Anlage 5

Modulhandbuch des Studiengangs

Animation and Game
Bachelor of Arts

des Fachbereichs Media

der Hochschule Darmstadt – University of Applied Sciences

Gültig ab 01.01.2024

Vom 27.06.2023

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Preliminary Note: Project Based Learning

Preconditions

Facing the Rise of Complexity

Animation and game projects are multidisciplinary in two ways: On the one hand, they are a combination of creative animation and game design, media production, game development and technical art; on the other hand, they are more and more often a combination of the various, but now very specific, media genres, including linear and/or interactive modalities such as animation, games, interactive products, installations, video, sound, etc. Teaching should respond to the unveiling of complexity by emphasizing appropriate methods for dealing with this increasing complexity.

Facing new concepts of work

The shift from an industrial to a knowledge-based society has profound implications for current and future work patterns. In addition, the useful life of tools and software is becoming shorter and shorter. For the individual worker, this means the rise of self-directed work, self-motivation, self-organization, lifelong learning and teamwork in international (i.e. multicultural) settings. This requires teaching methods that help students to achieve the necessary qualifications in these areas.

Supporting constructivist learning

Learning in the traditional sense means memorizing and recalling facts. This is a static way of acquiring declarative knowledge, which has limited use in complex situations. The future media developer needs practical methodological and problem-solving skills. Therefore, a change from an instructional to a constructivist view of teaching is helpful. In this sense, learning means both incorporating the enduring fundamentals and actively constructing thought patterns.

Supporting active learning

Constructivist learning means changing from reproduction to production, from knowledge acquisition to competence development, from testing to facilitation, from teaching to coaching. These requirements can be met by an adequate link between theory and practice.

Support for learning how to learn

Knowledge management is a central task of our knowledge society. Until today, the idea of a mainly explicit exchange of knowledge has prevailed. 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 an educational approach in which students engage in a rigorous, interdisciplinary project that revolves around a real-world problem or challenge. Students actively explore, inquire, and collaborate to develop deep content knowledge and critical thinking skills. PBL fosters student autonomy and responsibility as they make meaningful decisions, conduct research, and present their findings in a tangible, authentic product or presentation. This student-centered approach cultivates problem-solving, communication skills, and the application of knowledge in practical contexts, preparing students for real-life situations and fostering a deeper understanding of subject matter.

Implementation into the Animation and Game program

The PBL approach to teaching should include the disciplines of animation and game design, game programming, technical art, and producing and production management as inherent parts of a project module with a given semester topic. The module will follow the timeline of a real-life situation, including the steps ideation, concept, research and development, production and implementation, publishing, evaluation and documentation.

Teaching method

PBL encourages students to investigate complex questions or problems, design plans or experiments, collect and analyze data, draw conclusions, and create artifacts to present their acquired knowledge. PBL is a departure from traditional teaching methods, such as the problem-based learning strategy, in which the instructor's role is to guide the learning process rather than provide knowledge (Hmelo-Silver, C. E. & Barrows, H. S. (2006). "Goals and strategies of a problem-based learning facilitator," Interdisciplinary Journal of Problem-Based Learning, 1. 21-39.). In this perspective, feedback and reflection on the learning process and group dynamics are essential components of PBL. Students are seen as active agents engaged in social knowledge construction. Nevertheless, a professional and reliable input framework is necessary.

Teaching methods in the projects can be:

- Seminar.
- Impulse keynote talk.
- Project 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

- Identify problem.
- Begin exploration.
- Start investigation.
- Launch research.
- Design and formulate plan.
- Develop solution.
- Share and analyze results.
- Conclude on project.

Advantages of PBL compared to traditional teaching methods

- Promotes deeper understanding through active engagement.
- Develops problem-solving and critical thinking skills.
- Fosters creativity and innovation.
- Fosters collaboration and teamwork.
- Facilitates real-world application of knowledge.
- Motivates students by making learning relevant.
- Improves communication and presentation skills.
- Promotes self-directed learning and autonomy.
- Provides opportunities for cross-disciplinary learning.
- Enables the integration of technology into learning.

Semester 1

Game Programming 1

Field of Specialization: Technology

1	**Module Name**	
	Game Programming 1	
1.1	**Module Code**	
	AG-GP1	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Game Programming 1	
1.4	**Semester**	
	Semester 1	
1.5	**Module Responsible**	
	Prof. Dr. Martin Leissler	
1.6	**Teaching Professors**	
	Prof. Dr. Martin Leissler, Prof. Stephan Jacob, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Basic game programming: This topic should cover the basic syntax and control structures of a major programming language, as well as its applications in game development. It should also include practical exercises in implementing game logic and game mechanics.	
	• Basic OOP for Games: This topic should cover the fundamental concepts of object-oriented programming (OOP) and its applications in game development. It should also include practical exercises in designing and implementing game systems using OOP principles.	
	• Basic Graphics Programming: This topic should cover the basic concepts and techniques of graphics programming, focusing on software rendering techniques that do not rely on a graphics processing unit (GPU) or DirectX. It should also include practical exercises in implementing basic 2D and 3D graphics rendering algorithms.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	
	• Implement simple games with basic mechanics by applying basic programming concepts in a major programming language.	
	• Apply object-oriented programming principles to game development, creating well-structured and reusable	

		code that is easy to maintain and expand.
		• Implement basic 2D graphics in their games, using low-level drawing routines or basic graphics libraries to create visually interesting and engaging game experiences.
4	**Teaching Methods**	
	Lecture, practical	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 125 h	
	Contact Hours: 4 SWS 52 h	
	Self-study: 73 h	
	Credit Points: 5	
6	**Assessment Methods**	
	Written exam or practical exam. The assessment method and duration will be announced at the beginning of the module. The exam can be repeated.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, winter term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	A literature list will be provided to students at the beginning of the course.	
	Examples:	
	The C++ Programming Language, 4th Edition by Bjarne Stroustrup	
	Beginning C++ Game Programming: Learn to program with C++ by building fun games, 2nd Edition by John Horton	
	Real-Time Rendering, Fourth Edition 4th Edition by Tomas Akenine-Möller et al.	
	Mastering Open Frameworks: Creative Coding Demystified by Denis Perevalov	

Algorithms and Data Structures for Games

Field of Specialization: Technology

1	**Module Name**	
	Algorithms and Data Structures for Games	
1.1	**Module Code**	
	AG-ADG1	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Algorithms and Data Structures for Games	
1.4	**Semester**	
	Semester 1	
1.5	**Module Responsible**	
	Prof. Dr. Martin Leissler	
1.6	**Teaching Professors**	
	Prof. Dr. Martin Leissler, Prof. Stephan Jacob, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Linear data structures: This topic should cover common linear data structures such as arrays, linked lists, stacks, and queues, and their applications in game development. It should also include practical exercises in implementing and manipulating linear data structures in code, and cover topics such as traversal algorithms, sorting and searching algorithms, and performance analysis.	
	• Non-linear data structures: This topic should cover common non-linear data structures such as trees, graphs, and hash tables, and their applications in game development. It should also include practical exercises in implementing and manipulating non-linear data structures in code, and cover topics such as traversal algorithms, graph algorithms, and collision detection algorithms.	
	• Runtime and memory complexity: This topic should cover the concepts of runtime and memory complexity and their significance in game development. It should also include practical exercises in analyzing and optimizing the performance of game algorithms and data structures, and cover topics such as algorithmic efficiency, profiling tools, and memory management techniques.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	
	• Implement common linear data structures, such as arrays, linked lists, and stacks, and use them to efficiently manage game data, such as player inventories or enemy AI behaviors.	
	• Implement non-linear data structures, such as trees, graphs, and hash tables, and use them to efficiently	

	manage more complex game data, such as game maps or player networks. • Analyze the runtime and memory complexity of their game algorithms and data structures, using tools such as Big O notation to optimize their code for better performance and scalability.
4	**Teaching Methods** Lecture, practical
5	**Credit Points, Contact Hours and Self Study** Workload: 125 h Contact Hours: 4 SWS 52 h Self-study: 73 h Credit Points: 5
6	**Assessment Methods** Written exam or practical exam. The assessment method and duration will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites** -
8	**Recommended Prerequisite Knowledge** -
9	**Duration and Frequency** 1 semester, winter term
10	**Used in other Modules** -
11	**Recommended Reading** A literature list will be provided to students at the beginning of the course. Example: Data Structures and Algorithms in C++ 2nd Edition by Michael T. Goodrich et al.

Art, Animation and Creative Technologies 1

Field of Specialization: Art and Design

1	**Module Name**
	Art, Animation and Creative Technologies 1
1.1	**Module Code**
	AG-AACT1
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Art, Animation and Creative Technologies 1
1.4	**Semester**
	Semester 1
1.5	**Module Responsible**
	Prof. Noa Kafka
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**

	• Introduction to animation
	  - Principles of animation.
	  - Basic principles of physics and mechanics for animations.
	  - Introduction to 2D and 3D animation techniques and production workflows.
	
	• Introduction to cinematography for animations, games and XR
	  - Basic cinematographic building blocks.
	  - Visual composition and staging for animations, games and XR.
	  - Introduction to cinematographic ideation and prototyping.
	  - Introduction to storytelling.
	  - Introduction to lighting and camera.
	  - Introduction to editing.
	  - Introduction to the analysis of animated scenes, sequences and films.
	  - Introduction to the history of animation and game cinematography.
	
	• Introduction to environment design
	  - Basic principles of spatial design for 2D, 3D and 360° environments.
	  - Introduction to research, ideation and prototyping methods for environment design.
	  - History and functions of environments in animations, games and XR productions.
	  - Introduction to color theory and color design.
	  - Introduction to texture design and texture creation methods.
	
	• Introduction to character design for animations, games and XR productions

	- Basic human and animal anatomy. - Introduction to figurative drawing and basic strategies of abstraction and stylization. - Introduction to physical and digital sculpting. - Functions of characters and creatures in animations, games and XR productions. - Introduction to narratological and psychological character concepts and theories. - Introduction to research, ideation and design methods for characters and creatures.
3	**Learning Outcomes** On successful completion of this module, students will be able to: • Identify and describe basic principles of animation their relevance to the representation of gravity, speed, dynamics, rhythm and timing in animation. • Demonstrate an awareness of methods and techniques to conceptualize and produce simple animations. • Explain and apply basic principles of visual storytelling and cinematography. • Use basic ideation, previsualization and prototyping methods to develop and test concepts for simple narrative sequences. • Analyze and discuss storyboards, animatics and animated sequences with regard to composition, staging, camera and editing using specialized vocabulary. • Identify and describe aesthetic, narrative and ludic functions of environments and settings for animations, games and XR experiences. • Explain and apply principles of spatial composition, perception and navigation for animation and game environments. • Demonstrate basic technical and artistic skills in creative research, conceptualization and prototyping of environment designs. • Identify and apply fundamental principles and methods of character and creature design. • Demonstrate visual observation and abstraction skills with regard to anatomy, shape, form, proportion, balance and weight an apply these in the design of simple anthropomorphic and animal figures. • Identify and describe the basics functions and types of characters in animations and games. • Describe and critically reflect the role of characters for audiences and players.
4	**Teaching Methods** Lecture, practical, project
5	**Credit Points, Contact Hours and Self Study** Workload: 250 h Contact Hours: 10 SWS 130 h Self Study: 120 h Credit Points: 10
6	**Assessment Methods** Portfolio exam. The portfolio requirements will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites** -
8	**Recommended Prerequisite Knowledge** -

9	**Duration and Frequency**	
	1 semester, winter term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	A reading list will be provided to students at the beginning of the course.	

