Module Guide
Media Technology

Faculty Electrical Engineering and Media Technology

Examination regulations 01.10.2024

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MTM-01 ACADEMIC WORK, DATA ANALYSIS AND MACHINE LEARNING

Module code	MTM-01
Module coordination	Prof. Susanne Krebs
Course number and name	Academic work data analysis and machine learning
Lecturers	Prof. Bjoern Seeger Prof. Dr. Christine Wünsche
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Subject-specific compulsory electives include lectures from similar degree programmes. [SS1] Depending on the specialisation, students will be able to prepare for their future work activity. A class form the other specialisation may also be chosen.

Please ensure that you get the subjects approved. Subjects must be at the master?s standard and encompass the minimum number of required Semester hours per week/ECTS credits.

Make use of the further opportunity for students to take courses via the Institute?s digital platform.

[SS1]Satz im Deutschen unvollständig, hier ergänzt mit "include" bitte prüfen und ggf. anpassen

Applicability in this and other Programs

Master?s (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

None

ACADEMIC WORK

Objectives

During their project work, students will learn to work scientifically on sensor and actor projects.

Using a basic microcontroller (msp430, cc3200) or the Raspberry, a variety of sensor-actor applications will be developed and be used in order to answer a scientific issue.

Upon successful completion of the module, students will have achieved the following learning outcomes:

(1) Knowledge of how sensor-actor systems are developed

(2) Introduction into the Linux operating system

(3) Ability to recognise, configure and use development tools for[SS1]

(4) They will have tackled a special board interface

In addition to acquiring methodological and technical skills, students will learn how to work scientifically using a variety of examples. They will be aware of how scientific articles are structures and have used a variety of databases for research purposes. They will have run through and commented on articles.

[SS1]Fehlende Anwendungen: DE - "Die Entwicklungswerkzeuge für [???] kennen"

Learning Content

(I) Scientific work

(II) Media controllers, micro-computers

1.0 Operating systems for media applications

2.0 Linux

2.1 Operating system

2.2 Process control

2.3 File system

2.4 User management

2.5 Configuration

3.0 C programming basics

3.1 Accessing a camera

4.0 Sensor-actor configuration

5.0 Basic principles of scientific work

Entrance Requirements

Programming knowledge, basic hardware-near programming

Type of Examination

part of module exam

Methods

Lectures and practicals, laboratory practical covering development boards and host development; plus PAL interface back-coupling

Remarks

Type of examination

LPort

Recommended Literature

- Bjarne Stroustrup, "The C++ Programming language",1990, ISBN-0-201-51459-1;
- Jerry Peek, "Unix Power Tools", Random House, ISBN 0679-79073-X;
- Andrew S. Tannenbaum, "Moderne Betriebssysteme", Pearson Studium, ISBN 3-83273-7019-1;
- Da Vinci motherboard documentation (internal)
- 1.7.3 Embedded Multimedia

DATA ANALYSIS AND MACHINE LEARNING

Objectives

During lectures and in practical approaches the topic of Artifical intelligence will be introduced withthe help of methods from machine learning.

Based on the three componets aof machine learning: data, hypotheses and quality function the backbone of AI will be explained.

Students are expected to learn

(1) understanding and preparing of data

(2) basic competences in asking the right question

(3) Basics for educated guesses regarding the loss-function (quality function) as origin of artifical learning

(4) knowledge about legal context regarding the use of AI in media creation

Learning Content

(1) Collecting and preparing of data

(2) refresher in basic statistical methods (mean(s), standard deviation, grafical representation of results)

(3) machine learning: background and selcted models

(4) empirical risk minimisation

(5) legal context for AI

Entrance Requirements

Basics in Statistics (e.g. from Bachelor programme)

Type of Examination

part of module exam

Methods

Lecture with practical parts

Recommended Literature

Jörn Firscher "Maschinelles Lernen für Dummies", 2024, ISBN 9783527841844;

Volltext E-Book FHD:

https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=31251646

Alexander Jung, 2024, Maschinelles Lernen - die Grundlagen, ISBN 9789819979721;

Volltext E-Book FHD: https://doi.org/10.1007/978-981-99-7972-1

Matthias Plaue, 2021, Data Science- Grundlagen, Statistik, maschinelles Lernen,
ISBN: 9783662634882

MTM-02 ELECTIVE SUBJECT 1

Module code	MTM-02
Module coordination	Prof. Susanne Krebs
Course number and name	MTM-02-01 MTM-02-02 Event production MTM-02-03 Advanced topics in real-time 3D visualization
Lecturers	Prof. Susanne Krebs Prof. Jens Schanze Prof. Stephan Windischmann
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory course, compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

In the course of this module, students can select subjects from the other specialist focus, the vhb programme or another master's programme. The subjects in question must be of tangible relevance to the career that is ultimately to be pursued. Languages may not be selected:

Underlying requirements: 4 semester periods/week; 5 ECTS credits, master's level; the Examination Office (*Prüfungsamt*) shall be allowed to access the examination grade(s).

Applicability in this and other Programs

Master's (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

Basics of programming are required in order to qualify for the technical element.

MTM-02-01

Type of Examination

project work

MTM-02-02 EVENT PRODUCTION

Objectives

Objectives

The elective subject Event Production is the logical follow-up to the Event Conception module. In this elective module, the conceptualisation derived from the module is carried over into a real project during a project week. In a large team, students taking this master?s course will implement the planning abilities they have previously derived with respect to the disciplines directing and dramaturgy, lighting design, stage design, rigging, audio, lighting and electric power to carry out an event involving invited guests.

Professional skill
Students will expand their theoretical knowledge of technical relations in a real project environment. They will deepen their knowledge in their selected disciplines.

Methodological skill
Students will implement a real project in a large team and reflect on the outcomes and successful procedure models. They will learn to meet external demands as well as various team ideas just-in-time.

Personal skill
Students will experience what consequences arise from their actions in a broader context within a complex project environment. They will learn how to apply error and feedback culture in practical situations.

Learning Content

Content

1. Project Management
1.1. Coordination with the client
1.2. Coordination with Design and Technology
1.3. Setup and teardown timeline
1.4. Scheduling

2. Setup and teardown
2.1. Construction of decoration and lighting objects
2.2. Lighting engineering (lighting, sound, media)
2.3. Sound engineering
2.4. Media technology
2.5. Show programming

3. On-site support
3.1. Events directing
3.2. Event control
3.3. Technical control

4. Post-processing and documentation

Project work
The project task will be chosen and defined by the lecturers offering projects at the time.

