



AALBORG UNIVERSITET

STUDIEORDNING FOR MEDICIN MED INDUSTRIEL SPECIALISERING KANDIDAT 2013

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MODULER SOM INDGÅR I STUDIEORDNINGEN

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MOLECULAR PATHOGENESIS - BM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Passed course in general pathology (module 4.3 of the AAU Medicine/MedIS bachelor programme or equivalent).

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate relevant knowledge of all topics taught in the bachelor education in Medicine with Industrial Specialization

SKILLS

- Elaborate on how disease processes may originate from common hazards like oxidative stress, inflammation, autoimmunity, pathogens, atherosclerosis, carcinogens, hemorrhagic diathesis, and genetic deficiencies.
- Reflect upon the temporal aspect of disease progression
- Understand how aging affects health and tendency towards disease manifestations
- Evaluate and compare the causative roles of oxidative stress, inflammation, autoimmunity, pathogens, atherosclerosis, carcinogens, hemorrhagic diathesis, and genetic deficiencies in the pathogenetic mechanisms leading to major human diseases

COMPETENCES

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

TYPE OF INSTRUCTION

Modules consisting of lectures by university staff, experts from hospitals or other universities in Denmark, presentations by students, and work with scientific papers and study problems.

EXAM

EXAMS

Name of exam	Molecular Pathogenesis
Type of exam	Active participation/continuous evaluation
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Please contact the [programme student counsellors](#) if you consider applying to the education and you have questions.

Please consult the Moodle page for your semester and contact the semester coordinator if you have academic questions, or the study secretary if you have administrative questions.

All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Molekylær patogenese - BM
Module code	MEDMS13K1_1
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

PATHOPHYSIOLOGY AND DIAGNOSTICS - BM

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

SKILLS

- Choose relevant methodology for analysing disease states of the human biological system
- Formulate a working hypothesis based on biomedical knowledge and data

COMPETENCES

- Analyse disease processes using relevant methods
- Select and critically demonstrate an understanding at the theoretical and practical level on relevant methodology used for testing their hypotheses
- Analyze data from experimental or theoretical experiments relevant to the chosen biological systems

TYPE OF INSTRUCTION

- Project as described in chapter 3. Literature review. Hypothesis formulation. Practical work in laboratory. The project period is experimentally based and will attempt to allow the students to work in depth in the laboratory.

EXAM

EXAMS

Name of exam	Pathophysiology and Diagnostics
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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Patofysiologi og diagnostik - BM
Module code	MEDMS13K1_8

Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

GENOMICS, PROTEOMICS AND BIOINFORMATICS IN DISEASE AND DIAGNOSTICS - BM AND TM

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

After attending this course, the student is expected to:

This course should give an in-depth understanding of molecular basis of life. Furthermore the role of genes and genomes in disease development in principally all organs of the body is a big part of this course. The most important methods in molecular diagnostics are discussed. The course encompasses basic bioinformatics tools needed in a modern biomedical laboratory.

The course spans the following topics:

1. Genomics and proteomics in diagnostics and disease:

- Regulation of gene expression
- Post-translation protein modifications and fibrillation
- Epigenetics
- Molecular cloning
- Mutations and DNA repair
- Modern diagnostic methods

2. Bioinformatics:

- Biological Databases
- Alignments and Phylogeny
- Gene expression and Structural Analysis of genes and gene products

LEARNING OBJECTIVES

KNOWLEDGE

- Explain organization of genes and genomes in eukaryotes, particularly in human.
- Explain all levels at which expression of genes is regulated and what consequences it has for the disease pathophysiology as well as potential in diagnostics

SKILLS

- Apply basic molecular methods in diagnostic laboratory
- Evaluate a choice of diagnostic method
- Choose appropriate databases, algorithms and parameters in a bioinformatics analysis

COMPETENCES

- Combine the theoretical knowledge about genes and genomes with the ability to perform laboratory experiments in order to design a diagnostic or analytical protocol
- Evaluate the obtained results based on the theoretical knowledge within pathophysiology and molecular medicine
- 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, proteins using bioinformatics

TYPE OF INSTRUCTION

The course is developed as a series of lectures with exercises, mini projects and practical laboratory exercises.

