AALBORG UNIVERSITET

CURRICULUM OF MASTER OF SCIENCE IN MEDICINE WITH INDUSTRIAL SPECIALISATION 2020

MASTER OF SCIENCE (MSC) IN MEDICINE WITH INDUSTRIAL SPECIALISATION
AALBORG

Link to this studyline

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§ 1: PREFACE

Pursuant to Act 778 of August 7, 2019 on Universities (the University Act), the following curriculum for the Master's programme in Medicine with Industrial Specialisation is stipulated.

The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for Aalborg University.

§ 2: BASIS IN MINISTERIAL ORDERS

The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Order no. 20 of January 9, 2020 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 22 of January 9, 2020 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 153 of February 26, 2020 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order).

§ 3: CAMPUS

The programme is offered in Aalborg.

§ 4: FACULTY AFFILIATION

The Master's programme falls under The Faculty of Medicine, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under Study Board of Medicine.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme is associated with the external examiners corps on Medicine.

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal right of admission (retskrav)

- Bachelor in Medicine with Industrial Specialisation, Aalborg University

Applicants without legal right of admission

- Bachelor in Medicine, Aalborg University, Copenhagen University, Aarhus University, Southern Denmark University
- Bachelor in Molecular Medicine, Copenhagen University, Aarhus University
- Bachelor in Pharmaci, Copenhagen University, Southern Denmark University

All applicants without a legal claim must prove that their English language qualifications is equivalent to level B (Danish level) in English

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the designation cand.scient.med. i medicin med industriel specialisering (candidatus/candidata scientiarum medicinae)

The English designation is: Master of Science (MSc) in Medicine with Industrial Specialisation

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The Master's programme is a 2-year, research-based, full-time study programme. The programme is set to 120 ECTS credits.

§ 10: RULES CONCERNING CREDIT TRANSFER (MERIT), INCLUDING THE POSSIBILITY FOR CHOICE OF MODULES THAT ARE PART OF ANOTHER PROGRAMME AT A UNIVERSITY IN DENMARK OR ABROAD

The Study Board can approve that passed programme elements from other educational programmes at the same level replaces programme elements within this programme (credit transfer).

Furthermore, the Study Board can, upon application, approve that parts of this programme is completed at another university or a further education institution in Denmark or abroad (pre-approval of credit transfer).

The Study Board's decisions regarding credit transfer are based on an academic assessment.

§ 11: EXEMPTIONS

The Study Board's possibilities to grant exemption, including exemption to further examination attempts and special examination conditions, are stated in the Examination Policies and Procedures published at this website: https://www.studieservice.aau.dk/regler-vejledninger

§ 12: RULES FOR EXAMINATIONS

The rules for examinations are stated in the Examination Policies and Procedures published at this website: https://www.studieservice.aau.dk/regler-vejledninger

§ 13: RULES CONCERNING WRITTEN WORK, INCLUDING THE MASTER'S THESIS

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's formulation and spelling ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The Study Board can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's Thesis must include an English summary. If the project is written in English, the summary can be in Danish. The summary is included in the evaluation of the project as a whole.

§ 14: REQUIREMENTS REGARDING THE READING OF TEXTS IN A FOREIGN LANGUAGE

It is assumed that the student can read academic texts in his or her native language as well as in English and use reference works etc. in other European languages.

§ 15: COMPETENCE PROFILE ON THE DIPLOMA

The following competence profile will appear on the diploma:

A Candidatus graduate has the following competency profile:

A Candidatus graduate has competencies that have been acquired via a course of study that has taken place in a research environment.

A Candidatus graduate is qualified for employment on the labour market based on his or her academic discipline as well as for further research (PhD programmes). A Candidatus graduate has, compared to a Bachelor, developed his or her academic knowledge and independence so as to be able to apply scientific theory and method on an independent basis within both an academic and a professional context.

§ 16: COMPETENCE PROFILE OF THE PROGRAMME

The candidate programme in Medicine with Industrial Specialisation is composed of three health related profiles:

Biomedicine

Knowledge

- Demonstrate knowledge in one or more subject areas that is based on the highest international research level
- Explain in details advanced concepts and theories of molecular and cellular biology in human pathophysiology
- Explain in detail advanced key technologies used in biomedical research
- Explain how molecular and cellular biology can be used in clinical diagnostics
- Describe how molecular pharmacology can help to understand the mechanism of a drug
- Understand current trends and identify challenges in cell- and molecular-based assays used in biomedical research
- Summarise how manipulations of the immune system may alleviate, stop or avoid disease processes
- Describe the principles of molecular therapy using small molecule, protein based drugs or gene therapy
- Understand the translational similarities and differences between animal models of major diseases and human pathophysiology
- Describe how molecular pharmacology can help understanding how drugs works against a pathogenesis
- Explain how different regenerative and tissue engineering approaches can be used to treat human diseases
- Explain how precision and personalised medicine approaches can be used to optimise diagnostics and treatment of human diseases