The learning content will vary depending on the task.

Type of examination

Written examination, 90 min.

Type of Examination

student research project

Methods

Lectures, practical exercises, project work, project documentation, individual and group work

Remarks

Remarks

The compulsory elective subject will take place as a block module during term time. The exact dates will be announced at the beginning of the relevant semester.

Recommended Literature

Event-Technik; Holger Syhre, Stefan Luppold, SpringerGabler, 2018

Event-Regie; Monika Graf, Stefan Luppold, SpringerGabler, 2018

Tontechnik für Veranstaltungstechniker in Ausbildung und Praxis; Volker Smyrek, Hirzel, 2020

Licht und Beleuchtung im Medienbereich; Roland Greule, Hanser, 2021

Technische Leitung, Veranstaltungsleitung: technische Fachplanung, Verantwortung und Anforderungen; Thomas Sakschewski, Beuth, 2021

MTM-02-03 ADVANCED TOPICS IN REAL-TIME 3D VISUALIZATION

Type of Examination

project work

MTM-03 FACIAL ANIMATION

Module code	MTM-03
Module coordination	Prof. Joerg Maxzin
Vertiefung	Digital Media Production (DMP)
Course number and name	Facial Animation
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Professional skill
On completing the module, students will have acquired a basic understanding of the anatomy of the human body and the ability to analyse facial expressions and interpret their emotional content. Students will be in a position to generate and animate virtual faces.

Methodological skill
Students will have developed their own content within teams and evaluated and discussed the outcomes with their fellow students. In the course of scrutinised their work outcomes and thus deepened their methodological knowledge. Students will have professionally presented their project outcomes.

Social skill
Students will be in a position to carry out project-related tasks within the team and to coordinate these with their fellow students.

Applicability in this and other Programs

Polyvalent

Entrance Requirements

Basic principles of 3D modelling and animation.

Learning Content

1. Human head anatomy
- 1.1 Bone structures
- 1.2 Muscles of the head
- 1.3 Skin and fatty tissue
- 1.4 Eyes
- 1.5 Mouth, teeth, tongue
- 1.6 Hair

2. Facial expressions; emotions
- 2.1 Basic principles of facial expressions
- 2.2 Facial action coding system
- 2.3 Phonemes

3. Form generation
- 3.1 3D scanning
- 3.2 Retopology
- 3.3 Morph target modelling
- 3.4 Design aspects of head shapes

4. Texturing
- 4.1 Surface unwrapping
- 4.1 Polygroups
- 4.3 Generation of various maps
- 4.4 Design aspects of colour schemes

5. Animation
- 5.1 Basic principles of facial expressions
- 5.2 Morph target animation
- 5.3 Bone animation
- 5.4 Graphical interfaces

6. Real-time visualisation
- 6.1 Exporting to a real-time render engine
- 6.2 Real-time rendering

7. Presentation
- 7.1 Presentation of project outcome

Teaching Methods

Seminar-style tuition, lectures and practical laboratory exercises, presentation of semester outcomes.

Remarks

Additional assistance through e-learning platform.

Recommended Literature

1. Osipa, J.: Stop Staring, John Wiley & Sons, 2010

2. Ekman, P.: Facial Action Coding System (FACS), Research Nexus, 2002

3. Zarins, U.: Anatomy of Facial Expression, Anatomy Next Inc., 2017

4. Zarins, U.: Form of the Head and Neck, Anatomy Next Inc., 2021

MTM-04 SHORT FILM PRODUCTION

Module code	MTM-04
Module coordination	Prof. Jens Schanze
Vertiefung	Digital Media Production (DMP)
Course number and name	Short film production
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

On completing this module, students will be familiar with the fundamental web technologies. They will be able to differentiate between client and server technologies. They will have familiarised themselves and learned about the various technologies, such as HTML, CSS, Javascript, Node, PHP, and accessed databases. In doing so, they will use data formats such as XML and JSON.

In addition to the above, students will become familiar with concepts for applying the above technologies to a variety of web applications and know when to use the technologies.

They will realise a project and use agile development methods in the process. These include software engineering methods such as SCRUM or Kanaban. At least one process will be treated in detail.

During the projects, students will collectively articulate requirements and manage these requirements. By working together in teams, they will further hone their skills with respect to developing projects in a team environment.

Applicability in this and other Programs

Media Technology, M.Eng

Entrance Requirements

Basic knowledge of web technologies (HTML, CSS, Javascript, PHP, databases)

Learning Content

1.0 Definition of terms

2.0 Web application categories

3.0 Development processes

4.0 Project work

- 4.1 Web design
- 4.2 Usability
- 4.3 Software development

The drafting and realisation of web applications using the model view controller architecture pattern will be taught.

Various client- and server-based frameworks using Javascript and PHP will be applied in the process.

Current web technologies and trends will additionally be examined.

Teaching Methods

Team teaching, project-based learning, front-of-class teaching, presentations

Recommended Literature

- Kappel et.al.: Web-Engineering, dpunkt Verlag 2003;
- Caroline & Matthias Kannengiesser: PHP5 / MySQL5, Franzis, Poing, 2005;
- Krug, S. Don't Make Me Think, Redline GmbH, Heidelberg 2006
- Frank Becher: Kurzfilmproduktion, UVK, Konstanz, 2012
- Eckard Wendling: Filmproduktion, Eine Einführung in die Produktionsleitung, UVK, Konstanz, 2015
- Werner Faulstich: Grundkurs Filmanalyse, Brill/Fink, München, 2013

- Gerrit Koehler: Drehbuch schreiben, Frankfurter Taschenbuchverlag, Frankfurt am Main, 2007
- Steven Katz: Shot by Shot, Das Handbuch zur Bildsprache des Films, Zweitausendeins, Frankfurt a.M, 2002
- Davit Mamet: Die Kunst der Filmregie, Alexander-Verlag, Berlin, 2009
- Joerg U. Lensing: Sound-Design, Sound-Montage, Soundtrack-Komposition, Schiele & Schön GmbH, Berlin, 2018

MTM-05 SPACE AND EVENT DESIGN

Module code	MTM-05
Module coordination	Prof. Susanne Krebs
Course number and name	Methods of visualization
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Module objectives

The event will serve as a testing ground to demonstrate how various media interact and interlock. By skilfully combining technology with dramaturgy, events are an especially good means of creating lasting experiences in the room.