EXAM

EXAMS

Name of exam	Genomics, Proteomics and Bioinformatics in Disease and Diagnostics
Type of exam	Written exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Genomik, proteomik og bioinformatik i sygdom og diagnostik - BM og TM
Module code	MEDMS13K1_2
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

MOLECULAR AND CELLULAR METHODS IN BIOMEDICINE - BM AND TM

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The goal of this module is to introduce students to modern methods used in biomedicine to investigate and diagnose disease processes, with a focus on methods used to study the diseases at molecular and cellular levels.

LEARNING OBJECTIVES

KNOWLEDGE

- Recall the terminology, concepts, and theories in molecular and cellular biology associated to the methods discussed in the module, both under normal conditions and in disease.
- Identify and classify the different approaches for the study and diagnosis of disease processes, recognizing the advantages and limitations of each of these approaches
- Demonstrate understanding of the theory and principles behind the different molecular and cellular methods
- Identify the current perspectives and challenges in cell and molecular-based assays used in biomedicine

SKILLS

- Investigate and critically assess the relevant scientific literature
- Apply the theory to design experimental protocols, identifying the appropriate sources of materials and interpreting the corresponding technical specifications
- Select the appropriate methods in the context of a cell or molecular biological research problem
- Use basic routines to collect data from measurement instruments
- Use bioinformatic tools and databases to obtain and analyse relevant molecular biology data
- Qualitatively and quantitatively analyse experimental data and apply cell and molecular biology knowledge to interpret the results

COMPETENCES

- Critically assess, organize and present scientific information, both orally and in writing
- Integrate the obtained knowledge and skills within new areas to design, plan and conduct advanced tasks and projects
- Select the appropriate methods and approaches to aid the screening, diagnosis, and monitoring of diseases in their professional practice

TYPE OF INSTRUCTION

- Lectures and exercises. The last session of the module will consist of oral group presentations of a final assignment by the students.

EXAM

EXAMS

Name of exam	Molecular and Cellular Methods in Biomedicine
Type of exam	Written exam Continuous evaluation of exercises and delivery of the final assignment
ECTS	5
Assessment	Passed/Not Passed

Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Molekylære og cellulære metoder i biomedicin - BM og TM
Module code	MEDMS13K1_3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

CURRENT RESEARCH TOPICS IN MODERN PHARMACOLOGY - TM

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Pharmacology is a research discipline applying a set of principles and methods to study mode of action of drugs in biological systems.

The goal of this course is to expose students to a variety of cutting-edge research topics in basic and applied pharmacological research. Through this course students will be trained and prepared for careers in research and development (R&D) in pharmaceutical industry, academic and research institutions, governmental and other healthcare agencies.

Topics encompass a number of different areas in modern pharmacology such as molecular pharmacology, cardiovascular pharmacology, gastrointestinal pharmacology, respiratory tract pharmacology, urogenital tract pharmacology, pharmacology of tissue repair, neuropharmacology, psychopharmacology, Immunopharmacology, pharmacology of aging, paediatric pharmacology, and latest developments in drug delivery.

LEARNING OBJECTIVES

KNOWLEDGE

- Have solid knowledge of core principles of research pharmacology based on the highest international research in modern pharmacology
- Understand scientific problems and challenges in R&D pharmacology and how to reflect on challenges with possible solutions

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
- Apply knowledge gained in this course to solve problems in pharmacology research in a real-world manner. Must be able to initiate discussion, define a problem and implement pharmacology discipline- specific tools to arrive at a consensus on how the problem is best solved

COMPETENCES

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

TYPE OF INSTRUCTION

This course consists of formal lectures given by faculty members and visiting lecturers from academia and industry; research seminars or workshops; interactive in-class discussions; literature-based projects; and student seminars on various properties and effects of newer drugs in form of oral presentations or written reports.

Research projects on current pharmacological research, new drug and delivery developments and re- evaluation of currently employed drugs, their mechanism of action, etc. will be introduced, followed by group discussions on PBL exercises.

Small lab visits can be arranged to provide students a direct research experience in a chosen area.

EXAM

EXAMS

Name of exam	Current Research Topics in Modern Pharmacology
Type of exam	Written and oral exam Evaluation of students will be based on multiple assessment tools including: class participation and interactive discussion, homework assignments, written reports and oral presentations.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Please contact the [programme student counsellors](#) if you consider applying to the education and you have questions.