Technical Art 1

1	**Module Name**	
	Technical Art 1	
1.1	**Module Code**	
	AG-TA1	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Technical Art 1 – Theoretical Lecture and Wrap-ups	
	Technical Art 1 – Practical	
1.4	**Semester**	
	Semester 1	
1.5	**Module Responsible**	
	Prof. Carla Heinzel	
1.6	**Teaching Professors**	
	Prof. Carla Heinzel, Prof. Stephan Jacob, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	Basic theoretical knowledge and practical assignments in the areas of:	

- Basics of 3D software paradigms.
- 3D modelling.
- 3D rigging.
- 3D texturing.
- 3D lighting.
- Interactive animation systems.
- Terrain systems.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:

- Understand basic principles of 3D software paradigms.
- Understand the technical principles of the animation and game 3D production pipeline in the areas of modeling, texturing, rigging, lighting, and animation.
- Construct and analyze 3D meshes in terms of efficiency and clean polygonal structures.
- Understand, construct and analyze UV layouts.
- Understand and apply different texturing methods.
- Analyze movement with regard to the requirements for its mechanical setup.
- Understand, construct and analyze rigging-mechanics in terms of animatability, efficiency, and deformability.
- Understand and apply basic digital lighting in realtime and offline rendering.
- Analyze movement with regard to interactivity and its technical requirements.
- Understand, construct and analyze interactive animation systems.
- Understand and manipulate virtual terrain systems.
- Identify and describe the basic principles of animation and their relevance to the representation of gravity, speed, dynamics, rhythm, and timing in animation.

4	**Teaching Methods**
	Lecture, practical

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 73 h
	Credit Points: 5

6	**Assessment Methods**
	Preliminary exam:

- Completion of Exercises
- Preliminary exam is ungraded
- Passing the preliminary exam is the prerequisite for participation in the exam.

Exam:

- Written exam

Duration of exam will be announced at the beginning of the module. Possibility of repeating the preliminary exam and the exam in the following semester.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter term
10	**Used in other Modules**
	"Basics of Technical Arts and 3D Graphics" in study program "Augmented and Virtual Reality Design"
11	**Recommended Reading**
	-

Basic Technologies

1	**Module Name**	
	Basic Technologies	
1.1	**Module Code**	
	AG-BT1	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Basic Technologies - Theoretical Lecture and Wrap-ups (2 SWS)	
	Basic Technologies - Practical (2 SWS)	
1.4	**Semester**	
	Semester 1	
1.5	**Module Responsible**	
	Prof. Stephan Jacob	
1.6	**Teaching Professors**	
	Prof. Stephan Jacob, Prof. Dr. Martin Leissler, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

- Basic game engine use
  - Introduction to popular game engines, such as Unity or Unreal Engine.
  - Navigating the user interface and understanding the basic functionalities.
  - Importing and manipulating assets, including 3D models, textures, and audio files.
  - Setting up and manipulating hierarchical scenes and levels.
  - Using pre-built components for setting up basic in-engine functionality.

- Computer graphic principles
  - Understanding the concept of a render pipeline and its role in generating real-time graphics.
  - Exploring the stages of a typical render pipeline, including geometry processing, shading, and rasterization.
  - Basic mathematic principles for 3D Graphics such as Vector or Matrix Algebra
  - Hands-on experience with configuring rendering settings and optimizing graphics performance.
  - Introduction to shader development and customization using shading tools.

- High-level visual scripting
  - High-level visual scripting (HLVS) basics: This topic should cover the basics of HLVS tools. It should include practical exercises in building simple game behaviors based on gameplay-systems using HLVS tools, and cover topics such as event-driven visual programming, conditions, and variable management.
  - Game systems: This topic should cover the design and usage of game systems such as character control, inventory management, quests, or dialog. It should also include practical exercises in using and integrating game systems using a game engine, and cover topics such as data-oriented workflows,

	event handling, and interactions.
	- Combining HLVS with game systems for prototyping: This topic should cover the process of using HLVS tools to rapidly prototype behaviors using game systems and integrate them into a larger game project. It should also include practical exercises in building and testing prototype systems using HLVS tools, and cover topics such as iteration, testing, and optimization.
	- Introduction to concepts such as node-based and layer-based systems.
3	**Learning Outcomes** On successful completion of this module, students will be able to: • Demonstrate understanding of fundamental concepts in game engines, render pipelines, and high-level scripting. • Identify the roles and functionalities of different components within a game engine and render pipeline. • Apply critical thinking to solve technical challenges in game development and animations. • Evaluate the suitability of game engine features and optimization techniques for specific tasks. • Utilize game engines pre-built systems for basic mechanics and visual effects. • Implement shaders and write high-level scripts to enhance game functionality and interactivity. • Communicate technical concepts effectively. • Collaborate and work as a team member in game development projects. • Apply problem-solving skills to overcome technical challenges.
4	**Teaching Methods** Lecture, practical
5	**Credit Points, Contact Hours and Self Study** Workload: 125 h Contact Hours: 4 SWS 52 h Self Study: 73 h Credit Points: 5
6	**Assessment Methods** Presentation or term paper. The assessment method will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites** -
8	**Recommended Prerequisite Knowledge** -
9	**Duration and Frequency** 1 semester, winter term
10	**Used in other Modules** -

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.
	Examples:
	Akenine-Möller, Tomas; Haines, Eric; Hoffman, Naty (2019) [2008]. Real-Time Rendering.
	"Graphics Pipeline". Microsoft
	Nipp, K.; Stoffer, D. (1998). Lineare Algebra. v/d/f Hochschulverlag der ETH Zürich
	Lawrence, Jason (October 22, 2012). "3D Polygon Rendering Pipeline"
	Unity From Zero to Proficiency (Foundations) - Patrick Felicia
	Hands-On Unity 2022 Game Development - Nicolas Alejandro Borromeo
	Game Creator 2 Documentation (online): https://docs.gamecreator.io/
	Databrain Documentation (online): https://giantgrey.gitbook.io/databrain

Game Design

1	**Module Name**
	Game Design
1.1	**Module Code**
	AG-GD1
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Game Design
1.4	**Semester**
	Semester 1
1.5	**Module Responsible**
	Prof. Stephan Jacob
1.6	**Teaching Professors**
	Prof. Stephan Jacob, N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Introduction to game design.
	• Game mechanics and gameplay.
	• Game narrative and storytelling.
	• Level and environment design.
	• User experience (UX) and player psychology.

- Game prototyping and iterative design.
- Multiplayer and social interaction design.
- Game aesthetics and art direction and its influence on game design.
- Game testing and quality assurance (QA).

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:

- Demonstrate knowledge and understanding of fundamental game design principles, concepts, and terminology.
- Identify and analyze different game genres and their design characteristics.
- Apply critical thinking to analyze and evaluate game mechanics, gameplay elements, and narrative structures.
- Synthesize and integrate various design components to create cohesive and engaging game experiences.
- Apply game design principles to create and refine game mechanics, rules, and progression systems.
- Utilize level design tools and techniques to design immersive game environments.
- Communicate game design concepts and ideas effectively to peers and stakeholders.
- Collaborate and work as a team member in game design projects.
- Apply problem-solving skills to iteratively design, prototype, and playtest games.
- Demonstrate creativity and innovation in designing game mechanics, aesthetics, and user experiences.

4	**Teaching Methods**
	Lecture, seminar

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 73 h
	Credit Points: 5

6	**Assessment Methods**
	Presentation or term paper. The form of the assessment and the time required to complete it will be announced at the beginning of the module. It is possible to repeat the exam.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Methodology 1
Submodule: Producing and Production Management 1

1	**Module Name**	
	AG Methodology 1	
1.1	**Module Code**	
	AG-PPM1	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Submodule: Producing and Production Management 1	
1.4	**Semester**	
	Semester 1	
1.5	**Module Responsible**	
	Prof. Boris Kunkel	
1.6	**Teaching Professors**	
	Prof. Boris Kunkel. N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content** • Strategies for optimizing productivity and utilizing time efficiently. • Personal effectiveness and self-management. • Critical thinking and problem solving in animation, game development, and XR production. • Creative techniques for innovative content in animation, games and XR. • Success factors in the production of animation, games and XR.	
3	**Learning Outcomes** On successful completion of this module, students will be able to: • Implement work efficiency strategies in animation, game development, and XR production and streamline creative processes. • Develop critical thinking, problem solving, and communication skills to enhance personal contribution in a collaborative environment. • Apply a variety of creative techniques to create innovative content in animation, game and XR experiences. • Understand and apply key success factors in animation, games and XR production such as communication, teamwork and project organization.	

4	**Teaching Methods**
	Lecture

5	**Credit Points, Contact Hours and Self Study**
	Workload: 62,5 h
	Contact Hours: 2 SWS 26 h
	Self Study: 36,5 h
	Credit Points: 2,5

6	**Assessment Methods**
	Term paper or written exam. The form of the assessment and the time required to complete it will be announced at the beginning of the module. It is possible to repeat the exam.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	Bierbaum (2019). Personal Effectiveness: Be Your Best Self
	Blokdyk (2018). Creativity techniques: Standard Requirements
	Cottrell (2019). 50 Ways to Manage Time Effectively
	Grover (2020). Project Management Practices: Roadmap to Project Success
	Mugariri (2021). Extraordinaire: How to use effective and efficient study skills to consistently score excellent grades. How you can become a straight-A student in High School
	Further reading will be provided to students at the beginning of the module.

Methodology 1
Submodule: Design Theory 1

1	**Module Name**	AG Methodology 1
1.1	**Module Code**	AG-DT1
1.2	**Module Type**	Compulsory
1.3	**Course Title**	Submodule: Design Theory 1
1.4	**Semester**	Semester 1
1.5	**Module Responsible**	Prof. Noa Kafka
1.6	**Teaching Professors**	N.N.
1.7	**Level of Study**	Bachelor
1.8	**Language of Instruction**	English

2	**Indicative Module Content**
	• Introduction to experience design theories and methods.
	• Basic principles of interaction design for interactive animations, games and XR experiences.
	• Basic ideation and prototyping strategies.
	• Introduction to creativity theories.
	• Introduction to theories of visual communication.
	• Modes of visual representation in animations, games and XR experiences.
	• Introduction to key elements and principles of visual design in animations, games and XR experiences.
	• Representation and perception of time, space and motion in animations, games and XR experiences.
	• Concepts and theories of realism and abstraction in animations and games.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Explain basic experience design and interaction design concepts and theories in regards to animations, games and XR experiences.
	• Understand, contextualize and apply iterative design methods and prototyping strategies in the conceptualization and development of animation, game and XR experiences.

