



AALBORG UNIVERSITET

# **CAND.TECH. I VÆRDIKÆDER OG INNOVATIONSLEDELSE 2018**

CAND.TECH.  
KØBENHAVN

MODULER SOM INDGÅR I STUDIEORDNINGEN

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# CONFIGURATION, DESIGN AND IMPLEMENTATION OF MANUFACTURING OR SERVICE VALUE CHAINS

**2020/2021**

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

This project module attempt to integrate the internal perspective from the course “Operations Management and Productivity Improvement” with the external perspective from the course “Outsourcing and Procurement” – in order to create improvements in the configuration and design of a value chain in organizations or networks of organizations.

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Account for how to integrate selected parts of operation management and productivity theories, tools, and methods with the aim of configuring and designing an improved value chain of a manufacturing or service organization in practice.
- Understand the role for and the deployment of technologies within the process of improving value chains in organizations or networks of organizations.
- Explain how to overcome real life challenges connected to the (re)configuration and improvement value chains in organizations or networks of organizations.
- Show how to operationalize theoretical contributions to practical settings.
- Understand how sustainability considerations can be included the configuration, design and improvement of value chains.

#### SKILLS

- Combine insights from the literature and theory when configuring, designing, and improving value chains in organizations, networks of organizations.
- Analyse the role of technologies in value chains.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated,
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation,
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny,
  - Make a rigorous, systematic, and comprehensive analysis of the problem under investigation.
- Evaluate of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalisability of the study.

#### COMPETENCES

- Operationalize theoretical contributions in a practical setting.
- Work together as a team to analyse and collect data in connection to problems in relation to conceiving and designing a value chain in a real life setting.
- Integrate considerations on the deployment of technologies into the configuration, design, and improvement of the value chain of an organization, networks of organizations or value chains.

#### 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 organize 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 project module the expected workload is 450 hours for the student.

## EXAM

### EXAMS

Name of exam	Configuration, Design and Improvement of Manufacturing or Service Value Chains
Type of exam	Oral exam based on a project
ECTS	15
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	Konfiguration, design, og implementering af produktions eller service værdikæder
Module code	M-OIM-K1-N1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a>

### ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# RESEARCH METHODS AND ANALYSIS

**2020/2021**

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

This course aims to develop students' skills to understand, apply and evaluate search methods and tools in problem-based projects with academic rigor. A particular emphasis is on research design, data collection and data analysis and ensuring validity and reliability.

### LEARNING OBJECTIVES

#### KNOWLEDGE

- A coherent and profound understanding of research design approaches for studying value chains and business systems and processes.
- Understanding of how to operationalize theory as part of research design, data collection and data analysis.
- Understanding of quantitative and qualitative methods to collect data about value chains and business systems and processes, including the trade-offs between different data collection methods.
- Understanding of quantitative and qualitative methods to analyse value chains and business systems and processes.
- Understanding of approaches to ensure validity and reliability in relation to research design, data collection and data analysis.
- Knowledge of the state-of-the-art of technological developments within data generation.

#### SKILLS

- Developed skills in applying and evaluating quantitative and qualitative research designs necessary for understanding, analyzing and improving value chains and business systems and processes.
- Developed skills in applying and evaluating quantitative and qualitative methods for data collection and data analysis.

#### COMPETENCES

- Be able to select and operationalize appropriate quantitative and qualitative research designs.
- Be able to select and operationalise appropriate quantitative and qualitative approaches to data collection and data analysis.
- Be able to analyse and improve value chains and business systems and processes.

#### TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme curriculum §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	Research Methods and Analysis
Type of exam	Written or oral exam
ECTS	5

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	Forskningsmetoder og Analyse
Module code	M-OIM-K1-N2
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Thim Prætorius</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# OPERATIONS MANAGEMENT AND PRODUCTIVITY IMPROVEMENT

**2020/2021**

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

This course focuses on managing and developing operations and productivity. Taking the strategic development of the operations function as its point of departure the course will focus on how to manage operations within the company. Besides managing operations the course will also focus on how to analyze and improve production systems and processes. The course will also include service operations.

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Have gained understanding planning principles and concepts in manufacturing and service operations.
- Have gained insight into the use of technologies in productions and service systems.
- Have developed a understanding about how processes and systems can be improved using concepts such as lean, six sigma and total quality management.
- Have gained knowledge different production philosophies and their core elements.
- Have developed insight into the strategic development of manufacturing and service operations.
- Have developed an understanding of the relation between manufacturing and service processes and systems and the surrounding organization, society and environment.

#### SKILLS

- Be able to evaluate the use of technologies in production and service systems.
- Be able to describe manufacturing and service processes and systems.
- Be able to identify appropriate productivity improvement methods in a given situation depending on the actual contingencies.
- Be able to identify appropriate productivity improvement methods taking into consideration the long term sustainability goals (including financial, social and environmental goals).
- Be able to identify and evaluate key trade-offs in connection with the design and improvement of production and services systems.
- Be able to design manufacturing and service processes and systems which fits with the surrounding organization

#### COMPETENCES

- Be able to improve manufacturing and service processes using technologies.
- Be able to operationalize and apply improvement methodologies and tools in a practical context.
- Be able to realise and implement productivity improvement in manufacturing and services.
- Be able to improve performance taking into consideration the sustainability perspective

#### TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme curriculum §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	Operations Management and Productivity Improvement
Type of exam	Written or oral exam
ECTS	5
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	Produktionsledelse og produktivitetsudvikling
Module code	M-OIM-K1-N3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a>

### ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science



# OUTSOURCING AND PROCUREMENT

**2020/2021**

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The course focuses on the external dimensions of contemporary global production systems. Focus is especially on global strategies, outsourcing choices/practices, supplier related choices/practices and procurement choices/practices.

### LEARNING OBJECTIVES

#### KNOWLEDGE

- An understanding of the central international management theories.
- An understanding of the determinants behind the configuration of a company's internationalization choices.
- Knowledge of strategic procurement and the associated challenges.
- Knowledge of different key managerial challenges pertaining to the outsourcing decision, supplier selection, relationship building and collaboration with suppliers.
- Knowledge of the role of digitalization with regards to configuration of global value chains.
- Knowledge of the role of technological issues and sustainability when making outsourcing and procurement decisions.

#### SKILLS

- Developed skills in applying the international management theories when configuring global value chains.
- Developed skills to evaluate different options concerning internationalization choices from the perspective of international management.
- Developed skills to critically assess the limitations to international management theories and supplier management theories.
- Develop skills in making outsourcing choices, supplier management, and to procurement.

#### COMPETENCES

- Be able to discuss in a nuanced way the problem complex associated with internationalization with specific focus on aspects relating to ownership advantages, locational choices and internalization issues.
- Be able to discuss in a nuanced way central issues in respect to supplier management and procurement.
- Be able to provide theory informed yet independent reflections on the adequacy of the international management and supplier management theories.
- Develop abilities to craft and implement relevant organizational set-ups in the global companies or companies interested in internationalizing.

#### TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme curriculum §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	Outsourcing and Procurement
Type of exam	Written or oral exam

ECTS	5
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	Outsourcing og indkøb
Module code	M-OIM-K1-N4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Jan Vang</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# **INNOVATION AND IMPLEMENTATION WITHIN VALUE CHAINS**

**2020/2021**

## **PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE**

The module builds upon the knowledge acquired in 1st semester.

## **CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE**

This project module attempt to integrate the different perspectives from the courses taught during the semester. The idea in this project module is for the students to work with problems related to implementing and using innovations and technologies in a sustainable, coherent, and value creating manner within value chains of organizations or network of organizations.

## **LEARNING OBJECTIVES**

### **KNOWLEDGE**

- Account for how to integrate selected parts of theories, tools, and methods with the aim of implementing innovative solutions in the value chain of manufacturing or service organizations or networks of organizations.
- Understand the implementation of technologies in organizations, networks of organizations or value chains.
- Explain how to overcome real life challenges connected with innovation and the associated implementation of changes within value chains in organizations, networks of organizations or value chains.
- Show how to operationalize theoretical contributions to practical settings.
- Understand how sustainability considerations can be included the implementation of within the value chains organizations, networks of organizations or value chains.

### **SKILLS**

- Combine insights from the literature and theory when designing implementing approaches for novel value chains in organizations or networks of organizations.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a rigorous, systematic, and comprehensive analysis of the problem under investigation.
- Evaluate of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalisability of the study.

### **COMPETENCES**

- Operationalize theoretical contributions in a practical setting.
- Work together as a team to analyse and collect data in connection to problems in relation to conceiving and designing a value chain in a real life setting.
- Integrate considerations on the deployment of technologies into the configuration, design, and improvement of the value chain of an organization, networks of organizations or value chains.

## **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 organize 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 project module the expected workload is 450 hours for the student.

