Module Handbook

MA 3D Animation for Film & Games

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Experience Assessment

ID MA.3D.000	Workload 900 h	Credits 30 ECTS	Semester prior to studies	Frequency annual	Duration 6 months

Learning Outcomes / Competencies

The "Experience Assessment" module enables students to:
- provide the admission committee with official documentation of their highest academic certificate/degree
- demonstrate their professional-practical experience (equivalent to at least one year in total) that is relevant to the production of animation – this experience must be completed before students enroll and it may be the cumulative total of various positions/projects
- demonstrate their skills and experience in, as well as their knowledge of, animation production
- prove their sincere interest in, and professional ambition toward, the exploratory production of animated audio visions (linear and nonlinear), as well as the theoretical interrogation of, and reflection upon, audiovisual media in general and their own creations specifically
- demonstrate their ability to actively participate in academic discourse concerning media theoretical concepts, methodologies and inquiries

Module Content

1) Online Application

Applicants provide the necessary personal, professional (1 year of work experience relevant to the production of linear and / or nonlinear audio visions) and academic documentation for the successful completion of the application. They hand in a portfolio of their pieces of work as well as a project description relevant for the Masters' program.

2) Onsite Interview

Suitable applicants are invited to the media campus for an interview with the program's faculty.

Evaluation Methods

Discussion, evaluation of application materials (formal and artistic)

Prerequisite Subjects

The necessary academic qualification/degree, 1 year of professional experience in a field applicable to the creation of 3D animation

Assessment Methods

Online application (portfolio of at least 10 artistic pieces, project idea (one pager), formal documents, onsite interview (15 minutes)

Prerequisites for CP

Successful completion of all aspects of the application process

Used in Other Courses

Significance of Module Grade for Final Grade 0%
Module Director(s) and Evaluation Committee Module Directors: Prof. Björn Bartholdy and Prof. Rolf Mütze Evaluation Committee: Prof. Björn Bartholdy, Prof. Rolf Mütze and various CGL / ifs faculty and staff
Other Information ---

Project I: Virtual Character Creation

ID MA.3D.001	Workload 420 h	Credits 14 ECTS	Semester 1	Frequency Annual	Duration 16 Weeks
Courses 1) Project Development & Realization I			Contact Hours 108 h	Self-Study 312 h	Size of Groups 6-24

Learning Outcomes / Competencies

1) Project I: Virtual Character Creation:
Students are enabled to...
- orient themselves to organizational, technological and social structures of the Cologne Game Lab and the ifs, allowing them to learn and work effectively on artistic projects and assignments throughout the remainder of their studies
- conceptualize, visualize and execute a 3D animation character for film and games
- combine their creative and technical skill sets to develop and further an understanding of their role as a technical artist
- evaluate and falsify their project concept through means of prototyping, consequently developing a proficiency in design methods
- demonstrate extended competencies with animation software
- adequately convey their project concept in public to an expert audience
- demonstrate a high proficiency in multimedia presentation skills
- show expanded project management competencies (e.g. time management, competence to set strategic goals, problem solving strategies)

Module Content

1) Project Development & Realization I
Students realize a 3D character and finalize it for film (looped motion sequence) as well as games (implementation into a game engine). In the process they broaden and deepen their technical knowledge of such programs as Maya, Motion Builder and Unity as well as their creative skills in such areas as:
- Character concept
- Modelling, sculpting
- Surfaces: shading, texturing
- Character setup
- Key frame animation.

