

J.nr.	Title	Course leader	ECTS	Learning outcomes	Semester
Graduate School Health course offer 2025					
The course list may be subject to minor changes					
Department of Biomedicine					
B69	Flow Cytometry	Charlotte Christie Petersen	4	<p>Understanding the physics behind flow cytometry</p> <p>Understanding the applications and limitations of flow cytometry</p> <p>Practical knowledge and experience with flow cytometry experiment design</p> <p>Understanding essential flow cytometry controls</p> <p>Awareness of common (and not so common) pitfalls</p> <p>Hands-on, practical experience with data analysis</p> <p>Ability to critically evaluate flow cytometry results</p> <p>Requirements for publication of flow cytometry experiments</p>	Spring/Fall
B100	Laboratory Animal Science	Astrid Gerd Holtet	5	<p>The participants should obtain basic knowledge about the Laboratory animal science, which will make it possible for them to participate in research contributing to the humane use of laboratory animals ensuring high standards of animal welfare and quality in the performing, evaluating and reporting of laboratory animal experiments.</p> <ul style="list-style-type: none"> •Insight into Danish legislation concerning animals used for scientific purposes, the ethical aspects working with laboratory animals as well as the principles of the 3 Rs •Basic insight into the biology of laboratory animal, including normal/abnormal behaviour, housing, breeding, welfare and feeding •Basic insight into occupational health and safety when working with laboratory animals •Practical experience with handling and euthanizing laboratory animals as well as minimally invasive injections and blood sampling techniques •Basic knowledge of anaesthesia for minor procedures in common laboratory animals 	Spring/Fall

B112	Clinical assessment of insulin resistance and other metabolic parameters	Esben Søndergaard	1	<ul style="list-style-type: none"> · Understanding for the use and limitations of state of the art methods in metabolism research · Insight into tissue specific mechanisms underlying dysmetabolic conditions · Understanding for the signaling mechanisms linking insulin receptor to glucose uptake · Introduction into animal models and in vitro models for dysmetabolic conditions · Introduction into novel methods to assess substrate metabolism in humans 	Fall
B116	Advanced course in Laboratory Animal Science	Martin K. Thomsen	5	<ul style="list-style-type: none"> • Advanced insight into Danish and International legislation concerning animals used for scientific purposes, the ethical aspects of working with laboratory animals as well as the principles of the Three Rs. • Detailed knowledge of different aspects of ethics and the Three Rs in relation to both ethical and welfare issues raised by the use of animals in scientific procedures. • Knowledge of experimental design concepts, possible causes and elimination of bias, statistical analysis and information about where expertise can be found to assist with procedure, design, planning and the interpretation of results. • Insight into the use of animal models in biomedical research and their benefits and limitations. • Insight into the importance of standardization of environmental, microbiological factors and use of humane endpoints. • Knowledge about advanced experimental procedures such as microsurgery, anaesthesia, analgesia and euthanasia in rodent laboratory animals. • Write an application for a procedure to the Danish Ministry of Health. 	Fall

B226	Molecular Immunology	Thomas Vorup-Jensen	2,4	As there is no examination, the intention is really that the student picks topics of interest from the presented talks in the hope that some of these topics may be helpful in bringing the student further into understanding immunology as a possible. Past experiences suggest that a broad range of backgrounds permit the student to follow the course at a fully acceptable level.	Spring
B244	Genome Engineering	Yonglun Luo	3,8	<ol style="list-style-type: none"> 1. Acquire a systematic knowledge on CRISPR gene editing technology, progresses, and applications 2. Know how to design the CRISPR gRNA for gene knockout 3. Learn how to design the donors for gene knockin 4. Independently select the best CRISPR system and strategy for a gene editing project 5. Independently analyse and interpret CRISPR gene editing results 6. Carry CRISPR gene editing experiments 7. Know the concept, resources and potential of CRISPR data science 8. Understand the progresses, but also remaining challenges, in CRISPR gene therapy 	Spring
B246	Graduate neuroscience course	Mai Marie Holm	3,6	Participants will get a thorough theoretical knowledge within all areas of neuroscience. The course is structured according to the esteemed advanced level textbook entitled "Neuroscience" by Purves et al. published by Sinauer Associates, Inc. and all sections will be dealt with. The book will form the fundamental basis of the course, however not all specific details will be discussed. Participants are expected to obtain the book and prepare the relevant chapters before the sessions. Emphasis will be put on most interesting areas, as evaluated by the lecturers and their research profile. Topics include; Electrical Signals of Nerve Cells, Synaptic Transmission and Plasticity, Animal Models in Neuroscience, The Sensory System, Pain, Motor Control, Brain Development, Novel Treatment Principles in Neurological and Psychiatric Diseases, Neural Circuits, Repair and Regeneration, Sleep, Speech and Language, Emotions, Neurogenetics and Memory. Additionally, lecturers will present selected data from their own research to provide the most up-to-date techniques and knowledge. Selected reviews and original papers will be used, where relevant, to complement the book.	Spring

