



AALBORG UNIVERSITET

STUDIEORDNING FOR BACHELORUDDANNELSEN I MEDIALOGI, 2014, KØBENHAVN

**BACHELOR (BSC)
KØBENHAVN**

MODULER SOM INDGÅR I STUDIEORDNINGEN

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CREATIVE PLAY - APPLIED TECHNOLOGY

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The students must have passed the module: Creative Play – Applied Technology (Kreativ leg - teknologisk udformning)

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Students who complete the project module will be able to demonstrate preliminary learning outcomes for advancing as a student. Expectations are that the student can design, partly implement and assess the development of a media oriented work, such as a poster, computer game, interactive homepage, etc.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the project module will be able to:

Knowledge

- Explain problem-based study and the Aalborg model of PO PBL (**understanding**)
- Name prerequisites of group work ethics and organization (**knowledge**)
- Describe typical work processes in a problem based project related to Media Technology (**knowledge**)
- Describe individual as well as organizational learning processes (**knowledge**)

SKILLS

Students who complete the project module will be able to:

Skills

- Organize a short period of collaboration in-group and with a supervisor (**application**)
- **Apply** basic principles of scientific work and academic honesty including plagiarism rules and proper citations
- **Apply** taught methods to conceptualize, plan and organize own learning and knowledge sharing in a group situation
- Demonstrate basic analysis of media-oriented work (**analysis**)
- **Evaluate** practical problems and select relevant solutions in a media oriented context
- Formulate basic reflections and results of the problem based project work: orally, graphically and in writing (**synthesis**)

COMPETENCES

Students who complete the project module will be able to:

Competencies

Take independent responsibility of one's own learning during a shorter project period (**application**)

TYPE OF INSTRUCTION

Type of instruction:

Academically supervised student-governed problem oriented project work.

EXAM

EXAMS

Name of exam	Creative Play – Applied Technology
Type of exam	Oral exam based on a project Oral group examination with internal censor based on a written project report and a media-technological product plus a written process analysis. The Study Board for Media Technology may decide or exempt that only a technical artifact with documentation can be the basis for the individual oral examination. Furthermore, The Study Board for Media Technology may decide or exempt from the demand for a process analysis. The assessment is performed with the Pass/Fail grade.
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Kreativ leg - teknologisk udformning
Module code	MSNMEDB1141
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

DESIGNING FROM BOTH SIDES OF THE SCREEN

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The students must have passed the module: Creative Play – Applied Technology (Kreativ leg - teknologisk udformning)

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

To provide the student with practical experience defining a project within the area of information technology, communication and new media, which includes use of programming, to implement the project by working in groups and to document the solution in a project report.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the project module will be able to:

- **Explain** basic theory, methods and practices used in media technology that relate to the project (**understanding**)
- **Describe** basic concepts of problem-based study and the Aalborg model of PO PBL (**knowledge**)

SKILLS

Students who complete the project module will be able to:

- Compose a problem formulation from a larger problem area that can be answered or addressed within the scope of the project (**synthesis**)
- **Understand** how the target group from the problem formulation interacts in a real world context of use with similar media products or artifacts, which address the initial problem formulation
- Apply scientific theory and methods in a media technology oriented project and discuss basic reflections on their use in the project (**analysis**)
- **Apply** a programming language and implement parts of programs or small programs in order to solve a specific problem
- Carry out a basic evaluation of an artifact with the target user group (ideally not a convenience sample) or domain experts (**application**)
- Relate findings from the evaluation to a wider context (**analysis**) and apply knowledge from the field of Science, Technology and Society (STS) to identify relevant contextual perspectives (**understanding**)
- Organize and communicate the reflections and results of the problem based project work; orally, graphically and in writing – for the latter by applying a provided template or creating their own version of it (**understanding**)
- Organize and manage a longer-term project considering group and supervisor collaboration (**application**)
- **Analyse** the process involved in carrying out the project from a project management point of view and reflect on individual as well as group learning (**analysis**)

COMPETENCES

Students who complete the project module will be able to:

- Use proper terminology to discuss the project and Media Technology related aspects thereof (**understanding**)
- Take responsibility of one's own learning during a 2-3 month project period and generalize the gained experiences (**synthesis**)

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work.

Furthermore the Study Board for Media Technology wishes to note for implementation:

1. Students have to prepare a written P1 process analysis
2. Students will get support to identify relevant contextual perspectives by receiving comments on papers and feedback at group meetings
3. Students will get support to transfer project management theory to the projects by a PBL-seminar and related to this comments on papers as well as presentations in order to secure action on a mid-term process-analysis
4. A written comment to the group's process analysis will be provided to support project-examination

EXAM

EXAMS

Name of exam	Designing from Both Sides of the Screen
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology: Oral group examination with internal censor based on a written project report, evidence of design activities and their evolution (e.g., through sketchbooks, log books or a portfolio) and a media-technological product plus an A/V production that illustrates and summarizes the project plus a written process analysis.</p> <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	10
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Design fra begge sider af skærmen
Module code	MSNMEDB1142
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	10
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

AUDIO-VISUAL SKETCHING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

No special prerequisites for the module.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Students who complete the course module will obtain the following qualifications:

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- **Understanding** the fundamentals of camera usage and how it correlates with virtual cameras in 3D modelling software
- **Understanding** the fundamental principles of lighting a scene, both actual and in a virtual 3D environment
- **Knowledge** of the fundamentals of 3D modelling and compositing
- **Knowledge about** basic 2D and 3D animation principles, history, theories and techniques
- **Understanding** the concept and practice of key framing and in-betweens in animation
- **Knowledge of** how to combine virtual and physical objects in an animated sequence
- **Understanding** A/V and film techniques, such as editing, framing, image composition, types of shots, camera movement, focus, etc.
- **Knowledge** of basic sound-recording and –production, including knowledge about microphone types
- **Knowledge** of fundamental storytelling and storyboarding techniques in animation and A/V-productions
- **Knowledge** of the production pipeline in animation and A/V productions
- **Understanding** of sketching of objects, characters and storyboards and modelling of physical objects
- **Knowledge** of physical prototyping, including knowledge of preparing 3D models for 3D printing

SKILLS

Students who complete the course module will obtain the following qualifications:

- **Apply** knowledge of sketching of objects, characters and storyboards and physical modelling for prototypes, animatics and pre-visualizations
- **Apply** the fundamentals of key framing to create traditional animation
- **Apply** knowledge about 3D design, modelling, animation, and lighting to render a computer animated 3D scene
- **Apply** knowledge about principles and theories of traditional and 3D animation techniques, A/V-production theories and compositing to produce a short A/V production

COMPETENCES

Students who complete the course module will obtain the following qualifications:

- **Knowledge** of fundamentals of software applications within 3D modelling, animation and A/V-production
- **Apply** camera and storytelling techniques in a production
- **Analyse** and **apply** basic lighting set-ups and compositing techniques, e.g., green screen
- **Evaluate** the use of techniques and principles in A/V productions

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Audio-Visual Sketching
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Audio-Visuel Sketching
Module code	MSNMEDB1143
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5

Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

INTRODUCTION TO PROGRAMMING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

No special prerequisites for the module.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Students who complete the module obtain a solid foundation in working with computers and other digital devices, which will be built upon in future coursework to enable programming for different media platforms and working with analogue and digital sensors.

