AALBORG UNIVERSITET

CURRICULUM OF MASTER IN SCIENCE IN MEDICINE WITH INDUSTRIAL SPECIALISATION 2013

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

Link to this studyline

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§ 1: PREFACE

Pursuant to Act 695 of June 22, 2011 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's programme in Medicine with Industrial Specialisation is stipulated. The programme also follows the Framework Provisions and the Examination Policies and Procedures for the Faculty of Engineering and Sciences and The Faculty of Medicine.

§ 2: BASIS IN MINISTERIAL ORDERS

The Master's programme is organised in accordance with the Ministry of Science, Innovation and Higher Education's Order no. 814 of June 29, 2010 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 857 of July 1, 2010 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 233 of March 24, 2011 (the Admission Order) and Ministerial Order no. 250 of March 15, 2007 (the Grading Scale Order) with subsequent changes.

§ 3: CAMPUS

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 the Board of Studies for Medicine.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

§ 7: ADMISSION REQUIREMENTS

Admission to the Master's programme in Medicine with Industrial Specialisation requires a Bachelor's degree in Medicine, Biotechnology, Molecular Medicine or the like.

Students with another Bachelor's degree, upon application to the Board of Studies, will be admitted after a specific academic assessment if the applicant is deemed to have comparable educational prerequisites. The University can stipulate requirements concerning conducting additional exams prior to the start of study.

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

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

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

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The Master's programme is af 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 successfully completed (passed) programme elements from other Master's programmes in lieu of programme elements in this programme (credit transfer). The Study Board can also approve successfully completed (passed) programme elements from another Danish programme or a programme outside of Denmark at the same level in lieu of programme elements within this curriculum. Decisions on credit transfer are made by the Study Board based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

§ 11: EXEMPTIONS

In exceptional circumstances, the Study Board study can grant exemption from those parts of the curriculum that are not stipulated by law or ministerial order. Exemption regarding an examination applies to the immediate examination.

§ 12: RULES FOR EXAMINATIONS

The rules for examinations are stated in the Examination Policies and Procedures published by the faculty on their website.

§ 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 (or another foreign language: French, Spanish or German upon approval by the Study Board). If the project is written in English, the summary must be in Danish (The Study Board can grant exemption from this). The summary must be at least 1 page and not more than 2 pages (this is not included in any fixed minimum and maximum number of pages per student). 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 tha 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 Specialization is composed of three health related profiles:

Biomedicine

Knowledge

• Demonstrate knowledge in one or more subject areas that, in selected areas, is based on the highest international research in a subject area

• Understand and, on a scientific basis, reflect over the relevant knowledge and identify scientific problems

• Explain in detail advanced concepts and theories of molecular and cellular biology in pathophysiology as well as potential in diagnostics in normal conditions and disease.

• Identify the current perspectives and challenges in cell and molecular-based assays used in biomedicine

• Summarize how manipulations of the immune system may alleviate, stop or avoid disease processes

Skills

• Evaluate and select among the scientific theories, methods, tools and general skills and, on a scientific basis, advance new analyses and solutions

• Communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists

• Elaborate on how disease processes may originate

• Investigate and critically assess relevant scientific literature

• Design experimental protocols, identifying the appropriate sources of materials and interpreting the corresponding technical specifications

• Qualitatively and quantitatively analyse experimental biomedical data

• Can design rational biotherapies for relevant human diseases using appropriate set of engineering and molecular biological tools

• Can apply different regenerative and tissue engineering approaches to treat human diseases.

Competences

• Manage work and development situations that are complex, unpredictable and require new solutions.

• Independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility.

• Independently take responsibility for own professional development and specialisation

• Synthesize knowledge about how common diseases arise in man and be able to suggest likely targets for therapy based on genetic and phenotypic manifestations

• Combine the theoretical knowledge about genes and genomes with the ability to perform laboratory experiments in order to design a diagnostic or analytical protocol

• Solve and evaluate complex analytical issues e.g. design of new diagnostic tools, evaluation of scientific articles at the highest international level; integrating knowledge from the previous semesters with the current course.

• Analyse molecular data such as DNA sequences, mRNA and proteins using bioinformatic tools

• Compare and suggest suitable forms of protein, immunotherapy, stem cell therapy and regenerative medicine for a series of typical patients and give reasons for the choices

• Analyse disease processes using relevant methods

Translational Medicine

Knowledge

• Demonstrate knowledge of core principles of research pharmacology based on the highest international knowledge in modern pharmacology

• Understand scientific problems and challenges in R&D pharmacology and how to reflect on challenges with possible solutions

• Describe the legal and organisational framework of translational medicine

• Have an in depth understanding of different steps for planning, practical execution and completion of a clinical trial

• Discuss the interests and needs of healthy and ill subjects in research and the concept “conflicts of interests” in terms of researchers and other actors

• Understand and, on a scientific basis, reflect over the relevant knowledge and identify scientific problems

Skills

• 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

• Explain the role of the end user and identify actors and their driving forces in research

• Suggest how Good Clinical Practice and Good Manufacturing Practice can be implemented

• 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 role of media and pharmacoeconomics.