B273	Advanced In-vivo Optical Imaging Techniques	Euginio Gutierrez	3,3	<ul style="list-style-type: none"> •The students should be able to understand the basis of different techniques, to learn their pitfalls, advantages and disadvantages, and to plan research projects applying these techniques. •The participants should be able to identify which processing analysis is required 	Spring
B288	Host pathogen interactions – from basic microbiology and immunology to medicine	Trine Mogensen (og Holger Brüggemann)	5	<p>Have achieved a theoretical background and ability to discuss current knowledge in some aspects of basic cell biology, immunology, and microbiology related to human host-pathogen interactions, have obtained some insight into the methodologies used to investigate these and how to interpret data, and finally have gained perspectives on how these basic mechanisms translate into the pathogenesis of infectious diseases and the medical implications hereof.</p>	Spring
B299	Advanced Flow Cytometry	Morten Nørgaard Andersen	2,9	<ul style="list-style-type: none"> • how to design and optimize a flow cytometry experiment. •how to select the optimal flow cytometry related methodology. • which controls to include (e.g. data quality controls, negative/positive controls, compensation and FMO controls – and how to interpret the results. •how to analyze flow cytometry data including critically evaluation of the experimental results. •how to include high-dimensional data analysis tools (e.g. tSNE) •how to present flow cytometry data for publication. 	Spring
B313	Sex differences in Metabolic and Cardiovascular disease	Janne Lebeck, Eva Prescott		<ul style="list-style-type: none"> •To provide insight on how sex influences different pathophysiological aspects of cardiovascular and metabolic disease. •To increase awareness and knowledge of the role of sex in metabolic and cardiovascular disease •To facilitate networking opportunities with fellow peers and international speakers with both basic, clinical and epidemiological research backgrounds •To provide opportunities for researchers to present their projects •To evaluate how Data Science can be relevant in the context of your basic and clinical research project 	Fall Not planned

B320	Single Cell and Spatial OMICS – Basic Course (module 1)	Lin Lin		<ul style="list-style-type: none"> •Articulate and demonstrate systematic knowledge of the single cell and spatial OMICS. •Interpret and communicate new results within the field. •Describe and critically evaluate data generated with single cell and spatial OMICS methodologies. •Independently and properly select the right single cell and spatial OMICS technologies for specific research questions. •Understand the basic pipelines and tools needed for single cell and spatial OMICS analysis. •Understand the individual steps of the analysis pipeline for single cell RNA sequencing data. •Critically read and evaluate studies within the field of single cell and spatial sequencing. 	Spring - Not planned
B321	Single Cell and Spatial OMICS – Advanced Course (module 2)	Lin Lin	2,2	<ul style="list-style-type: none"> •Articulate and demonstrate systematic knowledge of the data analysis for single cell and spatial scRNAseq data. •Understand the principle of different computational tools in single cell/spatial data analysis. •Comprehend and work on the individual steps of the analysis pipeline for single cell RNA sequencing data. •Re-analyse the data from studies within the field of single cell and spatial sequencing. 	Fall Not planned
B322	Principles of Neural Organization	Sadegh Nabavi	3	<ul style="list-style-type: none"> • Have a good grasp of the limitations and advantages of small and large nervous systems. • Know the constrains that nervous systems face and how they evolved within these constrains. • Perceive brain design and function as an information processing entity. •Describe the basic principles that the brain uses to achieve a superior computational power while keeping the energy consumption in check. • Identify some fundamental principles shared by all systems and circuits within the brain. • Analyze, review and constructively criticize papers in the relevant fields. 	Spring

B328	Cancer Research from bench to bedside and back	Martin kristian Thomsen	3	<ul style="list-style-type: none"> • Broad understanding of cancer as a disease with a significant impact on public health. • Enable students to place their projects in the translation from bench to bedside. • Knowledge of common methods used in cancer research and how to apply new methods to progress their current research. • Insight into the progression from bench to bedside with a focus on an introduction to clinical trials. • How to present a research project and apply new methods and ideas to develop the project towards clinical application. 	Fall
Department of Public Health					
P98	Epidemiology II	Christina Catherine Dahm (ulige år) Dorte Rytter (lige år)	4,2	<ul style="list-style-type: none"> • Advanced insight into epidemiological study design • Advanced insight into design and evaluation of epidemiological studies • Insight into DAGs • Insight into strategies for analysing epidemiological data • Practical experience with analyses of epidemiological data 	Fall
P126/ (4 dage + 2 ekstra dage = 1 kursus)	Analysis of variance and repeated measurements	Bo Martin Bibby	2,4(3,6)	<ul style="list-style-type: none"> • Document and process data for a statistical analysis of repeated measurements. • Choose a relevant statistical model for a given research question and evaluate the assumptions behind the ANOVA or repeated measurement analysis. • Perform ANOVA, variance component analysis or repeated measurement analysis based on the chosen model. • Describe the results of the statistical analysis, and discuss the results in relation to the scientific question. • Be aware of the limitations of the statistical methods presented in the course. 	Fall

P155	Epidemiology I - Basic Principles of Epidemiology	Bodil Hammer Bech	2,5	<ul style="list-style-type: none"> • Define epidemiologic measures of occurrence and explain the difference between prevalence and incidence. • Define the following epidemiologic measures of association; relative risk, risk ratio, odds ratio, and rate ratio, risk difference and excess risk, including attributable risk and population attributable risk. • Define and describe strengths, weaknesses, and main applications of the designs; ecological, cross-sectional, follow up, case-control and intervention studies. • Define selection bias, information bias and confounding and be aware that evaluating the direction and strength of a possible bias or confounding is essential. • Learn to think along the lines that, when faced with data from an analytic epidemiologic study showing an association (or no association), this might reflect; random error, bias (systematic error), including selection bias or information bias, or confounding, or, if all other possibilities seem unlikely, causality. 	Fall
P169	Collecting qualitative research data	Sanne Angel	3,9	<ul style="list-style-type: none"> • The student will have knowledge of principles of more qualitative approaches and qualitative methods in general • The student will be able to judge the different methods' relevance to study designs • The student will have knowledge about the different form of data collection • The student will have collected data in form of field observation and interviews 	Spring
P193	Airborne exposures	Torben Sigsgaard		<ul style="list-style-type: none"> • Display knowledge on lung physiology and particle physics of importance for exposure assessment. • Describe airborne particulate exposures responsible for environmental diseases. • Choose a relevant sampling strategy and sampling method for a specific study, investigation or surveillance. • Evaluate the results from laboratory analyses of air or biomonitoring samples. • Discuss the consequences of variability in epidemiological studies. 	Fall Not planned
P216	Nutritional epidemiology	Christina Catherine Dahm	2,7	<ul style="list-style-type: none"> • Insight into study designs in nutritional epidemiology • Insight into design and conduct of nutritional epidemiological studies • Insight into strategies for analyses of nutritional epidemiological data • Ability to evaluate nutritional epidemiological studies 	Fall