Furthermore, the student will be provided with a foundation and basic introduction to the systematic development of programs. The student should acquire an understanding of basic concepts and mechanisms in an imperative programming language such that the student is able to use the language and associated library to implement small programs.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- **Understanding** of control flow structures, both branching (e.g., if, switch), and loops (e.g., for, while)
- **Understanding** variables, data types and structures (e.g., arrays, structs)
- **Understanding** functions including function parameters, function output, and recursion
- **Understanding** of design methodologies for programming and **understanding** of the distinction between good and bad programming practices
- **Understanding** top-down and bottom-up problem solving strategies.
- **Understanding** of the basic architecture and terminology related to computers (CPU, RAM, hard drive, I/O devices)
- **Understanding** of basic terminology related to information storage and processing (bits, bytes, binary and hexadecimal numbers, floating point numbers, 2's complement)
- **Understanding** of the basic steps of producing a runnable programme using an integrated development environment (IDE) (writing code, compiling, linking, debugging)
- **Understanding** of the basic steps of converting mathematical expressions into code (e.g., basic trigonometric functions and vector arithmetic)
- **Understanding** of the basic 2-D geometry needed to produce interactive 2-D graphics, e.g., vector arithmetic and trigonometric functions

SKILLS

Students who complete the course module will obtain the following qualifications:

- Ability to **apply** knowledge to the design of a simple event-driven interactive interface, e.g., a simple game
- Ability to interpret and **analyse** programming code
- Ability to **apply** programming skills to the implementation of input devices, e.g., keyboard, mouse
- Ability to **apply** programming skills to the design and implementation of basic functions and data structures
- Make use of built-in API functions and data types in synthesising new programmes (**application**)
- Ability to **apply** knowledge to the systematic design of software with proper documentation
- Must be able to plan and perform systematic test of small programs (e.g., black box and white box testing approaches) (**application**)
- Ability to **apply** programming skills to the implementation of basic mathematical expressions needed to create interactive 2D graphics
- Must be able to discuss/assess the quality of a given program (**analysis**)

- Must be able to use an IDE for software development, including a debugger (**application**)

COMPETENCES

Students who complete the course module will obtain the following qualifications:

- **Evaluate** existing code, judge its design, and recommend changes
- Must have competencies in using programming to solve programming tasks, especially programming tasks related to medialogy, communication and IT/new media (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Introduction to Programming
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Grundlæggende programmering
Module code	MSNMEDB1144
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology, Study Board of Electronics and IT
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

PROBLEM BASED LEARNING IN SCIENCE, TECHNOLOGY AND SOCIETY

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

No special prerequisites for the module.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

The students shall theoretically as well as practically understand how to plan and carry out a basic scientific problem-based project with technological, social and humanistic relevance. This includes an understanding of how technological aspects and contextual circumstances can be identified and included in the development of a problem solution.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the project module will be able to:

- Must have **knowledge** of basic learning theories
- Must have **knowledge** of project planning and management techniques
- Must have **knowledge** of different approaches of problem based learning (PBL) including the Aalborg model of PO PBL
- Must have **knowledge** about the history of media and its social-cultural context/application
- Must have **knowledge** about what a technology is, including how it can be assessed in a larger context, e.g., using technology assessment techniques
- Must be able to **describe** fundamental concepts regarding creativity and **relate** them to creative methods applied in a problem solving context

SKILLS

Students who complete the project module will be able to:

- Must be able to **apply** basic principles and study techniques related to planning and management of a problem-based project; especially including phases in a problem-oriented project, from initial problem to problem analysis and problem formulation, design, implementation and evaluation
- Must be able to analyse and evaluate the organisation of the project group work, identifying strong and weak factors within, e.g., group dynamics, team roles, internal/external communication and time management; reflecting on improvements for future situations and documenting the applied methods for the analysis (**application**)
- Must be able to analyse group conflicts: causes and possible solutions (**application**)
- Must be able to analyse and evaluate own contribution to studying and learning, e.g., by identifying continuous course of events influencing own learning, reflecting on how these events form the learning processes, learning style and the personal study experience (**application**)
- Must be able to **apply** basic methods for analysis and evaluation of a Medialogy-problem from a scientific, ethical, technological and societal perspective
- Must be able to **apply** basic creative design methods for problem solving tasks, especially considering wider contexts, e.g., assessing life styles, consumption, communication and common practices

COMPETENCES

Students who complete the project module will be able to:

- Must be able to apply knowledge (**application**) and **understanding** regarding being part of a team-based project work
- Must be able to **understand** and communicate project work (**application**)
- Must be able to **analyse** own learning processes
- Must be able to **analyse** and document learning processes within the group
- Must be able to establish optimal collaborative learning processes (**application**)
- Must be able to apply knowledge and understanding of science, technology and society (**application**) from a technological and holistic perspective
- Must be able to **understand** basic methodological strategies for evaluating Medialogy problems (e.g., applying concepts from Theory of Science for evaluating projects)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Problem Based Learning in Science, Technology and Society
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual oral or written examination with internal censor. The assessment is performed with the Pass/Fail grade.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Problembaseret læring i videnskab, teknologi og samfund
Module code	MSNMEDB1145
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

HUMAN-COMPUTER INTERACTION

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

1st semester or similar

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

After completing the project module the student shall be able to demonstrate knowledge, skills and competencies in how to design, develop and evaluate an artefact, such as a desktop or a mobile application, using a user-centred approach. The students shall develop their theoretical and methodological skills by designing an application complete with a user interface. They shall examine new modalities for individual and/or group perception, action and experience. With the aim of delivering unified experiences and/or new forms of perception/action, the students foster key competences in using development and design processes for creating media-technological artefacts and in working with requirements specifications developed from user needs. While pursuing this aim, they will be able to apply their knowledge and skills in mathematics, programming and interaction design.

As specified by the Study Board for Media Technology, a sub-theme description is formulated in connection with the project. In connection with the project a minimum of five related seminars /lectures are offered.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the project module will be able to:

- Describe new forms of interaction with the real world, data sources, and/or physical/virtual models (**understanding**)
- Explain how human computer confluence can enhance the foundations for future applications of societal value (**understanding**)
- Explain the methods for planning and developing an IT application (**understanding**)
- Explain the iterative nature of interaction design (**understanding**)

SKILLS

Students who complete the project module will be able to:

- **Apply** a human centred design approach in the context of use, design, development and evaluation of a new interface (**understanding**)
- Design, plan, organize and conduct a user needs study of a target group (**synthesis**)
- **Analyse** how a chosen target group interacts in a real world context of use with similar media products or artefacts and **apply** this to novel designs through, e.g., scenarios and storyboards, and later with early prototypes
- **Apply** methods, tools and theories to allow people to explore and augment human interaction capabilities and awareness in action and interaction
- **Synthesise** technical requirement specifications as a basis for developing a media technology project
- Design and implement a simple artefact based on fundamental object-oriented programming (OOP) strategies, models and development environments (**application**)
- Prepare and perform standardized testing of an artefact with the target user group (not a convenience sample) or domain experts and analyse and discuss the findings (**application**)

COMPETENCES

Students who complete the project module will be able to:

- **Apply** the gained experiences with project management to the future course of study (**evaluation**)
- **Evaluate** the ethical perspective of engineering and science and discuss implications of a responsible professional practice (**analysis**)
- Explain basic quantitative results with descriptive statistics in writing and in figures (**application**)

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work.

Furthermore the Study Board for Media Technology wishes to note for implementation that the students will get support to identify, analyse and assess relevant contextual perspectives by attending "Problem Based Learning in Science, Technology and Society" (STS) seminars, receiving comments on papers and feedback at group meetings. This will be facilitated or achieved through co-supervision from STS experts.

EXAM

EXAMS

Name of exam	Human-Computer Interaction
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>Oral group examination with external censor based on:</p> <ul style="list-style-type: none"> • a written project report • a media-technological artefact • evidence of design activities and their evolution (e.g., sketchbooks or portfolios) • a written P2 process analysis • an A/V production that illustrates and summarizes the project <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	15
Permitted aids	With certain aids: see semester description
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Menneske-Computer Interaktion
Module code	MSNMEDB2141
Module type	Project
Duration	1 semester

Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

INTERACTION DESIGN

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

All course and project-modules on the 1st semester must have been followed by the student.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

The objective of the course is to provide the students with an understanding of the theories and methods of interaction and graphics design and the ability to apply these theories and methods for concrete design problems.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- Must have **knowledge** and **understanding** of interaction design basics, different interaction models and user input/output modalities and their interplay
- Must have **knowledge** about iterative process of interaction design and user centred methods for design
- Methods for user tests (**application**)
- Must have an **understanding** about conceptualizing interaction
- The use of conceptual modelling (e.g., mental models) in design (**application**)
- Must have **knowledge** about the use of storyboards and scenarios

- Must have knowledge about the basics of qualitative and quantitative data gathering, analysis and interpretation
- Must have **understanding** of designing interfaces which go beyond the traditional graphical user interfaces, such as physical and mobile computing
- Must have **understanding** about the concept of designing and building lo-fi and hi-fi prototypes as an integral part of the iterative design process and to evaluate these in user tests
- Must have **understanding** of usability test design including establishing goals and measures such as user friendliness, learnability, likeability, sociability, playability, accuracy, speed, etc., for empirical and theoretical methods
- Must have **knowledge** about the basic theory of Graphical User Interfaces (GUIs), including graphic design and aesthetics
- Must have **understanding** of the visual relationships in a composition of GUIs and images
- Must have **knowledge** about the state-of-the-art techniques used in graphic design for human-computer interaction

SKILLS

Students who complete the course module will obtain the following qualifications:

- Must have ability to **apply** a qualitative approach (e.g., interviewing, contextual inquiry, etc.) to elicit user needs, preferences and capabilities in a real world context, **analyse** and explain the findings (**understanding**)
- Design (**apply**) solutions to interaction design related problems
- **Understanding** and **applying** how to perform user evaluations, and present basic quantitative results using descriptive statistics in writing and figures
- Ability to demonstrate (**application**) the concept behind the interface design through conceptual models
- Must be able to **understand**, evaluate and **apply** different graphical communication forms such as typefaces, shapes, contrasts, colors, balance, proportion and flow

COMPETENCES

Students who complete the course module will obtain the following qualifications:

- **Analyse** needs of different target groups
- **Compare** different user-centred evaluation methods, on a level to decide which of them are applicable and suitable for certain evaluations
- **Apply** and **evaluate** user-centred evaluation methods
- **Apply** the iterative method for interaction design
- **Apply** graphical design principles in interaction design

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Interaction Design
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Interaktionsdesign
Module code	MSNMEDB2142

Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

MATHEMATICS FOR MULTIMEDIA APPLICATIONS

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

No special prerequisites for the module.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Introduction of the mathematics needed for media technology applications.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- **Understand** trigonometric functions and identities
- **Understand** logarithmic and exponential functions
- **Understand** differentiation and integration of functions of one variable, including numerical methods
- **Understand** vectors and basic vector operations, dot product and cross product
- **Understand** basic geometry in 2 and 3 dimensions: points and distance; lines, planes, spheres and their intersections
- **Understand** parametric curves: position, velocity and acceleration
- **Understand** matrices, basic matrix operations and linear transformations
- **Understand** systems of linear equations
- **Understand** matrix inversion
- **Understand** the relevance and application of mathematics to modeling and understanding systems and phenomenon

SKILLS

Students who complete the course module will obtain the following qualifications:

- Ability to perform basic algebraic calculations (**application**)
- Ability to work with trigonometric, logarithmic and exponential functions (**application**)
- Ability to calculate derivatives of functions of one variable (**application**)
- Ability to calculate integrals of functions of one variable (**application**)
- Ability to perform calculations involving vectors, vector operations, matrices and matrix operations (**application**)
- Ability to determine equations for lines, spheres and planes, to calculate intersections and find distances (**application**)
- Ability to differentiate and integrate vector functions (**application**)
- Ability to determine solvability and complete solutions for systems of linear equations (**application**)
- Ability to determine the invertability of a small square matrix and its inverse if it exists (**application**).

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Mathematics for Multimedia Applications
Type of exam	<p>Written exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual written examination with internal censor. The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Matematik til multimedie-applikationer
Module code	MSNMEDB2143
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

PROGRAMMING FOR INTERACTION

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Introduction to Programming or Equivalent.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

By completing the module, the students will be able to design, program, and evaluate interactive applications both on the standard PC platform as well as mobile platforms. Furthermore, the module will seek to introduce basic concepts from object-oriented programming. The module covers the fundamentals of the programming of graphical user interfaces (GUIs) as well as interactions in mobile and pervasive environments that afford touch or sensor-based interaction. The objective is that the students acquire the knowledge, skills, and competencies required for the actual planning, implementing, code generation, and evaluation of interactive applications.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Knowledge** of fundamental object-oriented programming (OOP) strategies and models used in software development
- **Knowledge** of rich pictures and use case diagrams to facilitate a user centered design approach
- **Knowledge** of mobile development environments, debugging tools and methods for **evaluation** of mobile applications
- **Understanding** of basic design patterns relevant to mobile development (Model-View-Controller (MVC), singleton, etc.)
- **Knowledge** of GUI programming on both PC and mobile platforms
- **Understanding** the difference between sequential and event based program structures (e.g., event listeners, call-back functions)
- **Understanding** of working with files and file systems in programming
- **Understanding** different development methods (e.g., Waterfall, Spiral, Agile) in relation to software development

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to **apply** OOP in development and design of interactive applications.
- **Analyse**, interpret and **apply** design patterns and basic models (entity-relationship diagrams, UI storyboards, or flowcharts, etc.)
- Must be able to implement event based designs into functioning **applications**
- Must be able to **apply** an object-oriented approach to software implementation
- Must be able to implement an **application** with a GUI
- Must be able to develop, deploy, and test an application on a mobile device such as a smart phone or tablet (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Must be able to **understand** how to systematically design, program, and **evaluate** interactive applications
- Must be able to **analyse** the problem domain and user requirements

- Must be able to **synthesise** the domain understanding into models (entity-relationship diagrams, UI storyboards, flowcharts, design patterns, etc.)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Programming for Interaction
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in. If the student hands in a paper/exercise after the deadline, the student has used an examination attempt.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Programmering af interaktive systemer
Module code	MSNMEDB2144
Module type	Course
Duration	1 semester

Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

VISUAL COMPUTING-HUMAN PERCEPTION

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

2nd Semester or similar

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

One of the cornerstones in Medialogy is to build systems that automatically react to humans in ways that may or may not involve visual output. In this module the focus is on doing so using visual computing, i.e., automatically analysing visual information recorded by one or more cameras. For example, a computer game controlled by human movements or a dynamic art installation reacting to the constellation of people in an environment. Having humans as end-users also means a need to consider what we can and cannot perceive, and how we use perceptual information in relation to digital media application.

The students will work with a concrete problem where automatic analysis of visual data is central. The problem will be analysed and a concept for a solution suggested. The concept (or parts hereof) will be designed, implemented and evaluated using relevant theories and methods from the sub-fields of visual computing: image processing, programming and perception.

As specified by the Study Board for Media Technology, a sub-theme description is formulated in connection with the project. In connection with the project a minimum of five related seminars /lectures are offered.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the project module will obtain the following qualifications:

- Must have **knowledge** about the terminology within visual computing
- Must be able to **understand** how a particular visual computing system, e.g., the semester project of the student, works
- Must be able to **understand** and compare a particular visual computing system, e.g., the semester project, to similar systems and to the surrounding society
- Must be able to **understand** and explain the mathematical fundamentals of visual computing

SKILLS

Students who complete the project module will obtain the following qualifications:

- Must be able to **analyse** a problem and (if possible) suggest a solution that uses relevant theories and methods from visual computing
- Must be able to **analyse** a system that is based on visual computing and identify relevant constraints and assessment criteria. This relates both to the usability of the system, the technical aspects of the system and (if relevant) the usefulness to society
- Must be able to design and implement (**apply**), a system (or parts hereof) using relevant theories and methods (if possible) from visual computing
- Must be able to test and evaluate (**analyse**) a visual computing system (or parts hereof) with respect to the aforementioned assessment criteria
- Must be able to communicate the above knowledge and skills (using proper terminology) both orally and in a written report

COMPETENCES

Students who complete the project module will obtain the following qualifications:

- Must be able to discuss relevant theories and methods of visual computing and general theories on perception and **apply** to concrete problems and situations
- Must be able to **apply** current knowledge on human perception and visual computing in the evaluation of an implemented systems

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work.

EXAM

EXAMS

Name of exam	Visual Computing-Human Perception
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>Oral group examination with external censor based on:</p> <ul style="list-style-type: none"> • a written project report • a media-technological artefact • an A/V production that illustrates and summarizes the project <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	15
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Visual Computing-Human Perception
Module code	MSNMEDB3141
Module type	Project
Duration	1 semester
Semester	Autumn

ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

IMAGE PROCESSING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Mathematics for Multimedia Applications

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Cameras capture visual data from the surrounding world. Building systems which can automatically process such data requires image processing methods. Students who complete the module will understand the nature of digital images and have an overview of different theories and methods within image processing and their applicability.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Must have **knowledge** about basic and linear algebra
- Must have **knowledge** about the primary parameters of the camera and lens
- Must have **knowledge** about the representation of a digital image
- Must be able to **understand** the general framework of image processing
- Must be able to **understand** and interpret image histograms
- Must be able to **understand** color images and their different representations
- Must be able to **understand** the principle of point processing
- Must be able to **understand** principle of neighborhood processing
- Must be able to **understand** what a BLOB is and how it can be extracted
- Must be able to **understand** how moving objects can be segmented in a video sequence

SKILLS

Students who complete the module will obtain the following qualifications:

- Must be able to **apply** matrix calculations
- Must be able to **apply** the following point processing methods: grey-level mapping, histogram stretching, thresholding and image arithmetic
- Must be able to **apply** the following neighborhood processing methods: median filter, mean filter and edge detection
- Must be able to **apply** the following morphologic operations: dilation, erosion, opening and closing
- Must be able to **apply** basic feature extraction and matching
- Must be able to **apply** image differencing and background subtraction
- Must be able to **apply** geometric transformations to an image
- Must be able to **apply** convolution/correlation to an image by using the corresponding mathematical operation