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FACTS ABOUT THE MODULE

Danish title	Aktuelle forskningsområder i moderne farmakologi - TM
Module code	MEDMS13K1_4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

RESEARCH AND METHODOLOGY IN PHARMACOLOGY - TM

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

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

SKILLS

- Apply a set of principles and methods to study mode of action of drugs in biological systems either in terms of basic or applied pharmacological research.
- Design protocols for research in translational medicine
- Choose suitable methodology and apply appropriate statistics and data handling

COMPETENCES

- Assess or predict mechanisms of action or potential side-effects of drugs for a certain disorder or condition
- Students must be able to complete a clear and concise literature review;
- Formulate a fundamental aims of their research project;
- Discuss the theoretical and practical aspects of the chosen research field and corresponding methodologies, such as molecular pharmacology, cardiovascular pharmacology, gastrointestinal pharmacology, respiratory tract pharmacology, urogenital tract pharmacology, pharmacology of tissue repair, neuropharmacology, psychopharmacology, Immunopharmacology, pharmacology of aging, paediatric pharmacology, or drug delivery.
- Collect, critically analyse and interpret data

EXAM

EXAMS

Name of exam	Research and Methodology in Pharmacology
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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Farmakologisk forskning og metode - TM
Module code	MEDMS13K1_9
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

QUALITY DEVELOPMENT AND PATIENT SAFETY - MMA

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

- Concepts and definitions of quality in the health care system
- Laws and regulations on quality and safety in the health care system Methods for monitoring and improving quality
- Methods and principles for the prevention of adverse events Clinical quality databases
- Involvement of patients and relatives in quality and safety
- Quality and economics, including the concept of waste

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate understanding of basic concepts and terminology in quality and patient safety including:
 - the different dimensions of quality in health care, such as clinical quality, patient experienced quality and staff experienced quality
 - different views on safety, such as the absence of injuries and the presence of robust systems that ensure against injuries
- Demonstrate knowledge and overview of the methods used for quality development in health care, such as accreditation, indicator monitoring, auditing, event analysis and analysis of error sources, as well as knowledge of the efficacy of these methods according to the latest research in the field.
- Demonstrate knowledge of healthcare law regulations on quality and safety, such as reporting adverse events.
- Demonstrate knowledge of the possibilities and methods for involving patients and families in the development of quality and safety.
- Demonstrate understanding of selected models and theories on innovation and implementation, with particular focus on the difficulties in implementing new initiatives in the health care system.
- Demonstrate understanding of the different purposes of measuring quality, for example research, improvement and control, and the related prerequisites and methods.
- Demonstrate understanding of the concept of variation as it is used in statistical quality development.
- Demonstrate knowledge of the methods for the identification and reduction of waste in the health care system and linkages between quality and economics.

SKILLS

- Use theoretical models for analysis and interpretation of specific quality and safety problems in the health care system, such as Reason's Swiss cheese model, the ETTO principle, Donabedian's quality-of- care dimensions, Deming's system of profound knowledge, Juran's Trilogy, etc.
- Use the Model for Improvement for a specific issue 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.

COMPETENCES

- Contribute to planning, implementation and reporting of clinical quality development projects.
- Identify and report adverse events

TYPE OF INSTRUCTION

- Teaching varies between lectures, workshops, (group) exercises and individual study.

EXAM

EXAMS

Name of exam	Quality Development and Patient Safety
Type of exam	Written 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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Kvalitetsudvikling og patientsikkerhed - MMA
Module code	MEDMS13K1_5
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

PRINCIPLES OF MARKETING AND MARKETING MANAGEMENT - MMA

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate basic knowledge of marketing theory and marketing strategy (Introduction to the field and overview of theory)
- Demonstrate basic knowledge of marketing considerations regarding product properties, branding, packaging, price, costs of innovation, distribution, promotion, key stakeholders, corporate branding, segmentation, product development (user-driven).
- Demonstrate basic understanding of a customer focus (i.e. learning to focus on the customer; the need to know something about the customer in order to make strategic decisions)
- Demonstrate knowledge of Applied Methods in Market Analysis
- Demonstrate basic knowledge of marketing in the health sector, including an introduction to business planning and implementing marketing activities in Denmark.
- Demonstrate knowledge of market access tasks in a company, including knowledge of companies' work relative to doctors and patients (and patient associations, researchers, etc.) with an eye toward the use of medicine (both the introduction of new medicines, as well as sustaining the market over time) and collaboration/negotiation with authorities
- Demonstrate knowledge of pricing in selected countries such as the United States, the United Kingdom, Germany, Denmark and Sweden

SKILLS

- Use the methods of the field to 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
- Outline the content of a simple marketing initiative based on context and formulation of the problem

COMPETENCES

- Understand the need of pharmaceutical companies for information on markets
- Understand companies' organisation of market analyses and marketing activities

TYPE OF INSTRUCTION

- Teaching varies between lectures, workshops, (group) exercises and individual study.