When developing concepts, students will draw on new substantive and design approaches from every aspect of artistic work and combine these with the higher education institution?s context. Students will recognise and evaluate trends and create and design contributions based on their personal analysis.

In small teams, they will thus develop viable ideas and present these as pitches. Students will acquire key qualifications such as the ability to work with others in interdisciplinary teams, the ability to plan and coordinate a concept design on their own unassisted, to allocate tasks, and to define and adhere to milestones.

Professional skill
Students will deepen their media-specific knowledge during practical project work and develop the ability to devise solutions to experimental tasks on their own and unassisted and thus draw closer to stamping their own personal mark on the design work.

Methodological skill

Students taking this module will be in a position to manage and complete complex media projects on their own, unassisted and within teams. They will have implemented projects in the course of their studies and reflected on the outcomes and successful procedure models.

Personal skill
Students will have learned to define goals, apply appropriate means, acquire knowledge on their own and additionally be able to reflect systematically and critically on the social, economic, ecological and ethical impact of the activity and to be responsible-minded as they incorporate this knowledge into their actions.

Applicability in this and other Programs

Master?s (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

None

Learning Content

1. Concept development
1.1. Client briefing
1.2. Pitching ideas
1.3. Coordination of ideas with clients

2. Project work
2.1. Concept design
2.2. Dramaturgy
2.3. Scenography
2.4. Engineering (lighting, sound, media)
2.5. Media design
2.6. Show programming

Accompanying tutorial

The project task will be defined based on the project environment at the time by the lecturers offering projects.

The learning content will vary depending on the task.

Teaching Methods

Lectures, practical exercises, project work, project documentation, individual and group work

Remarks

Guest lectures

Recommended Literature

- **Recommended reading**
- Design Th!nking; Gavin Ambrose, Paul Harris, stiebner, 2010
- Design Methoden, 100 Recherchemethoden und Analysetechniken für erfolgreiche Gestaltung; Bella Martin, Bruce Hanington, stiebner 2012
- visuelle kreativität; Mario Pricken, Verlag Hermann Schmidt Mainz, 2015
- Eventpsychologie; Steffen Ronft Hrsg., SpringerGabler, 2021
- Handbuch Mediatektur, Andrea Rostásy, Tobias Sievers, Transcript Design, 2018
- Immersive Narrative Installations, Tamschick Media+Space, avedition, 2015
- Interreaction; Jakob Behrends; avedition, 2015
- Marketing Spüren, Willkommen am Dritten Ort; Christian Midkunda; Redline Verlag; 2012
- Szenografie; Petra Kiedaisch, Sabine Marinescu, Janina Poesch, avedition, PLOT, 2020
- Wirkungsvolle Live-Kommunikation; Axel Gundlach, SpringerGabler, 2013
- Event-Technik; Holger Syhre, Stefan Luppold, SpringerGabler, 2018
- Event-Regie; Monika Graf, Stefan Luppold, SpringerGabler, 2018
- Tontechnik für Veranstaltungstechniker in Ausbildung und Praxis; Volker Smyrek, Hirzel, 2020
- Licht und Beleuchtung im Medienbereich; Roland Greule, Hanser, 2021
- Technische Leitung, Veranstaltungsleitung: technische Fachplanung, Verantwortung und Anforderungen; Thomas Sakschewski, Beuth, 2021

MTM-06 ADVANCED AUDIOPRODUCTION

Module code	MTM-06
Module coordination	Prof. Dr. Gerhard Krump
Vertiefung	Digital Media Production (DMP)
Course number and name	Advanced audio production
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

To enable students to apply their acquired theoretical and practical knowledge to audio-production. In the process, specialist technical knowledge will be combined with design and textual features under career-related conditions to develop a presentation-worthy product. Doing so will involve a high level of creative application of numerous audio-mixing methods, such as noise and sound production, effect processing, multi-channel sound processes and sound design, in order to train practical noise/sound production and sound design skills and creatively apply these to career-related situations.

The following outline counts among the skills and skills that will be acquired:

Professional skill

- Knowledge of the main principles and technical terms relating to audio-production
- Knowledge and application of the basic principles of sound production using electronic and natural musical instruments, sound synthesis as well as MIDI technology
- Knowledge and application of field recordings, i.e. the recording and editing of natural sounds in environments outside the recording studio

Methodological skill

- Methods of artificial audio production (foley artist)
- Methods of multi-channel sound recording, mixing and coding
- Knowledge and application of effect and audio processing as well as sound mixing
- Mastering of various recordings and various audio tracks to produce an overall sophisticated product using stereo and surround technology
- Application of recording, audio processing and audio reproduction processes to develop a publicly presentable media product
- Combination of acquired technical expertise and with design and textual abilities to generate a sophisticated product

Personal skill

Students will learn to work unassisted in a recording studio and to present their individual production outcomes to an expert audience using descriptive means. They will be in a position to perform the creative development and technical implementation of an idea concerning a product and through their own unassisted, systematic and deadline-oriented work activities.

The project will combine factual and conceptual knowledge with process and production knowledge to create meta-cognitive knowledge by enabling students to recognise and apply their talent to audio-production. Students will be required to create works in the individual subfields including the stereo mixing of radio dramas and worlds of sound in surround technology.

Applicability in this and other Programs

None

Entrance Requirements

Bachelor's degree programme involving the basic principles and knowledge of operating audio software and mixing sound recordings

Learning Content

1. Generating electronic sound: types of sound production, sound modules VCO, VCA, VCF etc., types of synthesis, history

2. Sound production from natural musical instruments: sound emission within a space, types of instruments, history, physical and musical realities

3. Signal processing in effect devices: modulation effects, exciters, compressors, etc. (technology, signal flow, practical application), audio mastering

4. MIDI, multi-channel sound, CD technology: technical background, historical development, practical applications

5. Sound design: theoretical and practical sound design in radio dramas, audio books and sound-only worlds of sound as opposed to film audio latching on to images; accompanied by: history of sound design and history of German radio dramas.