Skills

- Investigate and critically assess relevant scientific literature
- Understand and reflect on new knowledge and identify scientific problems
- Understand and reflect on the regulations, guidelines and ethical requirements of preclinical and clinical studies (including concepts of data and sample collection, biobanking, data handling and reporting)
- Design an experimental study to address a scientific problem
- Evaluate and select molecular methods to solve a scientific problem
- Qualitatively and quantitatively analyse and interpret results from molecular experiments
- Communicate research-based knowledge and discuss scientific problems with both peers and non-specialists
- Present ideas and results of experiments clearly to a specific audience in both oral and written form
- Identify appropriate sources of materials and interpret the corresponding specification datasheets to design experimental protocols

Competences

- Manage a scientific project
- Collaborate to solve complex scientific problems
- Independently initiate and implement discipline-specific and interdisciplinary cooperations
- Independently take responsibility for own professional development and specialisation
- Suggest likely targets for molecular therapy based on genetic, proteotypic or phenotypic manifestations
- Combine the theoretical knowledge about genomes, proteomes and metabolomes with the ability to perform laboratory experiments in order to design a diagnostic or analytical protocol
- Analyse and interpret molecular data such as DNA sequences, mRNA and proteins using bioinformatic tools
- Compare and suggest suitable forms of protein, immunotherapy, stem cell therapy, regenerative medicine and precision medicine for a series of typical patients
- Analyse disease processes or responsiveness to treatment using relevant methods

Translational Medicine

Knowledge

- Demonstrate knowledge of core principles of translational research principles applied in research and drug/devise development
- Describe the legal and organisational framework of translational medicine
- Understand and scientifically reflect over the relevant knowledge and identify scientific problems in translational research
- Demonstrate knowledge of core principles of research pharmacology based on the highest international knowledge in modern pharmacology
- Understand scientific problems and challenges in translational research and drug development and how to reflect on scientific and statistical challenges
- Have an in depth understanding of different steps for planning, practical execution, completion and evaluating clinical trials
- On a scientific, analytical and ethical basis, reflect over the relevant knowledge and identify scientific problems
- Demonstrate an in depth understanding of different translational models and approaches from a multi- and interdisciplinary perspective
- Understanding scientific problems and challenges in translational research
- Understand how to transfer laboratory discoveries into new methods for diagnosis, preventing and treating diseases plus testing these methods in humans

Skills

- Formulate and analyse all documents and regulations involved in planning, practical execution, completion and evaluating clinical trials
- Suggest how Good Clinical Practice and Good Manufacturing Practice can be implemented and maintained
- Suggest submission processes in relation to EMA and FDA
- Apply methods and tools to analyse current pharmacology research projects, to evaluate obtained data, to predict or interpret findings and to communicate these by scientific presentations
- Suggest relevant biomarkers to be applied in translational research
- Develop new biomarkers as proxies for specific mechanisms and diseases
- Analyse, compare and discuss critically and systematically different forms of clinical trials concerning design and statistical models
- Explain topics essential for translational medicine and drug/medical device development
- Apply a set of principles and methods at any stage from design to conduction and reporting a clinical trial at any phase from phase I to phase IV
- Apply rules and guidelines to conduct and monitor a trial, report of post-marketing drug surveillance, adverse reactions, pharmacovigilance and the health economical perspectives
- Explain topics essential for translational medicine and drug/devise development
- Assess or predict mechanisms of action or potential side-effects of drugs/devices for a certain disorder or condition
- Write research and clinical trial protocols for research in translational medicine and choose suitable methodology and apply appropriate statistics and data handling principles
- Apply research questions to translational biomedical research
- Investigate and critically assess relevant scientific literature

Competences

- Formulate and execute translational research projects
- Formulate research proposals to identify mechanisms of action or potential side-effects of new drugs/devises for a certain disorder or condition
- Analyse analytically and statistically clinical trial data
- Design clinical trials utilising translational knowledge and biomarkers
- Plan research project concerning approval, conduct ethical considerations and relate relevant aspects of translational medicine with advanced concepts in biomedicine
- Assess safety and efficacy of drugs/medical devices considering global benefits to people and economies utilising

- guidelines, standards, tools and approaches
- Scientifically reflect over the relevant knowledge and identify scientific problems in translational research
- Critically evaluate the importance of basic research into a translational context
- Being able to participate into translational science discussions, which explore a variety of approaches in order to solve big real-world problems

Medical Market Access

Knowledge

- Understand scientific problems within medical market access
- Demonstrate an in-depth understanding of different health economic analysis and approaches from a multi- and interdisciplinary perspective
- Describe basic marketing theories and strategies with a focus on application within the health sector
- Outline the health care system's organisation and financing, including the central differences between different health systems
- Demonstrate an in-depth understanding of quality in healthcare
- Identify a company's need for information on key market conditions