COMPETENCES

Students who complete the module will obtain the following qualifications:

Must be able to **apply** the general framework of image processing in a new context. This includes choosing the relevant methods and evaluating the output

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Image Processing
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or ex-ercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Billedbehandling
Module code	MSNMEDB3142
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

HUMAN SENSES AND PERCEPTION

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Interaction Design (2nd semester)

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

We perceive and interpret the world around us using our senses. The same senses can also be deceived, often because we expect the world to look, sound or feel as we have been used to. Students who complete this module should be able to design systems that take advantage of the sensitivities and insensitivities of the human senses.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Must have **knowledge** of the basic physiology of the human senses (vision, hearing, touch and vestibular)
- Must have **knowledge** about the sensitivity and limitations of the human senses (vision, hearing, touch and vestibular)
- Must have **knowledge** about the basic principles of neural function and communication: neural firing, receptive fields and after-effects
- Must be able to **understand** how objects and scenes are perceived
- Must be able to **understand** attention theories
- Must be able to **understand** motion perception theories
- Must be able to **understand** frequency, amplitude, pitch, loudness and timbre of a sound
- Must be able to **understand** masking effects
- Must be able to **understand** Gestalt theories

SKILLS

Students who complete the module will obtain the following qualifications:

- Must be able to **apply** a list of constraints with regards to human sensitivity when designing a medialogy application: limits of audibility and visibility; latency vs. reaction times, etc.
- Must be able to **apply** knowledge of sensitivity when assigning computational resources in the design of digital media applications

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Must be able to **apply** general theories on perception to concrete phenomena and situations
- Must be able to **apply** current knowledge on human perception in the evaluation of systems, reflecting on what users can and cannot perceive
- Must be able to **apply** theories on human perception and attention in designs that take the human user into account

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Human Senses and Perception
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or ex-ercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Perception
Module code	MSNMEDB3143
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

PROGRAMMING OF COMPLEX SOFTWARE SYSTEMS

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Programming for Interaction and Introduction to Programming.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Many real world software systems are complex, involving multiple devices, processors, users, and complex algorithms. To allow the students to work with such software systems, this module introduces several methods that are relevant when developing and using large software systems. The objective is to give the students an understanding of object-oriented software analysis and design methods. Furthermore, an introduction to network programming and parallel programming, data structures and algorithms is also given. Several of these aspects of the module can also support the Image Processing course running in parallel.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Understanding** of the basic concepts of object-oriented design and analysis (e.g., encapsulation, inheritance, composition, association, interfaces)
- **Understanding** of using the UML language to produce and communicate an object-oriented software design (structure, behaviour, and interaction diagrams)
- **Understanding** of structure and tools for documenting codebases
- **Understanding** of data structures used for search and sort algorithms (graphs, linked lists, queues, stacks, trees, heaps, hash tables)
- **Understanding** of the concept of the complexity of an algorithm and big-O notation
- **Understanding** of programming concepts related to networks: clients and servers, sockets, ports, IP address (static/dynamic), Ethernet address
- **Understanding** digital application and communication protocols: the OSI model, TCP and UDP.
- **Understanding** the concepts behind parallel programming: processes and threads, scheduling, bottlenecks and deadlocks, shared data, mutex locks, race conditions
- **Understanding** of common versioning software practices and terminology

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to both produce and understand UML-based diagrams in order to work with object-oriented design and analysis (**application, analysis**)
- Ability to implement an object-oriented design from a UML description (**application**)
- Ability to choose and **apply** appropriate data-structures to create efficient programmes for searching and sorting
- Ability to **apply** to design a fitting software solution both in the field of networking and multithreaded programming
- Ability to **apply** programming skills to implement a multithreaded program that uses the network to communicate between two digital devices (**application**)
- Ability to use a commonly used software versioning system (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Produce and implement object-oriented software designs (**application**)
- Document an object-oriented software system using UML (**application**)

- **Evaluate** existing code in the fields of network and multithreading, judge its design and recommend changes
- Must have competencies in designing efficient solutions using advanced data structures to solve programming tasks, especially programming tasks related to medialogi, communication and IT/new media (**application**)
- Read and design algorithms and **analyse** their complexity

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Programming of Complex Software Systems
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or ex-ercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Programmering af komplekse software-systemer
Module code	MSNMEDB3144
Module type	Course
Duration	1 semester

Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

SOUND COMPUTING AND SENSOR TECHNOLOGY

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

3rd semester or similar

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Hearing is one of the fundamental senses of the human perceptual system. Being able to understand how auditory signals are created and how they can be used as input or output devices in solving problems in interactive media is an essential element of the Medialogy program. In this semester project, students pose problems that include the design and implementation of computer systems being able either to analyse an auditory signal in real-time or to produce interactive auditory feedback. Such feedback is either created from scratch using sound synthesis techniques or obtained by manipulating recorded samples. Examples of such systems are an interface which is controlled by the human voice or an interactive installation where the sounds change according to users' motions, or a tangible sonic interface embedded with sensors. The posed problem must be motivated, analysed and its solution evaluated using quantitative experiments and statistics.

As specified by the Study Board for Media Technology, a sub-theme description is formulated in connection with the project. In connection with the project a minimum of five related seminars /lectures are offered.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- **Knowledge** about theories and techniques within audio design and computing
- **Describe** basic concepts and terminologies in the field of sound design and processing
- **Understand** how to evaluate the proposed solution using quantitative experiments and statistics
- **Knowledge** about how to create interactive sound systems that react to users' action
- **Knowledge** about applications of sensors technologies (electrical transducers) to interactive systems

SKILLS

Students who complete the course module will obtain the following qualifications:

- **Analyse** a problem and suggest a solution that uses relevant theories and methods from interactive sound design and computing
- **Apply** programming in a multimedia system where sound and interaction play an important role
- Identify relevant constraints and assessment criteria for a system based on audition, in terms of usability and technical aspects (**analysis**)
- Design an interactive system wherein audio is used as either input and/or output, using relevant theories from sound and music computing (**application**)
- **Apply** electrical transducer(s) as input devices for an interactive system
- **Apply** passive electronics to interface the transducer(s) with the computer
- Assess the proposed solution using a quantitative experiment and statistics (**analysis**)
- Describe, communicate and argue the designed solution using proper terminologies and theories from the fields of sound and music computing and experiment design, both orally and in a written report (**synthesis**)

COMPETENCES

Students who complete the course module will obtain the following qualifications:

- Select relevant theories and methods from the field of sensors technology, mathematics and programming and apply these to solve a problem in sonic interaction (**synthesis**)
- Plan, structure, execute and evaluate a project within the field of sonic interaction (**synthesis**)

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work

EXAM

EXAMS

Name of exam	Sound Computing and Sensor Technology
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>Oral group examination with internal censor based on:</p> <ul style="list-style-type: none"> • a written project report • a media-technological artefact • an A/V production that illustrates and summarizes the project <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	15
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Lyd- og sensorteknologi
Module code	MSNMEDB4141
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

AUDIO PROCESSING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Human Senses and Perception, Programming of Complex Software Systems, Mathematics for Multimedia Applications

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

The objective of this course is to give the students an introduction to audio processing, including a basic understanding of audio and music signals, how these are generated and what their properties are. The course takes its starting point in the physics of sound and how audio signals are measured using computers by sampling and quantization. The course then covers how to manipulate audio signals using filters and audio effects, like chorus, flanger, phaser, reverb, and equalizer, and how to design and analyse such effects. Moreover, it covers how to synthesise sound and music signals using, for example, physical models. Finally, the course covers how to analyse audio signals using the Fourier transform and auto-correlation.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Apply** knowledge from auditory perception in working with sound
- **Knowledge** of the physics of sound
- **Knowledge** of how to measure physical properties of sound
- **Understand** sampling, aliasing, quantization and signal-to-noise ratio
- **Understand** the time and frequency domains
- **Understand** the properties of audio signals in the time and frequency domains
- **Understand** filters and filtering in the time domain and frequency domain
- **Understand** convolution, impulse responses and transfer functions
- **Understand** correlation
- **Understand** basic sound synthesis techniques
- **Understand** basic filter-based sound effects
- **Understand** aspects of audio processing in real-time and off-line

SKILLS

Students who complete the module will obtain the following qualifications:

- Implement filters for processing digital audio (**application**)
- Quantitatively **analyse** audio signals using correlation and the Fourier transform
- Implement sound effects and sound synthesis techniques (**application**)
- Express and analyse filters as rational functions (**application**)
- Apply complex numbers, finite/infinite sums, and integrals to analyse signals and filters (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Students who complete this module will be able to build audio processing systems for interactive multimedia applications (**synthesis**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Audio Processing
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor.</p> <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Lydbehandling
Module code	MSNMEDB4142
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen

Responsible for the module	Claus Brøndgaard Madsen
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ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

DESIGN AND ANALYSIS OF EXPERIMENTS

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Interaction Design, Mathematics for Multimedia Applications, Human Senses and Perception

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

A crucial aspect of designing medialogy systems, tools or applications is the need to evaluate the work experimentally. The knowledge of how to properly design experiments to collect and evaluate data is essential to answer many of the problems within medialogy. Examples are testing which of two tracking algorithms is the most efficient; how users perform with different kinds of feedback; possible relationship between age and performance, etc.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Must be able to **understand** the basic concepts of probability: sample space of all possible events; combinatorics; independent events; conditional probability; Bayes' formula; binomial distribution, etc.
- Must display **knowledge** about basic statistic terminology and treatment of data: distributions (probability density function, cumulative distribution function, quantile function); measures of central tendency and variability; histogram; central limit theorem, significance, power, type I and II errors, etc.
- Must be able to **understand** advantages and disadvantages with different types of designs and studies (between-group and within-group designs; correlational studies; blind/double blind, complete/incomplete and balanced/unbalanced designs)
- Must be able to **understand** the difference between common experimental designs, e.g., single sample experiments, two sample experiments, and factorial/multifactorial experiments
- Must **understand** the basic experimental design principles of independence, randomization, replication, and blocking and how these can be applied in experiments.
- Must be able to relate frequency distributions to the concept of hypothesis testing (**understanding**)
- Must be able to **understand** possible ethical concerns for a study

SKILLS

Students who complete the module will obtain the following qualifications:

- Must be able to design an experiment to measure changes in a dependent variable, identifying and efficiently controlling relevant independent variables (**application**)
- Must be able to properly inform and instruct persons participating in a study (**application**)
- Must be able to **understand** and select among the most common methods for statistical analysis and assessment of experimental data (e.g., t-test, analysis of variance, chi-square tests, binomial test, correlation, and simple linear and logistic regression)
- Must be able to **understand** the difference between parametric and non-parametric analysis methods
- Must be able to **understand** different measurement scales and discuss experiments in terms of reliability, bias and sensitivity
- Must be able to discuss own data in terms of assumptions for statistical testing (**application**)
- Must be able to use an existing statistical package to **analyse** and present experimental results
- Must be able to discuss and represent empirical data in different ways (describing text, numbers, formulas, graphs and figures) and shift between these according to the needs of the situation and context (**application**)
- Must be able to read, understand and implement experimental and empirical work as described in relevant literature (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Students who complete this module will be able to systematically design quantitative, scientific experiments, taking into account relevant factors (**application**)
- Students who complete this module will be able to use a statistical software package to analyse experimental data (**application**)
- Students who complete this module will be able to document their experimental results, and to understand experimental results presented by others (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Design and Analysis of Experiments
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in..</p> <p>The exam format is individual assessment based on a written or oral exam with an internal censor. The assessment is performed with the 7-step grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Design og analyse af eksperimenter
Module code	MSNMEDB4143

Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

PHYSICAL INTERFACE DESIGN

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Introduction to Programming, Interaction Design, Mathematics for Multimedia Applications

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Physical Interface Design is a course module where students learn about basic principles of electronics and how different sensors can be interfaced to a microcontroller to design novel forms of interactions between man and machines.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Should be able to recall basic circuit theory concepts and rules, including resistance, voltage, current, Ohm's law, and Kirchoff's laws (**knowledge**)
- Should be able to describe basic analog (e.g., potentiometers, force sensitive resistors) and digital (e.g., push button, touch interface) sensing technologies (**knowledge**)
- Should be able to express how a micro-controller can be used for measuring/actuating analog and digital inputs/outputs by the use of sensors and output devices (e.g., displays, LEDs, and vibrators) (**understanding**)
- Should be able to recall that some functionalities can be implemented using both hardware and software (**knowledge**), and to discuss the pros and cons of either solution (**understanding**)
- Should be able to identify practical needs in electric circuits such as DC filtering and circuit protection (**understanding**)
- Should be able to describe basic amplification (e.g., OpAmp) and filtering (e.g., RC and RL) circuits (**knowledge**)
- Should be able to explain basic concepts such as sampling and scaling in context of real-time use of signals (**understanding**)

SKILLS

Students who complete the module will obtain the following qualifications:

- Should be able to apply the taught skills and methods on physical interface design to develop a prototype/artifact, and to demonstrate its use (**application**)
- Should be able to formulate a linear system of equations for voltage, current and resistance relationships in an electric circuit, and to solve the system to find unknown currents, voltages, or resistances (**application**)
- Should be able to use an electronic circuit simulator (**application**)
- Should be able to sketch and interpret an electric circuit diagram (**application**)
- Should be able to program a microcontroller to make it read inputs from sensor circuits and produce output(s) to a user (e.g., vibration, light, and text) (**application**)
- Should be able to examine and verify basic electric circuit designs using, e.g., a multimeter, and to test if a build electric circuit has the desired functionalities (**analysis**)
- Should be able to apply basic interface design principles for realizing a physical interface for human-computer interaction in the context of use (**application**)
- Should be able to assess the artifact by applying taught evaluation method(s) (**evaluation**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Should be able to summarize the whole design process of the artifact (**synthesis**)
- Should be able to use correct technical and theoretical terms in dissemination (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Physical Interface Design
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Fysisk interfacdesign
Module code	MSNMEDB4144
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology, Study Board of Electronics and IT
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

AUDIO-VISUAL EXPERIMENTS

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

4th semester or similar

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Computer generated imagery (CGI) is an integral part of visual media products. It is so abundant and of so high quality that oftentimes it is no longer noticed. We find CGI and animation in movies that are either entirely computer generated or substantial elements are made as special effects and we find CGI in commercials, music videos or for example visualizations of molecular biology. Interactive 3D computer graphics and animation applications are also becoming increasingly abundant and find them-selves into ever more aspects of our lives. They range from 3D computer games and animations for entertainment over mobile augmented-reality applications for navigation to visualizations of abstract phenomena in web-based applications. In addition to its wide range of applications areas, interactive 3D computer graphics and animation is also mediated in many different ways, from high-end desktop computers to hand-held devices, from projection screens to head-mounted displays, from monitors to laser light displays.

The students shall learn about screen media production, computer graphics, animation and rendering techniques, including the analysis of relationships between audio-visual communication and the communication offered by animation and computer graphics technologies. The students shall develop their technical and methodological skills by creating audio-visual experiments and experiences that are pre-rendered and/or interactive.

In this project module students will be working with analysing, designing and implementing (parts of) applications and media-technological experiments in which pre-rendered and/or real-time, interactive 3D computer graphics and animation are essential parts.

This can, for example, be a 3D game based on a game-engine consisting of an animated short story, a custom-designed application for data visualization, an interactive edutainment installation, a mobile navigation application or even developing a technology and/or a methodology for a special effect or production tools for aiding in the implementation/production of such products.

It is essential that projects contain elements of pre-rendered and/or real-time, interactive 3D computer graphics and animation and address an audio aspect, if applicable (and it has to be considered that many of the desired impacts on an audience can be achieved through the use of audio instead of, or in combination with, visuals). Film theory and cinematography must be applied wherever it can be applicable for the project or wherever the project can benefit from such theoretical and practical considerations. Evaluations of the designed solution must be conducted to investigate experiences, design criteria or formulated hypotheses.

