplification of the topics towards their occurrence, influence and relevance in media. - Introduction into the aims, approaches and policies of major International Organizations such as UN or EU and their subdivisions to improve communication,

	collaboration, communal productivity/creativity and avoid or compensate disbalances.
3	**Ziele (Learning Outcomes)** On successful completion of these modules the student shall be able to: - Demonstrate and apply knowledge of central aspects of gender, diversity and intercultural issues and questions prevalent in contemporary societies related to the contents, production conditions, technologies and working situations in media - Demonstrate and apply knowledge of the similarities and differences in diverse media cultures (presuming the roles as media makers, producers, performers and consumers) based on diversity and gender - Apply appropriate terms and strategies to analyse issues of gender, diversity and intercultural communication in media, understand and discuss the origins and causes of disbalances and frictions of the issues, their ethical, humanitarian as well as economical implications - Apply appropriate ways of meeting a standard of connecting the requirements of gender, diversity and interculturality with the aims and requirements of media production in the digital, globalized media world.
4	**Lehr- und Lernformen (Teaching Methods)** • Lecture (V), • Seminar, practical (Ü)(L), • Presentation and demonstration Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 2,5 CP 2 SWS/32 h Self-Study: 43 h Workload: 75 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as coursework (Studienarbeit) over the whole lecture period in accordance with ABPO § 13 Abs. 2 (70% of the final mark) and a presentation in accordance with ABPO § 13 Abs. 5 (30% of the final mark) with a duration of 20 minutes. Alternatively, other forms of examination can be used by the lecturer of the Socia- and Cultural Sciences program. The lecturer announces the form of examination and exemptions according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt

8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 2 SWS, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period

§ 6 Modulbeschreibung der Electives im 6. Semester

1	**Modulname (Module name)** Advanced Elective in Extended Reality
1.1	**Modulkürzel (Shorthand symbol)** AVRD-AE (6.1, 6.2)
1.2	**Art (Kind)** Elective module
1.3	**Lehrveranstaltung (Lecture)** Advanced Elective in Extended Reality
1.4	**Semester (Semester)** 6. Semester
1.5	**Modulverantwortliche(r) (Module responsible)** Prof. Philip Hausmeier
1.6	**Weitere Lehrende (Other teachers)** N.N. (associate lecturers)
1.7	**Studiengangsniveau (Degree level)** Bachelor
1.8	**Lehrsprache (Teaching language)** English
2	**Inhalt (Content)** **General Description** The learners deepen their knowledge and competencies in specialised media fields or advanced topics related to Extended Reality. They work in genre-spanning teams and contexts and/or gain and deepen knowledge from other media fields or research fields. Topics would commonly address advanced sections to Extended Reality such as Design in XR (extended TV/film, extended games, interfaces in XR, storytelling in Extended Reality, et.al.), Technology in XR (advanced VR/AR/MR systems, extended media systems, other future platforms, et.al.) Media Studies and Research & Development. They may incorporate mind-sets and strategies from different disciplines: Storytelling, gamification, interaction, media in space, mobile media, social media, and others will stimulate the learners to investigate and explore ideas, concepts and strategies in new and challenging ways.

	Indicative Module Content The electives may be chosen from the following fields or topics: • Design for Extended Reality • Technology and Computer Science • Methodologies for Extended Reality • Research and Development
3	**Ziele (Learning Outcomes)** On successful completion of these modules the student shall be able to: 1_Knowledge & Understanding: • Deepen the knowledge and understanding in the field of the offered elective. 2_Intellectual skills: • Develop and describe advanced media concepts in a broad cultural and social horizon with regard to Extended Reality. • Develop and include advanced strategies of connected medial fields and adapt them to Extended Reality productions. • Develop and describe concepts, strategies and a unique media-language for Extended Reality. • Analyse research topics and develop future concepts and solutions. 3_Competences and Practical & Professional skills: • Use all necessary design abilities to achieve and evaluate a high-quality media product. • Use all necessary informatics and technical abilities and skills to develop a high-quality media system.
4	**Lehr- und Lernformen (Teaching Methods)** • Lecture, • Seminar • Practical • Project and presentation Media: Use of changing media according to the possibilities given in the lecture hall, seminar room or laboratory room.
5	**Arbeitsaufwand und Credit Points (Workload and Credits)** 5 CP 4 SWS/64 h Self-Study: 86 h Workload: 150 h
6	**Prüfungsform, Prüfungsdauer und Prüfungsvoraussetzung (Assessment Methods)** The module exam is conducted as coursework (Studienarbeit) over the whole lecture period in accordance with ABPO § 13 Abs. 2 (70% of the final mark) and a presentation in accordance with ABPO § 13 Abs. 5 (30% of the final mark) with a duration of 20 minutes.

	The lecturer announces the form of examination according to §10 Abs.3 ABPO in the first week of the lecture period. Opportunities to repeat the examinations are provided in the following semester.
7	**Notwendige Kenntnisse (Prerequisite Subjects)** Not applicable / entfällt
8	**Empfohlene Kenntnisse (Recommended Subjects)** Not applicable / entfällt
9	**Dauer, zeitliche Gliederung und Häufigkeit des Angebots (Duration, time structure and frequency of the offer)** 4 SWS, Winter Term, Summer Term
10	**Verwendbarkeit des Moduls (Usability of the module)** Not applicable / entfällt
11	**Literatur (Literature)** Literature to be announced at the beginning of the lecture period