6. Creation of artificial sounds: practical foley work in audio recording booths and how these recordings can be distorted using effect devices

Teaching Methods

Seminar-style tuition, coupled with practical exercises in a recording studio; unassisted work in a recording studio with personal mentor

Projector, board, overhead projector, audio and video demos

Remarks

Comprehensive script; instructions, practical exercises

Recommended Literature

- Dickreiter M., Handbuch der Tonstudiotechnik, K.G. Saur-Verlag, 2008;
- Meyer J., Akustik und musikalische Aufführungspraxis, Verlag Das Musikinstrument, Frankfurt, 1980;
- Ruschkowski A., Elektronische Klänge und musikalische Entdeckungen, Reclam Stuttgart, 1998;
- Wandler H., Elektronische Klangerzeugung und Musikreproduktion, Verlag Peter Lang Frankfurt, 2005;
- Friedrich H.-J., Tontechnik für Mediengestalter, Springer-Verlag, 2008;
- Lensing J. U., Sound-Design Sound-Montage Soundtrack-Komposition, Schiele und Schön-Verlag, 2009;
- Lazarus H. et al. Akustische Grundlagen sprachlicher Kommunikation, Springer-Verlag, 2007;
- Weinzierl S., (Hrsg.) Handbuch der Audiotechnik, Springer-Verlag, 2008;
- Flückiger F., Sounddesign, Schüren-Verlag, 2001

MTM-07 VIRTUAL PRODUCTION

Module code	MTM-07
Module coordination	Prof. Stephan Windischmann
Vertiefung	Light and Media Engineering (LME)
Course number and name	Virtual Production
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Module objectives
To broaden students? knowledge of how interactive real-time systems can be put to use in modern film and video studio production work, especially where this relates to virtual production projects. At the same time, they will explore methods and procedures for producing dramatic storytelling for virtual and hybrid productions, their processes and appraisal. They will acquire skills in the realms of project planning, realisation and management of a production in the context of the virtual production, the staging of a so-called digital twin, and hybrid event staging.

Professional skills
Students will learn the key technologies, methods and processes relating to virtual production and human-machine interaction using the analysis and processing of sensor, image and audios signals as the basis. They will become knowledgeable in evaluating how modern real-time 3D game engines can be put to use in a variety of virtual production application fields and how to apply them. They will acquire knowledge in the fields of virtual reality, interactive real-time 3D scenography as well as 3D level design for virtual productions.

Methodological skills
Within the framework of guided seminar work, students will expand their abilities to solve complex tasks as members of interdisciplinary teams. They will have

collaborated on projects and understand how to present work outcomes to a variety of target groups and how to formulate constructive criticism. This ability will enable them to work effectively in teams and also to run such teams.

Personal skills
Students will develop an awareness of modern, interactive and technologically demanding productions in the fields of media informatics and media production in the digital age.
They will have acquired the personal organisational skills to enable them to assign tasks within the team and to provide feedback. They can put forward technical arguments supporting their work and present these using a variety of technologies. They will acquire an ability to evaluate how interactive systems and modern video studio technologies can be put to a variety of uses and how to apply them.

Applicability in this and other Programs

Master?s (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

To participate in this module, students will be required already to be familiar with the basic principles of programming, design, and 3D, film and media product.

Learning Content

1. Knowledge of the key technologies, processes and procedures concerning SDI camera, lighting, film and video studio technology
2. Application of appropriate camera, image and audio recording processes and digital editing processes (post-production) to enable students to perform virtual video productions
3. Application of aspects and disciplines of modern studio technology and staging for virtual productions taking the use of modern video studio software and the application of modern real-time 3D game engines as an example
4. Motion tracking sensor technologies
5. Processes relating to the editing, processing, segmentation and analysis of image/video data
6. Mapping of sensor data
7. Tools, programming and workflow environments employed to conceive and realise virtual production scenarios
8. Standardised and application-specific interface technologies (Live Link, OSC, DMX, ArtNet) and their application

9. Media control (media devices, application programmes, 3D engine)

Teaching Methods

Lectures, practical exercises, projects, project documentation, individual and group work

Remarks

Remarks

Guest lectures, excursion

Recommended Literature

- THE VIRTUAL PRODUCTION FIELD GUIDE VOLUME 1 By Noah Kadner Presented by Epic Games; https://www.unrealengine.com/vpfieldguide
- THE VIRTUAL PRODUCTION FIELD GUIDE VOLUME 2 By Noah Kadner Presented by Epic Games; https://www.unrealengine.com/vpfieldguide
- Unreal Engine 4 Virtual Reality Projects: Build immersive, real-world VR applications using UE4, C++, and Unreal Blueprints; Packt Publishing; Robert Rudd;
- Blueprints Visual Scripting for Unreal Engine 5: Unleash the true power of Blueprints to create impressive games and applications in UE5; Packt Publishing; Brenden Sewell
- Branded Interactions: Lebendige Markenerlebnisse für eine neue Zeit; Marco Spies, Katja Wenger; Verlag Hermann Schmidt
- Systemisches Design, Intelligente Oberflächen für Information und Interaktion; Cyrus Dominik Khazaeli, 2005

MTM-08 AUDIOVISUAL SYSTEMS DESIGN

Module code	MTM-08
Module coordination	Prof. Bjoern Seeger
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-08 Audiovisual systems design
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-09 LIGHTING AND CAMERA

Module code	MTM-09
Module coordination	Prof. Bjoern Seeger
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-09 Lighting and camera
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-10 STAGE LIGHTNING

Module code	MTM-10
Module coordination	Prof. Susanne Krebs
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-10 Stage lightning
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-11 SOFTSKILLS AND BUSINESS DEVELOPMENT

Module code	MTM-11
Module coordination	Prof. Dr. Goetz Winterfeldt
Course number and name	MTM-11-01 MTM-11-02 Softskills
Lecturers	Anton Achatz Christine Stöhr Prof. Dr. Goetz Winterfeldt
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work, Portfolio
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Upon successfully completing the module, students will have acquired the following professional, methodological and personal skills:

Professional skill

The module provides students an insight into the basic principles of corporate planning in the context of media. Students will develop a business plan for a company and provide their views on the company?s development. Upon successfully completing the module, students will (in terms of content):

- have modelled a company using Excel. They will have simulated a P&L on the basis of sales and cost drivers. They will have planned investments and calculated the financial requirements;
- have analysed the product for their market and evaluated its demand using statistics supplied by Statista, destatis;

- have analysed the competition using online analyses and elaborated a product strategy;
- have created a Going2Market plan and factored in the means of communication.

Methodological skill

Students still have used and/or applied various tools, including the following:

- database research in databases: Statista, Federal Gazette, Hoppenstedt
- Setup of corporate models using Excel
- Use of collaborative tools, such as Google Docs, owncloud

Personal skill

Tasks are performed in groups. Groups review and comment on the outcomes submitted by the respective other groups. Work outcomes are discussed in plenaries. This form of teaching encourages a propensity among students to be adventuresome as well as problem-solving skills and a willingness to understand the positions of others.

