AALBORG UNIVERSITET

MASTER OF SCIENCE IN TECHNOLOGY (GLOBAL SYSTEMS DESIGN) 2017

MASTER OF SCIENCE (MSC) IN TECHNOLOGY
COPENHAGEN

MODULES INCLUDED IN THE CURRICULUM

TABLE OF CONTENTS

ENGINEERING OF AUTONOMOUS SYSTEMS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge on how to use system engineering tools to model, investigate and select new solutions to the specific problems.
- Must have knowledge about how to optimize the operations of an autonomous systems in a deterministic or stochastic environment using Operations Research methods and tools.
- Must have knowledge about how to model and implement a control solution in a given problem to improve the management and performance of an individual autonomous system.

SKILLS

- Is able to use the major system engineering tools to model an autonomous system.
- Is able to design autonomous systems and motivate the choices using system design methods.
- Is able to document the design and the developments using system engineering methods.

COMPETENCES

- Is able to apply project- and team-based learning to complete a team project, including preparation of problem definition, coherent analysis and writing of a technical report with clear formulation of results and conclusions, and with proper use of source references.

TYPE OF INSTRUCTION

The module is carried out as group-based, problem-oriented project work. The group work is carried out as an independent work process in which the students themselves organise and coordinate their workload in collaboration with a supervisor. The project is carried out in groups with normally no more than 6 members.

EXTENT AND EXPECTED WORKLOAD

Since it is a 15 ECTS course module the expected workload is 450 hours for the student.

EXAM

EXAMS

Name of exam	Engineering of Autonomous Systems
Type of exam	Oral exam based on a project
ECTS	15
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Udvikling af autonome systemer

Module code	M-AS-K1-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

SYSTEMS ENGINEERING AND VALIDATION

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge of the most important system engineering tools.
- Have knowledge about tools for system modelling and simulation.
- Know of methods for simulating or emulating automated production systems to test control logic and validate broader impact of automation projects on production / logistics system performance with metrics for capacity and bottleneck utilization, material flow, inventory levels.
- Know how to proactively design for and manage system lifecycle targets.

SKILLS

- Understands system engineers' role and responsibilities.
- Is able to apply systems engineering tools to realistic problems.
- Develop simple simulation and emulation models to validate impact of automation projects on manufacturing / logistics systems and overall system performance using queuing theory and stochastics.
- Can formulate an effective plan for gathering and using data.

COMPETENCES

- Must be able to rationalize and scientifically justify the use of a specific model for a given problem.
- Is able to recognize the value and limitations of modelling and simulation.
- Should be able to develop models for pre-testing various control logics.
- Should be able to communicate with rest of the organization about impact of automation / steering on metrics for production unit / logistics system.
- Should be able to develop a systems engineering plan for a realistic project.
- Should be able to judge the applicability of any proposed process, strategy, or methodology for systems engineering using the fundamental concepts from disciplines such as of probability, economics, and cognitive science.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Systems Engineering and Validation
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Systemudvikling og validering
Module code	M-AS-K1-2
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Evangelos Boukas

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

MODELLING AND CONTROL OF MECHATRONIC SYSTEMS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge about analytic modeling of physical systems.
- Have knowledge about control of dynamic systems and tools for analysis of a controlled system.
- Have knowledge about industrial and proportional–integral–derivative controllers.
- Have knowledge about performances of a controlled system such as transient response, steady-state accuracy, stability and robustness.
- Have knowledge about signal processing and discrete time control.
- Have knowledge about control of robots, robot control schemes and architectures.

SKILLS

- Be able to formulate models and apply methodologies to address and solve problems related to the dynamics of electro-mechanical systems.
- Be able to simulate the dynamic model of a system and test control methods in simulation.
- Be able to implement a control system and evaluate the system performances of a physical dynamic system.
- Be able to generalize the knowledge to the design of multi-disciplinary controlled systems.

COMPETENCES

- Be able to rationalize and scientifically justify the use of a specific model for a given problem.
- Be able to communicate with experts about themes related to vibrations, system dynamics and control.
- Be able to identify problems in controlled systems and provide solutions to improve the performances of a controlled system.
- Be able to implement new control solutions for a given control problem.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Modelling and Control of Mechatronic Systems
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Modellering og styring af mekatroniske systemer
Module code	M-AS-K1-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Matteo Fumagalli

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

OPTIMIZATION, SCHEDULING AND ROUTING

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Knowledge of formulating a linear optimization problem using linear equation.
- Knowledge of important algorithms such as Dijkstras shortest paths algorithm and the simplex method.
- Knowledge of the characteristics of 1-2 major metaheuristics and the concept of a heuristic.
- Knowledge of general scheduling and routing problems.

SKILLS

- Is able to critically evaluate advantages of different models and methods applied to a given problem.
- Can use different tools to solve realistic problems.
- Can formulate a real-life optimization problem with a mathematical programming model.
- Apply scheduling and routing models to optimize automated manufacturing and transportation / logistics systems and their operational execution to achieve desired targets for productivity, process quality etc.

COMPETENCES

- Must be able to rationalize and scientifically justify the use of a specific solution method.
- Is able to recognize the value and limitations of a solution method.
- Should be able to communicate with experts the themes related to mathematical programming
- Should be able to develop a model for a realistic problem and to implement a solution method for the problem using the tools from the course
- Should be able to judge the applicability of the different mathematical programming models and corresponding methods.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Optimization, Scheduling and Routing
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Optimering, skedulering og routing
Module code	M-AS-K1-4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Line Blander Reinhardt

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

INTELLIGENT AUTONOMOUS SYSTEMS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained knowledge and experience of how to develop autonomous solution with advanced sensing, big data, machine learning, vision and perception technologies.
- Have gained knowledge and experience of how to design intelligent autonomous systems and networks with related concepts, theories, methods and tools, based on demand characteristics in different industry/business contexts.
- Have gained knowledge and experience of how to evaluate the performance of intelligent autonomous systems and networks in a dynamic application/commercial environment.

SKILLS

- Be able to analyse the system demand in a real case and specify its characteristics.
- Be able to develop an intelligent autonomous solution with related technologies, aiming to meet the identified demands.
- Be able to conduct a cost and benefit analysis for the proposed solution to justify economic feasibility.
- Be able to comprehensively evaluate the performance of intelligent autonomous systems and networks in a dynamic application/commercial environment.

COMPETENCES

- Have the ability to interpret the differences of intelligent autonomous solutions compared with conventional ones in a specific context, e.g. autonomous robots, production or transportation logistics.
- Have the ability to formulate a project to target and solve an intelligent autonomous solution in a real case, as well as planning and conducting such a project with team work.
- Have the ability to estimate and assess the achievement of logistic and economic objectives in intelligent autonomous solutions in a specific context.
- Have the ability to analyse the limitations, opportunities, and the survivability of an intelligent autonomous system/network against more complex and contested environments.

TYPE OF INSTRUCTION

The module is carried out as group-based, problem-oriented project work. The group work is carried out as an independent work process in which the students themselves organise and coordinate their workload in collaboration with a supervisor. The project is carried out in groups with normally no more than 6 members.

EXTENT AND EXPECTED WORKLOAD

Since it is a 15 ECTS course module the expected workload is 450 hours for the student.

EXAM

EXAMS

Name of exam	Intelligent Autonomous Systems
Type of exam	Oral exam based on a project

ECTS	15
Assessment	7-point grading scale
Type of grading	External examination

FACTS ABOUT THE MODULE

Danish title	Intelligente autonome systemer
Module code	M-AS-K2-1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

SENSING AND PERCEPTION

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- About the theory of sensors/sensing.
- About sensor signal processing.
- About 3D Perception
- Of creation and real-time update of virtual world models
- About multi sensor integration

SKILLS

- Is able to design and implement perception systems required for specific applications.
- Is able to create software that process sensor data which are further employed by an integrated system.

COMPETENCES

- Must be able to rationalize and scientifically justify the use of specific sensors for a given problem
- Is able to recognize the value and limitations of each perception method.
- Should be able to communicate with experts about themes related to sensors, signal processing and world virtualization.
- Should be able to judge the applicability of any perception system, both concerning effectiveness and cost.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Sensing and Perception
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Sensor baseret perception

Module code	M-AS-K2-2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

MACHINE LEARNING AND BIG DATA

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- Of the most important machine learning techniques.
- About tools for applying machine learning solutions.
- About characteristics of big data.
- About programming models and tools for big data analysis.

SKILLS

- Understand the types of machine learning algorithms, such as supervised, unsupervised and reinforcement learning.
- Understand the different classes of tasks where machine learning can be applied, including classification, regression and clustering problems.
- Apply machine learning algorithms in a given problem.
- Understand big data characteristics, such as volume, velocity, variety, veracity, valence, and value and explain how they can influence big data analysis.
- Create data models that suit the characteristics of given data.
- Design and develop autonomous systems that exploit machine learning and big data.

COMPETENCES

- Is able to compare, choose, or develop the most appropriate machine learning algorithm in a given problem.
- Can identify the type of task and required machine learning algorithm in a given application.
- Can identify what are big data problems.
- Must have the competency to compare and choose the most appropriate data model that suits the characteristics of given data.
- Is able to compare and assess the use of techniques and tools for issues that include collecting, storing, organizing, analyzing and using big data.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Machine Learning and Big Data
Type of exam	Written or oral exam
ECTS	5

Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Machine Learning og Big Data
Module code	M-AS-K2-3
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Tsampikos Kounalakis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

NETWORKS OF AUTONOMOUS SYSTEMS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained an understanding of typical applications of AxS in the various domains, e.g. military use, manufacturing, production and logistics.
- Have gained an understanding of autonomy classifications
- Have gained an understanding of interoperability challenges in both short- and long-term.
- Have gained an understanding of the concepts and methods of designing an AxS network.
- Have gained an understanding of methods and tools of evaluating the performance of an AxS network.

SKILLS

- Be able to design an AxS system or network based on a certain demand characteristics in a context e.g. manufacturing, production and logistics.
- Be able to evaluate the performance of an AxS system or network in a dynamic application environment.
- Be able to assess both technological and economic feasibility of an AxS system or network in a specific application/commercial context.

COMPETENCES

- Have gained awareness and a holistic understanding on the impacts of AxS in an running business or industrial context.
- Have gained the insights and tools of employing AxS systems or networks in a specific facility.
- Be able to conduct a comprehensive performance/risk analysis in a quantitative manner, by identifying the stochastic characteristics of application .context/environment, based on which should be able to judge the applicability of any AxS systems or networks.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Networks of Autonomous Systems
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Netværk af autonome systemer
Module code	M-AS-K2-4
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Jens Christian Moesgaard Rauhe

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

AUTONOMOUS SYSTEMS IN PRACTICE

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st and 2nd Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge about the advantages and practical limitations of autonomous systems deployed in at least one application area.
- Must have knowledge of the scientific basis and possible engineering solutions for the specific application area.

SKILLS

- Must be able to make a requirement specification for the implementation of autonomous systems in a given situation.
- Must be able to seek out and develop a solution and present it in the form of sketches, diagrams, drawings and virtual, as well as physical, prototypes.
- Must be able to justify the benefits of a developed solution
- Must be able to independently plan and carry out a development on basis of a given problem.
- Must be able to choose and apply relevant methods and tools.

COMPETENCES

- Must be able to devise how a relatively complex autonomous system can be specified, designed, managed and implemented, and in a professional manner to prove this.
- Must have the ability to assess important impacts, such as material flows, equipment or asset utilization, and other economic aspects, of the solution.
- Must be able to demonstrate engineering skills within the implementation and/or deployment of autonomous systems and to display their ability to perform engineering work.
- Must be able to take responsibility for their own professional development.

TYPE OF INSTRUCTION

The project work is carried out as an independent work process in which the students themselves organise and coordinate their workload in collaboration with a supervisor. The project may be carried out individually or in groups. The project may be finalized with a project report or in the form of a scientific paper with supporting appendices.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS course module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Autonomous Systems in Practice
Type of exam	Oral exam based on a project
ECTS	30
Assessment	7-point grading scale

Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Anvendelse af autonome systemer
Module code	M-AS-K3-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

ACADEMIC INTERNSHIP

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The module adds to the knowledge obtained in 1st and 2nd Semester.

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge about the advantages and practical limitations of autonomous systems deployed in at least one application area.
- Must have knowledge of the scientific basis and possible engineering solutions for the specific application area.

SKILLS

- Must be able to make a requirement specification for the implementation of autonomous systems in a given situation.
- Must be able to seek out and develop a solution and present it in the form of sketches, diagrams, drawings and virtual, as well as physical, prototypes.
- Must be able to justify the benefits of a developed solution
- Must be able to independently plan and carry out a development on basis of a given problem.
- Must be able to choose and apply relevant methods and tools.

COMPETENCES

- Must be able to devise how a relatively complex autonomous system can be specified, designed, managed and implemented, and in a professional manner to prove this.
- Must have the ability to assess important impacts, such as material flows, equipment or asset utilization, and other economic aspects, of the solution.
- Must be able to demonstrate engineering skills within the implementation and/or deployment of autonomous systems and to display their ability to perform engineering work.
- Must be able to take responsibility for their own professional development.

TYPE OF INSTRUCTION

The student is included in the company's daily work. Concurrent to the work in the company, the student makes a report which is evaluated after ending the internship.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS course module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Academic Internship
Type of exam	Oral exam based on a project
ECTS	30
Assessment	7-point grading scale
Type of grading	Internal examination

FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb i en virksomhed
Module code	M-AS-K3-2
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

LONG MASTER'S THESIS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The master thesis can be conducted as a long master thesis using both the 3rd and 4th Semester. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge of how to provide solutions to problems that require innovative solutions rather than current industry approaches.
- Must have knowledge of how to apply interdisciplinary methods in order to exceed the limits of current solutions.

SKILLS

- Must be able to acquire and demonstrate new in depth knowledge related to selected topics.
- Must be able to find the connection with technologies related to other topics.
- Must be able to plan and carry out a research study based on a specific problem.
- Must be able to justify the decisions as well as to analyse benefits and limitations of the selected solution.
- Must be able to communicate problems, methods and results within the scientific area, in writing and discuss professional and scientific problems with peers.

COMPETENCES

- Must be able to demonstrate scientific skills within the subject of autonomous systems and to display their ability to perform scientific work in the area of Autonomous Systems.
- Must be able to take responsibility for their own professional development.

TYPE OF INSTRUCTION

In this module, the Master's project is carried out. The module constitutes independent project work and concludes the program. Within the approved topic, the Master's project must document that the level for the programme has been attained.

EXTENT AND EXPECTED WORKLOAD

Since it is a 60 ECTS course module the expected workload is 1800 hours for the student.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	60
Assessment	7-point grading scale
Type of grading	External examination

FACTS ABOUT THE MODULE

Danish title	Lang kandidatspeciale
Module code	M-AS-K3-3
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	60
Language of instruction	English
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

MASTER'S THESIS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge of how to provide solutions to problems that require innovative solutions rather than current industry approaches.
- Must have knowledge of how to apply interdisciplinary methods in order to exceed the limits of current solutions.

SKILLS

- Must be able to acquire and demonstrate new in depth knowledge related to selected topics.
- Must be able to find the connection with technologies related to other topics.
- Must be able to plan and carry out a research study based on a specific problem.
- Must be able to justify the decisions as well as to analyse benefits and limitations of the selected solution.
- Must be able to communicate problems, methods and results within the scientific area, in writing and discuss professional and scientific problems with peers.

COMPETENCES

- Must be able to demonstrate scientific skills within the subject of autonomous systems and to display their ability to perform scientific work in the area of Autonomous Systems.
- Must be able to take responsibility for their own professional development.

TYPE OF INSTRUCTION

In this module, the Master's project is carried out. The module constitutes independent project work and concludes the program. Within the approved topic, the Master's project must document that the level for the programme has been attained.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS project module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	30
Assessment	7-point grading scale
Type of grading	External examination

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale

Module code	M-AS-K4-1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Copenhagen
Responsible for the module	Lazaros Nalpantidis

ORGANISATION

Study Board	Study Board of Industry and Global Business Development
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science