## EXAM

### EXAMS

Name of exam	Innovation and Implementation within Value Chains
Type of exam	Oral exam based on a project
ECTS	15
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	Innovation og implementering i værdikæder
Module code	M-OIM-K2-N1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# INNOVATION, TECHNOLOGY AND CHANGE

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired in 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

This course focuses on managing innovation and technology as well as organizational change, which often accompany technological innovations. Relatedly, the course highlights that innovation and technological development needs innovation and change management to successfully develop, implement and realize inventions and new technologies.

## LEARNING OBJECTIVES

### KNOWLEDGE

- Have gained understanding of the role of and relationship between innovation, technology and change in organizations, networks of organizations or supply chains.
- Have gained understanding of different types of innovation and innovation management theories.
- Have gained knowledge about organizational change and change management methods, and theories.

### SKILLS

- Have gained understanding of the role of and relationship between innovation, technology and change in organizations, networks of organizations or supply chains.
- Have gained understanding of different types of innovation and innovation management theories.
- Have gained knowledge about organizational change and change management methods, and theories.

### COMPETENCES

- Be able to design, evaluate, and improve innovation, technology, and change management initiatives and processes in an organization, network of organizations or supply chains.
- Be able to operationalise and apply theories and methods about innovation, technology, and change management to analyse and evaluate such initiatives in an organization, network of organizations or supply chains.
- Be able to realise and implement innovation, technology, and change management initiatives in an organization, network of organizations or supply chains.

## TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme curriculum §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	Innovation, Technology and Change
Type of exam	Written or oral exam
ECTS	5

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	Innovation, teknologisk udvikling og forandring
Module code	M-OIM-K2-N2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a> , <a href="#">Thim Prætorius</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# DEVELOPING INTEGRATED SOLUTIONS

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired in 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The focus areas of the course are on developing and implementing integrated solutions to bring innovative products or services into new markets. This entails a focus on three different, but related, perspectives. Firstly, it is necessary to be able to set-up a value chain possibly including both upstream and downstream perspectives. Secondly, it is necessary to carry out effective project management and master the needed practical tools. Thirdly, it is necessary to integrate different aspects into the solution – for example technology, supply chain, customer, and stakeholder aspects.

## LEARNING OBJECTIVES

### KNOWLEDGE

- An understanding of the requirements and challenges related to developing and implementing an integrated solution needed for bringing innovative products and service into to new markets.
- An understanding of how value chains can be developed possibly including both upstream and downstream aspects.
- An understanding of project management and related tools and concepts.
- An understanding of how different aspects within the value chain can be integrated and aligned.

### SKILLS

- Managing a project aimed at developing and implementing an integrated solution for bringing an innovative product or service to market.
- Developing, designing, and setting-up an integrated value chain including both upstream and downstream aspects.
- Identifying and analyzing how different aspects of the integrated solution can be integrated and aligned.
- Develop skills in managing the behavioural dimension of project management.

### COMPETENCES

- Develop and design integrative solutions for bringing new products and services into new markets.
- Select and operationalize theories, models, and concepts in connection with the development and design of the integrated solution.
- Critically assess the implications of the integrated solution for the relevant stakeholders.

## TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme curriculum §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	Developing Integrated Solutions
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Type of exam	Written or oral exam
ECTS	5
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	Udvikling af integrerede løsninger
Module code	M-OIM-K2-N3
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Jan Vang</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science



# OPERATIONS AND INNOVATIONS MANAGEMENT

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired during the first two semesters

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Deep knowledge of the subject matter in the specific area of the project.

#### SKILLS

- Evaluate the concepts, theories and methodologies applied in the solution of the problem.
- Account for the choices made during the solution of the problem and substantiate that these are made on a high professional level.
- Assess and evaluate the limitations of the concepts, theories and methodologies applied in the solution of the problem.
- Plan, execute and report an extensive individual research project within an agreed time frame.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.

#### COMPETENCES

- Analyse and solve an actual problem of industrial relevance through application of systematic research and development processes, including advanced analytical, experimental, and/or numerical methods and models.
- Work together with a manufacturing or service organisation and to identify operations and/or supply chain management problems and finally develop data driven and robust solutions using technologies.
- Operationalize theoretical contributions in a practical setting.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic or other consequences of the proposed solutions.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral.

#### 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 project module the expected workload is 900 hours for the student.

**EXAM****EXAMS**

Name of exam	Operations and Innovations Management
Type of exam	Oral exam based on a project
ECTS	30
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

**ADDITIONAL INFORMATION**

The project may be finalized with a project report or in the form of a scientific paper with supporting appendices documenting the research conducted and reported in the paper.

**FACTS ABOUT THE MODULE**

Danish title	Værdikæder og innovationsledelse
Module code	M-OIM-K3-N1
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	<a href="#">Anders Paarup Nielsen</a>

**ORGANISATION**

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# ACADEMIC INTERNSHIP

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired during the first two semesters on the education.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Deep knowledge of the subject matter in the specific area of the project.

#### SKILLS

- Evaluate the concepts, theories and methodologies applied in the solution of the problem.
- Account for the choices made during the solution of the problem and substantiate that these are made on a high professional level.
- Assess and evaluate the limitations of the concepts, theories and methodologies applied in the solution of the problem.
- Plan, execute and report an extensive individual research project within an agreed time frame.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.

#### COMPETENCES

- Analyse and solve an actual problem of industrial relevance through application of systematic research and development processes, including advanced analytical, experimental, and/or numerical methods and models.
- Work together with a manufacturing or service organisation and to identify operations and/or supply chain management problems and finally develop data driven and robust solutions using technologies.
- Operationalize theoretical contributions in a practical setting.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic or other consequences of the proposed solutions.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral.

#### TYPE OF INSTRUCTION

The student works in a company providing experience in solving advanced and relevant engineering tasks on a level corresponding to the learning objectives outlined above and with a progression in the degree of difficulty of the tasks during the period. The type of work must allow for an academic report to be made.

#### 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	Academic Internship
Type of exam	Oral exam based on a project
ECTS	30
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

**ADDITIONAL INFORMATION**

The student writes either a project report or a case□ based project report within the theme of the 3rd semester of the education; cf. "Guidelines for Project Work in an External Organisation (Academic Internship)" laid down by the School of Engineering and Science.

**FACTS ABOUT THE MODULE**

Danish title	Projektorienteret forløb i en virksomhed
Module code	M-OIM-K3-N2
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	<a href="#">Anders Paarup Nielsen</a>

**ORGANISATION**

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# LONG MASTER'S THESIS

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired in the first two semesters.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Deep knowledge of the subject matter in the specific area of the project.

#### SKILLS

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Apply scientific methodology in solving a wide variety of problems within the field of specialization.
- Perform scientific work in relevant topics of the field of the specialization.
- Apply a wide range of technologies and engineering methods in research and development projects in the field of specialization.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Participate in or lead projects within the fields of the specialisation.

#### COMPETENCES

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.
- Work independently with a project on a complex problem within their field of interest on the highest possible level within their specialization.
- Take part in both discipline-specific and interdisciplinary cooperation to solved complex problems.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic consequences and impact on society, environmental and safety issues related to the project.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation.

#### TYPE OF INSTRUCTION

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

#### EXTENT AND EXPECTED WORKLOAD

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

## EXAM

### EXAMS

Name of exam	Long Master's Thesis
Type of exam	Master's thesis/final project
ECTS	60
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

## ADDITIONAL INFORMATION

The long Master's thesis has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

## FACTS ABOUT THE MODULE

Danish title	Lang kandidatspeciale
Module code	M-OIM-K3-N3
Module type	Project
Duration	2 semesters
Semester	Autumn
ECTS	60
Language of instruction	English
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science

# MASTER'S THESIS

**2020/2021**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds upon the knowledge acquired in the first three semesters.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

### LEARNING OBJECTIVES

#### KNOWLEDGE

- Deep knowledge of the subject matter in the specific area of the project.

#### SKILLS

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Apply scientific methodology in solving a wide variety of problems within the field of specialization.
- Perform scientific work in relevant topics of the field of the specialization.
- Apply a wide range of technologies and engineering methods in research and development projects in the field of specialization.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Participate in or lead projects within the fields of the specialisation.

#### COMPETENCES

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.
- Work independently with a project on a complex problem within their field of interest on the highest possible level within their specialization.
- Take part in both discipline-specific and interdisciplinary cooperation to solved complex problems.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic consequences and impact on society, environmental and safety issues related to the project.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation.

#### TYPE OF INSTRUCTION

In this module, the Master's Thesis is carried out. The module constitutes independent project work and concludes the programme. Within the approved topic, the Master's Thesis must document that the level of 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
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

## ADDITIONAL INFORMATION

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.

## FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale
Module code	M-OIM-K4-N1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Copenhagen
Responsible for the module	<a href="#">Anders Paarup Nielsen</a>

## ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	Faculty of Engineering and Science