P224	Quantitative exposure assessment in occupational and environmental epidemiology	Vivi Schlünssen	3,5	<ul style="list-style-type: none"> • Understand basic concept of exposure and exposure variability • Understand the theory of bias and random error, within and between person variability, and attenuation of exposure-response • Perform random effect analyses to estimate determinants of exposure and understand implications for within and between person variability • Understand the construction and applications of job Exposure matrices for exposure assessment • Based on the above skills be able to design exposure assessment strategies for different types of exposure in occupational and environmental cohort studies • Evaluate advantages and drawbacks for different exposure metrics in epidemiological studies 	Spring - Not planned
P231	Developing complex interventions in Public Health	Knud Ryom	2,4	<ul style="list-style-type: none"> •Insight into complex interventions based on the UK Medical Research Council Model •Skills for working with program theory and logic models •Insight in developing complex interventions addressing co-production, co-creation and PPI •Insight in contextual elements that can influence successful change •Overview of different complex intervention evaluation strategies 	Spring
P237	Which covariates to adjust for: An introduction to causal directed acyclic graphs	Cathrine Carlsen Bach	2,6	<ul style="list-style-type: none"> •To understand the basic anatomy of directed acyclic graphs (DAGs) •To draw and apply DAGs for selection of covariates to account for confounding •To draw and apply DAGs to illustrate potential selection bias •To draw and apply DAGs to illustrate potential information bias •To draw and apply signed DAGs to estimate the potential direction of bias in a research project 	Spring

P255	Introductory course in questionnaire technique and clinimetrics	Henrik Hein Lauridsen	2	<ul style="list-style-type: none"> • Have knowledge about conceptualisation and operationalisation • Know the most important concepts related to questionnaire research • Know the basics of how to design a questionnaire and write items • Have basic knowledge in how to develop a new measurement instrument • Have the skills to find and select the most appropriate outcome measure • Have the skills to translate an international questionnaire into Danish • Have basic knowledge of the COSMIN taxonomy • Have basic knowledge of the measurement properties of validity, reliability, responsiveness and interpretation • Know the requirements for evaluating a questionnaire for risk of bias 	Fall
P264	Public and patient involvement in health research	Jeanette FINDERUP	1,8	<ul style="list-style-type: none"> • Summarise the theory and practice of patient and public involvement in health research in the research cycle • Assess different approaches of patient and public involvement in health research relevance and applicability in various study designs • Take an analytical and critical view on the processes and potential outcomes of patient and public involvement in health research • Plan, apply, and evaluate patient and public involvement in health research in own study 	Fall

P265	Qualitative data analysis: Using NVivo	Annesofie Lunde Jensen	4,8	<ul style="list-style-type: none"> • Create projects. • Describe units of analysis relevant for the student's own project. • Critically identify element (sources and cases) as a foundation for making queries. • Create memos, annotations, and links. • Know how to use NVivo together with bibliographic software such as EndNote and RefWorks. • Code data in relation to different types of qualitative data analysis techniques. • Analyse data, visualise data analysis and make different kinds of queries. • Be able to explain and visualise the data analysis the students use in their own PhD-project. • Know how to build models and make different kinds of graphic presentations and diagrams. 	Fall
P281	Causal Inference in Health Sciences	Cecilia Ramlau-Hansen	3,4	<ul style="list-style-type: none"> • Introduction to the potential outcome framework and counterfactuals • Assumptions for causal inference • Introduction to and practical experience with g-methods • Introduction to and practical experience with causal interaction analysis • Introduction to and practical experience with causal mediation analysis 	Spring
P284	Conducting a systematic review – meta-analysis and a meta-synthesis	Merete Bjerru og Vivi Schlünssen		<ul style="list-style-type: none"> • Specify research topic using PICO and PICO • Search strategy • Assessing quantitative and qualitative studies using relevant tools • Extract and pool extracted data • Synthesize extracted data • Assess summarized findings using GRADE: summary of findings tables or CERQual • Present a meta-analysis and meta-synthesis 	Fall

P301	How to design and conduct your PhD study to be family-focused	Karin Piil og Anne Brødsgaard Madsen	2,6	<ul style="list-style-type: none"> • Understand the basic characteristics of family-focused approach and dialogue • Understand, discuss and argue for the central methodological considerations • Identify appropriate family-focused qualitative and quantitative data sources for research • Describe and argue for the choice of patient-reported outcome and caregiver-reported outcome • Identify strengths and limitations of a family-focused approach in research • Understand and apply family-focused values across cultures and in vulnerable families • Present the family-focused PhD study in a concise and structured format 	Spring
P302	Evaluating complex interventions in Public Health	Helle Terkildsen Maindal og Knud Ryom	2,4	<ul style="list-style-type: none"> • Insight into evaluation of complex interventions based on the UK Medical Research Council Model • Overview of different complex intervention evaluation strategies • Insight into evaluating complex interventions using quantitative research designs • Insight into evaluating complex interventions using qualitative and mixed methods research designs 	Spring
P310	How to design and conduct a qualitative content analysis in a qualitative study or a systematic review	Cecilie Nørby Lyhne	3,5	<ul style="list-style-type: none"> • Knowledge on the background, theoretical foundation and the potential of content analysis. • Describe the main steps in conducting a qualitative content analysis. • Design a plan for using qualitative content analysis in your own study, including: formulate specific research questions, specify the plan of conduct including the analytical steps to be performed in your study, and discuss own and co-participants' choices and considerations focusing on the validity and reliability of the analysis. • Apply strategies to strengthen the quality of studies using qualitative content analysis, focusing on validity, reliability, transparency, and transferability in conducting and presenting a qualitative content analysis. • Discuss methodological issues in qualitative content analysis, including methodological reflections in relation to own project designs and plans for analyzing own data material. 	Spring