As specified by the Study Board for Media Technology, a sub-theme description is formulated in connection with the project. In connection with the project a minimum of five related seminars /lectures are offered.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the course module will obtain the following qualifications:

- **Understanding** of modeling, animation and rendering techniques for high quality computer graphics imagery
- **Understanding** of film form and dramaturgic models
- **Analysis** of fundamental concepts and theories within screen media production, animation, rendering and computer graphics

SKILLS

Students who complete the course module will obtain the following qualifications:

- Ability to **analyse**, design and implement/produce an audio-visual pre-rendered and/or interactive artifact with a narrative element and aimed at communicating a formulated message or experience to a human user or group of users
- Ability to **analyse** relationships between established theories for audio-visual communication and the communicative possibilities offered by animation and computer graphics rendering technologies
- Ability to **apply** theories, methods and techniques within animation, rendering and computer graphics (to create a pre-rendered and/or interactive application or a communicative artefact/installation)
- Ability to analyse theoretical and practical issues in pre-rendered and/or interactive 3D computer graphics and to synthesise solutions for such issues (**application**)
- Ability to **apply** 3D modeling, animation and rendering techniques to synthesise pre-rendered and/or interactive 3D computer graphics content.
- Ability to **apply** cinematographic concepts in state-of-the-art graphics rendering tools for pre-rendered and/or interactive content
- Ability to **analyse** the audio-visual communication possibilities and requirements associated with a chosen project subject
- Ability to **analyse** the technical requirements associated with the chosen project subject
- Ability to **synthesise** an effective solution to the chosen project domain by bringing together relevant concepts, theories and techniques from the fields of film theory and 3D computer animation, rendering and graphics

COMPETENCES

Students who complete the course module will obtain the following qualifications:

- Ability to **synthesise** knowledge, methodology, theories and/or techniques concerning a problem centered around computer generated pre-rendered and/or interactive imagery or animation content that are effective according to some chosen communication requirements
- Ability to **analyse** the product requirements of a pre-rendered and/or interactive graphics application and to synthesise a functional/formal specification for it
- Ability to critically **evaluate** knowledge in comparison to the knowledge required for the project work - in particular knowledge in 3D computer graphics rendering, animation, human-computer interaction and/or audio visual design and programming
- Ability to **evaluate** the designed solution in order to investigate experiences, design criteria or formulated hypotheses.

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work.

EXAM

EXAMS

Name of exam	Audio-Visual Experiments
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>Oral group examination with external censor based on:</p> <ul style="list-style-type: none"> • a written project report • a media-technological artefact • an A/V production that illustrates and summarizes the project <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	15

Permitted aids	With certain aids: see semester description
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Audio-visuelle eksperimenter
Module code	MSNMEDB5141
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

COMPUTER GRAPHICS PROGRAMMING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon knowledge obtained in the modules Introduction to Programming, Mathematics for Multimedia Applications, Image Processing, and Programming of Complex Software Systems.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

The course provides an introduction to real-time computer graphics concepts and techniques. The focus is on programmable functionalities (i.e., shader programs) of modern Graphics Programming Units (GPUs) as offered by graphics APIs such as OpenGL. It also covers the relevant underlying mathematical concepts (e.g., transformations between coordinate systems) and mathematical models (e.g., Phong's reflection model), as well as how these are applied in GPU-based shader programs.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Ability to describe the programmable, hardware-accelerated graphics rendering pipeline as exposed, for example, by OpenGL, and its relationship and interaction with the central processing unit (**knowledge**)
- Ability to describe the concepts of vector bases, vector spaces, and coordinate systems as well as transformations between them (**application**)
- Ability to describe the mathematical representation of any rotation of 3D space by a matrix, by an axis and an angle, and by a quaternion (**application**)
- Ability to explain the computation of quadratic Bezier curves and splines (**application**)
- Ability to describe the interpolation of vertex attributes such as colors (e.g., for pre-vertex lighting), normals (e.g., for per-pixel lighting), and texture coordinates (**knowledge**)
- Ability to describe framebuffer operations including blending and depth tests (**knowledge**)
- Ability to explain acceleration techniques such as viewport clipping and backface culling (**understanding**)
- Ability to explain techniques to improve image quality such as antialiasing by supersampling and mipmap texture filtering (**understanding**)
- Ability to explain common performance bottlenecks of GPUs – including GPUs for mobile devices (**understanding**)

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to describe the 4x4 matrix representation and application of any 3D affine transformation in homogeneous coordinates and apply it in a GPU-based shader program (**application**)
- Ability to describe real-time local illumination models, in particular the Phong reflection model and apply them in a GPU-based shader program (**application**)
- Ability to explain texture mapping techniques including compositing of multiple textures, normal mapping, environment/reflection mapping, and shadow mapping and apply them in a GPU-based shader program (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Ability to create a program for procedurally generating and interactively controlling and rendering three-dimensional content (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in § 17.

EXAM

PREREQUISITE FOR ENROLLMENT FOR THE EXAM

- To be eligible to take the exam the student must have fulfilled:
 - handing in of written assignments or the like
- completion of certain – or all – study activities

EXAMS

Name of exam	Computer Graphics Programming
Type of exam	Written or oral exam Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Computergrafik programmering
Module code	MSNMEDB5142
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology, Study Board of Electronics and IT, Study Board of Computer Science
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

RENDERING AND ANIMATION TECHNIQUES

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Audio-Visual Sketching, Mathematics for Multimedia Applications, Human Senses and Perception, Programming of Complex Software Systems

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Rendering is the last major step in the graphical pipeline, giving the final appearance to the models and animation. 3D computer animation combines 3D models of objects and motion based on key-frames, procedural-, or interactive input. This course empowers students to synthesise (design, create and render) image sequences and/or animations, 3D content or related assets, including animation for real-time applications, according to some desired visual expression by using state-of-the-art rendering platforms.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Knowledge** of basic concepts of radiometry/photometry
- **Understanding** of the ray tracing technique
- **Understanding** of the differences between local and global illumination
- **Understanding** of trade-offs between rendering quality and rendering time
- **Understanding** camera matching, illumination matching, and High Dynamic Range environment maps for augmentation/compositing
- **Understanding** modelling, rigging, and skinning for animation
- **Understanding** kinematic constraints, forward and inverse kinematics needed for character- and procedural animation
- **Understanding** of mathematical concepts to compute radiance/luminance levels in scenes with known illumination sources: solid angles and integration over spherical domains
- **Understanding** concepts of procedural animation

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to **apply** cinematographic elements to rendered sequences, i.e., working with camera effects (depth-of-field, motion blur, lens flares, etc.) and illumination, in order to achieve a desired visual expression
- Ability to **apply** camera matching and image-based illumination for rendering virtual objects into image sequences
- Ability to prepare 3D models for real-time and rendered animation by the **application** of rigging and skinning to them
- Ability to **apply** various animation techniques to models, primarily those that are utilized in procedural animation, like forward/inverse kinematics, blending of animations, as well as morph target animation, per-vertex animation, shape interpolation, blend shapes
- Ability to **apply** state-of-the-art modelling/animation/rendering tools in a production workflow involving export of models, key-framed animations and light maps to real-time rendering 3D platforms in order to utilize procedural and interactive user-controlled animation
- Ability to **apply** mathematical knowledge from Mathematics for Multimedia Applications course to understand/program/debug relevant material in this course (spherical coordinates, numerical integration, and mathematics for ray tracing: vector/matrix calculation, line and plane equations, their intersections, quadratic equation of a circle/sphere, trigonometry in order to calculate distances and angles); and apply knowledge of basic calculus (position, velocity, acceleration of the body) for procedural animation

COMPETENCES

Students who complete the module will obtain the following qualifications:

Ability to **synthesise** (design and create) rendered image sequences and/or real-time animations, 3D content or related assets according to some desired visual expression

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Rendering and Animation Techniques
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology.</p> <p>To be eligible to take the exam the students must have fulfilled:</p> <ul style="list-style-type: none"> • Handing in of written assignments or the like • Completion of certain – or all – study activities <p>The exam is an individual written or oral examination with internal censor. The assessment is per-formed in accordance with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Rendering og animation
Module code	MSNMEDB5143
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen

Responsible for the module	Claus Brøndgaard Madsen
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ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

SCREEN MEDIA

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Audio-Visual Sketching, Human senses and Perception

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Must have **knowledge** of historical and theoretical aspects of motion picture and screen media production and technology
- Must be able to **understand** general theories and practices within film/media productions
- Must be able to **understand** film form
- Must be able to **understand** dramaturgic models for scriptwriting
- Must be able to **understand** continuity and discontinuity editing; spatial and temporal relations
- Must be able to **understand** film production elements

SKILLS

Students who complete the module will obtain the following qualifications:

- Must be able to **apply** theoretical aspects of motion picture in analysis of production
- Must be able to **understand** mise-en-scene, cinematography and framing
- Must be able to **analyse** traditional narrative theories and interactive narrative forms
- Must be able to **analyse** film types and genres
- Must be able to **analyse** major film theories and approaches
- Must be able to **apply** theoretical knowledge to conduct film/media analysis