Applicability in this and other Programs

Master's degree programmes in another technical field: MSc. Applied Sciences, MSc. Electrical Engineering

Entrance Requirements

None

MTM-11-01

Type of Examination

part of module exam, Portfolio

Remarks

Type of examination

Part of end-of-module examination; written examination 60 min.; record of performance exposé required

MTM-11-02 SOFTSKILLS

Type of Examination

project work, part of module exam

Remarks

Type of examination

Written examination, 90 min.

MTM-12 SELECTIVE SUBJECT II

Module code	MTM-12
Module coordination	Prof. Susanne Krebs
Course number and name	Selective Subject II
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Students choose a subject of relevance to their future career from the subjects offered in the other specialisation or another master?s degree programme. All subjects of a master?s standard, with 4 Semester hours per week and 5 ECTS credits are eligible

Applicability in this and other Programs

Master?s (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

Depends on the subject area ...

Learning Content

See description of subjects

Teaching Methods

Lectures, practicals and one project

Recommended Literature

See description of subjects

MTM-13 HEARING AND PSYCHOACOUSTICS

Module code	MTM-13
Module coordination	Prof. Dr. Gerhard Krump
Vertiefung	Digital Media Production (DMP)
Course number and name	Hearing and psychoacoustics
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	written ex. 90 min.
Duration of Examination	90 min.
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

After taking part in this module, students will be familiar with the basic principles and terminology concerning hearing and psycho-acoustics and understand the complex signal processing in human hearing and its technical/mathematical definition to the extent that, using functional schematic diagrams and models, they can personally explain and describe the correlations between stimuli and sensations. By applying knowledge of and dealing with descriptive models, signal theory and hearing-specific linkages and correlations can be outlined so that auditory perceptions can be objectively calculated and estimated in certain realms of the model description.
Through this module, students will be able to pursue a profession in a creative surrounding (sound processing, sound design) as well as in engineering (acoustic consultancy, noise abatement) and a scientific field (research, development).
Scientific methods and descriptive processes in particular will be deepened and applied.
Factual knowledge, conceptual knowledge, procedures, but also meta-cognitive knowledge will be communicated.

Examples of tasks will be directly incorporated into the subject matter of the lecture and worksheets covering practical tasks completed. Students will be expected to do the necessary calculations of the tasks on the worksheets at home in preparation for the lecturer then explaining them.

The following is a sample of the skills that students will acquire:

Professional skill

- Knowledge of hearing and psychoacoustic terminology
- Knowledge of signal processing in human hearing and the corresponding hearing impairments
- Knowledge and performance of acoustic measuring and hearing test processes, their evaluation and technical description
- Knowledge of acoustic functional schematic diagrams and models and their application

Methodological skill

- Practice using and setting up measuring systems as well as unassisted conducting and evaluation of standardised measurements
- Comprehension of the correlations between stimuli and sensations (e.g. frequency - pitch, noise level - volume, modulation - coarseness)
- Comprehension of acoustic correlations and sensations, their description and their complex interaction with physical and electric systems
- Analysis and evaluation of acoustic and sound engineering issues by using suitable measuring systems and describing the technical correlations and interactions through formulae, graphics and functional schematic diagrams (e.g. noise abatement, acoustic consultancy or recording studio configurations)
- Application of suitable calculation processes and functional schematic diagrams for solving acoustic issues
- Comprehension of scientific modes of working and methods
- Development of new acoustic solution-focused approaches by combining engineering-like methods, functions and modes of working from a variety of disciplines, such as mechanics, informatics, electrical engineering and acoustics (e.g. vehicle acoustics)
- Set-up of hearing tests and thus scientific analysis of sound and products (e.g. sound from loudspeakers, televisions, merchandise tests)
- Explanation of acoustic phenomena and sensations using knowledge relating to signal processing in human hearing and, following on from this, development of new methods of processing and analysis (e.g. testing, analysis and development of various codec processes such as MP3)

Personal skill

In their responsible capacity as engineers, students will be trained to create aurally-accurate sound recordings and mixes and/or technically mature productions on the one hand while, on the other, avoiding any influences that may be harmful to the sense of hearing in and of itself but also in their products. Using functional models and functional schematic diagrams of the signal processing in human hearing, they will acquire the skills for scientific working including experiments and counter experiments and thus be able to articulate and systematically examine scientific questions whereby the promotability of the master?s degree will be underscored.

Applicability in this and other Programs

None

Entrance Requirements

Bachelor?s degree covering the basics of acoustics

Learning Content

1. Stimulus and sensation: the function of sensations, hearing test methods, test evaluation

2. Hearing system: physiology of hearing, threshold of hearing at silence, pathology of hearing, recruitment, cocktail party effect, hearing tests to determine levels of hearing impairment, speech audiometry, otoacoustic emissions

3. Masking: masking through random noise, evenly obscuring noise, evenly stimulating noise, masking through pure tones, temporal occlusion effects, listening thresholds period patterns

4. Frequency band and stimulation: frequency bandwidth, stimulation and excitation, threshold model, excitation level versus critical-band rate pattern

5. Loudness: just-noticeable level differences, level loudness, isophone, loudness, partial masked loudness, model of loudness, specific loudness versus critical-band rate pattern, time dependency of loudness

6. Fluctuation strength: model of fluctuation strength

7. Roughness: model of roughness

8. Sharpness: model of sharpness

9. Pitch: just-noticeable changes in frequency, ratio pitch, spectral pitch and pitch shift, virtual pitch, scales of pitch-related sensations, pitch strength

10. Subjective duration: model of subjective duration

11. Spatial hearing: outer ear transfer functions, interaural level difference, interaural time difference, directional bands, sound localisation, interaural coherence, recording processes, binaural masking level differences, binaural loudness, binaural signal detection, models of binaural hearing

Teaching Methods

Lectures and seminar-style tuition involving sample calculations and numerous audio demos and experiments; assignment sheets with practice-oriented exercises for the students to calculate at home and then go through during lectures scheduled to delve deeper into the subject matter.

Projector, board, overhead projector, audio and video demos

Remarks

Comprehensive script

Recommended Literature

- Terhardt E., Akustische Kommunikation, Springer-Verlag, 1998;
- Ulrich J., Hoffmann E., Hörakustik, DOZ-Verlag, 2007;
- Weinzierl S., Handbuch der Audiotechnik, Springer-Verlag 2007;
- Zollner M., Zwicker E., Elektroakustik, Springer-Verlag 1993;
- Fastl H., Zwicker E., Psychoacoustics, Springer-Verlag, 2005;
- Zwicker E., Psychoakustik, Springer-Verlag, 1982
- Görne, Tontechnik, Hanser Verlag, 2014

MTM-14 CORPORATE FILM

Module code	MTM-14
Module coordination	Prof. Jens Schanze
Vertiefung	Digital Media Production (DMP)
Course number and name	Short film production 2
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

2.3.1 Commercial (Amberg):

By watching short films, module participants will be able to identify dramatic and aesthetic principles of films and to explain how they deviate from one another.
The knowledge acquired through this module must be viewed in terms of the theoretical and practical importance for the student?s own film work. At the same time, film artefacts from the past will be classified and also discussed in terms of their relevance for the perspectives specific to film.
Based on pre-defined substantive and genre-related patterns, every aesthetic principle of film can be creatively implemented.
The organisational (production/shooting schedule) and economic (film calculations) implications of a film idea or a script/screenplay (editing) must be recognised in terms of their inter-relatedness and analysed in terms of their aesthetic and production impact.
The findings of the analysis are to be related to the intended aim(s) of the short film (content), the budget that has been made available, and to its editorial use (broadcasting slot).
The available know-how and expertise should provide students with the design methods and examples of past and present film art to enable them to develop and realise their own personal design trademark (production).

In keeping with the declared educational goals, students will become familiar with and be able to apply the specialist terminology (jargon) as part of their factual knowledge and also need to learn and master cinematographic interrelations (camera work, editing, etc.).
All of the factual knowledge is to be comprehended in context in terms of its film aesthetics and film history. In doing so, narrative models and dramatic as well as film-making theories are always to be related to the students? own work.
Process-oriented knowledge must factor in both the theoretical and practical aspects of production guidelines (16 mm film or video). Specialised film production techniques are only to be communicated in a general setting (given the nature of the technical equipment), with those relating to video production to be communicated in a theoretical and practical setting. The key outcome here is that students gain an awareness of the far-reaching consequences of the diverse nature of the underlying media types (film or video).
Students should ultimately be able to recognise their own progress in terms of design and to see this in the context of its multi-media use.
Students? own design strengths and weaknesses are to be accepted in the context of creative development and incorporated into the various stages of the teamwork.

2.3.2 Short film 2 (Deggendorf):

When viewing short films, participants should be able to identify the dramatic and cinematographic principles and outline how these differ.
In terms of the student?s own film work, the acquired knowledge must be illustrated in terms of its theoretical and practical significance. In this context, historical film artefacts are to be classified and their relevance discussed in respect of their film aesthetic perspectives.
Based on pre-defined substantive and genre-related patterns, every aesthetic principle of film can be creatively implemented.
The organisational (production/shooting schedule) and economic (film calculations) implications of a film idea or a script/screenplay (editing) must be recognised in terms of their inter-relatedness and analysed in terms of their aesthetic and production impact.
The findings of the analysis are to be related to the intended aim(s) of the short film (content), the budget that has been made available, and to its editorial use (broadcasting slot).
The available know-how and expertise should provide students with the design methods and examples of past and present film art to enable them to develop and realise their own personal design trademark (production).

In keeping with the declared educational goals, students will become familiar with and be able to apply the specialist terminology (jargon) as part of their factual knowledge and also need to learn and master cinematographic interrelations (camera work, editing, etc.).
All of the factual knowledge is to be comprehended in context in terms of its film aesthetics and film history. In doing so, narrative models and dramatic as well as film-

making theories are always to be related to the students? own work.
Process-oriented knowledge must factor in both the theoretical and practical aspects of production guidelines (16 mm film or video). Specialised film production techniques are only to be communicated in a general setting (given the nature of the technical equipment), with those relating to video production to be communicated in a theoretical and practical setting. The key outcome here is that students gain an awareness of the far-reaching consequences of the diverse nature of the underlying media types (film or video).
Students should ultimately be able to recognise their own progress in terms of design and to see this in the context of its multi-media use.
Students? own design strengths and weaknesses are to be accepted in the context of creative development and incorporated into the various stages of the teamwork.
Applicability in this and other degree programmes

Master's (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Applicability in this and other Programs

BA with area of concentration on production

Entrance Requirements

BA with area of concentration on production

Learning Content

2.3.1 Commercial (Amberg):

1. TV production
1.1 TV production in teamwork
1.2 Interaction between the faculties involved
1.3 Audio/video design elements in television
1.4 Technical and design quality in television
1.5 image/sound linking
1.6 Making an actually broadcast news programme
1.6.1 Professional skills
1.6.2 Social skills
1.6.3 Artistic skills
1.6.4 Methodological skill
1.6.5 Personal skills
2. Seminar papers
2.1 Various topics concerning overall TV production

2.3.2 Short film 2 (Deggendorf):

1. clarification and discussion of the genre term (discussion)
1.1. Analysis and discussion of the die terminology used by the working group Kurzfilm - Bundesverband Deutscher Kurzfilm
1.2. "Überraschende Begegnung der kurzen Art" (Documentation, ZDF/ARTE 2005) Analysis of artistic film viewpoints
1.3. Discussion of examples from film history

2. Aspects and methods of film analysis (lecture)
2.1 Analysis and discussion of short films from the Academy of Media Arts Cologne
2.2 Short film: special broadcast on ARTE: analysis and discussion of sample films

3. Idea, synopsis, treatment and script/screenplay (lecture)
3.1 From the idea to the synopsis ? students? own practical attempts, with discussion
3.2. Script/screenplay and storyboard (further immersion)
3.3. Script/screenplay ? practical attempts, with discussion
3.4. Storyboard ? practical attempts, with discussion

4. Aspects of film directing (lecture, with examples)
4.1. Camera work
4.2. Working with actors
4.3. Further immersion using the "German Short Films 2009" and "Germany Shorts in Cannes 2008" series of films as an example; analysis and discussion

5. The documentary short film (lecture, with examples)
5.1. Planning and producing a short film (general work process)
5.1.1 Analysis of the script/screenplay from a production perspective
5.1.2. (Sample) Calculation
5.1.3. Recording techniques and team
5.1.4. (Sample) shooting schedule
5.2. Analysis of the script/screenplay from a film-making perspective
5.2.1. Directing (storyboard) and casting
5.2.2. Production design, props, etc.

6. Filming
6.1. Presentation and discussion of the filmed material

7. Editing/post-production
7.1. Presentation and discussion of the rough cut

Teaching Methods

Lectures (interdisciplinary); project work in groups (film teams for graduation films); use of film media, especially to include coverage of historical short films; meetings (discussion) with external movie artists

Remarks

2.3.2 Short film 2 (Deggendorf): public presentation

Recommended Literature

2.3.1 Commercial (Amberg):

A.Vogel, P.Effenberg (Medienbildungsgesellschaft Babelsberg, Hrsgb.): Handbuch HD-Produktion. 2nd edition, 2010, Schiele & Schön Fachverlag GmbH, Berlin. ISBN: 978-3-7949-0815-8;

Miscellaneous: original manuals concerning the devices and programs used (available as a compilation of PDF files from the Amberg multi-media laboratory);

K. Grüger: Laboratory documentation. Loose-leaf collection, as amended from time to time (available as a PowerPoint file from the Amberg multi-media laboratory; will also be distributed by the lecturer in file form);

2.3.2 Short film 2 (Deggendorf):

Short Report. Kurzfilmmagazin. All editions 2005 and later. Herausgeber AG Kurzfilm Bundesverband Deutscher Kurzfilm;

German Short Film. All editions 2004 or later. Herausgeber German Short Film Association. Überraschende Begegnung der kurzen Art. Gespräche über den Kurzfilm;

Peter Kremski, Schnitt der Filmverlag 2005. In Zusammenarbeit mit den Internationalen Kurzfilmtagen Oberhausen;

European Medie Art Festival ? Kurzfilmedition 2005/06 Teil 1 und 2: Hrsg. EMAF Osnabrück Festivalleitung;

Next Generation 2003 und 2007. A Selection of Short Films by Students of German Film Schools;

Das Handbuch zum Drehbuch, Übungen und Anleitungen zu einem guten Drehbuch, Syd Field, Frankfurt 1991;

Das Drehbuchschreiben als Handwerk, 3rd Edition, Holger Ellermann, Coppengrave 1997;

Norbert Grob: Regie in: Thomas Koebner (Hrsg.): Reclams Sachlexikon des Films. Philipp Reclam jun. Verlag Stuttgart. 2nd Edition 2007;

Kurzfilmproduktion, Becher, Frank, Konstanz 2007

MTM-15 DESIGN PSYCHOLOGY

Module code	MTM-15
Module coordination	Prof. Susanne Krebs
Vertiefung	Digital Media Production (DMP)
Course number and name	Design psychology
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

In design, the terminology used today is visual systems. The aim of this module is to summarise ideas coherently to form one communications concept and to provide reasons for this. This approach enables students to create powerful, substantive and visual experiences across various media. An intensive analysis of the needs and requirements of the target groups and a real contract commissioner will be performed.

Students will learn hands-on to apply every stage of the design process ? from understanding to developing ideas and ultimately producing an implementation-ready prototype. At the end of the module, students will pitch their concepts.

Professional skill
Students will deepen the knowledge of cross-media visual systems communicated in relevant bachelor?s degree programmes. Students will be in a position to transfer a viable creative idea to a complex cross-media design system.

Methodological skill
Within the framework of guided seminar work, students will expand their abilities to solve complex tasks as members of interdisciplinary teams. They will have collaborated on projects and understand how to present work outcomes to a variety of target groups and how to formulate constructive criticism. This ability will enable them to work effectively in teams and also to run such teams.

Personal skill
Students will deal with the responsibility vested in them as designers. They will be able to organise and allocate tasks to other members of the team on their own and to provide feedback. They will produce professional arguments supporting their work and present these using a variety of technologies.

Applicability in this and other Programs

Master?s (M.Eng.) in Media Technology; subjects are also admissible for other master?s degree programmes

Entrance Requirements

None

Learning Content

1. Broadening of visualisation principles
1.1. Perception
1.2. Media, their possibilities and their requirements
1.3. User-centric design strategies, design thinking

2. Deep dives
2.1. Concept design
2.2. Dramaturgy
2.3. Scenography
2.4. Technology
2.5. Media design

3. Concept development
3.1. Client briefing
3.2. Over the shoulder: pitching ideas
3.3. Pitch presentation

Accompanying tutorial

Project work
The project task will be chosen and defined by the lecturers offering projects at the time.

The learning content will vary depending on the task.

Teaching Methods

Lectures, practical exercises, project work, project documentation, individual and group work

Remarks

Guest lectures

Recommended Literature

- Design Th!nking; Gavin Ambrose, Paul Harris, stiebner, 2010
- Design Methoden, 100 Recherchemethoden und Analysetechniken für erfolgreiche Gestaltung; Bella Martin, Bruce Hanington, stiebner 2012
- Eventpsychologie; Steffen Ronft Hrsg., SpringerGabler, 2021
- Event-Technik; Holger Syhre, Stefan Luppold, SpringerGabler, 2018
- Event-Regie; Monika Graf, Stefan Luppold, SpringerGabler, 2018
- visuelle kreativität; Mario Pricken, Verlag Hermann Schmidt Mainz, 2015
- Handbuch Mediatektur, Andrea Rostásy, Tobias Sievers, Transcript Design, 2018
- Immersive Narrative Installations, Tamschick Media+Space, avedition, 2015
- Interreaction; Jakob Behrends; avedition, 2015
- Marketing Spüren, Willkommen am Dritten Ort; Christian Midkunda; Redline Verlag; 2012
- Szenografie; Petra Kiedaisch, Sabine Marinescu, Janina Poesch, avedition, PLOT, 2020
- Wirkungsvolle Live-Kommunikation; Axel Gundlach, SpringerGabler, 2013

MTM-16 ADDITIVE MANUFACTURING AND SUSTAINABILITY

Module code	MTM-16
Module coordination	Prof. Joerg Maxzin
Vertiefung	Digital Media Production (DMP)
Semester	
Duration of the module	0 semester
Module frequency	annually
Course type	
Level	Postgraduate
Semester periods per week (SWS)	0
ECTS	5
Workload	Time of attendance: 0 hours Total: 0 hours
Type of Examination	project work
Weighting of the grade	5 /90
Language of Instruction	

Module Objective

Professional skill
On completing this module, students will have acquired the skills to generate 3D reference models using photogrammetry and 3D scanning. They will be in a position to creatively capture human forms, to reproduce these in 3D modelling and to colour texturize them. Students will become knowledgeable of how to optimise and output their 3D models for additive manufacturing from a sustainability perspective.

Methodological skill
Students will have developed their own 3D models of human body shapes and discussed their outcomes with their fellow students. In a discussion format, they will have scrutinised their work outcomes and thus further broadened their specialist knowledge in developing 3D shapes for resource-saving additive manufacture.

Personal skill
They will have learned to question their own work and appropriately evaluate the work produced by others.

Applicability in this Program

MTM-21 Masterarbeit

Applicability in this and other Programs

Polyvalent

Entrance Requirements

Basic principles of 3D modelling and animation

Learning Content

1. Designing the human body
- 1.1 Art and development history references
- 1.2 Specific human anatomy
- 1.3 3D concepts

2. 3D shaping
- 2.1 Photogrammetry
- 2.2 3D scanning
- 2.3 Polygonal modelling
- 2.4 Free-form modelling

3. Preparing 3D data
- 3.1 Retopology
- 3.2 Surface reconstruction

4. Importing and exporting 3D data
- 4.1 3D file formats
- 4.2 Software-specific requirements

5. 3D texturing
- 5.1 Managing human body shapes
- 5.2 3D texturing tools

6. Manufacturing
- 6.1 Generative manufacturing processes
- 6.2 Subtractive manufacturing processes
- 6.3 Own production

7. Sustainability
- 7.1 Local production
- 7.2 Energy efficiency
- 7.3 Material consumption and waste reduction
- 7.4 Recycling and circular economy

Teaching Methods

Seminar-style tuition, lectures and practical laboratory exercises, presentation of semester outcomes.

Remarks

Additional assistance through e-learning platform.

Recommended Literature

1. Maxzin, J. et.al.: Lukas aus der Asche, Kunstverlag Josef Fink, Lindenberg, 2016

2. Gebhardt, A.: Generative Fertigungsverfahren, 1. Auflage, Hanser, München, 2007

3. Murdock, K. L.: Autodesk 3ds Max 2017 Complete Reference Guide, SDC Publications, 2016

4. Spencer, S.: ZBrush Digital Sculpting Human Anatomy, 1. Auflage, Sybex, Indianapolis, 2010

5. Digital Tutors: Caricatures in ZBrush 3 (DVD), 1. Auflage), Digital Tutors, Oklahoma City, 2008

6. Autodesk 3ds MAX Learning Channel (YouTube/Online)

MTM-17 ARCHITECTURAL LIGHTNING

Module code	MTM-17
Module coordination	Prof. Bjoern Seeger
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-09 Architectural lightning
Lecturer	N.N.
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-18 LIGHTING AND MEDIA CONTROL

Module code	MTM-18
Module coordination	Prof. Bjoern Seeger
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-18 Lighting and media control
Lecturer	N.N.
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-19 EXTENDED REALITY AND VIRTUALIZATION

Module code	MTM-19
Module coordination	Prof. Stephan Windischmann
Vertiefung	Light and Media Engineering (LME)
Course number and name	Extended Reality
Lecturer	Prof. Stephan Windischmann
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	project work
Weighting of the grade	5/90
Language of Instruction	German

Module Objective

Students will be familiar with how packet-sending networks function, such as the internet, and the tasks of various multi-media protocols. They understand how to program socket applications and have familiarised themselves with the issues and boundaries facing multi-media on the internet (NAT, Firewall).

They will have installed and configured applications (Web, Chat, VoIP). **They will analyse** known multi-media protocols such as RTP, etc.
Students will have analysed streaming technologies and assessed their potential realisation.

They will synthesise socket-based applications using multi-media components and develop applications.

They will critically assess their approaches and optimise their actions. They will thus further refine their knowledge and skills in the superordinate area of software engineering.

Applicability in this and other Programs

Elective subject for Applied Computer Science

Entrance Requirements

Formally: none

Content-wise: lectures on programming and computer networks

Learning Content

1. Introduction

2. Basics of computer networks
   2.1 Layered model
   2.2 Protocol
   2.3 Standards
   2.4 Transport layer
   2.5 Network layer
   2.6 Multicast
   2.7 NAT
   2.8 Firewalls

3. Multimedia protocols
   3.1 Introduction
   3.2 RTP (transportation of data)
   3.3 RTSP (packetising of multimedia streams)
   3.4 RTCP (quality control)
   3.5 SIP

4. Practical component
   4.1 Installation and sniffing of a chat application
   4.2 Installation and sniffing of a VoIP application

5. Programming
   5.1 Socket programming
   5.2 Using an API protocol

6. Advanced topics
   6.1 Compression
   6.2 VoIP

Teaching Methods

Lectures with practical exercises

Remarks

Recommended Literature

James F. Kurose, Keith W. Ross: Computernetzwerke, Der Top-Down-Ansatz, 4th, revised Edition, München 2008;

Jon Crowcroft, Mark Handley, Ian Wakeman: Internetworking Multimedia, licensed under the creative commons, download at http://www.cl.cam.ac.uk/~jac22/ware.html

MTM-20 AUDIOVISUAL NETWORK

Module code	MTM-20
Module coordination	Prof. Bjoern Seeger
Vertiefung	Light and Media Engineering (LME)
Course number and name	MTM-20 Audiovisual network
Lecturer	Prof. Bjoern Seeger
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory elective course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Language of Instruction	German

MTM-21 MASTERTHESIS

Module code	MTM-21
Module coordination	Prof. Susanne Krebs
Course number and name	Masterthesis
Semester	3
Duration of the module	1 semester
Module frequency	as required
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	0
ECTS	30
Workload	Time of attendance: 0 hours self-study: 900 hours Total: 900 hours
Type of Examination	StA, presentation 20 min., master thesis
Weighting of the grade	30/90
Language of Instruction	German

Module Objective

Unassisted, engineering work;

Professional presentation of the work outcomes in a master?s thesis

Applicability in this and other Programs

Media Technology, M.Eng

Entrance Requirements

Every 1st and 2nd semester examination has been successfully passed

Learning Content

Unassisted writing of a scientific or engineering paper on a subject relating to media technology and production under the guidance of a lecturer.

Teaching Methods

Students briefly present the content and outcomes of their master?s thesis at a colloquium.

Remarks

The master?s thesis must be written in compliance with the Regulations for the Conduct of University Examinations (RaPO) and the General Examination Regulations (APO) of Deggendorf Institute of Technology.

Recommended Literature

The thesis must include a full record of the literature used, information obtained, and all other sources