P324	Advanced GIS in Health Sciences	Jibran Khan	5	<ul style="list-style-type: none"> •Understand and explain the basic methodologies and conceptual models of the contents of a geographic database •Explain the different geographical data formats •Explain the principles of transformation between different geodesic reference system •Explain concepts and estimation methods within advanced spatial analysis and modelling •Account for auto-correlation in geographic data 	Fall
P1050	Basic Biostatistics - part 1	Erik Thorlund Parner	2,4	<ul style="list-style-type: none"> •Document and handle data needed for a statistical analysis •Chose a relevant statistical model for a given research question and evaluate the assumptions of the statistical analysis •Perform a statistical analysis based on the chosen model •Describe the results of the statistical analysis, and discuss the results in relation to the scientific question •Make simple calculations of sample sizes for the planning of a comparative study 	Spring/ Fall
P1050	Basic Biostatistics - part 2	Erik Thorlund Parner	3,9	<ul style="list-style-type: none"> •Document and handle data needed for a statistical analysis •Chose a relevant statistical model for a given research question and evaluate the assumptions of the statistical analysis •Perform a statistical analysis based on the chosen model •Describe the results of the statistical analysis, and discuss the results in relation to the scientific question 	Spring/ Fall
Department of Clinical Medicine					
C47	Magnetic Resonance	Lone Hanberg Sørensen og Steffen Ringgaard	3,6	<ul style="list-style-type: none"> •General overview of the underlying principles in magnetic resonance imaging and spectroscopy with relevance for applications in biomedical research •Outline of magnetic resonance applied in research studies of organ functionality and diseases •General overview of hyperpolarized magnetic resonance imaging and spectroscopy applied in cells, animals and humans 	Spring
C104	From Gene to Function – Molecular Analysis of Disease Genes	Peter Bross		<ul style="list-style-type: none"> •Assessment of effects of gene variations •Protein folding, trafficking, and biogenesis and their disturbances in diseases •Methods for experimental investigations of effects of gene variations •Design and interpretation of cellular and in vitro experiments •Design and interpretation of energy metabolism assays (Seahorse) 	Fall Not planned

C116	Advanced course in Laboratory Animal Science – Porcine models in biomedical research	Birgitte Saima Kousholt	5	The course will, in unison with the basic course in laboratory animal science, qualify participants to apply for and obtain licence to perform animal experiments in Denmark.	Spring
C142	Proteomics and protein profiling	Johan Palmfeldt	6,4	<ul style="list-style-type: none"> •Understanding of the principles of proteomics methodologies, and how the different methods can be combined •Knowledge of the value of protein analysis in biomedical research, including advantages and limitations •Acquired practical experience in 1) lab work in protein analysis and 2) software tools used to analyze proteomics data with regard to MS spectra, protein modifications, pathway analysis etc. •To be able to interpret, discuss and critically assess proteomics data •To be able to design studies on protein analysis and proteomics (type of sample, procedures, instruments etc.) 	Spring
C151	Clinical Research	Morten Bøttcher	2,1	Enable to course participant to conduct clinical research	Spring
C155	Epidemiology I - Basic Principles of Epidemiology	Ulrik Schiøler Kesmodel	2,5	<ul style="list-style-type: none"> •Define epidemiologic measures of occurrence and explain the difference between prevalence and incidence. •Define the following epidemiologic measures of association; relative risk, risk ratio, odds ratio, and rate ratio, risk difference and excess risk, including attributable risk and population attributable risk. •Define and describe strengths, weaknesses, and main applications of the designs; ecological, cross-sectional, follow up, case-control and intervention studies. •Define selection bias, information bias and confounding and be aware that evaluating the direction and strength of a possible bias or confounding is essential. •Learn to think along the lines that, when faced with data from an analytic epidemiologic study showing an association (or no association), this might reflect; random error, bias (systematic error), including selection bias or information bias, or confounding, or, if all other possibilities seem unlikely, causality. 	Spring

C160	Investigator-initiated Clinical Trials and GCP	Birgitte Olrik Schlemmer	2,9	<ul style="list-style-type: none"> •Explain and implement the legal, regulatory and good practice framework – The principles of GCP, national regulations, application to the authorities •Illustrate and relate to the organization of the study - sponsor, investigator, contracts and agreements, delegation of responsibilities, training, internal and external communication •Discuss and assess on what's important in the conduct of the study including ethical issues – informed consent, enrolment, essential documents in Trial Master File, biological samples, study monitoring, •End of trial issues •Explain and implement the process in safety monitoring and reporting •Explain and apply the data-management process from CRF preparation, data collection, data analysis, clinical study report and publication 	Spring
C171	Introduction MATLAB with examples from Health Science	Irene Klærke Mikkelsen	4,2	<ul style="list-style-type: none"> •The MATLAB program in general including editor, command window, and help •MATLAB data structures including matrices, cells and structs Generic programming principles including loops, conditions, functions •MATLAB graphics for plotting and vitalization of data •MATLAB Debugging capability 	Fall
C177	Introduction to Clinical Epidemiology	Deirdre Cronin Fenton	3,3	<p>The course includes lectures and exercises on the following:</p> <ol style="list-style-type: none"> 1) Providing a broad knowledge and understanding of clinical epidemiology 2) Designing a clinical epidemiology study 3) Understanding measures of disease frequency, effect and association, and which are appropriate to each study design 4) Assessing study validity, including identifying various biases and sources of error in epidemiological studies 5) Interpreting clinical epidemiology research papers 	Spring
C189	Synthesising Evidence: Meta-Analyses and Systematic Reviews	Olaf Dekkers		<ul style="list-style-type: none"> •Understanding and evaluating meta-analyses •Conducting systematic reviews •Assessing heterogeneity between the studies included •Combining the results from individual studies in a pooled estimate 	Fall Not planned