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Ability to **synthesise** new audio-visual artifacts based on theories and techniques
- Ability to **synthesise** theoretical knowledge to construct audiovisual sequences and/or tools for designing audiovisual experiences or effects
- Ability to **synthesise** soundscapes and audio-visual artifacts

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Screen Media
Type of exam	Written or oral exam

	<p>In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed with the Pass/Fail grade.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Screen Media
Module code	MSNMEDB5144
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

BSC PROJECT (INTERACTIVE SYSTEMS DESIGN)

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

All previous semesters (projects and course-modules) must have been passed

(1st to 5th semester)

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Interactive Systems Design is a core element of Medialogy. The goal of the Medialogy 6th semester project module is for students to use the acquired knowledge, skills and competences from previous semesters and combined with what is learnt in this semester how to create their final bachelor project. Concerning design, analysis and evaluation, the final semester demands an advanced theoretical, methodological and reflective thinking.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Understanding of emerging technologies when designing interactive media (**synthesis**)
- Understanding of theories and methods for processing of sensory input, synthesising of outputs (sounds, graphics, touch) and design rules and concepts of software systems (**application**)
- Understanding of societal contexts of a Medialogy application (**analysis**)
- Understanding of the 'vocabularies' of specialized Medialogy disciplines to be able to communicate ideas and processes to experts (**synthesis**)
- Knowledge of principles for designing, realizing, analysing and evaluating an interactive media product (**evaluation**)
- **Synthesis** of methodological consideration to describe the theoretical and empirical foundation of the project
- Understanding of theories of interactive systems design (application areas can be, e.g., a game, an art installation, an edutainment system, a rehabilitation system or a different service to the public) (**application**)

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to **analyse** previous research, theories and current trends concerning interactive and converging media
- Ability to use such an analysis to **synthesise** an interactive media system involving auditory, visual and/or haptic feedback and alternative input devices (i.e., computer vision or tangible interfaces)
- Ability to **synthesise** learned theories and methods in the design and implementation of an interactive media application
- Ability to **synthesise** scientific methods in the investigation of previous research in the related field of interest
- Ability to discuss the developed system with both end users and peers/professional experts (**evaluation**)
- Ability to plan, design and perform and evaluate systematic test(s) of the media-technological artefact from a human-centered and/or system-based perspective wherever applicable in the specific context of the interactive system (**analysis**)
- Ability to implement and discuss feasibility, design requirement specifications and sustainability of the developed interface (**evaluation**). Furthermore feasibility should not be limited to economic considerations such as cost/benefit, but go beyond and include e.g., societal, political and technological impact-factors
- Must be able to discuss/assess the quality of the solution(s) of the project in a wider context (**evaluation**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Generalize the gained experiences with managing the bachelor project and put them into perspective of the future course of study (**evaluation**)
- Ability to **synthesise** knowledge, methods, theories and techniques concerning a problem centered around an interactive system
- Must have competencies in combining a wide range of technologies, such as auditory and visual displays, input- and output devices, network and communication protocols in order to realize advanced and non-trivial applications and solutions (**synthesis**)
- Ability to collaborate with industry professionals, e.g., game designers, interaction designers, designers of interfaces for children and the disabled, GUI designers, in order to participate in the design and implementation of an interactive media product (**evaluation**)
- Ability to **synthesise** knowledge in various forms of documentation, e.g., written, oral presentations, A/V productions, portfolio and prototypes
- Ability to communicate and present the project applying scientific-based descriptions of aspects such as design, construction, analysis and evaluation of an interactive media including consideration of human factors (**evaluation**)
- Reflect on the possible ethical perspective of the interactive system, the science behind and discuss implications of a responsible professional practice (**analysis**)
- Must have competencies in comparing and assessing the potential of different technologies, methods and approaches in order to make the proper design choices for optimum functionality (**synthesis**)
- Must show command of the **knowledge**, skills and competencies acquired in the semesters 1-5 at least to the level of learning as described for the individual respective courses and project modules

TYPE OF INSTRUCTION

Academically supervised student-governed problem oriented project work.

EXAM

EXAMS

Name of exam	BSc Project (Interactive Systems Design)
Type of exam	<p>Oral exam based on a project In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>Oral group examination with external censor based on:</p> <ul style="list-style-type: none"> • a written project report • a media-technological artefact • an A/V production that illustrates and summarizes the project <p>The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	15
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Bachelorprojekt (Design af interaktive systemer)
Module code	MSNMEDB6141
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

ARTIFICIAL INTELLIGENCE PROGRAMMING

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Computer Graphics Programming

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Concepts of artificial intelligence (AI) are central to the design and development of contemporary systems, e.g., database search and management, handheld devices (e.g., smartphones and tablets), games (e.g., chess), various adapting or learning systems, and so on. The objective of this course is to give students exposure to and an understanding of the fundamentals of AI programming, including: rational agents and their environment, knowledge representation, formal languages and logic, reasoning, basic graph theory, pathfinding algorithms, finite state automata, steering behaviors, and decision making. Students will develop practical skills in AI programming useful for the development and deployment of intelligent systems.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Understand** different levels of intelligent agent architectures, environments, and their application domains
- **Understand** basic graph theory
- **Understand** finite state machines, decision trees, and behaviour trees, and their implementation
- **Understand** different search strategies, and their implementation and underlying data-structures
- **Understand** different pathfinding algorithms and their implementation
- **Understand** steering algorithms and their implementation
- **Understand** classical planning approaches
- **Understand** knowledge representation, formal logic, and reasoning
- **Understand** basic fuzzy logic

SKILLS

Students who complete the module will obtain the following qualifications:

- **Apply** the above knowledge to construct an intelligent system using available technologies
- Choose appropriate methods and technologies for a given problem (**analysis**)
- Interpret and **evaluate** AI systems and their behaviour
- Use agent simulation systems for prototyping system behaviour (**apply**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Ability to **synthesise** knowledge, methodology or techniques concerning a problem centred around intelligent systems
- Ability to integrate AI-based libraries into larger projects (**apply**)
- Ability to learn the use of AI tools like agent-based simulators, planning systems, network simulators, etc. (**apply**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Artificial Intelligence Programming
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Programmering af kunstig intelligens
Module code	MSNMEDB6142
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
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Studieordning for bacheloruddannelsen i medialogi, 2014, København

Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

ETHNOGRAPHICALLY INFORMED DESIGN

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

No special prerequisites for the module.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

In this course, we consider the larger picture and the situated nature of where and how people act and interact with media technologies. We work with theories, methods and material developed in successful design companies such as IDEO and Frog Design, which continue to evolve. The students will work with multiple evaluation methods that they apply in a hands-on approach that they consider as part of their ongoing critical reflection to the design process. The course will give students a better understanding of how chosen approaches, conceptual frameworks and methods produce different kinds of possible analyses for both the development, use and improvement of media technologies.

The students will understand and apply selected user-centered, contextual and situational theories which can include ethnographic, psychological and sociological approaches and methods when analysing the use of media technology. The course will cover some of the large ranges of responses (e.g., interaction, reaction, deliberation, active and passive engagement) users can make when consuming media technologies, and provide students with methodological and analytic tools to analyse these responses in a given context and to implement these tools in their future design work.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Must have **knowledge** and **understanding** of empirical and critical research, including systematic quantitative and qualitative research data gathering, analysis and interpretation methods
- Must **understand** and **apply** interpretative paradigms to media development. This includes **evaluation** of those approaches that promote qualitative methodologies, such as ethnography, grounded theory, case studies, discourse analysis, narrative research, diary studies, cultural probes and video interaction analysis, as well as **application** of quantitative methods including, for example, logging of use, physiological capture, or statistical analysis
- Must **understand** that the theories and methodology adopted impact on the nature of evidence gathered in media related research (**evaluation**)
- Must have **knowledge** of psychological, statistical, ethnographic, or sociological approaches to the study of contextual behaviour and their relevance and implications to media development and design (**understand**)
- Must have **knowledge** and **understanding** how a variety of ethnographic methods including contextual data capture are useful for guidelines for testing and evaluation and iterative design (**application**) which can be implemented for user-oriented problems

SKILLS

Students who complete the module will obtain the following qualifications:

- Must have ability to **apply** a range of qualitative methods (e.g., interviewing, contextual inquiry, etc.) to elicit user needs, preferences and capabilities and be able to **analyse** and explain the findings (**understanding**)
- Must have ability to **apply** a range of quantitative methods, which may include logging and analysis, statistical tests, correlation and cluster analysis to assess perception and user behavior (**understanding**).
- **Apply** observational methods to situations as they happen in real time and **evaluate** data in relation to end-user groups
- **Apply, analyse** and **evaluate** social, situated and digital micro and macro acts in interactions

- Design (**apply**) guidelines and **apply** adequate theories and study designs, using advanced qualitative and quantitative methods for collection and analysis of data (**analysis**)
- Design (**apply**) guidelines and **apply** different observational methods, including video observations and exploration of user states (e.g., immersed, engaged, emotional, pleasant).
- Design (**apply**) solutions to design and situated context related problems (**synthesis**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Plan, organize and implement a full cycle of design, evaluation and re-design for a real world problem (**evaluation**)
- **Synthesise** and **apply** knowledge and understanding gained in the course regarding the consequence of choosing a specific approach, method, conceptual framework and theory in relation to media technology and a specific research question or problem
- **Understand** advantages, disadvantages, possibilities and limitations regarding the use of specific methods, for example, video card game, video Interaction analysis, discourse analysis, interviewing, questionnaires, storyboards, scenarios, and **know** statistical methods (e.g., tests, clustering, correlation analysis) or various psychological experimental paradigms (e.g., free categorization) (**analysis**)
- Synthesise, **understand** and **apply** in situ observational strategies, for example, shadowing, participation, video-observation for user evaluation and analysis in a context of media technologies (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Ethnographically Informed Design
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures
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FACTS ABOUT THE MODULE

Danish title	Etnografisk inspireret design
Module code	MSNMEDB6143
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

REAL-TIME INTERFACES AND INTERACTIONS

2021/2022

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

Real-time Interfaces and Interactions is a course module offering the students opportunities to investigate technologies addressing different modalities that are commonly associated with creation of integrated multimodal interactive systems. The course is built upon the previous five semesters to augment foundational knowledge, skills and competences needed to achieve integration of technologies and evaluation methods.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Understanding** of the state-of-the-art in the field of alternative input and output technologies for uni- and multimodal applications (application)
- **Understanding** of visualization techniques such as virtual or augmented reality (application)
- **Understanding** of sound design methods and real-time audio processing techniques such as interactive auralization and sonification (application)
- **Understanding** of the measurement and analysis of physiological data via sensors detecting signals present in the human body for techniques such as affective computing
- **Understanding** of haptic interfaces, theory and implementation of haptic feedback systems using vibrotactile stimulation
- **Understanding** adaptive systems which change behaviour according to user input within a session
- **Understanding** of iterative design processes as used in the design of real-time interfaces and multimodal interactive systems

SKILLS

Students who complete the module will obtain the following qualifications:

- Ability to **synthesise** new interface components of responsive Human-Computer Interaction systems, and log data from users and/or their interactions for data analysis
- Ability to scientifically **analyse** and argue with theoretical and methodological justification to demonstrate understanding of related research/work in the current scientific discourse
- Ability to **apply** real-time sensor inputs in the design of an interactive media product
- Ability to **synthesise** and **apply** contextual understanding and knowledge related to human factors in the design of novel interfaces
- Ability to **apply** theories, techniques and methods for the design and implementation of systems which can adapt to human needs and level of expertise

COMPETENCES

Students who complete the module will obtain the following qualifications:

- Ability to **synthesise** knowledge and understanding regarding previous research and current trends concerning interactive media systems
- Ability to **apply** such knowledge, understanding and skills toward creation of new interfaces and interactive systems that function in real-time (low latency response)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in § 17.

EXAM

PREREQUISITE FOR ENROLLMENT FOR THE EXAM

- To be eligible to take the exam the student must have fulfilled:
 - handing in of written assignments or the like
- completion of certain – or all – study activities

EXAMS

Name of exam	Real-time Interfaces and Interactions
Type of exam	Written or oral exam Individual oral or written examination based on mandatory exercises and mini-project with internal censor.
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Realtids interfaces og interaktioner
Module code	MSNMEDB6144
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen
Responsible for the module	Claus Brøndgaard Madsen

ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

THEORY AND PRACTICE OF GAME DESIGN AND DEVELOPMENT

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

5th semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives:

This course provides students with the foundational knowledge and practices in the design and development of games such as the social and economic context of gaming and game production, the game industry, formal and dramatic elements of games, system dynamics of games, iterative game design through playtesting, completeness and balance of games, and game technologies. It is a hands-on course in which the students are expected to create actual prototypes, evaluate and iteratively redesign them.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- Discuss the structure and formal elements of games – in particular players, objectives, procedures, rules, resources, conflict, boundaries and outcome – and dramatic elements of games – in particular challenge, play, premise, character, story, world building, and the dramatic arc (**understanding**)
- Review the context of games, game classifications and players (**understanding**)
- Explain game technologies including controllers, game engines (and their components such as render engines, audio engines, physics engines, etc.), and game development tools (**understanding**)
- Describe the game development pipeline from idea via iterative design and development to product launch (**understanding**)
- Describe the game industry and game entrepreneurship including platforms for distribution, independent developers, development studios, and publishers (**understanding**)

SKILLS

Students who complete the module will obtain the following qualifications:

- **Analyse** and summarize (**application**) system dynamics of existing games
- Create, present, critique and revise original game ideas (**evaluation**)
- Iteratively produce (**application**) and **evaluate** key game features through playtesting of physical and/or digital prototypes
- Judge completeness and balance (**evaluation**) and **evaluate** player experience of games and/or gameprototypes with established metrics
- Produce pitch materials including game demos and design documents (**application**)

COMPETENCES

Students who complete the module will obtain the following qualifications:

- **Plan, organize** and **implement** a game (pre)production (**application**)

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Theory and Practice of Game Design and Development
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination with internal censor. The assessment is performed in accordance with the 7-point scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Teori og praksis af spildesign og -udvikling
Module code	MSNMEDB6145
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen

Responsible for the module	Claus Brøndgaard Madsen
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ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

TECHNOLOGIES FOR WEB AND SOCIAL MEDIA

2021/2022

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

All previous programming courses

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objectives

Web technologies are pervasive in the everyday life of most people in modern-day society and most public and private digital services are delivered through the world wide web.

This course aims to introduce the students to the technologies and the practices adopted in web-based applications and web sites.

The students will learn to develop new web-based systems, and maintain and extend existing systems. Furthermore, the students will learn to evaluate existing technologies and platforms, such as social media and web based services, and to develop integrated applications that make use of these platforms and contribute to them.

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module will obtain the following qualifications:

- **Understand** client-server architectures and basic networking
- **Know** the purpose, structure and basic functionalities of the hypertext transfer protocol
- **Understand** the purpose, characteristics and components of XML, HTML and CSS
- **Know** the basic principles of server-side development
- **Analyse** and explain the document object model
- **Understand** the principles of client-side development and DOM manipulation
- **Apply** techniques to debug and profile web systems
- **Apply** the principles of asynchronous client/server interaction
- **Know** the state-of-the art technologies in both server-side and client-side development.
- **Understand** the concept of mash-up and how to interact with external services (e.g., social media)

SKILLS

Students who complete the module will obtain the following qualifications:

- **Synthesise** and **evaluate** static and dynamic web pages and web based applications
- **Analyse**, correct and extend existing client- and server-side programs
- **Apply** external frameworks and API to integrate advanced functionalities and connections to existing services.
- **Evaluate**, employ and personalise existing web platforms - e.g., wiki, CMS or blogs

COMPETENCES

Students who complete the module will obtain the following qualifications:

- **Evaluate** emerging web technologies
- **Evaluate** the limitations and the potentials of different web technologies and choose the most appropriate for a specific project

TYPE OF INSTRUCTION

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided in accordance with the current Framework Provisions and directions are decided and given by the Study Board for Media Technology.

EXAM

EXAMS

Name of exam	Technologies for Web and Social Media
Type of exam	<p>Written or oral exam In accordance with the current Framework Provisions and directions on examination from the Study Board for Media Technology:</p> <p>To be eligible to take the exam the student must have fulfilled:</p> <ul style="list-style-type: none"> • handing in of written assignments or the like • completion of certain – or all – study activities <p>Note that if admittance to the exam or parts of the assessment is to be based on written work or exercises, a deadline is stipulated for when the work must be handed in.</p> <p>Individual oral or written examination based on mandatory exercises and mini-project with internal censor. The assessment is performed in accordance with the 7-point grading scale.</p>
ECTS	5
Permitted aids	With certain aids: See semester description
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Teknologier til internet og sociale medier
Module code	MSNMEDB6146
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg, Campus Copenhagen

Responsible for the module	Claus Brøndgaard Madsen
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ORGANISATION

Study Board	Study Board of Media Technology
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design