- Identify and describe basic creativity theories and creative strategies.
- Identify and describe fundamental aesthetic and structural characteristics of animations and games.
- Deconstruct modes and strategies of visual representation and communication in animations, games and and XR experiences.
  - Describe and compare animations and games with regard to stylistic features.

4	**Teaching Methods** Lecture
5	**Credit Points, Contact Hours and Self Study** Workload: 62,5 h Contact Hours: 2 SWS 26 h Self Study: 35,5 h Credit Points: 2,5
6	**Assessment Methods** Presentation or term paper. The assessment method will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites** -
8	**Recommended Prerequisite Knowledge** -
9	**Duration and Frequency** 1 semester, winter term
10	**Used in other Modules** -
11	**Recommended Reading** A reading list will be provided to students at the beginning of the course.

Semester 2

Game Programming 2

Field of Specialization: Technology

1	**Module Name**
	Game Programming 2
1.1	**Module Code**
	AG-GP2
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Game Programming 2
1.4	**Semester**
	Semester 2
1.5	**Module Responsible**
	Prof. Dr. Martin Leissler
1.6	**Teaching Professors**
	Prof. Dr. Martin Leissler, Prof. Stephan Jacob, N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Game Engine-based development: This topic should cover the fundamental syntax and concepts of game engine-based programming, as well as the basics of using a game engine such as Unity. It should also include practical exercises in building simple games using a major programming language and a game engine, and cover topics such as scene management, asset management, and basic gameplay mechanics.
	• OOP Patterns for games: This topic should cover the fundamental concepts and patterns of object-oriented programming (OOP), and how they apply to game development. It should also include practical exercises in building game systems using OOP patterns, such as the Entity-Component-System (ECS) pattern or the Observer pattern.
	• AI/behavior basics: This topic should cover the fundamental concepts and techniques of artificial intelligence (AI) and behavior programming, and how they apply to game development. It should also include practical exercises in building simple AI behaviors using a game engine and programming techniques such as state machines or pathfinding.
3	**Learning Outcomes**
	On successful completion of this module, students will be able to:

	• Use game engines and associated programming languages to create basic game mechanics, such as player movement, input handling, and scoring systems. • Apply object-oriented programming (OOP) patterns to game development, creating well-structured and reusable code that is easy to maintain and expand. • Implement basic artificial intelligence (AI) and behavior mechanics in their games, such as simple enemy movement, decision-making, or game object interaction to create more challenging and engaging gameplay experiences.
4	**Teaching Methods** Lecture, practical
5	**Credit Points, Contact Hours and Self Study** Workload: 125 h Contact Hours: 4 SWS 52 h Self Study: 63 h Credit Points: 5
6	**Assessment Methods** Written exam or practical exam. The assessment method will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites** Game Programming 1
8	**Recommended Prerequisite Knowledge** -
9	**Duration and Frequency** 1 semester, summer term
10	**Used in other Modules** -
11	**Recommended Reading** A reading list will be provided to students at the beginning of the course. Examples: Game Programming Patterns by Robert Nystrom Head First Design Patterns: A Brain-Friendly Guide First Edition by Eric Freeman et al.

Graphics Programming

Field of Specialization: Technology

1	**Module Name**
	Graphics Programming
1.1	**Module Code**
	AG-GRP
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Graphics Programming – Theoretical Lectures and Wrap-ups (2 SWS)
	Graphics Programming – Practicals (2 SWS)
1.4	**Semester**
	Semester 2
1.5	**Module Responsible**
	Prof. Stephan Jacob
1.6	**Teaching Professors**
	Prof. Stephan Jacob, Prof. Dr. Martin Leissler, N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Overview of graphics programming and its applications.
	• Introduction to graphics libraries and APIs (e.g. OpenGL, DirectX, …).
	• Creating and manipulating graphics objects.
	• Understanding the render pipeline and its stages.
	• Introduction to shaders and their role in graphics programming.
	• Overview and use of a high-level shading language.
	• Understanding the fundamentals of lighting and shading.
	• Techniques for optimizing graphics applications for performance and efficiency.
	• Resource management strategies and Advanced optimization techniques like culling and LOD.

3	**Learning Outcomes**

On successful completion of this module, students will be able to:

- Apply technical skills to design and implement 2D and 3D graphics applications using various programming languages, libraries, and tools.

- Develop and understanding of the render pipeline, 3D Mathematics and the role of APIs in facilitating the creation and manipulation of graphics objects, materials and effects.

- Create and modify shaders using a high-level shading language to achieve desired visual effects.

- Analyze and optimize graphics applications for performance, efficiency, and quality.

- Evaluate different rendering techniques and apply optimization strategies to enhance application performance and minimize rendering problems.

- Understand the importance of managing resource usage and applying advanced techniques to improve performance and visual quality.

- Explore the integration of graphics programming with other areas of computer science, such as computer vision, human-computer interaction, and machine learning.

- Apply graphics programming to solve real-world problems in these areas and develop applications that demonstrate this integration.

- Understand the importance of creating efficient and effective graphics applications that meet specific user needs and goals.

4	**Teaching Methods**

Lecture, practical

5	**Credit Points, Contact Hours and Self Study**

Workload: 125 h

Contact Hours: 4 SWS 52 h

Self Study: 63 h

Credit Points: 5

6	**Assessment Methods**

Written exam or practical exam. The assessment method will be announced at the beginning of the module. The exam can be repeated.

7	**Module Prerequisites**

-

8	**Recommended Prerequisite Knowledge**

-

9	**Duration and Frequency**

1 semester, summer term

10	**Used in other Modules**

-

11	**Recommended Reading**

A reading list will be provided to students at the beginning of the course.

Examples:

Akenine-Möller, Tomas; Haines, Eric; Hoffman, Naty (2019) [2008]. Real-Time Rendering. "Graphics Pipeline". Microsoft

Nipp, K.; Stoffer, D. (1998). Lineare Algebra. v/d/f Hochschulverlag der ETH Zürich

Lawrence, Jason (October 22, 2012). "3D Polygon Rendering Pipeline"

Art, Animation and Creative Technologies 2

Field of Specialization: Art and Design

1	**Module Name**	
	Art, Animation and Creative Technologies 2	
1.1	**Module Code**	
	AG-AACT2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Art, Animation and Creative Technologies 2	
1.4	**Semester**	
	Semester 2	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

- Animation
  - Movement and rhythm: Animation as expression of intent and emotion.
  - Animation as narrative tool.
  - Introduction to acting for animators.
  - Advanced body mechanics for animators.
  - Animation practice and portfolio building.

- Cinematography for animations, games and XR
  - Storytelling and worldbuilding for animations, animations, games and XR formats.
  - Cinematographic techniques and strategies for animations, games and 360° productions.
  - Lighting concepts, methods and techniques for 2D, 3D and 360° environments.
  - Introduction to 3D animation prototyping and real-time cinematography.
  - Research, ideation, pre-production and documentation methods.
  - Genre, form and style in animation and game cinematography.

- Environment design
  - Textures and materials design.
  - Digital creation techniques and workflows for architectures, terrains and landscapes.
  - Real world capture and recording.
  - Cinematography and game level prototyping in 3D and 360° spaces.
  - Staging, pacing, spatial dramaturgy and attention direction in animation, games, and XR environments.
  - Settings and environments as semiotic, narrative and ludic spaces.

	- History of visual arts and architecture for environment designers. - Visual development research; look development, iteration and documentation methods and techniques in environment design. • Character design for animation, game and XR productions - Narrative design of character and creature behaviors. - Stylistic expression and design language in character design. - Emphasizing personality though poses, gestures and facial expressions. - Designing colors, costumes and props with regard to character role and setting. - Surfaces, textures and materials in character and creature design. - Digital character and creature creation workflows and technologies for animation, game and XR productions. - Concepts and theories related to the perceptual and emotional engagement of audiences/players with characters and creatures in animation, game and XR productions. - Research, ideation, documentation and presentation methods in character and creature design. - Ethical issues in character and creature design; diversity and intercultural perspectives.
3	**Learning Outcomes** On successful completion of this module, students will be able to: • Identify and describe animation styles and concepts and their impact in animations, games and XR. • Analyze and understand movement, rhythm and choreography as narrative tools. • Conceptualize and implement believable character animation; critically analyze own work as well as the work of others. • Demonstrate knowledge and understanding related to core principles, terminology, workflows and techniques used in virtual animation cinematography. • Create concepts and prototypes for animated sequences and short formats such as animated short films, trailers, cinematics. • Analyze and evaluate short animated formats with regard to narration, dramaturgy and cinematography • Appreciate the role of lighting for experience design and spatial narration. • Design, previsualize and implement lighting scenarios for digital environments. • Perform design research, develop, previsualize and prototype sets and environments for animations, games and XR productions. • Evaluate spatial designs with regard to stylistic, narrative, ludic and functional consistency. • Demonstrate knowledge and skills in the field of creative research, ideation, development and industry standard production workflows of digital characters and creatures. • Analyze and evaluate character and creature designs with regard to originality, authenticity, stylistic consistency, functionality, production context and target audience. • Demonstrate a critical awareness of ethical, intercultural and diversity issues with regard to character and creature designs. • Produce industry standard documentation of character and creature designs with regard to narrative/ludic function, stylistic language, construction, digital production and animation. • Analyze and discuss character design and behavior with regard to agency, presence, identification and immersion in animations, games and XR.
4	**Teaching Methods** Lecture, practical, project
5	**Credit Points, Contact Hours and Self Study** Workload: 250 h Contact Hours: 10 SWS 130 h Self Study: 120 h

	Credit Points: 10
6	**Assessment Methods** Portfolio exam. Portfolio requirements will be announced at the beginning of the course. The exam can be repeated.
7	**Module Prerequisites** -
8	**Recommended Prerequisite Knowledge** -
9	**Duration and Frequency** 1 semester, summer term
10	**Used in other Modules** -
11	**Recommended Reading** A reading list will be provided to students at the beginning of the course.

Technical Art 2

1	**Module Name**	
	Technical Art 2	
1.1	**Module Code**	
	AG-TA2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Technical Art 2 - Theoretical Lecture and Wrap-ups	
	Technical Art 2 - Practical	
1.4	**Semester**	
	Semester 2	
1.5	**Module Responsible**	
	Prof. Carla Heinzel	
1.6	**Teaching Professors**	
	Prof. Carla Heinzel, Prof. Stephan Jacob	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

Advanced theoretical knowledge and practical assignments in the areas of:

- Modelling
- Rigging
- Shading
- Lighting

Theoretical knowledge in the areas of:

- Basic mathematical and geometric principles of 3D software

3	**Learning Outcomes**

On successful completion of this module, students will be able to:

- Understand and apply advanced principles of the animation and game 3D production pipeline in the areas of modelling, rigging, shading and lighting.
- Understand basic mathematical and geometric principles of transformation in 3D software.
- Analyze and construct 3D meshes for efficiency and deformability.
- Analyze and construct mechanics for 3D animation in terms of animation-friendliness and flawless animated movement.
- Understand basic principles of digital shading.
- Analyze materials in terms of digital realization.
- Understand and apply shading methods.
- Understand and apply digital lighting methods for realtime and offline rendering.
- Analyze lighting setups in terms of efficiency and feasibility.