C204	Basic and practical course in quantitative immunoassays	Mette Bjerre	2,2	The participants obtain theoretical knowledge and practical skills required for development, troubleshoot, and validation of ELISA and TRIFMA assays.	Fall
C214	Registries, databases and other electronic data sources in clinical research	Signe Sørup	2,7	<ul style="list-style-type: none"> •List the Danish registries and other secondary data sources most often utilized in clinical research •Identify relevant Danish registries and other secondary data sources based on the research question •Describe the data structure as well as some specific pitfalls of working with Danish registries and other secondary data sources •Compare the content of different Danish registers and other secondary data sources and evaluate their usefulness for clinical epidemiological research questions •Assess the strength and weaknesses of the use of Danish registries and other secondary data sources in clinical epidemiology •Design and execute a validation study of some of the content of a Danish Register or another secondary data source. •Design a clinical epidemiological study using Danish registers and/or other secondary data sources 	Spring
C229	Preparation and critical reading of meta-analysis	Inger Mechlenburg	2	<ul style="list-style-type: none"> •Carry out a meta-analysis based on the quantitative results of a systematic review, interpret the results and provide a clinical guideline based on the meta-analysis •Describe the statistical assumptions, the chosen methods and the results of the meta-analysis •Assess the quality of meta-analyses 	Spring
C236	Introduction to Research Training in Health Sciences	Rikke Katrine Jentoft Olsen	1	<ul style="list-style-type: none"> •Introduction to basic, clinical, qualitative and epidemiological research •Gain knowledge on writing research protocols •Gain knowledge on writing successful applications •Introduction to structured literature search •Reflections on student-supervisor relationships •Introduction to ethics and regulations in animal and clinical research 	Fall

C240	Mindfulness-based interventions in the clinic - background, methods, and application	Lone Fjorback		<ul style="list-style-type: none"> •Understand the basic characteristics of family-focused approach and dialogue •Understand, discuss and argue for the central methodological considerations •Identify appropriate family-focused qualitative and quantitative data sources for research •Describe and argue for the choice of patient-reported outcome and caregiver-reported outcome •Identify strengths and limitations of a family-focused approach •Understand and apply family-focused values across culture and in vulnerable families •Present the family-focused PhD study in a concise and structured format 	Not Planned
C243	How to get published	Søren Dinesen Østergaard	3	<ul style="list-style-type: none"> •Have a basic knowledge of all aspects of the publication process •Have improved their writing abilities •Have learned how to perform peer-review •Altogether, this will increase the participants chances of publishing their scientific work. 	Fall
C245	Cancer Epidemiology using the Danish Clinical Cancer Databases	Deirdre Cronin Fenton	3,3	<ul style="list-style-type: none"> •Identify and design a clinical epidemiologic research study using the Danish Clinical Cancer Databases – comparing and contrasting study designs in order to suitably address a research question •Identifying and ascertaining data from the Clinical Cancer Databases •Assessing study validity and implementing validity checks •Data analysis including data cleaning and implementing survival analysis using Stata •Evaluating study findings, interpreting and reporting study findings 	Spring
C254	An introduction to Good Manufacturing Practice (GMP)	Dirk Bender	2,1	<ul style="list-style-type: none"> •Be familiar with basic principles and terms of GMP and its impact in Danish legislation •Be able to understand specific challenges arising from GMP •Know where to seek advice concerning further development of GMP skills 	Fall

C267	Introduction to Fluorescence Microscopy	Lene Niemann Nejsum	3,9	The students will obtain basic knowledge of different fluorescence microscopy techniques, sample preparation, image acquisition and image analysis. This should enable students to prepare samples for fluorescence microscopy, choose the appropriate microscope setup, acquire images, analyse images and generate publication figures. This will enable students to participate in research projects involving fluorescence microscopy.	Spring
C279	Personalised Medicine	Deirdre Cronin Fenton		<ul style="list-style-type: none"> •Define “personalised medicine” in disease diagnosis and treatment •Enumerate “omics” and how “omics” can be utilized in routine clinics •Describe the role of epigenetics in personalized medicine •Understand molecular pathology approaches as a tool in personalised medicine •Compare and contrast clinical epidemiology approaches to personalised medicine •Describe “big data” approaches to assess the effectiveness of precision medicine •Identify ethical issues related to personalised medicine in clinical practice and in clinical epidemiologic research 	Fall Not planned
C282	Introduction to Quantitative Bias Analysis for Epidemiologic Research	Oleguer Plana-Ripoll		<p>Identify different sources of biases in epidemiological studies. Conduct simple, multidimensional and probabilistic bias analysis using summary data in Microsoft Excel and interpret the output. Conduct probabilistic bias analysis using individual level data (record level correction) in STATA and interpret the output. Discuss the strengths and limitations of each approach.</p>	Spring Not planned
C285	Introduction to register-based research	Oleguer Plana-Ripoll	3,5	<ul style="list-style-type: none"> •Describe commonly used Danish health registers and how they can be used in research •Identify different epidemiological designs used to investigate register data •Discuss strengths and limitations of register data •Describe how other sources of data, such as genetic data, cohort data and survey data can complement data in the registers •Perform simple data management tasks using artificial register data •Plan their own research using registers or to critically read publications from register-based studies 	Fall

