



AALBORG UNIVERSITET

MASTER OF SCIENCE (MSC) IN ENGINEERING (OPERATIONS AND INNOVATION MANAGEMENT) 2017

MASTER OF SCIENCE (MSC) IN ENGINEERING
AALBORG

MODULES INCLUDED IN THE CURRICULUM

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ORGANISATION ANALYSIS AND DESIGN

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Account for theories and their paradigmatic underpinning on the design of industrial and professional service organisations
- Describe the impact of corporate and operations strategies, technologies and (competitive) environments on the design of such organisations

SKILLS

- Identify organizational design problems in industrial and professional service organization
- Operationalize these problems and collect relevant information concerning the industrial/competitive, strategic, technological, and organization design aspects describing these problems
- Analyse, evaluate and (re)design organisational designs in their contexts
- Apply concepts and theories to cases and (real-life) examples.

COMPETENCES

- Visualize in, for example, exercises and cases of:
 - The paradigms in organisation theory
 - The principles of organisation design, including division and coordination of labour, and the impact of key contextual characteristics (including strategy, technology and environment) on organisation design parameters
 - Decision making, and the role of power, politics, control and conflicts in organisations
 - The similarities and differences between designing and managing start-ups, mature, expert-based, innovative, diverse, networked and virtual organisations
 - The needs, challenges, dilemmas, dualities and paradoxes in combining exploration and exploitation.
- Take the lead in diagnosing and solving problems in organization designs of various types of industrial and professional service companies

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 | Organisation Analysis and Design |
| 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 | Organisationsanalyse og design |
| Module code | M-OIM-K1-1 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Autumn |
| ECTS | 5 |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Harm Boer |

ORGANISATION

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

ENTERPRISE ENGINEERING AND DESIGN

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

This course is aimed at methodologies for analysis, modelling, simulation, design, realization and implementation of large integrated enterprise systems as solution to complex business situation.

LEARNING OBJECTIVES

KNOWLEDGE

- Describe and classify theories, methods and tools related to enterprise engineering and design
- Identify feasible approaches and frameworks for integrated business solutions
- Understand enterprise architectures and typology
- Explain theoretical and methodological foundations for analysis, modelling, simulation, design and evaluation of integrated business solutions
- Design conceptualisation processes and orchestrate concept development in operations and supply chains
- Recommend strategies for realization and implementation of solutions.

SKILLS

- Apply enterprise engineering and design
- Simulate and evaluate integrated solutions in operations and supply chain
- Relate enterprise solutions to corporate strategies and development goals
- Demonstrate proof of concepts, mock-ups and demonstrator models.

COMPETENCES

- Conceive and communicate complex solutions.
- Analyse and reflect on own practice and approaches
- Assess the need for synthesizing new knowledge

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 | Enterprise Engineering and Design |
| 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 | Virksomhedsudvikling |
| Module code | M-OIM-K1-2 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Autumn |
| ECTS | 5 |
| Language of instruction | English |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Charles Møller |

ORGANISATION

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

OPERATIONS DEVELOPMENT AND STRATEGY

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- A coherent and profound understanding of how and why operations globalise, including an in-depth knowledge of the associated theories and strategies
- Insight into the strategic analysis and synthesis of global operations footprints including the understanding of; the strategic situation; the process of globalisation; and the theory-based conceptualisation of operations strategy
- Knowledge of strategic configuration of operations, including structures and infrastructures, the extended operations system and strategic capabilities
- Knowledge about strategic innovation in an operations system context.

SKILLS

- Developed skills to evaluate different options and argue for specific choices for strategic design of global operations systems and operations development strategies, including recognising of competitive opportunities, configuring operations capabilities, organisational processes and organisational designs
- Developed relevant skills to apply theories and methods to the improvement and reorganisation of global operations
- Developed skills to identify and implement options for reorganisation and improvements in the context of global operations.

COMPETENCES

- Be able to discuss the complex of problems associated with globalisation of operations to outline the different paths and strategies a company may choose
- Develop abilities to craft and implement relevant operations strategies.

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 Development and Strategy |
| 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 | Global produktionsudvikling og -strategi |
| Module code | M-OIM-K1-3 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Autumn |
| ECTS | 5 |
| Language of instruction | English |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Brian Vejrum Wæhrens |

ORGANISATION

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

INTEGRATED SOLUTIONS - DESIGNING GLOBAL BUSINESS SYSTEMS AND VALUE CHAINS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Account for the relationships between theories on operations strategy/development and organization/enterprise analysis, engineering/design operations
- Understand the role for and the deployment of strategic and technological choices in the design of (global) companies, supply chains and production networks
- Show how to operationalize theoretical contributions to practical settings

SKILLS

- Analyze and develop an integrated solution to a practical problem, usually in the form of a project developed in and together with a company. The project theme is integrated solutions and normally requires:
 - Demarcation and analysis of the empirical background to the problem
 - Development of an operationalization of a relevant and researchable research problem/project objective, using theory taught on this semester, but usually going beyond that.
 - Development of an adequate research/project design, including the elements mentioned next
- Write a well-structured project report, written with clear arguments including the following elements:
 - A critically exploration of the empirical problem and account for the choice of theories and approaches analyze and solve the problem under investigation,
- Detailed questions/objectives
- An account of the data collection and data validation methods, data sources
- An account of the analytical methods used and methods used to validate the findings
- An account of the (design) methods used to develop recommendations/solutions to resolve the research problem / achieve the project objective.
- Presentation and validation of data
- Presentation, validation and discussion of analytical findings
- Presentation and validation of recommendations/solutions
- Evaluation of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalizability of the study.

COMPETENCES

- Operationalize theoretical contributions on organization/enterprise analysis, design and engineering, operations strategy and development as well as other relevant scientific fields in a practical setting
- Work together as a team to analyze and develop integrated and feasible solution(s) to a practical organizational problem
- Work together with an organization in an academically yet practically adequate manner.

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 course module the expected workload is 450 hours for the student.

EXAM

EXAMS

| | |
|-----------------|---|
| Name of exam | Integrated Solutions - Designing Global Business Systems and Value Chains |
| 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 | Integrerede løsninger - Design af globale forretningssystemer og værdikæder |
| Module code | M-OIM-K1-4 |
| Module type | Project |
| Duration | 1 semester |
| Semester | Autumn |
| ECTS | 15 |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Astrid Heidemann Lassen |

ORGANISATION

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

INNOVATION AND CHANGE MANAGEMENT

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand the role of technology, and various forms of innovation and change (including incremental/radical, business process redesign/continuous improvement, product/process/position/paradigm, business model) in established and emerging businesses
- Understand the characteristics and drivers of innovation and change, as well as the practical means of handling them in a business context
- Understand the range, scope and complexity of challenges related to the management of technology, innovation and change
- Understand organizing for and management/leadership of innovation and change, including aspects of culture, power and politics, enablers of and barriers to change, factors of innovation success and failure

SKILLS

- Describe, analyze and redesign innovation and change management processes
- Identify and analyze the field of innovation and change management including the value position of stakeholders; customers, suppliers and other network partners
- Design, evaluate and audit the innovative and change capabilities of a business organization
- Apply principles of business model innovation and risk management to suggest redesign and improvement of business models

COMPETENCES

- Realize and implement innovation- and change management initiatives, including the design, implementation and execution (management/leadership) of innovation and change management projects in companies, supply chains and networks, as well as relating practical innovation and change management experiences to conceptual understanding of innovation leadership and change management

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 and Change Management |
| 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 | Innovations- og forandringsledelse |
| Module code | M-OIM-K2-1 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Spring |
| ECTS | 5 |
| Language of instruction | English |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Frank Gertsen , Astrid Heidemann Lassen |

ORGANISATION

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

GLOBAL BUSINESS PERFORMANCE

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand various perspectives and theories that inform the formation and functioning of contemporary extended enterprise which consist of the focal company and its suppliers
- Understand complexity management principles and tool kits based on systems science and systems methodology
- Account for various orientations of companies' operations systems (technology, innovation, cost, quality, flexibility) and can explain how these orientations affect performance management and control
- Understand risk types (both internal and external) and their impacts in extended enterprises
- Understand the principles of value stream costing, using value stream mapping and business process re-engineering
- Understand and can explain value engineering, target costing and chained target costing in cooperation between the focal company and its 1st, 2nd, etc. tier suppliers
- Understand total cost of ownership (TCO), differentiated on the basis of product-/supplier type, techniques in the form of 'Monetary-based method' (Activity Based Cost Systems), 'Cost-ratio/value-based method' and 'Mathematical programming decision model'
- Understand and can explain supply chains financial and non-financial performance and its sensitivity as a function of the market and selected divide between push and pull operations
- Understand and can explain conflicting and colliding cases of Lean and the company's financial management and reporting, as well as possible solutions, including financial reporting that complies with Lean's seven waste categories

SKILLS

- Conduct analysis and evaluation of operations performance in the context of extended enterprises
- Use tools and techniques for measuring and managing performance of activities that cross both geographical and organizational boundaries
- Initiate performance improvement programs and their implementation in contemporary extended enterprises

COMPETENCES

- Identify and diagnose problems with performance management systems in contemporary extended enterprises
- Conceive appropriate performance management system designs
- Take responsibility for implementation and control of operations performance management systems in contemporary extended enterprises

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 | Global Business Performance |
| 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 | Præstationsmåling og -vurdering af globale forretningsprocesser |
| Module code | M-OIM-K2-2 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Spring |
| ECTS | 5 |
| Language of instruction | English |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Jesper Hemdrup Kristensen |

ORGANISATION

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

BUSINESS INTELLIGENCE AND ANALYTICS

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Account for Business Intelligence (BI) concepts, theories and methods including:
 - Creation of knowledge from either people/employees/"experts" or from analysing existing data
 - Knowledge representation
 - Traditional BI handling systems such as expert systems, knowledge base systems, decision support systems and executive information systems.

SKILLS

- Make decisions about the optimal use of the BI concepts, theories, methods and selected systems for identification of needs, development of alternative solutions, evaluation selection and implementation
- Use BI in disciplines such as enterprise engineering/modelling, business analytics, data mining, etc.

COMPETENCES

- Apply knowledge and skills in relation to business intelligence development projects and thereby apply the knowledge handling activities: knowledge acquisition, knowledge verification, knowledge representation and knowledge engineering.

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 | Business Intelligence and Analytics |
| 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 | Business Intelligence og analytiske metoder |
| Module code | M-OIM-K2-3 |
| Module type | Course |
| Duration | 1 semester |
| Semester | Spring |
| ECTS | 5 |
| Language of instruction | English |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Kim Nørgaard Jensen |

ORGANISATION

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

GLOBAL IMPLEMENTATION

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme. Furthermore, this project builds on the three courses taught in the 2nd Semester of the programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate understanding of the theories, concepts, methods and tools taught in this semester.

SKILLS

- Demonstrate the skills to choose among and apply in practice the theories, concepts, methods and tools taught in this semester.
- Analyze, and develop an integrated solution to a practical problem, usually in the form of a project developed in and together with an organization. The project theme is global implementation, and normally requires:
- Demarcation and analysis of the empirical background to the problem
- Development and operationalisation of a relevant and researchable research problem/project objective using theory taught on the semester, but usually going beyond that
- Development of an adequate research/project design, including:
 - Detailed questions/objectives
 - An account of the data collection and data validation methods, data sources
 - An account of the analytical methods used and methods used to validate the findings
 - An account of the (design) methods used to develop recommendations/solutions to resolve the research problem / achieve the project objective.
- Presentation and validation of data
- Presentation, validation and discussion of analytical findings
- Presentation and validation of recommendations/solutions
- Evaluation of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalizability of the study.

COMPETENCES

- Work together as a team to analyze, and develop integrated and feasible solution(s) to a practical organisational problem
- Work together with an organization in an academically yet practically adequate manner.

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 | Global Implementation |
| 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 | Global implementering |
| Module code | M-OIM-K2-4 |
| Module type | Project |
| Duration | 1 semester |
| Semester | Spring |
| ECTS | 15 |
| Empty-place Scheme | Yes |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Astrid Heidemann Lassen |

ORGANISATION

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

OPERATIONS AND INNOVATION MANAGEMENT

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st and 2nd Semester of the MSc in Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

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

SKILLS

- Solve complex business problems using operation and innovation management theory and concepts and management engineering methods and tools
- Evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem
- Evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project
- Account for any choices made during the problem analysis and solution development
- Develop solution alternatives and evaluate the performance, strategic, organizational, managerial and other relevant prerequisites for and consequences of solution alternatives and make a well-informed choice based on that
- Plan, execute and report an extensive individual research project within an agreed time frame
- Write a well-structured project report, which meets all the usual requirements of an academic work, including:
 - Empirical background
 - Research problem/project objective
 - Relevant theory
 - Research design:
 - Detailed questions/objectives
 - An account of the data collection and data validation methods, data sources
 - An account of the analytical methods used and methods used to validate the findings.
 - An account of the methods used to develop recommendations/solutions to resolve the research problem/achieve the project objective
 - Presentation and validation of data
 - Presentation, validation and discussion of analytical findings
 - Presentation and validation of recommendations/solutions
 - Evaluation of the project; i.e., findings, methods and, if relevant, considerations regarding the limitations and generalizability of the study.
 - specific for internship: a personal reflection is required, a reflection on: how was it to work alone, full-time in a company, and, if applicable, in a different country with a different culture, language, industrial structure, etc.

COMPETENCES

- Analyze 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 organization and identify operations and/or innovation 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 and other consequences of the proposed solutions
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation

TYPE OF INSTRUCTION

The project 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 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 | Integrated Solutions - Designing Global Business Systems and Value Chains |
| Type of exam | Oral exam based on a project |
| ECTS | 30 |
| Assessment | 7-point grading scale |
| Type of grading | Internal examination |

ADDITIONAL INFORMATION

Option A

FACTS ABOUT THE MODULE

| | |
|----------------------------|----------------------------------|
| Danish title | Værdikæder og innovationsledelse |
| Module code | M-OIM-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 Aalborg |
| Responsible for the module | Harm Boer |

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

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st and 2nd Semester of the MSc in Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

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

SKILLS

- Solve complex business problems using operation and innovation management theory and concepts and management engineering methods and tools
- Evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem
- Evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project
- Account for any choices made during the problem analysis and solution development
- Develop solution alternatives and evaluate the performance, strategic, organizational, managerial and other relevant prerequisites for and consequences of solution alternatives and make a well-informed choice based on that
- Plan, execute and report an extensive individual research project within an agreed time frame
- Write a well-structured project report, which meets all the usual requirements of an academic work, including:
 - Empirical background
 - Research problem/project objective
 - Relevant theory
 - Research design:
 - Detailed questions/objectives
 - An account of the data collection and data validation methods, data sources
 - An account of the analytical methods used and methods used to validate the findings.
 - An account of the methods used to develop recommendations/solutions to resolve the research problem/achieve the project objective
 - Presentation and validation of data
 - Presentation, validation and discussion of analytical findings
 - Presentation and validation of recommendations/solutions
 - Evaluation of the project; i.e., findings, methods and, if relevant, considerations regarding the limitations and generalizability of the study.
 - specific for internship: a personal reflection is required, a reflection on: how was it to work alone, full-time in a company, and, if applicable, in a different country with a different culture, language, industrial structure, etc.

COMPETENCES

- Analyze 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 organization and identify operations and/or innovation 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 and other consequences of the proposed solutions
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation

TYPE OF INSTRUCTION

The student is included in the company's daily work and carry out independent project work on an industrial problem relevant for the company. Concurrent to the work in the company, the student makes a project report, which is evaluated after the ending of 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-OIM-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 Aalborg |
| Responsible for the module | Harm Boer |

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

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Successful conclusion of the first two semesters of the Operations and Innovation Management programme. Exemptions to this rule may be given, but only by decision of the Study Board of Industry and Global Business Development.

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 specialisation
- Perform scientific work in relevant topics of the field of the specialisation
- 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 specialisation
- 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 course 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 |

ADDITIONAL INFORMATION

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 | Lang kandidatspeciale |
| Module code | M-OIM-K3-3 |
| Module type | Project |
| Duration | 2 semesters |
| Semester | Autumn |
| ECTS | 60 |
| Language of instruction | English |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Harm Boer |

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

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Successful conclusion of the first two semesters of the Operations and Innovation Management programme. Exemptions to this rule may be given, but only by decision of the Study Board of Industry and Global Business Development.

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 specialisation
- Perform scientific work in relevant topics of the field of the specialisation
- 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 specialisation
- 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 course 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 |

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-K4-1 |
| Module type | Project |
| Duration | 1 semester |
| Semester | Spring |
| ECTS | 30 |
| Language of instruction | English |
| Location of the lecture | Campus Aalborg |
| Responsible for the module | Harm Boer |

ORGANISATION

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