EXAM

EXAMS

Name of exam	Principles of Marketing and Marketing Management
Type of exam	Written or oral exam
ECTS	5
Assessment	Passed/Not Passed

Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Principper inden for markedsføring og markedsføringsledelse - MMA
Module code	MEDMS13K1_6
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

ECONOMICS OF HEALTH AND HEALTH CARE - MMA

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate basic understanding of costs, including the difference between expenses and disbursements, as well as fixed, variable, indirect and direct costs
- Understand economic evaluation methods/models, i.e. cost-effectiveness, cost-utility (and QALY), cost-benefit
- Demonstrate knowledge of the health care system's organisation and financing, including the central differences between the Danish health care system and corresponding systems in selected countries such as the United States; the United Kingdom, Germany and Sweden.
- Demonstrate basic knowledge of the use of microeconomic theories/models for analysis of the health sector, including supply-demand model, Principal-agent, human capital and investment in health, corporate production function and cost components, large scale operations and productivity.

SKILLS

- Produce a (simple) economic evaluation of a medical technology (e.g. a new medicine/intervention) including sensitivity analysis (one-way, two-way, threshold value analysis, scenario analysis).
- Calculate the budget expenditures for the introduction of new medical technology (for a given organisation such as a hospital or region) and assess whether a new intervention represents "good value for money."
- Use the models and methods of the field to analyse selected issues

COMPETENCES

- Critically assess existing economic analyses
- Critically assess alternative models of financing and organizing in the health sector
- Read and understand the key messages and assumptions in published economic evaluations and reports on economic conditions in the health care system

TYPE OF INSTRUCTION

- Teaching varies between lectures, workshops, (group) exercises and individual study.

EXAM

EXAMS

Name of exam	Economics of Health and Health Care
Type of exam	Written exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Sundhedsøkonomi - MMA
Module code	MEDMS13K1_7
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

MARKET ANALYSIS AND NEW PRODUCTS BUSINESS CASES - MMA

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand the various components of the health care system including the financing and how demand and supply is influenced by market orientation within the public sector and the medical industry.

SKILLS

- Develop, design, and implement marketing programs, processes, and activities.
- Apply the analytical procedure to be followed when designing questionnaires for survey or experimental research
- Apply analytical techniques and implement marketing activities in the medical sectors is fundamental competences for the fulfilment of job requirements in the market oriented parts of the medical industry.

COMPETENCES

- Recognize and compare the breadth and interdependencies of today's marketing environment
- Evaluate marketing decisions and the development of goal-oriented marketing strategies and market research including presentation of the stages in the marketing research process from the definition of a research problem to the presentation of research results.

EXAM

EXAMS

Name of exam	Market Analysis and New Products Business Cases
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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Markedsanalyse og marketing cases - MMA
Module code	MEDMS13K1_10
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

REGULATORY AND ETHICAL ASPECTS OF CLINICAL RESEARCH - TM, BM AND MMA

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Participation in all exams of the 1. semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Describe the legal framework of translational medicine
- Describe the regulatory process, including Good Clinical Practice, Good Laboratory Practice and Good Distribution Practice (GCP, GLP, GDP).
- Discuss the institutions and factors governing the conduct of research (legislation, boards, and guidelines)
- Explain the Danish requirements for and process of obtaining approval of experiments with animals and with humans, in particular relating to drug testing
- Discuss the interests and needs of healthy and ill subjects in research
- Reflect on the concept "conflicts of interests" in terms of researchers and other actors (e.g. manufacturing companies, contract research companies, and patient organisations)
- Discuss the issue of access to research results and research data
- Discuss the concept "scientific fraud" and the related institutions in public and private research