4	**Teaching Methods**

Lecture, practical

5	**Credit Points, Contact Hours and Self Study**

Workload: 125 h

Contact Hours: 4 SWS 52 h

Self Study: 63 h

Credit Points: 5

6	**Assessment Methods**

Preliminary exam:

- Completion of exercises
- Preliminary exam is ungraded
- Passing the preliminary exam is the prerequisite for participation in the exam

Exam:

- Written exam

Duration of written exam will be announced at the beginning of the course.

Possibility of repeating the preliminary exam and the exam in the following semester.

7	**Module Prerequisites**

-

8	**Recommended Prerequisite Knowledge**

-

9	**Duration and Frequency**

1 semester, summer term

10	**Used in other Modules**
	"Basics of Technical Arts and 3D Graphics" in study program "Augmented and Virtual Reality Design"
11	**Recommended Reading**
	-

Sprint Project 1 / Sprint Project 2

1	**Module Name**	
	Sprint Project 1 / Sprint Project 2	
1.1	**Module Code**	
	AG-SP1 / AG-SP2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Sprint Project 1 / Sprint Project 2	
1.4	**Semester**	
	Semester 2	
1.5	**Module Responsible**	
	Prof. Tilmann Kohlhaase	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

Series of two team projects that encourages creative solutions by applying a variety of skills:

- Art, design and animation
  - Techniques and strategies of idea generation, concept development and concept presentation.
  - Introduction to design methods (research/design heuristics, iteration, design documentation basics).
  - Basic visualization and prototyping for animations, games and XR experiences.
  - Introduction to interaction design.
  - Introduction to storytelling for animations, games and XR experiences (principles of linear and non-linear storytelling and dramaturgy).
  - Analysis and critique of existing animation and gameplay concepts.
  - Introduction to sound design: The role of sound for animations, games and XR experiences.

- Methodology
  - Introduction to marketing and branding in the entertainment industry.
  - Resource planning, time estimation and planning.
  - Processes, roles and methods of producing an animation, game or XR experience and managing teams.
  - Introduction to processes and methods of developing knowledge and fostering innovation.
  - Animation and game studies: Genres and genre languages, animation and game history, animation and game theory.
  - Animation and game culture: Concepts, practices and ethical frameworks.

- Technical art
  - Basics of computer generated graphics: Modeling, rigging, texturing/shading, animation, lighting, rendering, and asset creation.
  - Introduction to pipeline management.

- Introduction to data management and transfer.
- Technology
  - Introduction to gameplay mechanics and game interaction patterns.
  - Basic object-oriented game software development.
  - Game software architectures and feature implementation.
  - Runtime performance considerations.
  - Applied principles of computer graphics programming.
  - Applied artificial intelligence in games.
  - Game physics primer.
  - Introduction to tools, methods, and technologies for prototyping and previsualisation.
  - Basics of game testing and usability.

3	**Learning Outcomes**

The objective of Sprint Project 1 and Sprint Project 2 is to encourage the development of creativity in students through a series of short, well-defined project activities. These activities should promote awareness of the issues associated with the development of ideas and the use of appropriate audiovisual language in the communication of those ideas. Short sprint projects involving animation, simple game mechanics, audio, character creation, code implementation or use of game engines for linear or interactive applications should be developed to allow the student to experience the range of creative activities within contemporary practice in animation, games or XR experiences.

In these short projects, students are familiarized with the aesthetic and technological implications related to the creation of two- and three-dimensional ludic or narrative worlds. They are encouraged to integrate fundamental concepts of storytelling, cinematography, and gameplay. Students will be introduced to the standard project phases of concept development, planning, pre-production, production, and testing, and will gain initial production skills. They are encouraged to take responsibility for self-directed, group-oriented learning processes and to explore individual and collective methods of problem solving. They also take on different roles and functions in the production process to find their own strengths and artistic voice.

By creating a simple animation, game, or XR-related task, students are exposed to the dynamics of the various disciplines and roles that contribute to animation and game production. They experience the essential characteristics of both fields of practice and explore the creative potential at the intersection of game and animation. They will develop an awareness of the aesthetic specificities of genres and formats that will guide their creative decision-making.

The module might be carried out as a COIL project (Collaborative Online International Learning), connecting students with students from international partner universities to prepare intercultural communication skills and introduce them to remote project work.

Collaborative Online International Learning (COIL), an educational approach using online technology, has become a popular tool in universities around the world to support curriculum internationalization (Rubin, 2017). COIL can facilitate the development of students' intercultural competence at their home institution, and thus could be a way to ensure that all students have the opportunity to develop intercultural competence, not just the select few who take advantage of study or internship abroad. COIL falls under the social constructivist educational approach of collaborative learning and emphasizes learning through social interaction, which is a cornerstone of intercultural competence development (Guth & Rubin, 2015). An exploratory study found that students who took a COIL course had positive attitudes toward international online collaboration, but also found that diversity in communication styles could hinder successful learning experiences (Kayumova & Sadykova, 2016). Naicker et al. (2021) found that students were more open to learning about other cultures, different religions, and traditions after a COIL experience. Vahed and Rodriguez (2020) discovered that COIL positively influenced intercultural awareness and stimulated students to be globally engaged.

On successful completion of this module, students will be able to:

- Understand and experience key characteristics of team based projects and related communication processes.
- Understand and apply basic methods of producing techniques and production management.
- Apply basic principles of research to relevant areas of project tasks, such as: project topic, target audience and users, existing products, social and cultural environment, functional and technical conditions.
- Demonstrate methodical and practical skills in creating, visualizing and evaluating ideas and concepts related to animations, games and XR experience.
- Produce a simple animation or game/game prototype or XR experience in an appropriate media language and with necessary technical skills.
- Identify basic concepts and models of culture and communication and apply them to the field of animation and game production and reception.
- Be aware of intercultural challenges, possibilities as well as demands from remote project workflows.
- Develop intercultural competence, cultural intelligence, and multicultural personality.

4	**Teaching Methods**

Project, seminar, lecture, peer review and tutorials, presentations and demonstrations, assisted teamwork, COIL

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 2 SWS 26 h
	Self Study: 99 h
	Credit Points: 5

6	**Assessment Methods**
	Presentation and portfolio exam.
	• Presentation: 25%
	• Portfolio exam: 75%
	Duration of presentation and portfolio requirements are announced at the beginning of the course.
	The exam can be repeated.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, summer term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	-

Methodology 2
Submodule: Producing and Production Management 2

1	**Module Name**	
	AG Methodology 2	
1.1	**Module Code**	
	AG-PPM2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Submodule: Producing and Production Management 2	
1.4	**Semester**	
	Semester 2	
1.5	**Module Responsible**	
	Prof. Boris Kunkel	
1.6	**Teaching Professors**	
	Prof. Boris Kunkel, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Introduction to the techniques essential for successful production planning and management in the context of animation, game and XR experiences.	
	• Key concepts related to production planning and management.	
	• Principles and strategies for building effective teams and fostering collaboration in the production of animation, game and XR experiences.	
	• Team-building techniques to organize and execute production processes.	
	• Critical thinking approaches to analyze project content and assess its impact on the quality of animation, game and XR experiences.	
	• Problem-solving techniques to make informed decisions and improve the overall quality of the production.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	
	• Demonstrate an understanding of essential techniques for successful production planning and management of animation, game and XR experiences to enable efficient project execution.	
	• Apply key production planning and management concepts to effectively coordinate and oversee the creation of animation, game and XR experiences.	
	• Implement principles and strategies to build cohesive teams, foster collaboration, and increase	

		productivity in the production of animation, game and XR experiences.
		• Use team-building techniques to organize and execute production processes to ensure smooth workflow and timely delivery of animation, game and XR experiences.
		• Apply critical thinking approaches to analyze project content and assess its impact on the overall quality of animation, game and XR experiences, enhancing creative decision-making and problem-solving skills.
4	**Teaching Methods**	
	Lecture	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 62,5 h	
	Contact Hours: 2 SWS 26 h	
	Self Study: 36,5 h	
	Credit Points: 2,5	
6	**Assessment Methods**	
	Term paper or written exam. The form of the assessment and the time required to complete it will be announced at the beginning of the module. It is possible to repeat the exam.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, summer term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	Bourne (2015). Making Projects Work: Effective Stakeholder and Communication Management.	
	Duarte (2010). Resonate: Present Visual Stories that Transform Audiences.	
	Lencioni (2002). The Five Dysfunctions of a Team: A Leadership Fable.	
	Portny (2017). Project Management For Dummies.	
	Further reading will be provided to students at the beginning of themodule.	

Methodology 2
Submodule: Design Theory 2

1	**Module Name**	
	AG Methodology 2	
1.1	**Module Code**	
	AG-DT2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Submodule: Design Theory 2	
1.4	**Semester**	
	Semester 2	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Modes of character representation in animations, games and XR experiences.	
	• Introduction to theories of narrative representation and fictionality in animations and games.	
	• Introduction to theories of cognition, emotion and involvement related to animations and games.	
	• Introduction to player/audience psychology and conceptualizations of player culture/spectatorship.	
	• Diversity and interculturalism in animations and games; introduction to design ethics.	
	• Introduction to animation and game studies.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	
	• Describe and compare animations, games and XR experiences with regard to modes of visual and narrative representation.	
	• Identify and describe basic dimensions of perceptual, cognitive and emotional and ludic engagement of audiences and players.	
	• Analyze animation, game and XR productions from experiential perspectives and describe the effect of their formal and structural properties on player/audience experience.	
	• Demonstrate an awareness of social, cultural and ethical contexts of animation and game creation and	

		reception.
		• Make use of academic sources and present concepts and arguments in a structured manner using appropriate academic and professional language.
4	**Teaching Methods**	
	Lecture	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 62,5 h	
	Contact Hours: 2 SWS 26 h	
	Self Study: 35,5 h	
	Credit Points: 2,5	
6	**Assessment Methods**	
	Presentation or term paper. The assessment method will be announced at the beginning of the module. The exam can be repeated.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, summer term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	A reading list will be provided to students at the beginning of the course.	

Semester 3

Network Programming for Games

Field of Specialization: Technology

1	**Module Name**	
	Network Programming for Games	
1.1	**Module Code**	
	AG-NP	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Network Programming for Games	
1.4	**Semester**	
	Semester 3	
1.5	**Module Responsible**	
	Prof. Stephan Jacob	
1.6	**Teaching Professors**	
	Prof. Stephan Jacob, Prof. Dr. Martin Leissler, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Fundamentals of network programming: This topic should cover the basic concepts and techniques of network programming, such as network protocols, sockets, client-server architecture, and data serialization. It should also include practical exercises in programming simple networked applications, such as chat programs or simple games, using low-level socket APIs.	
	• Concepts and approaches to common challenges in network programming: This topic should cover the main challenges and techniques involved in designing and implementing network games, such as synchronization, prediction, interpolation, and anti-cheating measures. It should also include practical exercises in programming simple multiplayer games, such as tic-tac-toe or Pong, using custom networking code.	
	• Using In-Engine network frameworks: This topic should cover the main features and usage of popular in-engine network frameworks, such as Unity Netcode for GameObjects. It should also include practical exercises in programming simple multiplayer games using these frameworks.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	

- Demonstrate an understanding of the fundamental concepts of network programming, including protocols, sockets, and packet management.
- Analyze and apply different approaches and techniques for addressing common challenges in network programming, such as latency, packet loss, and synchronization.
- Use in-engine network frameworks, such as Unity's Netcode for GameObjects or Unreal Engine's Gameplay Framework, to implement networked multiplayer features in their games, including matchmaking, authoritative server, and player synchronization.

4	**Teaching Methods**
	Lecture, practical

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 63 h
	Credit Points: 5

6	**Assessment Methods**
	Written exam or practical exam. The assessment method and duration will be announced at the beginning of the module. The exam can be repeated.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Art, Animation and Creative Technologies 3

Field of Specialization: Art and Design

1	**Module Name**
	Art, Animation and Creative Technologies 3
1.1	**Module Code**
	AG-AACT3
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Art, Animation and Creative Technologies 3
1.4	**Semester**
	Semester 3
1.5	**Module Responsible**
	Prof. Tilmann Kohlhaase
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Animation - Advanced character and creature animation - Motion capturing (facial and body). - Animation practice and portfolio building. - Facial animation. - Using and planning technical tools in the process of animation (life action reference, motion capture, behavior trees, motion libraries, procedural animation etc.). - Experimental animation. • Scripting for Artists - Scripting for 3D applications (e.g. Python scripting for Maya). - Creating plug-ins for 3D applications. - Creating macros through scripting.

3	**Learning Outcomes**

On successful completion of this module, students will be able to:

- Identify methods and use cases of procedural animation.
- Distinguish and implement acting methods and choices in regards to narration of animation, games and XR.
- Differentiate and apply state of the art animation techniques and workflows.
- Identify and critically analyze established animation forms, styles and approaches and develop an own artistic handwriting.
- Understand and apply basic scripting- and programming-principles such as variables, loops, conditions and functions.
- Know and name different data-types such as float, integer and boolean.
- Understand and implement common linear data structures such as arrays and lists.
- Implement scripts and plugins to optimize workflow in 3D software applications.
- Implement scripts and plugins to solve specific animation and game related problems.

4	**Teaching Methods**

Lecture, practical, project-based learning

5	**Credit Points, Contact Hours and Self Study**

Workload: 125 h

Contact Hours: 4 SWS 52 h

Self Study: 63 h

Credit Points: 5

6	**Assessment Methods**

Portfolio exam. Portfolio requirements are announced at the beginning of the course. The exam can be repeated.

7	**Module Prerequisites**

-

8	**Recommended Prerequisite Knowledge**

-

9	**Duration and Frequency**

1 semester, winter term

10	**Used in other Modules**

-

11	**Recommended Reading**

A reading list will be provided to students at the beginning of the course.

Animation and Game Project 3

1	**Module Name**
	Animation and Game Project 3
1.1	**Module Code**
	AG-P3
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Animation and Game Project 3
1.4	**Semester**
	Semester 3
1.5	**Module Responsible**
	Prof. Tilmann Kohlhaase
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Art, design and animation
	- Creating, documenting and presenting design concepts.
	- Design languages and styles.
	- Basics of visual branding and visual communication in animation and game.
	- Character design and character animation.
	- Environment and world design.
	- Digital scenography for animation and game.
	- Interaction design for games and interactive animations, introduction to concepts and methods of user centered design and experience design.
	- Storytelling and dramaturgy for linear and non-linear animation and game formats.
	- Advanced cinematography for animations and games.
	- Game design (level design, game balancing, game mechanics).
	- Basic directing of animations and games.
	- Design methods: Iteration, prototyping and previsualization, implementation).
	- Basics of sound design, music and dialogue writing for animations and games.
	- Creative coding.
	• Methodology
	- Research and development.
	- Introduction to financing and funding of animation, game and XR productions.
	- Legal aspects of production and distribution.
	- Managing remote teams.
	- Recruiting and human resources.
	- Introduction to quality management.

- Introduction to media reception theory and user research.
- Animation and game studies (intermediate level): Genres and genre languages, animation and game history, animation and game theory.
- Animation anf game culture (intermediate level): Concepts, practices and ethical frameworks.

- Technical Art
  - Intermediate computer generated graphics: Modeling, rigging, texturing/shading, animation, lighting/rendering, asset creation.
  - Introduction to additional CGI topics such as cloth simulation, hair simulation, fluid effects, fire effects, smoke effects, crowd simulation.
  - Intermediate lighting and rendering methods.
  - Intermediate rigging concepts and mechanics.
  - Introduction to post-production: Editing, sound, compositing.
- Technology
  - Introduction to source code repositories and collaborative development tools.
  - Intermediate gameplay mechanics and interaction patterns.
  - Advanced object-oriented game software development.
  - Advanced game engines: Architectures, features, and applications.
  - Basic 2D game programming principles and practices.
  - Intermediate principles of computer graphics.
  - Introduction to cross platform and mobile game development.
  - Intermediate artificial intelligence in games.
  - Introduction to real-time character animation.
  - Intermediate game programming physics.
  - Introduction to user interfaces for games.
  - Basics of interactive cinematography and game camera implementation.
  - Advanced tools and technologies for prototyping and previsualisation.
  - Intermediate game testing and usability analysis.

3	**Learning Outcomes**

This project focuses on the development of a functioning game/game prototype or animation format for a defined target audience and platform. Students will be encouraged to integrate industry-standard production methods and practices. They will acquire and apply advanced skills in problem solving and quality assurance, budgeting and project management to conceive and produce a marketable product. Based on scientific methods, they will establish branding and marketing objectives. They will explore and apply advanced methodical tools of analysis and evaluation in relation to audience/user-centered design. They will be exposed to advanced media technologies such as platforms, distribution channels, interaction and input devices. By creating a product for a defined platform and audience, students will learn to generate ideas, concepts and solutions in response to identified market needs.

On successful completion of this module, students will be able to:

- Apply producing and project management techniques, tools and strategies through all stages of a project.
- Demonstrate the use of appropriate research and presentation methods in the development and implementation of a project.
- 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.
- Apply an appropriate range of specialized software and hardware tools in the execution and completion of a project.
- Understand the importance of leading a production.

4	**Teaching Methods**

Project, seminar, lecture, peer review and tutorials, presentations and demonstrations, assisted teamwork

5	**Credit Points, Contact Hours and Self Study**
	Workload: 375 h
	Contact Hours: 8 SWS 104 h
	Self Study: 271 h
	Credit Points: 15
6	**Assessment Methods**
	Presentation and portfolio exam.
	• Presentation: 25%
	• Portfolio exam: 75%
	• The duration of the presentation and the portfolio requirements are announced at the beginning of the course. The exam can be repeated.
7	**Module Prerequisites**
	-
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Methodology 3
Submodule: Introduction into Research and Development

1	**Module Name**	
	AG Methodology 3	
1.1	**Module Code**	
	AG-RSDVIN	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Submodule: Introduction to Research and Development	
1.4	**Semester**	
	Semester 3	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Fundamental concepts and characteristics of research in the field of art, design and technology • Basic principles of academic integrity. • Basic evaluation criteria for academic resources. • Introduction to systematic literature and information search. • Introduction to formats and basic structural elements of academic writing. • Introduction to basic methods, objectives, and conventions of academic writing. • Introduction to citing and referencing.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to: • Identify and describe fundamental concepts and characteristics of research in the field of art, design and technology. • Understand and apply basic principles of academic integrity. • Distinguish different types of academic sources and identify fundamental evaluation criteria of academic sources. • Identify basic methods of literature search; formulate and conduct systematic literature search.	

		• Extract, summarize and contrast relevant information, ideas and arguments from sources.
		• Plan and compose short academic texts and presentations implementing basic methods, objectives and conventions of academic writing and research.
		• Identify relevant bibliographic information for various types of academic sources and correctly apply citation styles relevant to the disciplinary field of animations and games.
4	**Teaching Methods**	
	Lecture	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 62,5 h	
	Contact Hours: 2 SWS 26 h	
	Self Study: 35,5 h	
	Credit Points: 2,5	
6	**Assessment Methods**	
	Term paper or presentation. The form of the assessment and the time required to complete it will be announced at the beginning of the module. The exam can be repeated.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, winter term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	A reading list will be provided to students at the beginning of the module.	

Methodology 3
Submodule: Producing and Production Management 3

1	**Module Name**	
	AG Methodology 3	
1.1	**Module Code**	
	AG-PPM3	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Submodule: Producing and Production Management 3	
1.4	**Semester**	
	Semester 3	
1.5	**Module Responsible**	
	Prof. Boris Kunkel	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	• Key steps involved in starting, executing, collaborating on, monitoring, and closing projects related to animation, game and XR experiences.	
	• Methodologies and best practices for efficient and effective production management in these areas.	
	• Advanced techniques for managing project scope, allocating resources, and creating schedules to ensure timely and budgeted delivery of animation, game, and XR experiences.	
	• Strategies to address challenges and risks that may arise during production.	
	• Methods to ensure and maintain high-quality standards throughout the production process of animations, games and XR.	
	• Creative strategies and innovative approaches to overcome obstacles and successfully complete animation, game, and XR experiences.	

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Understand the critical stages involved in initiating, executing, collaborating on, monitoring, and closing projects related to animation, game and XR experiences.
	• Apply advanced techniques for efficient and effective production management, including project scope, resource allocation, and scheduling for timely delivery.
	• Analyze and implement strategies to address challenges and risks that may arise during the production of animation, game and XR experiences.
	• Develop a comprehensive understanding of maintaining high-quality standards throughout the production process of animation, game and XR experiences.
	• Explore creative strategies and innovative approaches to overcome obstacles and successfully complete animation, game and XR productions.
4	**Teaching Methods**
	Lecture
5	**Credit Points, Contact Hours and Self Study**
	Workload: 62,5 h
	Contact Hours: 2 SWS 26 h
	Self Study: 35,5 h
	Credit Points: 2,5
6	**Assessment Methods**
	Term paper or written exam. The form of the assessment and the time required to complete it will be announced at the beginning of the module. It is possible to repeat the exam.
7	**Module Prerequisites**
	-
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	Chandler (2019). The Game Production Handbook.
	Heagney (2016). Fundamentals of Project Management.
	Heldman (2018). PMP: Project Management Professional Exam Study Guide.
	Hight & Novak (2016). Game Development Essentials: Game Project Management.
	Further reading will be provided to students at the beginning of the course.

Semester 4

Animation and Game Industrial Placement

1	**Module Name**	
	Animation and Game Industrial Placement	
1.1	**Module Code**	
	AG-IP	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Animation and Game Industrial Placement	
1.4	**Semester**	
	Semester 4	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

The students work in professional areas related to the creation, realization and implementation of animations and games such as:

- Development and/or production of animations.
- Development and/or production of games.
- Development and/or production of virtual reality or augmented reality projects.
- Development and/or production of virtual production projects.
- Development and/or production of digital visual effects.
- Development and/or production of visualizations and simulations.
- Development and/or production of immersive events and experiences.
- Development and/or production of film or tv productions.

There will be accompanying studies at the university that will introduce participants to topics and issues such as:

- Application strategies and recruiting processes.
- Career perspectives and professional roles in the industry.
- Evaluation and documentation of industry experiences.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Identify and distinguish current recruitment and selection processes used by companies and institutions in the disciplinary field and produce suitable application material.
	• Describe and reflect their discipline related skills, competencies and interests and formulate personal qualification and development goals.
	• Integrate into a work environment and demonstrate appropriate conduct, self-management and communication skills.
	• Apply knowledge and skills acquired in the degree course to a work environment.
	• Identify and describe industry areas and work settings and with regard to organizational structures, policies, job profiles and methods of operation.
4	**Teaching Methods**
	Lecture
5	**Credit Points, Contact Hours and Self Study**
	Workload: 750 h
	Contact Hours: 2 SWS 26 h
	Self Study: 724 h
	Credit Points: 30
6	**Assessment Methods**
	Written report and presentation. Report requirements and duration of presentation are announced at the beginning of the course.
	No grade (successful completion)
	The exam can be repeated.
7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2.
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Animation and Game Study Abroad

1	**Module Name**	
	Animation and Game Study Abroad	
1.1	**Module Code**	
	AG-STA	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Animation and Game Study Abroad	
1.4	**Semester**	
	Semester 4	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	Language of instruction at receiving institution	
2	**Indicative Module Content**	

The students study one semester abroad in a Bachelor program related to the disciplinary field of animation and game, such as:

- Animation.
- Game design.
- Game programming.
- Computer graphics.
- Technical art.
- Cisual effects.
- Augmented reality, virtual reality, immersive media.
- Digital media, digital arts, digital environments.
- Cinematography.
- Screenwriting.
- Animation studies, game studies.
- Narrative design.
- Visual development, production design.

A learning agreement must be concluded beforehand between the sending institution (Darmstadt University of Applied Sciences) and the receiving institution.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Demonstrate intellectual flexibility through approaching their academic discipline from another perspective.
	• Appreciate culturally diverse traditions, forms and practices in animation and game creation.
	• Demonstrate intercultural, interpersonal and self-management skills and collaborate effectively in creative teams.
	• Gain basic proficiency in language skills of the host country.
4	**Teaching Methods**
	According to the curriulum of the receiving institution
5	**Credit Points, Contact Hours and Self Study**
	Workload: 750 h
	Contact Hours: according to the regulations of the receiving institution
	Self Study: according to the regulations of the receiving institution
	Credit Points: 30
6	**Assessment Methods**
	determined by receiving program
7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2.
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter and summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Semester 5

AI and Behavior Programming for Games

Field of Specialization: Technology

1	**Module Name**
	AI and Behavior Programming for Games
1.1	**Module Code**
	AG-AIBP
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	AI and Behavior Programming for Games
1.4	**Semester**
	Semester 5
1.5	**Module Responsible**
	Prof. Dr. Martin Leissler
1.6	**Teaching Professors**
	Prof. Dr. Martin Leissler, Prof. Stephan Jacob, N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Classic approaches to AI programming: Finite State Machines and Behavior trees are a powerful tools for modeling complex behaviors in games. They enable game developers to create decision-making logic for non-player characters (NPCs) and other game entities that is easy to maintain, expand, and debug. Students should learn how to design, implement, and modify state machines and behavior trees for different game scenarios.
	• Pathfinding and Navigation: Pathfinding and navigation are essential components of many game genres, including real-time strategy games and role-playing games. Students should learn how to implement pathfinding algorithms, such as A* and Dijkstra's algorithm, to create efficient and effective NPC movement in game-environments. They should also learn how to integrate pathfinding with other AI systems, such as decision-making and perception.
	• Machine Learning: Machine learning is a rapidly growing field that has many applications in game development, such as creating adaptive AI systems, improving game balancing, and generating content. Students should learn how to apply machine learning algorithms, such as neural networks and reinforcement learning, to game development problems. They should also understand the limitations and challenges of using machine learning in games, such as training data availability and overfitting.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Design, implement, and modify state machines and behavior trees to model complex behaviors for non-player characters and other game entities.
	• Evaluate the advantages and limitations of state machines and behavior trees as decision-making tools in game development.
	• Analyze and optimize state machines and behavior trees for performance and maintainability.
	• Implement pathfinding algorithms, such as A* and Dijkstra's algorithm, to create efficient and effective NPC movement in game environments.
	• Integrate pathfinding with other AI systems, such as decision-making and perception, to create more realistic and responsive NPC behavior.
	• Analyze and optimize pathfinding algorithms for performance and scalability.
	• Apply machine learning algorithms, such as neural networks and reinforcement learning, to game development problems, such as game balancing and content generation.
	• Evaluate the strengths and weaknesses of different machine learning algorithms for different game development scenarios.
	• Analyze and optimize machine learning models for accuracy and performance.
4	**Teaching Methods**
	Lecture, practical
5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 63 h
	Credit Points: 5
6	**Assessment Methods**
	Written exam or practical exam. Assessment method and duration is announced at the beginning of the course. The exam can be repeated.
7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2. Successful completion of Animation and Game Project 3.
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter term
10	**Used in other Modules**
	-

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Art, Animation and Creative Technologies 5

Field of Specialization: Art and Design

1	**Module Name**
	Art, Animation and Creative Technologies 5
1.1	**Module Code**
	AG-AACT5
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Art, Animation and Creative Technologies 5
1.4	**Semester**
	Semester 5
1.5	**Module Responsible**
	Prof. Tilmann Kohlhaase
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**

	• Animation
	   - Virtual Beings.
	   - Advanced Performance Capture.
	   - Advanced Retargeting.
	   - Real Time Animation and Workflows.
	   - Puppeteering.
	   - Stylisation in Animation.
	
	• Cinematography
	   - Virtual Production Design.
	   - Virtual Cameras.
	   - Previsualisation.
	   - Pitch Vis.
	   - Virtual Scouting.
	
	• Art, Design and Concept
	   - Advanced Look Development.
	   - Art Direction.
	   - Virtual Effects.
	   - Cinematics.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Identify methods and use cases of virtual production in regards to animation, set design and previsualisation.
	• Distinguish and implement acting and performance as reference for animation.
	• Differentiate and apply state of the art the creative process of cinematics.
	• Understand and apply technical issues and challenges of work flows in virtual production.
	• Gain knowledge of methods for problem solving in virtual and/ or real-time productions.
4	**Teaching Methods**
	Project, seminar, lecture, peer review and tutorials, presentations and demonstrations, assisted teamwork
5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 63 h
	Credit Points: 5
6	**Assessment Methods**
	Portfolio exam. Portfolio requirements are announced at the beginning of the course. The exam can be repeated. The exam can be repeated.
7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2. Successful completion of Animation and Game Project 3.
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Animation and Game Project 5

1	**Module Name**
	Animation and Game Project 5
1.1	**Module Code**
	AG-P5
1.2	**Module Type**
	Compulsory
1.3	**Course Title**
	Animation and Game Project 5
1.4	**Semester**
	Semester 5
1.5	**Module Responsible**
	Prof. Tilmann Kohlhaase
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	• Art, design and animation - Creating and documenting advanced design concepts and design programmes, art bibles and design bibles. - Environmental storytelling in virtual spaces. - Script-writing, dialogue and character development. - Advanced character animation, acting for animation, character expression, facial animation. - Design of serial, modular or cross-platform concepts and worlds. - Designing for target groups: Concept development, branding and visual communication in animations and games. - Advanced interaction design; user centered design. - Strategies and examples of digital scenography. - Advanced game design / level design. - Script writing for animations and games. - Sound design, music and dialogue for animations and games. - Directing animations and games. - Artistic vision and author's voice. • Methodology - Advanced project management tools and skills including audience and user testing. - Creative strategies and design management. - Business models in the entertainment industry, distribution and marketing of animation and game products, strategies for online distribution. - Processes, roles and methods for creating and managing large teams.

- Media reception theory and user research.
- Advanced animation and game studies: Genres and genre languages, animation and game history, animation and game theory.
- Animation and game culture (advanced level): Concepts, practices and ethical frameworks.
- Game testing.
- Game usability.
- Technical Art
  - Introduction to motion capturing, motion tracking and 3D scanning.
  - Introduction to scripting for computer generated graphics.
  - Advanced rigging concepts and mechanics.
  - Advanced strategies for technical artists and technical direction.
  - Advanced lighting and rendering methods.
  - Intermediate post-production for animation.

- Technology
  - Advanced game programming.
  - Introductory DevOps and development infrastructure management.
  - Advanced AI for animation and game (p.ex. pathfinding, collision detection, matrix structures, crowd simulation, non-player behavior).
  - Software engineering.
  - Networks and databases.
  - Gesture recognition, audio and video based input.
  - Writing clear, efficient and highly performing code.

| 3 | **Learning Outcomes** |

The objective of Animation and Game Project 5 is to develop, produce, and implement a fully functional product from brief through presentation, iteration/testing, and final production. Students are encouraged to explore the potential of cross-format, cross-platform, and transmedia concepts. Special emphasis will be placed on detailed pre-production in accordance with leading industry standards. The study and critical reflection of advanced topics in media design and technology encourages students to transcend common aesthetic standards and established models of user/audience participation.

The project work will integrate advanced producing and production management aspects that will enable students to develop scenarios for emerging or future technological environments and market conditions in which their project could be successfully deployed or applied. They will be asked to self-reflect on their conceptual work at all stages and to evaluate decisions made in the conceptual process in order to optimize results.

To allow students to work on more complex topics with strong innovative elements or experimental/artistic nature, Animation and Games Project 5 can be taken over two semesters together with Animation and Games Project 6 as an advanced media project (see also Animation and Games Project 6).

On successful completion of this module, students will be able to:

- Manage a self-initiated project from brief through pre-production, iteration/testing to production and presentation.

- Demonstrate creativity, independence and inventiveness in the approach and methods used to develop, direct and implement a project.

- Demonstrate a broadened understanding of linear and non-linear design structures and strategies.

- Extend and transgress standard concepts of storytelling and gameplay.

- Develop and produce a complex and innovative animation or game product.

- Identify and develop innovative concepts for user and target group centered design.

- Apply industrial standard animation and game technologies and technological procedures.

- Identify and develop production pipelines for effective and high quality workflows in media productions.

4	**Teaching Methods**
	Project, seminar, lecture, peer review and tutorials, presentations and demonstrations, assisted teamwork

5	**Credit Points, Contact Hours and Self Study**
	Workload: 500 h
	Contact Hours: 12 SWS 156 h
	Self Study: 344 h
	Credit Points: 20

6	**Assessment Methods**
	Presentation and portfolio exam
	• Presentation: 25%
	• Portfolio exam: 75%
	• The duration of the presentation and the portfolio requirements are announced at the beginning of the course. The exam can be repeated.

7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2. Successful completion of Animation and Game Project 3.

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	-

Semester 6

Animation and Game Project 6

1	**Module Name**	
	Animation and Game Project 6	
1.1	**Module Code**	
	AG-P6	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Animation and Game Project 6	
1.4	**Semester**	
	Semester 6	
1.5	**Module Responsible**	
	Prof. Tilmann Kohlhaase	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

- Art, design and animation
  - Learning from the avantgarde: Current design topics in animation, game, XR.
  - Creativity and experiment: Examples from art, design and cinematography.
  - Advanced design theory and design research.
  - Design ethics.
  - User experience design
  - Brand and identity design for the entertainment industry.
  - Transmedia/cross-format: Mixed reality and immersive environment design.
  - Advanced scenario development and scriptwriting for animations and games.
  - Art Direction for animations and games.
- Methodology
  - Advanced production management.
  - Artistic leadership.
  - Keeping a vision through the development and realization of a project.
  - Advanced media reception theory and user research.
  - Advanced animation and game studies: Genres and genre languages, animation and game history, animation and game theory.
  - Animation and game culture (advanced level): Concepts, practices and ethical frameworks.
- Technical Art

- Advanced technical direction.
- Creating software tools for 3D animation (MEL, Python).
- Advanced postproduction for animation.
- Advanced visual effects.
- Shader programming.
- Procedural content generation.
- Technology
  - Intermediate DevOps and development infrastructure management.
  - Advanced object oriented game software development.
  - Advanced 2D Game development principles and practice.
  - Advanced artificial intelligence in games.
  - Advanced real-time character animation.
  - Advanced network gaming.
  - Advanced user interfaces for games.
  - Advanced browser and mobile game technologies.
  - Advanced interactive cinematography and game camera/lighting implementation.
  - Advanced AR and VR.

3	**Learning Outcomes**

The objective of Animation and Game Project 6 is to develop, produce, and implement a fully functional product from briefing through presentation, iteration/testing, and final production. Students are encouraged to explore the potential of cross-format, cross-platform, transmedia, and VR experience concepts. Special emphasis will be placed on detailed pre-production according to leading industry standards. The study and critical reflection of advanced topics in media design and media technology will enable them to transcend common aesthetic standards and established models of user/audience participation. Project work will integrate advanced project management aspects that will enable students to develop scenarios for emerging or future technological environments and market conditions in which their project could be successfully deployed or applied. They will be asked to self-reflect on their conceptual work at all stages and to evaluate decisions made in the conceptual process in order to optimize results.

To allow students to work on more complex topics with strong innovative elements or experimental/artistic nature, Animation and Games Project 6 can be taken over two semesters together with Animation and Games Project 5 as an advanced media project (see also Animation and Games Project 5).

On successful completion of this module, students will be able to:

- Manage a self-initiated project from brief through preproduction, iteration/testing to production and presentation.

- Demonstrate creativity, independence and inventiveness in the approach and methods used to develop and implement a project.

- Demonstrate a broadened understanding of linear and non-linear design structures and strategies.

- Demonstrate confident use of production tools and design strategies in conceptual and technical development of media productions.

- Demonstrate strong technical and artistic problem solving skills.

- Extend and transgress standard concepts of storytelling worldbuilding and gameplay.

- Develop and produce a complex and innovative animation, game product or XR experience.

- Identify and develop innovative concepts for user centered design and user experience.

- Apply industrial standard animation and game technologies and technological procedures.

- Demonstrate a self-reflective and self-critique in creation of a highly immersive game or animation.

- Keep and defend the artistic vision throughout the production process.

4	**Teaching Methods**
	Project, seminar, lecture, peer review and tutorials, presentations and demonstrations, assisted teamwork.

5	**Credit Points, Contact Hours and Self Study**
	Workload: 375 h
	Contact Hours: 8 SWS 104 h
	Self Study: 271 h
	Credit Points: 15

6	**Assessment Methods**
	Presentation and portfolio exam
	• Presentation: 25%
	• Portfolio exam: 75%
	• The duration of the presentation and the portfolio requirements are announced at the beginning of the course. The exam can be repeated.

7	**Module Prerequisites**
	Successful completion of all modules of semester 1 and 2. Successful completion of Animation and Game Project 3.

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, summer term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	-

Methodology 6 – Research and Development Methods

1	**Module Name**	
	Methodology 6 - Research and Development Methods	
1.1	**Module Code**	
	AG-AACT2	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Methodology 6 - Research and Development Methods	
1.4	**Semester**	
	Semester 6	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	

- Research definitions, types and methods in the field of art, design and technology.

- Product, user and audience research methods.

- Design thinking and innovation research methods.

- Emerging technology in the field of animation, game and XR.

- Avantgarde and experiment in animations, games and XR.

- Advanced animation and game studies.

- Introduction to the conceptualization of research and development projects in the field of art, design and technology.

- Formats and best practices of academic writing in the field of art, design and technology.

3	**Learning Outcomes**

On successful completion of this module, students will be able to:

- Differentiate concepts and types of research in the field of art, design and technology

- Identify and critically analyze current and emerging creative forms, trends and practices in the field of animations, games and XR.

- Identify and evaluate current and emerging technologies and their use cases in the field of animations, games and XR.

- Independently develop and evaluate original artistic and/or technological concepts and/or approaches in the field of animation and games creation and production.

- Effectively design and implement product, user and audience research related to animation, game and XR experiences.

- Systematically explore aesthetic, cultural, social, psychological or technological dimensions of animations and games.

- Synthesize and communicate concepts and ideas effectively and critically evaluate own work as well as the work of others in a constructive manner.

4	**Teaching Methods**

Lecture, seminar, project

5	**Credit Points, Contact Hours and Self Study**

Workload: 250 h

Contact Hours: 3 SWS 39 h

Self Study: 211 h

Credit Points: 10

6	**Assessment Methods**

Research documentation (75%) and presentation (25%)

The research documentation requirements and the duration of the presentation are announced at the beginning of the course. The exam can be repeated.

7	**Module Prerequisites**

Successful completion of all modules of semester 1 and 2. Successful completion of Animation and Game Project 3.

8	**Recommended Prerequisite Knowledge**

-

9	**Duration and Frequency**

1 semester, winter term

10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Semester 7

Animation and Game Research and Development Project

1	**Module Name**	
	Animation and Game Research and Development Project	
1.1	**Module Code**	
	AG-RDP	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Animation and Game Research and Development Project	
1.4	**Semester**	
	Semester 7	
1.5	**Module Responsible**	
	Prof. Tilmann Kohlhaase	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	Students individually submit a briefing document for an animation, game, or XR experience product to a desired project supervisor (a professor). Once the brief is accepted, the student must write a research and development document that includes:	

- A project proposal.

- The results of the necessary research, developing the project.

- The description of a developed rough concept for the project.

- A rough project plan.

Project Schedule:

- Application with briefing document.

- Agreement on deliverables according to chosen subject with supervisor.

- Delivery of research and concept plan.

	• Discussion sessions and review of preliminary results (group/peer reviews). • Final Presentation (assessment).
3	**Learning Outcomes** On successful completion of this module, students will be able to: • Use appropriate methodologies to explore the topic for an animation, game or XR experience related product; and/or • Carry out extensive and detailed user/audience research for a product; and/or • Use appropriate methodologies with regard to research for technology or product development; and/or • Use appropriate methodologies with regard to market research; and/or • Use appropriate research methodologies with regard to animation and games studies; and/or • Use appropriate research methodologies with regard to cultural, historical, ethical or aesthetic aspects of animations and games; and/or • Use appropriate methodologies with regard to product concept and development; and/or • Use appropriate methodologies to plan the project organization and financing of a media-project; and/or • Identify and design for the cultural environment in which a product will be used or experienced.
4	**Teaching Methods** Seminar, tutorials, group discussions, peer reviews
5	**Credit Points, Contact Hours and Self Study** Workload: 375 h Contact Hours: 2 SWS 26 h Self Study: 349 h Credit Points: 15
6	**Assessment Methods** Research documentation (75%) and presentation (25%). The research documentation requirements and the duration of the presentation are announced at the beginning of the course. The exam can be repeated.
7	**Module Prerequisites** Successful completion of all mandatory modules of semesters 1 to 6 and minimum 1 elective module.

8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter and summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Animation and Game Bachelor Module

1	**Module Name**	
	Animation and Game Bachelor Module	
1.1	**Module Code**	
	AG-BAP	
1.2	**Module Type**	
	Compulsory	
1.3	**Course Title**	
	Animation and Game Bachelor Module	
1.4	**Semester**	
	Semester 7	
1.5	**Module Responsible**	
	Prof. Tilmann Kohlhaase	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	Students may develop and realize a complete media system or media product, such as an animation, a game, an XR experience, a media installation or application. The work should demonstrate an 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 the 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 team work 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).	
	• Paper prototyping, animatic (group/peer reviews).	
	• Prototype presentation, layout (group/peer reviews)	

	• Final Presentation (assessment).
3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• 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.
	• Demonstrate judgement in the application of appropriate research and design methods in arriving at final solution(s) for the proposed project.
	• Demonstrate specialized 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	**Teaching Methods**
	Seminar, tutorials, group discussions, peer reviews
5	**Credit Points, Contact Hours and Self Study**
	Workload: 375 h
	Contact Hours: 2 SWS 26 h
	Self Study: 349 h
	Credit Points: 15
6	**Assessment Methods**
	Bachelor Thesis and Colloquium.
	Bachelor Thesis: 75% of final mark.
	Colloquium: 25% of final mark.
	Colloquium duration according to § 12 BBPO.
7	**Module Prerequisites**
	Successful completion of all mandatory modules of semesters 1 to 6 and minimum 1 elective module.
8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter and summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	-

Elective Catalogue (Semester 3 onwards)

Animation and Game Methodology Elective

1	**Module Name**
	Animation and Game Methodology Elective
1.1	**Module Code**
	AG-ELAGM
1.2	**Module Type**
	Elective
1.3	**Course Title**
	Animation and Game Methodology Elective
1.4	**Semester**
	Semester 3-6
1.5	**Module Responsible**
	Prof. Noa Kafka
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**

The Animation and Game Methodology Electives aim to provide students with interdisciplinary knowledge and methodological skills to reflect animation and game creation and production with regard to economic, historic, cultural, aesthetic and ethical contexts. It provides students with advanced organization and communication competencies and fosters critical, quality oriented thinking as well as an increased awareness for audiences and users by focusing on topic areas such as:

- Animation and game history; history of animation and game technology.
- Animation and game studies.
- Art history and history of visual culture.
- Advanced audience and player research.
- Ethical issues in animations and games.
- Legal frameworks for animation and game production.
- Advanced project management and creative producing methods.
- Animation and game business and entrepreneurship.