Teaching Methods
Seminar, project work, mentoring

Prerequisite Subjects

Assessment Methods
Work Sample (animated signature pose of character, 5-15 seconds), documentation (at least five illustrations / screenshots of the character throughout the development process), presentation (15 minutes), evaluation and discussion of projects

Prerequisites for CP   Completion of homework or course work, completion of projects and project presentations
Used in Other Courses   ---
Significance of Module Grade for Final Grade   15,5%
Module Director(s) and Module Instructor(s)   Module Directors: Prof. Björn Bartholdy and Prof. Rolf Mütze   Module Instructors: Prof. Björn Bartholdy, Prof. Rolf Mütze, Prof. Emmanuel Guardiola, Waldemar Fast, Prof. Dr. Joachim Friedmann, Sebastian Luedke, guest instructors
Other Information   ---

Animation in Film & Games: History & Theory I

ID MA.3D.002	Workload 240 h	Credits 8 ECTS	Semester 1	Frequency Annual	Duration 16 Weeks
Courses 1) Audiovisual Media in Modern Times 2) Informatics I 3) Animation History I 4) Lecture Series I			Contact Hours 20 h 20 h 20 h 20 h	Self-Study 70 h 40 h 30 h 20 h	Size of Groups 6-24 6-24 6-24 15-150

Learning Outcomes / Competencies

1) Audiovisual Media in Modern Times
Students will:
- gain basic knowledge of the history and theories of audiovisual media with specific regard to animation and games;
- acquire a basic ability to analyze critically and historically contextualize works of audiovisual art;
- fuse academic and artistic perspectives with the goal of demonstrating how comparative historical knowledge and theoretical concepts can influence and expand the creative practice, especially the development of critical-analytical reflection and the creative utilization of one's own artistic potential;
- strengthen their academic presentation skills.

2) Informatics I
Students are enabled to...
- handle development environments.
- write their own programs to solve typical problems in animation.
- execute basic object oriented programming.

3) Animation History I
Students are enabled to...
- apply the general rules of animation based on their understanding of the history, theory and practice of this art form.
- participate in a professional discussion on phenomena in the field of animation due to an increased analytical as well as historical competence concerning their own and others' artistic work.

4) Lecture Series I
Students broaden their competencies in terms of theories and methods as well as their industry knowledge in the field of linear and nonlinear audiovisual production.

5) General Learning Outcomes / Soft Skills
Students are enabled to...
- develop the ability to transfer and reappropriate knowledge from theory into practice and vice versa
- establish a basis for (self)reflection on their own artistic output as well as artistic identity in the context of animated audio visions

Module Content

1) Audiovisual Media in Modern Times
The modern development of audiovisual media — from the theater of illusion to live action and animated film to television to digital games to augmented and virtual reality — is characterized by the successive accumulation of skills and technologies to generate and capture images and sound, and thus also by increasing complexity. This seminar will serve as an introduction to the social, cultural, and technological history of modern audiovisuality, from the Renaissance to the present time, and will confront participants with relevant cultural and aesthetic theories concerning audiovisual media.

2) Informatics I
In this submodule students are given an introduction into programming. They are taught the key elements of imperative programming (data type and control structures) as well as the basics of object oriented programming using contemporary programming languages (e.g. Java, Python). They learn to operate modern development environments (e.g. Eclipse) and work with debugging tools. As a practical training in programming experiments, students will — after an analysis of relevant animated examples — create their own animations using typical building blocks of animation (APIs).

3) Animation History I
The seminar "Animation History I" will cover the fundamentals of analog animation from a technological and aesthetical perspective and discuss the basic principles of this field. It includes the pre-forms and early days of animation as well as specific periods such as the German Avantgarde. It will also take a closer look at the work of selected studios such as Fleischer or Disney and expand the students' animation literacy by presenting and analyzing exemplary regional phenomena in Eastern Europe or Asia.

4) Lecture Series I
This campus-wide, ongoing event consists of a diverse collection of renowned guest lecturers, including theorists, artists and industry experts, among others. Lecture topics are relevant for student projects and/or the academic, cultural and socio-economic interrogation of linear and nonlinear audio visions.