C295	Bayesian statistics with applications in genomics	Jakob Skou Pedersen	4	<ul style="list-style-type: none"> •To understand the principles and central concepts of Bayesian statistics •Be able to translate and formalize simple scientific questions to Bayesian models •Be able to perform Bayesian statistical analysis in R and Stan •To understand and apply a range of inference methods 	Spring/Not Planned
C304	The Biology and characteristic of circulating cell free DNA and circulating tumour DNA in health and disease	Claus Lindbjerg Andersen		<p>Basic knowledge of cell free DNA biology and markers of ctDNA. The necessary knowledge needed to avoid, or at least control for, biases introduced by pre-analytical processing.</p> <p>Basic understanding of the pros and cons of present state-of-the-art methods and technologies used to analyse cell free DNA (cfDNA) and ctDNA. To enable the student to choose the method/technology best suited in a given situation.</p> <p>Knowledge about the clinical situations where ctDNA may potentially be used to guide clinical decision making</p> <p>Knowledge about pros and cons of different cfDNA/ctDNA trial designs.</p> <p>To qualify the student to design and conduct their own cfDNA/ctDNA study</p>	Spring/Not Planned
C305	What is research? Ontology, epistemology and methodology	Rune Dall Jensen	3,1	<ul style="list-style-type: none"> •Describe the fundamental concepts and positions in the philosophy of science •Articulate the research implications of the various philosophical positions on science •Position one's research project in a philosophy of science discourse •Formulate research questions, based on various epistemologies 	Fall
C307	Bacterial infections in implants and bone	Mats Bue og Nis Pedersen Jørgensen		<p>Describe the aetiology of implant and bone infections</p> <ul style="list-style-type: none"> - Exemplify why bone infections are difficult to treat? - Identify relevant preclinical models - Describe basic pharmacokinetic/pharmacodynamic aspects of antibiotic treatment - Acquire knowledge regarding state of the art microbiological and histopathological analysis - Plan, develop and present future relevant studies on bacterial infections in implants and bone 	Spring

C308	Applied Machine Learning in health Sciences	Peter Mondrup Rasmussen	4	<ul style="list-style-type: none"> • Describe main steps involved in typical machine learning analyses, including data preparation, data modeling, model evaluation, and result dissemination. • Describe the mathematical and statistical principles in supervised- and unsupervised machine learning. • Describe basic and advanced methods for predicting continuous- and discrete outcomes (regression and classification). • Describe procedures for model building, model selection and model evaluation. • Identify relevant machine learning techniques to solve research-based problems. • Design and implement a solution strategy to solve research-based problems. • Apply unsupervised- and supervised machine learning techniques to their own data. • Disseminate the analysis result and account for the solution strategy and analysis results as necessary for publication in scientific journals. 	Spring
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C309	The science of stress and resilience	Karen Johanne Pallesen	2,8	<p>After the course, participants should be able to:</p> <p>Present a neurobiological definition of stress.</p> <p>Distinguish between stressors, stress and stress responses.</p> <p>Describe the following responses/states:</p> <ol style="list-style-type: none"> 1. Mobilization (fight-flight). 2. Immobilization (freeze). 3. Restitution (rest-digest/breed-feed/calm-connect). <p>Describe the signaling pathways of commonly experienced stress symptoms such as increased heart rate, sweaty palms and “the mind going blank”.</p> <p>Describe processing modes in the nervous system that make mobilization “first choice”.</p> <p>Relate stress processes to theories of energy budgetting and survival.</p> <p>Describe the impact of predictive coding on our behaviour.</p> <p>Describe the theorized role of interoceptive networks.</p> <p>Describe the relationship between stress responses and emotions and predictive coding.</p> <p>Define “psychological safety” and describe how stress mobilization and immobilization interacts with ideals/quests for psychological safety.</p> <p>Describe the theorized interaction (acc. to polyvagal theory) between neural networks involved in restitution and positive/negative social co-regulation.</p> <p>Place mobilization, immobilization and restitution states in the context of evolutionary biology.</p> <p>Explain how individual life experiences influence individual variation in stress sensitivity and resilience.</p> <p>How can childhood trauma predispose to life-long heightened stress sensitivity, and how can a safe childhood make you stress resilient?</p> <p>Explain the link between long-term stress and diseases such as cardiovascular diseases, metabolic syndrome, depression and chronic pain disorders</p> <p>List presumed reasons for the “stress epidemic”, i.e. what are the common denominators of stress triggers, and which particular features of modern</p>	Spring
C312	Retire statistical significance: a world beyond $p < 0.05$	Morten Schmidt, Erik Parner	1,5	Learn to interpret and report effect estimates considering random error.	Fall
C316	Patient reported outcomes (PRO) in clinical research	Annette De Thurah	2,6	<ul style="list-style-type: none"> • have received an overall introduction to the concept of PRO and the implication of using PRO data in clinical research • be able to select PRO instruments, and evaluate its quality • be able to design, analyse, report and interpret PROs in clinical research 	Spring

C317	Introduction to Machine Learning for Health Research	Oleguer Plana-Ripoll	<ul style="list-style-type: none"> •Discuss the scenarios where machine learning can or cannot enhance epidemiologic research and practice •Assess ethical dilemmas that may arise when data-driven tools (i.e., derived from patterns in data without human direction) are used for public health •List and describe various learning algorithms and approaches to evaluate their performance •Evaluate the appropriateness of using machine learning for specific research questions, using current examples from the scientific literature •Demonstrate ability to utilize analytic tools that promote reproducibility •Analyze public health data by applying learning algorithms and evaluating the resulting models •Compare different machine learning approaches to address common challenges in epidemiologic research 	Spring Not planned
C319	Introduction to neurodegenerative diseases and disease models	Nathalie Van Den Berge/Caroline Cristiano Real Gregório	<p>1) explain the pathophysiology of common neurodegenerative disorders (what cells and regions are affected and potential mechanisms of disease progression);</p> <p>2) demonstrate a critical understanding of the methods of investigation and (differential) diagnosis;</p> <p>3) critically evaluate the different in vivo and in vitro disease models available, be able to judge the advantages and disadvantages;</p> <p>4) critically discuss the management options available for patients with neurodegenerative disorders, as well as potential future disease-modifying treatment options;</p> <p>5) critically appraise the scientific literature on the clinical and research aspects of neurodegenerative diseases.</p>	8 Fall

C326	Mechanisms, Clinical Presentation, and Treatment of Neuropathic Pain (online)	Pall Karlsson	5	<p>"- By the end of this course, students will have developed a comprehensive knowledge and conceptual understanding of the theoretical foundations of pain, including neuropathic pain, its classification, and the underlying mechanisms involved.</p> <ul style="list-style-type: none"> - Students will be able to describe different pain phenotypes. They will also gain skills in interpreting research data related to pain phenotypes. - Students will acquire in-depth knowledge of the mechanisms involved in the generation, transmission, and modulation of pain signals, with a specific focus on neuropathic pain. Specifically, students will develop the ability to critically evaluate experimental and clinical research findings pertaining to pain mechanisms as part of research projects or ongoing studies. - This course will enable students to design research studies aimed at investigating pain and neuropathic pain. Students will gain skills in formulating research questions, selecting appropriate methodologies, and analyzing and interpreting data. - Students will develop a comprehensive understanding of current treatment approaches for pain, including both pharmacological and non-pharmacological interventions. - Students will be able to critically appraise current controversial issues in the field of neuropathic pain research, and critically discuss them in an academic discourse." 	Spring Not planned
C327	How to secure funding for your research	Morten Søndergaard Lindhard	0,6	<p>At the end of this course, participants will have an improved understanding of how to secure funding for their research. Participants have strengthened their skills within the following themes:</p> <ul style="list-style-type: none"> - Clarity and Conciseness - Alignment with Funder's Objectives - Impact and Outcomes - Budget Transparency - Compelling Narrative 	Fall

C332	The Cardiovascular Research Tool Box: From lab to clinical trial	Stephan Lange	5(?)	<ul style="list-style-type: none"> •The students should be able to reflect and discuss the critical aspects in designing and interpreting basic, epidemiological, and clinical studies within cardiovascular research. •The students should get an overview of pre-clinical models for investigating cardiovascular disease, an overview of epidemiological research platforms, and clinical trial governance. •The students should learn critical appraisal of scientific texts within basic, epidemiological and clinical cardiovascular research •The students will gain knowledge and experience for conduct their own cardiovascular studies, and the course will provide an overview of available consulting services at the University. 	Spring
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Others, not in cooperation with a department

A88	Systematic Literature Search (Research-year)	Janne Lytoft Simonsen	0,7	<p>At the end of the course, the participants will be able to build a systematic search strategy and select relevant information sources and search terms. Furthermore, participants will be able to navigate common medical databases and be familiar with the concept of reference management software in general and EndNote in particular.</p>	Spring/fall
A103	Basic Course in Written English	Morten Pilegaard	2,5	<ul style="list-style-type: none"> • Knowledge about guidelines and conventions governing the structuring of clinical research papers. • Knowledge of principles of cohesion and thematic structure in research papers. • Knowledge of some of the main differences between English and Danish syntax and grammar. • Ability to describe typical structural and linguistic features of poster, abstract and paper. • Ability to trace errors of syntax and grammar in English-language texts. 	Spring/ Fall

A125	Advanced Course in Written English	Morten Pilegaard	2,5	<ul style="list-style-type: none"> •Ability to use existing guidelines and conventions governing the structuring of clinical research papers. •Ability to analyse and describe typical structural and linguistic features of poster, abstract and paper. •Ability to apply principles of cohesion and thematic structuring in own texts. •Ability to analyse and produce select text types. •Ability to trace and correct errors of composition and grammar in English-language texts. 	Spring/ Fall
A132	PhD Supervision (supervisors)	Mette Krogh Christensen	0	<ul style="list-style-type: none"> •Describe and give reasons for own supervision practice. Analyse and consider actual dilemmas in supervision. •Identify and argue for individual choices in managing one's supervisor role. •Write a supervisory letter to explicate values and traditions in the researcher community. •Apply communicative methods and time management tools that underpin progression in the supervision meeting. •Give constructive text feedback and thus promote the PhD-student's writing process. •Describe and give reasons for how talent identification and talent development takes place in the supervisor's research environment. •Adapt the rules and regulations of the Graduate School of Health. •Discuss the asymmetric supervisor-supervisee relation and responsible conduct of research. 	Spring/ Fall
A137	Literature search in medical databases (Language English)	Annette Balle Sørensen	0,7	<ul style="list-style-type: none"> •To enable the participants to perform qualified searches, systematic as well as citation searches, in relevant medical databases. •To introduce the participants to methods of scientific quality measurements, thus enabling them to understand the basic principles of research evaluation. •To present a brief overview of different aspects related to research publication such as Open Access, ORCID, Forskerportalen.dk, Copyright etc. •To introduce the basic concept of reference management programs in general and – if requested – to make the participants familiar with the specific reference management program EndNote. 	Spring/ Fall