• Explain topics in pharmacology essential for translational medicine and drug development

• Assess or predict mechanisms of action or potential side-effects of drugs for a certain disorder or condition

• Design protocols for research in translational medicine and choose suitable methodology and apply appropriate statistics and data handling

Competences

• Formulate a research proposal to identify mechanisms of action or potential side-effects of new drugs for a certain disorder or condition

• Analyse case studies of clinical trials and plan a (small) research project concerning approval, conduct and 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 utilizing guidelines, standards, tools, and approaches

Medical Market Access

Knowledge

• Demonstrate knowledge of the methods for the identification and reduction of waste in the health care system and linkages between quality and economics.

• Demonstrate knowledge in one or more subject areas that, in selected areas, is based on the highest international research in a subject area

• Demonstrate basic knowledge of marketing theory and marketing strategy (Introduction to the field and overview of theory) with focus on Marketing in the health sector

• Understanding of economic evaluation methods/models, i.e. cost-effectiveness, cost-utility

• Demonstrate knowledge of the health care system’s organisation and financing, including the central differences between different health systems

• Demonstrate basic knowledge of the use of microeconomic theories/models for analysis of the health sector and models for analysis of the costs and effects of new medical technologies

• Demonstrate knowledge of the use of patient-specific data from clinical trials as well as register-based data for analysis of costs and effects of new medical technology, including subgroup analyses.

Skills

• Use theoretical models for analysis and interpretation of specific quality and safety problems in the health care system

• Formulate descriptions of operational indicators for measuring quality and safety, including outlining a plan for data collection, processing and analysis.

• Use the basic tools for statistical quality development, such as series charts and Pareto charts, for presentation and analysis of clinical indicator measurements.

• Analyse a given market issue, identify company needs for information/knowledge on key market conditions

• Design and conduct interviews as part of a market study and outline the content of a simple marketing initiative based on context and formulation of the problem

• Can produce a (simple) economic evaluation of a medical technology (e.g. a new medicine/intervention) including sensitivity analysis and calculate the budget expenditures

• Can structure and present results from advanced health economic models and analyses of costeffectiveness, budget impact and cost-of-illness analyses

• Design and develop a market analysis for a topic related to the health care system

Competences

• Contribute to planning, implementation and reporting of clinical quality development projects.

• Critically assess existing economic analyses and alternative models of financing and organizing in the health sector

• Develop advanced health economic analyses, including economic evaluations (cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis, etc.), budget analyses, cost-of-illness analyses, MTV reports, etc.

• Assess methods and results from health economic calculations and design market studies.

§ 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:

1. Biomedicine, BM

2. Translational Medicine,

TM 3. 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 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: 1-professional					
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method
1 SEMESTER					
Molecular Pathogenesis - BM	Course	5	Passed/Not Passed	Internal examination	Active participation/continuous evaluation
Pathophysiology and Diagnostics - BM	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Genomics, Proteomics and Bioinformatics in Disease and Diagnostics - BM and TM	Course	5	Passed/Not Passed	Internal examination	Written exam
Molecular and Cellular Methods in Biomedicine - BM and TM	Course	5	Passed/Not Passed	Internal examination	Written exam
Current Research Topics in Modern Pharmacology - TM	Course	5	Passed/Not Passed	Internal examination	Written and oral exam
Research and Methodology in Pharmacology - TM	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Quality Development and Patient Safety - MMA	Course	5	7-point grading scale	Internal examination	Written exam
Principles of Marketing and Marketing Management - MMA	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Economics of Health and Health Care - MMA	Course	5	Passed/Not Passed	Internal examination	Written exam
Market Analysis and New Products Business Cases - MMA	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
2 SEMESTER					
Regulatory and Ethical Aspects of Clinical Research - TM, BM and MMA	Course	5	7-point grading scale	Internal examination	Written exam
Immuno- and Molecular Therapy - TM and BM	Course	5	7-point grading scale	Internal examination	Written exam
Regenerative Medicine - BM	Course	5	7-point grading scale	Internal examination	Written exam
Personalised Medicine - BM	Project	15	7-point grading scale	External examination	Oral exam based on a project
Perspectives of Clinical Trials in Drug and Medical Device Development - TM	Course	5	7-point grading scale	Internal examination	Written exam
Clinical Trials - TM	Project	15	7-point grading scale	External examination	Oral exam based on a project
Economics of Health Technologies and Technology Assessment - MMA	Course	5	Passed/Not Passed	Internal examination	Written exam
Non-Experimental Research Design and Analysis - MMA	Course	5	Passed/Not Passed	Internal examination	Written exam
Economic Evaluations and Technology Assessments - MMA	Project	15	7-point grading scale	External examination	Oral exam based on a project
3 SEMESTER					

Professional Development - MMA, TM and BM	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
4 SEMESTER					
Master's Thesis	Project	30	7-point grading scale	External examination	Oral exam based on a project

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).

*According to the framework provisions, students can design their own individual semester by choosing a 60 ECTS master project. Students can choose to go abroad or perform the project work in a public or private company. Regardless, students must choose an internal supervisor for their projects.

§ 19: ADDITIONAL INFORMATION

The current version of the curriculum is published on the website of the Board og Study for Medicine including more detailed information about the programme, including exams.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the Dean of The Faculty of Medicine and enters into force as of September 2013.

In accordance with the Framework Provisions for the Faculty of Engineering and Science and The Faculty of Medicine at Aalborg University, the curriculum must be revised no later than 5 years after its entry into force.

Completion of the Master's programme

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

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

There have been minor editorial changes in connection with the digitization of the curriculum