Teaching Methods
Seminar, lecture, self-study

Prerequisite Subjects

Assessment Methods
Term paper (2500 words) or Presentation (45 minutes),
and documentation (2000 words and visual references)

Prerequisites for CP
Term paper or Presentation, documentation, active participation, completion of homework and course work (both individual and in groups)

Used in Other Courses
"Lecture Series" is open to the entire CGL and ifs student body

Significance of Module Grade for Final Grade
9%

Project II: Story & Performance

ID MA.3D.003	Workload 420 h	Credits 14 ECTS	Semester 2	Frequency Annual	Duration 16 weeks
Courses Project Development & Realization II			Contact Hours 108 h	Self-Study 312 h	Size of Groups 6-24

Learning Outcomes / Competencies

1) Project II: Story & Performance
Students are enabled to:
- deepen and professionalize their staging capacities of animated characters for film and games. They are able to...
  - handle the processing of motion sequences on a professional level
  - apply methods of iterative working processes and to develop a routine in project work based on design thinking
  - expand their knowledge of dramaturgy (linear and nonlinear methods of storytelling) for the analysis and creation of animation projects
- develop unique solutions for their animation projects with regard to their aesthetic, technological and ethical elements, thus strengthening the students' analytical and problem-solving competence
- actively participate in discourse on 3D animation, including topics such as cutting-edge technological developments and innovative design strategies
- apply their theoretical knowledge on animation to practice
- develop long-term strategies for work in the field of animation
- reflect on the medial, social and ethical aspects of their own work

Module Content

1) Project Development & Realization II
The project of the second semester consists of the staging of two animated characters. Students finalize their project's for film (motion sequence) and games (implementation into a game engine). To achieve this goal students expand and deepen their knowledge and skills in the following areas:

- linear and nonlinear storytelling (models such as the Hero's Journey, Nine Powers, Creative Matrix, Systemic Dramaturgy)
- writing and acting / directing of animation projects
- animation
- post-production.

Teaching Methods
Seminar, project work, mentoring

Prerequisite Subjects
"Project I: Virtual Character Creation I" module (MA.3D.001)

Assessment Methods

Work Sample (animated sequences, 20 - 30 seconds in total), presentation (10 minutes), evaluation and discussion of projects

Prerequisites for CP
Completion of homework or course work, completion of projects and project presentations

Used in Other Courses

Significance of Module Grade for Final Grade
15,5%

Module Director(s) and Module Instructor(s)
Module Directors: Prof. Björn Bartholdy and Prof. Rolf Mütze
Module Instructors: Prof. Björn Bartholdy and Prof. Rolf Mütze, Prof. Nanette Kaulig, Waldemar Fast, Carolin Schweizer, Alexander Daus, guest instructors

Other Information

Animation in Film & Games: History & Theory II

ID MA.3D.004	Workload 240 h	Credits 8 ECTS	Semester 2	Frequency Annual	Duration 16 Weeks
Courses 1) Principles and Procedures of Storytelling in Fiction and Non-Fiction 2) Informatics II 3) Animation History II 4) Lecture Series II	Contact Hours 20 h 20 h 20 h 20 h	Self-Study 70 h 40 h 30 h 20 h	Size of Groups 6-24 6-24 6-24 15-150		

Learning Outcomes / Competencies
1) Principles and Procedures of Storytelling in Fiction and Non-Fiction
Students will:
- fuse academic and artistic perspectives with the goal of demonstrating how comparative historical knowledge and theoretical concepts can influence and expand creative practice, especially the development of critical-analytical reflection and the creative utilization of one's own artistic potential.
- expand orientational knowledge in the fields of contemporary film and game research as well as production especially with regard to media studies, narratology, genre theory, cultural studies and sociology.
- further develop their proficiency in academic work, especially analysis, critique and providing feedback.

2) Informatics II
Students...
- can make use of the functionality and potentials of various game engines.
- are enabled to build interactive content with engines.
- can use basic scripting methods in the context of gaming middleware.
- apply their knowledge in the field of animation systems (blend trees, state machines and runtime rigs).

3) Animation History II:
Students are enabled to...
- reflect on the specific aesthetical aspects of 3D animation based on their accumulated knowledge of the history of computer based animation as well as the field of applied 3D animation.
- participate in a professional discussion in the field of 3D animation due to an increased analytical as well as historical competence concerning their own and others' artistic work.

4) Lecture Series I
Students broaden their competencies in terms of theories and methods as well as their industry knowledge in the field of linear and nonlinear audiovisual production.

5) General Learning Outcomes / Soft Skills
Students are enabled to...
- further apply theoretical fundamentals to their own project work and research

● further develop their proficiency to reflect on their own artistic output as well as artistic identity in the context of animation.

Module Content
1) Principles and Procedures of Storytelling in Fiction and Non-Fiction
Storytelling is a basic form of human communication. Narrative, whether it is nonfictional or fictional, helps us understand the world by endowing it with rational and emotional meaning. The seminar will focus on four topics: 1) principles and procedures of storytelling in general (modes of narration, elements of narration); 2) specifics and procedures of storytelling in different analog audiovisual media (constraints of time and space); 3) specifics and procedures of storytelling in different digital audiovisual media (linear and nonlinear narration, database and environmental orientation); 4) specifics and procedures of fictional and nonfictional storytelling in digital audiovisual media (questions of authenticity and authorship).
2) Informatics II
The focus of the sub-module "Informatics II" is on game engines. The students learn to work with established 3D game engines such as Unity 3D (https://unity3d.com/de), Unreal Engine (https://www.unrealengine.com/), Cryengine (https://www.cryengine.com/) or Lumberyard (https://aws.amazon.com/de/lumberyard/). They understand the general functions of these engines (main program, rendering engine, audio engine, physics engine and ai) and learn how to develop interactive content in these integrated development environments. Additionally, they will be introduced to the role of scripting languages relevant for the development process (e.g. Java, C#, or Lua Script) and concern themselves with animation related topics such as blend trees, state machines and runtime rigs.
3) Animation History II
The second part of this seminar series will concentrate on the history of computer based animation in general and specifically review the development of 3D Animation. Aspects of the application of animation in fields such as visual effects, advertising, television design and games will be featured and discussed. The current state of the art of 3D Animation in film and games will complete the historical approach to the subject.
4) Lecture Series
This campus-wide, ongoing event consists of a diverse collection of renowned guest lecturers, including theorists, artists and industry experts, among others. Lecture topics are relevant for student projects and/or the academic, cultural and socio-economic interrogation of linear and nonlinear audiovisions.

Teaching Methods
Seminars, lectures, self-study

Prerequisite Subjects
"Animation in Film & Games: History & Theory I" module (MA.3D.002)

Assessment Methods
Term paper (2500 words) or Presentation (45 minutes), *and* documentation (2000 words and visual references)

Prerequisites for CP
Term paper or presentation, documentation, active participation (Media Studies), completion of homework or course work (both individual and in groups)

Used in Other Courses
"Lecture Series" is open to the entire CGL and ifs student body

Significance of Module Grade for Final Grade
9%

Module Director(s) and Module Instructor(s)
Module Directors: Prof. Björn Bartholdy
Module Instructors: Prof. Björn Bartholdy (Animation History II), Prof. Dr. Gundolf S. Freyermuth (Principles and Procedures of Storytelling in Fiction and Non-Fiction), Dirk Kraus (Informatics II), various guest lecturers (Lecture Series)

Other Information

Project III: Immersive Animation

ID MA.3D.005	Workload 420 h	Credits 14 ECTS	Semester 3	Frequency Annual	Duration 16 Weeks
Courses Project Development & Realization III			Contact Hours 108 h	Self-Study 312 h	Size of Groups 6-24

Learning Outcomes / Competencies

1) Project III: Immersive Animation
Students are enabled to:
- extend and transfer their knowledge and skills of 3D animation to other forms of art such as Virtual Reality, Augmented Reality, performances or installations through means of experiment and artistic research
- refine their artistic practice and consequently their self image as a technical artist through the incorporation of one's understanding of the synergies and differences of various art forms into their own work
- strengthen and professionalize their technical and aesthetic capacities of 3D animation in the areas of:
  - o preproduction (high concept, pitching, concept, concept art, prototyping, testing)
  - o production (project execution, character and world design, animation, programming)
  - o postproduction (documentation, post-mortem, publication, external pitching/communication)
- develop projects that are both culturally reflective and relevant by market standards
- strengthen effective problem solving strategies in a fast-paced environment
- professionally apply prototype-oriented production strategies
- further develop their experience in the prototyping of 3D animation projects
- model workflow processes in production scenarios
- augment their ability to manage their time and resources

Module Content

1) Project III: Immersive Animation
Students design and execute an experimental animation project for e.g. Virtual Reality, Augmented Reality, performance capture, installations, film or games. To achieve this goal students expand and deepen their knowledge and skills in the following areas:
- immersive technologies
- spatial design concepts and spatial storytelling
- physical computing

Teaching Methods
Seminar, project work, mentoring

Prerequisite Subjects
"Project II: Story & Performance" module (MA.3D.003)

Assessment Methods
Work Sample (animated sequences, 60 - 90 seconds at most per student), documentation (at least five illustrations / screenshots of the development process), presentation (20 minutes), evaluation and discussion of projects
Prerequisites for CP
Completion of homework or course work, completion of projects and project presentations
Used in Other Courses

Significance of Module Grade for Final Grade
15,5%
Module Director(s) and Module Instructor(s)
Module Directors: Prof. Björn Bartholdy and Prof. Rolf Mütze
Module Instructors: Prof. Björn Bartholdy, Prof. Rolf Mütze, Prof. Nanette Kaulig, Jan-Philipp Koch, Sebastian Lüdke, Carolin Schweizer, Sae Yun Jung, Diana Menestrey, guest instructors
Other Information

Animation in Film & Games: History & Theory III

ID MA.3D.006	Workload 240 h	Credits 8 ECTS	Semester 3	Frequency Annually	Duration 16 Weeks
Courses 1) Academic and Artistic Research: History, Theory, and Practice 2) Informatics III 3) Professionalization 4) Lecture Series			Contact Hours 20 h 20h 20 h 20 h	Self-Study 70h 40 h 30 h 20 h	Size of Groups 6-24 6-24 6-24 15-150

Learning Outcomes / Competencies

1) Academic and Artistic Research: History, Theory, and Practice
Students will:
- gain knowledge of the history and theories of academic and artistic research with specific regard to their Master's thesis projects;
- further develop their proficiency in academic work, especially analyzing, critiquing, and providing feedback;
- further improve their ability to engage in academic discourse as well as apply theoretical fundamentals to their own academic and artistic research.

2) Informatics III
Students...
- understand the rendering pipelines of modern game engines and are able to modify them for better performance and custom behavior
- can write custom shaders (e.g. for complex lighting effects)
- are able to add individual post-processing effects to their games in order to create a special look

3) Professionalization
Students are enabled to...
- use marketing tools based on market-relevant analysis
- advance their presentation skills to meet industry standards

4) Lecture Series I
Students broaden their competencies in terms of theories and methods as well as their industry knowledge in the field of linear and nonlinear audiovisual production.

5) General Learning Outcomes / Soft Skills
Students are enabled to…
- further apply theoretical fundamentals to their own project work and research
- further develop their proficiency to reflect on their own artistic output as well as artistic identity in the context of animated audio visions

Module Content
1) Academic and Artistic Research: History, Theory, and Practice
In early modernity, artistic and academic research flourished side by side. The process of industrialization, however, marginalized artistic research whose raison d'être was not the research itself, but rather the artistic production based on it. While reliable academic procedures and practices of research were established in the natural sciences, social sciences, and humanities during the 19th and 20th century, artistic study and experimentation, by its very nature, could not follow the standards of industrialized research: detailed planning, Taylorization in execution, and reliable standardization in its presentation. Currently, with the transition from industrial to digital culture, artistic research gains new significance. In this seminar, participants will learn about the history and theories of research and be encouraged to reflect on related problems and questions of academic as well as artistic research arising in the context of the Master's thesis projects.
2) Informatics III
In this sub-module students acquire an understanding of the rendering pipelines of modern 3D software a well as game engines and gain the ability to modify them, in order to achieve performance or artistic driven goals. To this end, the students will learn how to write custom vertex, geometry and fragment shaders in a shader language such as CG or HLSL/GLSL. Additionally, "Informatics II" will focus on fundamental real-time rendering algorithms used in modern game engines — especially on the the concepts behind physically based rendering (PBR) as well as its implications on material design.
3) Professionalization
Students learn to establish a business plan for their project and further their professional competencies such as pitching, documentation and publication.
4) Lecture Series
This campus-wide, ongoing event consists of a diverse collection of renowned guest lecturers, including theorists, artists and industry experts, among others. Lecture topics are relevant for student projects and/or the academic, cultural and socio-economic interrogation of linear and nonlinear audiovisions.
Teaching Methods
Seminar, lecture, self-study
Prerequisite Subjects
"Animation in Film & Games: History & Theory II" module (MA.3D.004)
Assessment Methods
Term paper (2500 words) or Presentation (45 minutes),
and documentation (2000 words and visual references)
Prerequisites for CP
Term paper or presentation, documentation, active participation (Media Studies), completion of homework or course work (both individual and in groups)
Used in Other Courses

Significance of Module Grade for Final Grade
9%

Module Director(s) and Module Instructor(s)
Module Directors: Prof. Björn Bartholdy, Prof. Rolf Mütze
Module Instructors: Prof. Dr. Gundolf S. Freyermuth (Academic and Artistic Research: History, Theory, and Practice), Dirk Kraus (Informatics III), Prof. Odile Limpach (Professionalization), Prof. Rolf Mütze (Professionalization), Charles Harris (Professionalization), various guest lecturers (Lecture Series)

Other Information

Master's Project

ID MA.3D.007	Workload 720 h	Credits 24 ECTS	Semester 4	Frequency Once	Duration 16 Weeks
Courses 1) Master's Project 2) Project Presentation and Defense			Contact Hours 60 h 10 h	Self-Study 600 h 50 h	Size of Groups 1-5 1-5

Learning Outcomes / Competencies
The "Master Thesis" module enables students to:
- develop unique problem-solving strategies through the development of a 3D animation project or an academic thesis concerning the same field of expertise
- apply meta-concepts and meta-strategies to their own development and research process
- accumulate differentiated experience in generating, developing, refining and evaluating innovative ideas and concepts in the applied as well as academic field of 3D animation
- expand and strengthen their proficiency in technological conceptualization and development of 3D animation projects
- professionally engage in academic discourse as well as apply theoretical fundamentals to their own academic and artistic research
- strengthen their multimedia-professional skills, including public speaking, pitching, moderating, networking and management, among others

Module Content
1) Master's Project
Students produce an artistic-academic media project for either film, game or other related areas including a media theoretical thesis. The project demonstrates their ability to conceptualize and realize a worthwhile, marketable product with due regard to technological and economic standards, as well as aesthetic, cultural and social considerations. Alternatively, students may choose to pursue an academic research project including media application. Students receive consultation throughout the Master's project from the professors.

2) Project Presentation and Defense
Students present their projects to the module directors as well as faculty and staff.

Teaching Methods
Thesis project work, mentoring, feedback via Thesis Defense

Prerequisite Subjects
90 ECTS (Successful completion of the first three semesters of instruction)

Assessment Methods
Work Sample (individual or group animation project, processing time 4 months), Thesis (depending on a theoretical or practical focus of the project 40 - 70 pages), Thesis Presentation (15 - 30 minutes) and Defense (30 minutes)

Prerequisites for CP
Completion of Master Thesis and successful defense thereof

Used in Other Courses

Significance of Module Grade for Final Grade 26,5%
Module Director(s) and Evaluation Committee Module Directors: Prof. Björn Bartholdy and Prof. Rolf Mütze Evaluation Committee: Prof. Björn Bartholdy, Prof. Rolf Mütze and various faculty and staff
Other Information ---