SKILLS

- Explain the role of the end user
- Identify actors and their driving forces in research
- Suggest how Good Clinical Practice, Good Laboratory Practice, Good Distribution Practice can be implemented in a specific experiment/research project or manufacturing process
- Relate Good Manufacturing Practice to the work with research
- Discuss the importance of following

COMPETENCES

- Provisionally plan a (small) research project concerning approval, conduct and ethical considerations
- Analyze case studies of clinical trials

EXAM

EXAMS

Name of exam	Regulatory and Ethical Aspects of Clinical Research
Type of exam	Written 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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Regulatoriske og etiske aspekter i klinisk forskning - TM, BM og MMA
Module code	MEDMS13K2_1
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

IMMUNO- AND MOLECULAR THERAPY - TM AND BM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Passed course in basic immunology (module 2.2 of the AAU medicine/medIS bachelor programme or equivalent).

Passed course on proteomic and genomics ("Proteomics and Genomics in Diagnostics and Disease" on the AAU medIS master programme or equivalent).

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Summarize how manipulations of the immune system may alleviate, stop or avoid disease processes
- Argue how proteins and products of the immune system (antibodies, cytokines and cells) can be utilized as therapeutic agents either as such or in conjugation with drug-encapsulated carriers

SKILLS

- Summarize the mechanisms of action of different forms of protein and immunotherapy
- Design experiments in protein and immunotherapy

COMPETENCES

- Compare and suggest suitable forms of protein and immunotherapy for a series of typical patients and give reasons for the choices.

TYPE OF INSTRUCTION

Teacher directed lectures and student directed presentations based on scientific papers and study problems.

EXAM

EXAMS

Name of exam	Immuno- and Molecular Therapy
Type of exam	Written 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

ADDITIONAL INFORMATION

Please contact the [programme student counsellors](#) if you consider applying to the education and you have questions.

Please consult the Moodle page for your semester and contact the semester coordinator if you have academic questions, or the study secretary if you have administrative questions.

All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Immun- og molekylærterapi - TM og BM
Module code	MEDMS13K2_2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

REGENERATIVE MEDICINE - BM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Participation in exams on 1st semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Has knowledge about engineering, developmental, molecular biological, biological, and medical concepts

SKILLS

- Can apply an understanding of the processes that determine at the molecular level cellular responses into schemes that aim to replace human tissues or organs, or aim at the restoration of physiological state of thereof
- Can design rational biotherapies for relevant human diseases using appropriate set of engineering and molecular biological tools
- Can assess the prospective value of proposed solutions, including medical significance and feasibility, both at the theoretical and empirical levels
- Can apply different regenerative and tissue engineering approaches to treat intractable human diseases.

COMPETENCES

- Must have insight into molecular processes that underlie cell-cell as well as cell-material interactions and must understand how knowledge of these processes can be applied for the benefit of tissue regeneration in vivo and engineering of tissues in vitro.
- Can research, synthesize, and critically appreciate knowledge available across different fields to account for treatment options that are viable from the point of currently established medical criteria
- Can evaluate and identify novel areas of interest, the theoretical and practical knowledge of is necessary, in order to accomplish a successful regenerative therapeutic paradigm.

EXAM

EXAMS

Name of exam	Regenerative Medicine
Type of exam	Written 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

ADDITIONAL INFORMATION

Please contact the [programme student counsellors](#) if you consider applying to the education and you have questions.

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Regenerativ medicin - BM
Module code	MEDMS13K2_3
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

PERSONALISED MEDICINE - BM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

First semester of the profile Biomedicine.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Explain the concepts and problems related to personalized medicine

SKILLS

- Apply theoretical knowledge relevant to the biological system of interest
- Design a proper experimental study
- Compare and choose relevant experimental methods

COMPETENCES

- Formulate a working hypothesis and teach the students how to test these hypotheses using relevant methods in order to obtain control of a disease process
- Integrate core knowledge and skills related to personalized medicine
- Critically demonstrate an understanding at the theoretical and practical level on relevant methodology used for testing biomedical hypotheses.

TYPE OF INSTRUCTION

The project period is experimentally based and will attempt to allow the students to work in depth in the laboratory.

EXAM

EXAMS

Name of exam	Personalised Medicine
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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Individualiseret medicin - BM
Module code	MEDMS13K2_7
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

PERSPECTIVES OF CLINICAL TRIALS IN DRUG AND MEDICAL DEVICE DEVELOPMENT - TM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

1st semester Master of Science in Medicine with Industrial Specialization, Profile: Translational Medicine TM

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Clinical trials are essential in development of new drugs and medical devices that should undergo rigorous and systematic testing in patient volunteers to ensure well documented safety and effectiveness profiles. Clinical trials are prerequisite for approval and will offer meaningful value for patients' use in a broader population. There are four phases of clinical trials (I, II, III and IV) and the goal of this course is to expose students to essential elements of these phases.

Topics encompass a number of areas from design to conduction and reporting a clinical trial such as different types of clinical trial design, objectives and outcomes, prevention and treatment of missing data in clinical trials through changes in study design and use of appropriate statistical methods, biomarkers, rules and guidelines to safeguard the reliability of trials, policy decisions, roles of stakeholders including pharmaceutical firms, commercial influence on clinical trials, patenting, post-marketing drug surveillance, reporting and monitoring adverse reactions, pharmacovigilance, drug use in community, role of media and pharmacoeconomics.

LEARNING OBJECTIVES

KNOWLEDGE

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

SKILLS

- Analyze, compare and discuss critically and systematically different forms of clinical trials concerning design and statistical models.
- Identify, formulate, discuss and evaluate issues, rules and responsibilities in clinical trial activities.
- Choose relevant problem-solving techniques in the design and analysis of clinical trials
- Apply gained knowledge and skills to design a clinical trial following regulations and requirements and analyze it.

COMPETENCES

- Assess product safety and efficacy utilizing monitoring tools, standards, and approaches while considering global benefits to people and economies.

TYPE OF INSTRUCTION

This course consists of formal lectures given by mentors and experts, with extensive background in clinical trials, who will guide students through the learning process.

EXAM

EXAMS

Name of exam	Perspectives of Clinical Trials in Drug and Medical Device Development
Type of exam	Written 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

ADDITIONAL INFORMATION

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Kliniske undersøgelser ved udvikling af medicin og medicinsk udstyr - TM
Module code	MEDMS13K2_4
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

CLINICAL TRIALS - TM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

1st semester, Master of Science in Medicine with Industrial Specialization, Profile: Translational Medicine.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand theoretical and practical issues relating to clinical trials essential for translational medicine and drug/medical device development

SKILLS

- 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.
- Obtain experience in any relevant area within the concept of clinical trials such as design, setting outcomes, use of appropriate statistical methods, application of 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.

COMPETENCES

- Select methodology appropriate to the chosen field and problem within translational medicine
- Collect, critically analyze and interpret data.
- Utilize guidelines, standards, tools, and approaches for assessing safety and efficacy of drugs/medical devices considering global benefits to people and economies.

EXAM

EXAMS

Name of exam	Clinical Trials
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

ADDITIONAL INFORMATION

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Kliniske forsøg - TM
Module code	MEDMS13K2_8
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

ECONOMICS OF HEALTH TECHNOLOGIES AND TECHNOLOGY ASSESSMENT - MMA

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Participation in MMA course and project exams in the 1th semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Knowledge of the construction and use of models for analysis of the costs and effects of new medical technologies (including new medicines and medical devices)
- 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

- Can use the methods of the field to analyse economic and clinical effects for current issues in the health sector
- Can structure and present results from advanced health economic models and analyses of cost- effectiveness, budget impact and cost-of-illness analyses

COMPETENCES

- Can 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.
- Can critically assess methods and results from health economic calculations
- Can be part of a health economic team in a company/organisation that performs and/or uses health economic analyses of new medical technology

EXAM

EXAMS

Name of exam	Economics of Health Technologies and Technology Assessment
Type of exam	Written exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Please contact the [programme student counsellors](#) if you consider applying to the education and you have questions.

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Økonomi i sundhedsteknologi og teknologivurdering - MMA
Module code	MEDMS13K2_5
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

NON-EXPERIMENTAL RESEARCH DESIGN AND ANALYSIS - MMA

2019/2020

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

SKILLS

- Can design and implement a market analysis
- Can plan, collect, analyze, and present data from e.g. a quantitative study (such as a survey or registerbased study), as well as a qualitative study
- Can understand and explain the steps in a “good” regression analysis, including the relationship between purpose and methodology, inclusion of theory/evidence and put forth hypotheses, examination of data, use statistical tools in model specification, risk of bias and a loss of efficiency, etc.
- Can use the guidelines on a “good method of analysis” for a given issue, including assessing the possibilities for conducting a ceteris paribus cause-effect analysis based on a data set with non-randomized data.
- Can critically assess articles/reports that use regression analysis/statistical analysis of register-based data or questionnaire data
- Can use and combine methods in the prerequisite subjects overall to design and develop a market analysis for a topic related to the health care system
- Can work with qualitative data and quantitative surveys simultaneously. Can specifically handle/evaluate how the company can obtain knowledge on a topic by means of a non-experimental study.

COMPETENCES

- Can design market studies
- Can be part of a medical market access/marketing team in a company, including constructively assessing and participating in marketing activities (including critiquing the activities of competitors)

EXAM

EXAMS

Name of exam	Non-Experimental Research Design and Analysis
Type of exam	Written exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Teoretisk forskningsdesign og -analyse - MMA
Module code	MEDMS13K2_6
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

ECONOMIC EVALUATIONS AND TECHNOLOGY ASSESSMENTS - MMA

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

First semester of the profile MMA.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- A basic understanding of the methods of health economics and health technology assessment provides a framework for subsequent courses.
- The understanding of economics of health and medical care in theory and practice is the foundation for the track
- To describe topics in market oriented medical care.
- To understand and apply the methods for the health economic evaluation
- To understand and apply the methods for the health technology assessment of alternative health technologies.
- To understand and apply theories of evidence based marketing.

SKILLS

- Apply the techniques of health economic assessment and health technology are fundamental competences for the fulfilment of job requirements in the market oriented parts of the medical industry.
- Provide a general overview of the economics of health and medical care, and cover the medical and nonmedical determinants of health; markets for health care services and health insurance,
- Analyse key players in the health care sector, and different health care systems.
- Use methods for the economic evaluation of health technologies (i.e. cost-effectiveness analyses, cost-utility analyses, cost-benefit analyses) that are increasingly used for reimbursement and pricing decisions in health care markets.

COMPETENCES

- Assess medical products using advanced interdisciplinary tools for. It provide the students with an understanding of the basic tools for health technology assessment as a means for political, administrative and clinical decision-making in national and international health care systems.

EXAM

EXAMS

Name of exam	Economic Evaluations and Technology Assessments
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

ADDITIONAL INFORMATION

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FACTS ABOUT THE MODULE

Danish title	Sundhedsøkonomi og teknologivurdering - MMA
Module code	MEDMS13K2_9
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

PROFESSIONAL DEVELOPMENT - MMA, TM AND BM

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Successful conclusion of the first two semesters. Exemptions can be given only by decision of the Study Board.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate an overview and understanding of scientific literature related to the project.

SKILLS

- Select and apply relevant methods in relation to the project
- Further develop scientific skills within the track and to display the ability to perform scientific work.
- Integrate and to deepen previously acquired knowledge and skills.

COMPETENCES

- Experience in identification and analysis of realistic and complex problems.
- To apply and critically evaluate general scientific methods to solve specific problems.
- To synthesize the results of a scientific project to new levels of scientific understanding.
- Design a study with subsequent acquisition of data, processing of results, and discussion.

EXAM

EXAMS

Name of exam	Professional Development
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

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Faglig udvikling - MMA, TM og BM
Module code	MEDMS13K3_1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine

MASTER'S THESIS

2019/2020

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

Successful conclusion of the first three semesters. Exemptions can be given only by decision of the Study Board.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate an overview and understanding of scientific literature related to the project

SKILLS

- Select and apply relevant methods in relation to the project
- Further develop scientific skills within the track and to display the ability to perform scientific work.
- Integrate and to deepen previously acquired knowledge and skills.

COMPETENCES

- Experience in identification and analysis of realistic and complex problems.
- To apply and critically evaluate general scientific methods to solve specific problems.
- To synthesize the results of a scientific project to new levels of scientific understanding.
- Design a study with subsequent acquisition of data, processing of results, and discussion.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Oral exam based on a 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

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All other enquiries may be directed to [Helene Nørgaard](#), secretary of the Study Board.

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale
Module code	MEDMS13K4_1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Helene Nørgaard

ORGANISATION

Study Board	Study Board of Medicine
Department	Department of Clinical Medicine
Faculty	The Faculty of Medicine