Skills

- Investigate and critically assess relevant scientific literature
- Design a health economic analysis, including the collection of both patient-specific data and register-based data
- Design a market analysis for a topic related to the health care system, including the collection of both qualitative and quantitative data
- Analyse and interpret a health economic analysis, including sensitivity analysis and budget expenditures
- Analyse problems in relation to quality and discuss potential solutions for quality improvements in healthcare
- Discuss the potential consequences of changes to the organisation and financing of the health system, including prioritisation

Competences

- Scientifically reflect over the relevant knowledge and identify scientific problems in medical market access
- Being able to participate in health economic and market access discussions, which explores a variety of approaches to solving real-world problems
- Critically appraise results from the highest international research relevant to a scientific medical problem
- Critically assess existing economic analysis and alternative models of financing and organising in the health sector
- Contribute to planning and evaluation of projects and strategies for improving economic and quality problems in healthcare
- Create a decision-analytic model to support decision making in healthcare
- Develop advanced health economic analysis, including economic evaluations (cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis etc.), budget analysis, cost-of-illness analysis, HTA reports

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

Completion of the Master's programme

The Master's programme must be completed no later than four years after it was begun.

The programme is structured in modules and organised as a problem-based study. A module is a programme element or a group of programme elements, which aims to give students a set of professional skills within a fixed time frame specified in ECTS credits, and concluding with one or more examinations within specific exam periods. Examinations are defined in the curriculum.

The programme is structured into three profiles:

- Biomedicine, BM
- Translational Medicine, TM
- Medical Market Access, MMA

Biomedicine focuses on the understanding of causes and treatment of disease at the molecular and cellular level. It builds upon the understanding of whole body functions. The students will learn how to perform hypothesis-driven experiments in order to understand human pathophysiology and to identify new targets for treatment. Therefore, a substantial part is devoted to experiments on cells or laboratory animals.

Translational medicine is driven by the objective of improving clinical outcomes by efficiently moving results from basic science to clinical application.

Medical Market Access is driven by the objective to improve market access of industry within the biotechnological, pharmaceutical and medical devices markets.

Students entering the candidate will have to choose a specific profile and the corresponding courses and projects, as the programme is designed to be coherent this way. Any exemptions must be approved by the study board.

The programme is based on a combination of academic, problem-oriented and interdisciplinary approaches and is furthermore organised based on the following work and evaluation methods that combine skills and reflection:

- lectures
- classroom instruction
- project work
- workshops
- exercises (individually and in groups)
- teacher feedback
- reflection
- portfolio work

§ 18: OVERVIEW OF THE PROGRAMME

Offered as: Study programme: Medicine with Industrial Specialisation						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Project with Focus on Methodological Approach - BM/TM/MMA (MEDMS20K1_1)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
Quality Improvement and Quality Assurance - BM/TM/MMA (MEDMS20K1_2)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Molecular Pathogenesis - BM (MEDMS20K1_3)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English

Molecular and Cellular Methods in Biomedicine - BM/TM (MEDMS20K1_4)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Designing and Evaluating Pharmacological Research - TM (MEDMS20K1_5)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Methods of Economic Evaluation in Healthcare - MMA (MEDMS20K1_6)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Marketing and Market Access for Healthcare - MMA (MEDMS20K1_7)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
Applied Project Management within Medicine with Industrial Specialisation - BM/TM/MMA (MEDMS20K2_1)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Regenerative Medicine - BM (MEDMS20K2_2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Immuno- and Molecular Therapy - BM/TM (MEDMS20K2_3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Advanced Statistics - TM/MMA (MEDMS20K2_4)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Decision-Analytic Modelling and Trial-Based Evaluations in Health Economics - MMA (MEDMS20K2_5)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Organisation and Financing in Healthcare - MMA (MEDMS20K2_6)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Disease Processes and Diagnostics - Personalised Medicine - BM (MEDMS20K2_7)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Translational Research Principles - TM (MEDMS20K2_8)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER						
Analysis of a Medically Relevant Problem - BM/TM/MMA (MEDMS20K3_1)	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	English
3-4 SEMESTER						
Master's Thesis (MEDMS20K4_2)	Project	60	7-point grading scale	External examination	Master's thesis/final project	English
4 SEMESTER						
Master's Thesis (MEDMS20K4_1)	Project	30	7-point grading scale	External examination	Master's thesis/final project	English

All modules are assessed through individual grading according to the 7-point scale or Pass/Fail. All modules are assessed by external examination (external grading) or internal examination (internal grading or by assessment by the supervisor only).

§ 19: ADDITIONAL INFORMATION

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the Dean of The Faculty of Medicine and enters into force as of September 2020.

The Study Board does not offer teaching after the previous curriculum from 2013 after the summer examination 2021.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS