Module Guide
Media Technology

Faculty Electrical Engineering and Media Technology

Examination regulations 14.03.2022

Date: Friday 07.10.2022 08:49

MTP-01 VIRTUAL PRODUCTION

Module code	MTP-01
Module coordination	Prof. Stephan Windischmann
Course number and name	Virtual Production
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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
Language of Instruction	German

MTP-02 MEDIATHEORY AND MEDIAMANAGEMENT

Module code	MTP-02
Module coordination	Prof. Dr. Goetz Winterfeldt
Course number and name	Softskills
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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 course asessment, practical course asessment
Language of Instruction	German

Type of Examination

part of module exam, written exam provided Exposé

SOFTSKILLS

Type of Examination

written ex. 90 min.

MTP-03 SELECTIVE SUBJECT

Module code	MTP-03
Module coordination	Prof. Dr. Goetz Winterfeldt
Course number and name	Selective Subject MTP-03 Event Production
Lecturer	Prof. Susanne Krebs
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	compulsory course, 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

SELECTIVE SUBJECT

Type of Examination

written ex. 90 min.

MTP-03 EVENT PRODUCTION

Type of Examination

written ex. 90 min.

MTP-04 EVENT CONCEPTION

Module code	MTP-04
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
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
Language of Instruction	German

MTP-05 FACIAL ANIMATION

Module code	MTP-05
Module coordination	Prof. Joerg Maxzin
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
Weight	5 x
Language of Instruction	German

Module Objective

Professional competence
After completing the module, the students have acquired basic knowledge of the anatomy of the human head and have the ability to analyze facial expressions and interpret their emotional content. The students are able to generate and animate virtual faces.

Methodical competence
In teams, the students developed their own content and evaluated and discussed the results with their fellow students. Based on the discussions, they questioned the results of their work and thus deepened their methodical knowledge. The students presented their project results professionally.

Social skills
The students are able to carry out project-related tasks in a team and coordinate them with their fellow students.

Applicability in this and other Programs

Polyvalent

Entrance Requirements

3D modeling and animation basics.

Learning Content

1. Human Head Anatomy

- 1.1 Bony structures
- 1.2 Muscle building on the head
- 1.3 Skin and adipose tissue
- 1.4 Eyes
- 1.5 Mouth, teeth and tongue
- 1.6 Hair

2. Facial expressions and emotions

- 2.1 Basics of facial expressions
- 2.2 Facial Action Coding System
- 2.3 Phonemes

3. Shape generation

- 3.1 3D scan
- 3.2 Retopology
- 3.3 Modeling morph targets
- 3.4 Design aspects of the head shape

4. Texturing

- 4.1 Unwrap the interface
- 4.1 Polygroups
- 4.3 Generating different maps
- 4.4 Design aspects of colouring

5. Animation

- 5.1 Basics of facial expressions
- 5.2 Animating with morph targets
- 5.3 Animating with bones
- 5.4 Graphical interfaces

6. Real time visualization

- 6.1 Export to a real-time render engine
- 6.2 Real-time rendering

7. Presentation

- 7.1 Presentation of the project results

Teaching Methods

Instruction seminars,lecture and practical laboratory exercises,presentation of semester results.

Remarks

Support through the 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

MTP-06 SHORT FILM PRODUCTION

Module code	MTP-06
Module coordination	Prof. Jens Schanze
	Module Vertiefung digitale Medienproduktion
Course number and name	
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
Type of Examination	project work
Language of Instruction	German

MTP-07 SPECIAL TOOLS

Module code	MTP-07
Module coordination	Prof. Dr. Marcus Barkowsky
	Module Vertiefung Medieninformatik
Course number and name	Special Tools
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required 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

MTP-08 SCIENTIFIC PROJECT SENSORS AND ACTORS

Module code	MTP-08
Module coordination	Prof. Dr. Goetz Winterfeldt
	Module Vertiefung Medieninformatik
Course number and name	Scientifi Projekt Sensors and actors
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

SCIENTIFI PROJEKT SENSORS AND ACTORS

Type of Examination

learning portfolio

MTP-09 SELECTIVE SUBJECT II

Module code	MTP-09
Module coordination	Prof. Dr. Goetz Winterfeldt
Course number and name	Selective Subject II
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

MTP-10 ADVANCED TOPICS AUDIOPRODUCTION

Module code	MTP-10
Module coordination	Prof. Dr. Gerhard Krump
	Module Vertiefung digitale Medienproduktion
Course number and name	Advanced Topics Audioproduction
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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.
Language of Instruction	German

ADVANCED TOPICS AUDIOPRODUCTION

Type of Examination

part of module exam

MTP-11 HEARING AND PSYCHOACOUSTICS

Module code	MTP-11
Module coordination	Prof. Dr. Gerhard Krump
	Module Vertiefung digitale Medienproduktion
Course number and name	Hearing and psychoacoustics
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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.
Language of Instruction	German

HEARING AND PSYCHOACOUSTICS

Type of Examination

part of module exam

MTP-12 SHORT FILM PRODUCTIOS 2

Module code	MTP-12
Module coordination	Prof. Jens Schanze
	Module Vertiefung digitale Medienproduktion
Course number and name	Short film production 2
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
Type of Examination	project work
Language of Instruction	German

MTP-13 METHODS OF VISUALISATION

Module code	MTP-13
Module coordination	Prof. Susanne Krebs
	Module Vertiefung digitale Medienproduktion
Course number and name	Methods of Visualisation
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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
Language of Instruction	German

MTP-14 3D-MODELLING FOR ADDITIV PRODUCTION

Module code	MTP-14
Module coordination	Prof. Joerg Maxzin
	Module Vertiefung digitale Medienproduktion
Course number and name	3D-Modelling for additiv Production
Semester	2
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
Weight	5 x
Language of Instruction	German

Module Objective

Professional competence
After completing the module, the students have acquired the ability to create 3D reference models using photogrammetry and measurement with a 3D scanner. They are able to capture human forms in a creative way, to reproduce them in 3D modeling and to texture them in colour. The students have the knowledge to optimize and export their 3D models for additive manufacturing.

Methodological competence
They developed their own 3D models of human body shapes and discussed their results with fellow students. Based on the discussions, they questioned the results of their work and thus further expanded their methodological knowledge in the development of 3D shapes for additive manufacturing.

Personal competence
They have learned to question their own work and to properly evaluate the work of others.

Applicability in this and other Programs

Polyvalent

Entrance Requirements

3D modeling and animation basics

Learning Content

1. Design of human bodies

- 1.1 References to art and history
- 1.2 Specific human anatomy
- 1.3 3D concepts

2. Gaining 3D shapes

- 2.1 Photogrammetry
- 2.2 3D scan
- 2.3 Polygon modeling
- 2.4 Free-form modelling

3. Preparation of 3D data

- 3.1 Retopology
- 3.2 Reverse engineering

4. Import and export of 3D data

- 4.1 3D file formats
- 4.2 Software specific requirements

5. 3D texturing

- 5.1 Unwrap of human body shapes
- 5.2 3D paint tools

6. Manufacturing

- 6.1 Additive manufacturing processes
- 6.2 Subtractive manufacturing processes

Teaching Methods

Instruction seminars,lecture and practical laboratory exercises,presentation of semester results.

Remarks

Support through the e-learning platform.

Recommended Literature

1. Maxzin, J.: 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)

7. Pixologic ZClassroom (Online)

3D-MODELLING FOR ADDITIV PRODUCTION

Objectives

After completing the module, students are able to:

1. Digitize real objects themselves using different methods

2. Retopologize self-generated digitized geometries in 3D

3. Create high polygonal, anatomically correct 3D models themselves

4. Texture self-generated high-polygonal 3D models

5. Prepare and export 3D models for production

Learning Content

1. Overview of 3D software concepts

    1.1 3D visualization and animation

    1.2 CAD construction

    1.3 Freeform modeling

2. Develop contexts

    2.1 Art and developmental references

    2.2 Specific anatomy

    2.3 3D concepts

3. Modeling - advanced techniques

    3.1 Strategies for creating editable polygon objects

    3.2 Practical work with editable polygon objects

3.3 Specific requirements of high-polygonal 3D models

4. Import and export of 3D data

4.1 3D file formats

4.2 Software-specific requirements

4.3 Archiving of 3D data

5. Digitizing forms

5.1 3D scanning methods

5.2 X-ray tomography

5.3 Photogrammetry

6. Processing uninterpreted 3D data

6.1 Retopology

6.2 Surface reconstruction

6.3 Reverse engineering

7. Applied freeform modeling

7.1 Special 3D human interfaces

7.2 Introduction to freeform modeling

7.3 Practical work in freeform modeling

8. Advanced 3D texturing techniques

8.1 Textures based on photographs

8.2 Normal mapping

8.3 3D paint tools

9. Manufacturing - 3D and rapid manufacturing

9.1 Subtractive production processes

9.2 Additive manufacturing processes

9.3 Casting processes

Entrance Requirements

Basics in 3D modelling and animation

Type of Examination

part of module exam

Methods

Seminars, lectures and practical laboratory exercises, papers, excursions, presentation of the semester results

Remarks

Support through the e-learning platform

Recommended Literature

1. Mach, Rüdiger: 3D-Visualisierung, Bonn, Galileo Press, 2000
2. Maxzin, Joerg: Lukas aus der Asche, Kunstverlag Josef Fink, Lindenberg, 2016
3. Bousquet, Michele: How to cheat in 3ds Max 2011, Taylor & Francis, 2010
4. Wendt, Volker: 3ds Max 2012 Workshops, Heidelberg, mitp, 2012
5. Gebhardt, A.: Generative Fertigungsverfahren, 4. Auflage, Hanser, München, 2013
6. Murdock, K. L.: 3ds Max 2010 Bible, 1. Auflage, Wiley, Indianapolis, 2010
7. Spencer, S.: ZBrush Digital Sculpting Human Anatomy, 1. Auflage, Sybex, Indianapolis, 2010
8. Autodesk 3ds MAX Learning Channel, YouTube, Online
9. Pixologic ZClassroom, Online

MTP-15 MACHINE VISION

Module code	MTP-15
Module coordination	Prof. Dr. Martin Jogwich
	Module Vertiefung Medieninformatik
Course number and name	Machine Vision
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Semester periods per week (SWS)	5
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.
Language of Instruction	German

MTP-16 APPLICATIONS DESIGN

Module code	MTP-16
Module coordination	Prof. Dr. Marcus Barkowsky
	Module Vertiefung Medieninformatik
Course number and name	Application Design
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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
Language of Instruction	German

APPLICATION DESIGN

Type of Examination

part of module exam

MTP-17 EXTENDED REALITY

Module code	MTP-17
Module coordination	Prof. Dr. Marcus Barkowsky
	Module Vertiefung Medieninformatik
Course number and name	Extended Reality
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	learning portfolio
Language of Instruction	German

MTP-18 CYBER SECURITY

Module code	MTP-18
Module coordination	Prof. Dr. Martin Schramm
	Module Vertiefung Medieninformatik
Course number and name	Cyber Security
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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.
Language of Instruction	German

MTP-19 SIMULATION AND PERFORMANCE OPTIMISATION

Module code	MTP-19
Module coordination	Prof. Dr. Peter Faber
	Module Vertiefung Medieninformatik
Course number and name	Simulation and Performance Optimisation
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
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
Language of Instruction	German

SIMULATION AND PERFORMANCE OPTIMISATION

Type of Examination

part of module exam

MTP-20 MASTERTHESIS

Module code	MTP-20
Module coordination	Prof. Dr. Goetz Winterfeldt
Course number and name	
Semester	3
Duration of the module	1 semester
Module frequency	as required
Course type	compulsory course, required course
Semester periods per week (SWS)	0
ECTS	30
Workload	Time of attendance: 0 hours self-study: 900 hours Total: 900 hours
Type of Examination	research paper, master thesis
Language of Instruction	German

Type of Examination

part of module exam

Type of Examination

written ex. 90 min.