3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Recognize and discuss current cultural, ethical, political, cultural and social issues related to the creation and reception of animations and games,
	• Analyze animation and game forms and genres with regard to aesthetic characteristics, historic references, cultural impact, market relevance and /or their reception by audiences and player.
	• Critically reflect ethical issues in animations and games.
	• Identify and explain professional methods, strategies and tools of project management and producing.
	• Apply relevant scholarly terms and models in order to contextualize animations and games as well as the practices of creation, production, distribution and reception.
	• Effectively compose presentations and texts according to academic standards.
	• Competently contribute to interdisciplinary and professional discourses in the field.
4	**Teaching Methods**
	Practical, seminar, lecture, project
5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 3 SWS 39 h
	Self Study: 86 h
	Credit Points: 5
6	**Assessment Methods**
	Term paper or presentation.
	The assessment method will be announced at the beginning of the module.
	The exam can be repeated.
7	**Module Prerequisites**
	-
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter and summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Art, Animation and Creative Technologies Elective

1	**Module Name**
	Art, Animation and Creative Technologies Elective
1.1	**Module Code**
	AG-ELAACT
1.2	**Module Type**
	Elective
1.3	**Course Title**
	Art, Animation and Creative Technologies Elective
1.4	**Semester**
	Semester 3-6
1.5	**Module Responsible**
	Prof. Noa Kafka
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	The Art, Animation and Creative Technologies Elective aim to deepen student knowledge and skills in specialized creative and artistic fields of animation, game and XR design and production:

- Advanced scenario and concept development for animations, games and XR experiences.
- Innovative animation, game and XR formats.
- Gamification and immersive learning.
- Visual Development and art direction for animations, games and XR experiences.
- Advanced animation.
- Advanced game design.
- Advanced game level design.
- Advanced ideation and prototyping methods an techniques.
- Advanced post production.
- Advanced interaction and UX design for games and XR experiences.
- Advanced storytelling, scriptwriting and dramaturgy for animations, games and XR experiences.
- Advanced cinematography for animations, games and XR experiences.
- Advance lighting and look development.
- Sound design, music and dialogue for animations, games and XR experiences.
- Advanced editing for animations and games.

	• Trailer concept development and production for animations, games and XR experiences.
3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Use professional methods and practices of creative and artistic research, idea generation, concept development, prototyping, production and documentation for animations, games and XR experiences.
	• Apply different technologies suitable for the creative and artistic development and production of animations, games and XR experiences.
	• Use scholarly terms and methods in order to critically analyze animations and games with regard to genre, form and aesthetic characteristics.
	• Demonstrate an awareness players and audiences and apply experience design methods.
	• Work and communicate effectively in multidisciplinary creative teams.
4	**Teaching Methods**
	Practical, seminar, lecture, project
5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 3 SWS 39 h
	Self Study: 86 h
	Credit Points: 5
6	**Assessment Methods**
	Research project or portfolio exam. The assessment method and requirements will be announced at the beginning of the module. The exam can be repeated.
7	**Module Prerequisites**
	-
8	**Recommended Prerequisite Knowledge**
	-
9	**Duration and Frequency**
	1 semester, winter and summer term
10	**Used in other Modules**
	-
11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Research and Development Elective

1	**Module Name**	
	Research and Development Elective	
1.1	**Module Code**	
	AG-ELRD	
1.2	**Module Type**	
	Elective	
1.3	**Course Title**	
	Research and Development Elective	
1.4	**Semester**	
	Semester 3-6	
1.5	**Module Responsible**	
	Prof. Noa Kafka	
1.6	**Teaching Professors**	
	N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	This module aims to provide learners with the knowledge, skills and competencies required to identify and investigate problems related to the development, production and reception of animation and games in form of self-directed case studies. Guided by academic mentors students formulate and carry out individual practice-based research projects in their field of professional or academic interest and thereby acquire advanced skills and competencies in the methodical exploration of scholarly, artistic and/or technological topics and ideas.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	

- Independently formulate and carry out original research concerning artistic, technological or methodological issues in the field of animations, games and XR experiences.
- Identify and apply relevant design, management or technology related methods of idea generation, concept development, realization and implementation in the field of animations, games and XR experiences.
- Critically evaluate animation and game concepts with regard to their innovation potential, their social and cultural impact, their aesthetic and technical relevance and their feasibility.
- Describe and apply relevant methods of presentation, simulation and prototyping in the field of animation and game and XR experiences.
- Identify and pursue individual areas of academic and professional developmen.
- Effectively contribute to academic, artistic and professional debates in the field of animation and game creation, production and reception based on grounded conceptual, practical and professional knowledge.

4	**Teaching Methods**
	Practical, seminar, lecture, project

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 3 SWS 39 h
	Self Study: 86 h
	Credit Points: 5

6	**Assessment Methods**
	Research project or portfolio exam. The assessment method and requirements will be announced at the beginning of the module.
	The exam can be repeated.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter and summer term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Social and Cultural Studies Elective

1	**Module Name**
	Social and Cultural Studies Elective
1.1	**Module Code**
	AG-ELSCS
1.2	**Module Type**
	Elective
1.3	**Course Title**
	Social and Cultural Studies Elective
1.4	**Semester**
	Semester 3-6
1.5	**Module Responsible**
	Prof. Noa Kafka
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	This module integrates a range of changing elective topics in the field of digital humanities, cultural studies and social sciences. It encourages students to contextualize their discipline specific knowledge and practice within current cultural, social and ethical discourses. Students can choose from the Elective Catalogue provided by the Department of Social and Cultural Studies SUK of Hochschule Darmstadt. The Social and Cultural Studies Electives address topics and areas such as:
	• Audiences and users in contemporary media culture.
	• Diversity and interculturalism.
	• Media ethics and media politics.
	• Legal frameworks and issues in international media production.
	• Work and workplace in digital societies.
	• Communication and conflict resolution.
	• Theories and models of cognition and learning.
	• Literature, film, media and public spaces as cultural texts.
	• Sustainability and systems thinking.
3	**Learning Outcomes**
	On successful completion of this module, students will be able to:
	• Recognize and discuss current cultural, ethical, political, cultural and social issues related to the creation

and reception of digital media.

- Analyze media forms and genres with regard to their historic and cultural context and their impact on contempory audiences and users.

- Critically reflect cultural stereotypes in communication and media.

- Identify and describe basic theories and models of communication, cognition and meaning making in arts and media.

- Demonstrate a basic understanding of sustainability and systems thinking.

- Show the capability to communicate and interact productively in interdisciplinary contexts.

- Appraise the importance of lifelong learning.

4	**Teaching Methods**
	Practical, seminar, lecture, project

5	**Credit Points, Contact Hours and Self Study**
	Workload: 125 h
	Contact Hours: 4 SWS 52 h
	Self Study: 63 h
	Credit Points: 5

6	**Assessment Methods**
	Term paper or presentation.
	The assessment method and duration will be announced at the beginning of the module.
	The exam can be repeated.

7	**Module Prerequisites**
	-

8	**Recommended Prerequisite Knowledge**
	-

9	**Duration and Frequency**
	1 semester, winter and summer term

10	**Used in other Modules**
	-

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.

Technical Art Elective

1	**Module Name**	
	Technical Art Elective	
1.1	**Module Code**	
	AG-ELTA	
1.2	**Module Type**	
	Elective	
1.3	**Course Title**	
	Technical Art Elective	
1.4	**Semester**	
	Semester 3-6	
1.5	**Module Responsible**	
	Prof. Carla Heinzel	
1.6	**Teaching Professors**	
	Prof. Carla Heinzel, Prof. Stephan Jacob, N.N.	
1.7	**Level of Study**	
	Bachelor	
1.8	**Language of Instruction**	
	English	
2	**Indicative Module Content**	
	Electives of the module Elective 3.1 shall deepen the students' knowledge of the various areas of technical art at an advanced level or cover areas of technical art that were not part of the foundation courses Technical Art 1 and 2. Possible topics for electives in this module: • Procedural content generation. • Motion capturing techniques. • Virtual production techniques. • XR technologies. • AI tools. • Virtual Cinematography. • Realtime and offline VFX. • Compositing techniques.	
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to: • Identify appropriate tools for specific technical art tasks. • Evaluate tools for effectiveness and feasibility for specific technical art tasks. • Apply professional workflows to complete specific technical art tasks.	

		• Apply effective problem solving techniques.
		• Evaluate the effectiveness of workflows for specific technical art tasks.
		• Develop workflows to solve technical art problems.
4	**Teaching Methods**	
	Practical, seminar, lecture, project	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 125 h	
	Contact Hours: 3 SWS 39 h	
	Self Study: 86 h	
	Credit Points: 5	
6	**Assessment Methods**	
	Research project or portfolio exam. The assessment method and requirements will be announced at the beginning of the module. The exam can be repeated.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, winter and summer term	
10	**Used in other Modules**	
	-	
11	**Recommended Reading**	
	A reading list will be provided to students at the beginning of the course.	

Technology Elective

1	**Module Name**
	Technology Elective
1.1	**Module Code**
	AG-ELT
1.2	**Module Type**
	Elective
1.3	**Course Title**
	Technology Elective
1.4	**Semester**
	Semester 3-6
1.5	**Module Responsible**
	Prof. Dr. Martin Leissler
1.6	**Teaching Professors**
	N.N.
1.7	**Level of Study**
	Bachelor
1.8	**Language of Instruction**
	English
2	**Indicative Module Content**
	Building upon the basic knowledge and skills acquired in the Technology specialization during semesters 1 and 2 through compulsory modules such as Game Programming 1 and 2, Algorithms and Data Structures for Games and Graphics Programming, the Technology Electives dive deeper into several specialized fields of game programming, such as:

- Gameplay mechanics and usability patterns.
- Advanced object-oriented game software development.
- Game Engines: architectures, features and applications.
- 2D Game development principles and practice.
- Advanced computer graphics.
- DirectX, OpenGL, shader languages.
- Cross platform game development, e.g. for mobile devices, consoles, or other specialized devices.
- Practical implementation of a complete game.
- Artificial intelligence in games.
- Real-Time character animation.
- Network games.
- Game programming physics.
- User interfaces for games.
- Browser game engines and technologies.

		• Interactive cinematography implementation, game cameras and lighting.
		• VR and AR games.
		• Tools and technologies for prototyping and previsualization.
3	**Learning Outcomes**	
	On successful completion of this module, students will be able to:	
	• Explain and use the principles of object-oriented software development to implement games across all genres.	
	• Describe, explain the game development process and apply professional tools and toolchains along those processes.	
	• Identify, explain, and debug possible flaws and errors in game code or game software architectures.	
	• Demonstrate professionalism within key aspects of game development, including the underlying principles, patterns, related tools and processes, as well as implementation details.	
	• Demonstrate state-of-the-art knowledge and skills in selected areas of game development, enabling them to design and implement own approaches to given challenges by reflecting, analyzing, and adapting existing approaches.	
	• Work and communicate efficiently within the role of a game developer in multidisciplinary teams.	
	• Demonstrate awareness of the complete software development process in the games industry.	
4	**Teaching Methods**	
	Practical, seminar, lecture, project	
5	**Credit Points, Contact Hours and Self Study**	
	Workload: 125 h	
	Contact Hours: 3 SWS 39 h	
	Self Study: 86 h	
	Credit Points: 5	
6	**Assessment Methods**	
	Research project or portfolio exam.	
	The assessment method and requirements will be announced at the beginning of the module.	
	The exam can be repeated.	
7	**Module Prerequisites**	
	-	
8	**Recommended Prerequisite Knowledge**	
	-	
9	**Duration and Frequency**	
	1 semester, winter and summer term	
10	**Used in other Modules**	
	-	

11	**Recommended Reading**
	A reading list will be provided to students at the beginning of the course.