A148	Qualitative analysis in a phenomenological study	Sanne Angel	3	<p>Critically evaluate literature and practice in Phenomenological health qualitative analysis. Write a plan for the analysis with reference to the literature. Analyse your own data from a phenomenological perspective (e.g. which step do you follow?) Discuss own and co-participants' choices and considerations. Describe a plan for analysing their qualitative data/material. Compare strength and weakness in an empirical phenomenological versus hermeneutical phenomenological analysis.</p>	Spring
A227	Research presenter - Educational Informatics	Maria Louise Gamborg	3,8	<ul style="list-style-type: none"> •Apply rhetorical skills for preparing and delivering research presentations •Use reflective skills in evaluating performance in academic and research presentations •Produce and present effective scientific posters and talks •Apply tools for giving and receiving feedback 	Spring/Fall
A253	Prepare yourself on the movement from a PhD in Health to a career in non-academia	Vibeke Broe	4,5	<ul style="list-style-type: none"> • Identify their transferable skills achieved during doctoral training • Explain the value of these skills within as well as outside of academia • Reflect on their own possible career path • Apply the different aspects of the course when marketing their skills in different situations • Furthermore, the participants should gain an understanding of common career areas for researchers, and the requirements companies have when employing PhDs. 	Fall

A291	Introduction to psychiatric epidemiology	Katherine Musliner og Isabell Brikell	3,7	<ul style="list-style-type: none"> •Demonstrate knowledge of basic concepts psychiatric epidemiology and its relevance for public health. •Discuss common study designs used in psychiatric epidemiology, including cohort, case-control and register-based designs, as well as methods for integrating biological and socio-demographic perspectives in psychiatric epidemiology. •Describe main type of data sources and measurements used in psychiatric epidemiology and explain their strengths and weaknesses. •Explain the applications of these methods for the study of etiology, treatment, and outcome in psychiatric disorders. •Describe, on a broad level, the current knowledge of the main adult and child psychiatric disorders based on psychiatric epidemiologic research and identify areas in need of further research. •Independently evaluate psychiatric epidemiology studies from scientific literature. 	Spring
A293	PhD-student as supervisor for undergraduate students – how and when?	Iris Maria Pedersen	2,2	<ul style="list-style-type: none"> •discuss and reflect on the requirements and responsibilities of the different supervisor and co-supervisor roles, •provide feedback to undergraduate students’ written or oral presentations in a way that facilitates the undergraduate students’ learning process, and •acquire knowledge about undergraduate students’ expectations and interests to balance the supervisor’s control and undergraduate students’ control of their projects. 	Spring/ Fall
A294	The Reflective Teacher	Peter Musaeus	2,4	<ul style="list-style-type: none"> •Describe the characteristics of student-centred teaching and learning. •Describe the characteristics of reflective practice of teaching. •Identify, evaluate, and reflect on teaching elements in their own teaching in order to enhance student learning. •Provide peer-feedback in teaching. •Plan, conduct and evaluate a specified lesson including give reasons for learning outcomes, student activities and teacher role in the lesson. •Develop a first draft towards a teaching portfolio 	Spring/Fall

A297	Advanced R course	Florian Franck Privé		<ul style="list-style-type: none"> •Use RStudio with a better setup to be more efficient in their work •Version their code with Git to keep track of changes in their code •Understand more R as a programming language and write better, simpler code •Manipulate and visualize data with the tidyverse and R Markdown •Produce efficient R code •Develop an R package 	Fall Not planned
A315	Introduction to managing Research Data, FAIR principles, and Open Access	Anne Vils Møller	0,3	<ul style="list-style-type: none"> •will understand the basic principles of RDM •will know the different aspects of the research data lifecycle •will know what constitutes a data management plan and be familiar with templates and specific tools for writing their own data management plan •will know about FAIR principles and how to make their own datasets as FAIR as possible •will know the different models of OA: gold, green, hybrid •will be aware of potential OA requirements of funders 	Spring/fall
A325	How to Communicate your PhD Research	Lise Wendel	1,5	<ul style="list-style-type: none"> •Insight into presentation techniques and communicative tools, to make complex knowledge understandable, interesting and relevant to the outside world. •Experience in communicating and conveying their own PhD research . •Knowledge of journalists' working methods and priorities as well as the researcher's own role and rights as an expert in a media context. •Knowledge of responsible research communication and insight into what can be communicated, to whom and when. 	Spring/ Fall
A331	Artificial Intelligence for scientific and academic writing	Morten Pilegaard	2,5	<ul style="list-style-type: none"> •Knowledge about AI tools for enhancing academic writing in English •Knowledge about common pitfalls in using AI for text generation and optimisation purposes •Knowledge about ethical considerations and legal issues when using AI •Ability to use a selection of AI tools for academic text production in conformity with current conventions, principles and practices in academic genres and particular scientific text types •Ability to use AI tools to restructure sentences, optimise word choice, improve cohesion and coherence, and ensure grammatical correctness and fluency •Ability to use AI tools for plagiarism detection. 	Spring/ Fall

A334	Become a productive and joyful researcher	Jens Larsen	1,5	Learn how to create a more productive and joyful writing praxis. Learn how to deal with stress related to writing your thesis Learn how to create writing goals, and overcome writers block. Learn how to use storytelling to develop your text. Learn how to create your own academic writing group.	Spring/Fall
A1000	Health - Welcome to the PhD study	Mia Maychrzak	0,5	The Graduate School of Health wishes to welcome all newly enrolled PhD students to the PhD programme, and to give PhD students the opportunity to meet and interact with fellow PhD students and AU representatives from fields relevant during the PhD programme.	Spring/ Fall
A1001	Time and project management: Using Project Management Tools to Communicate with your supervisors	Constance Kampf	1,4	At the end of the course, the participants will be able to revise their IPTO planning tool and integrate key decision points into it. In addition, they will have learned how to make connections between the high-level planning in the IPTO, and more detailed planning in their daily work. Finally, they will build a vocabulary for discussing progress with their advisor which allows for considering progress separately from content.	Spring/ Fall
A1002	Time and Project Management: Considering Risk & Coordinating your daily work with the big picture	Constance Kampf	1,5	At the end of the course, the participants will be able to reconsider their PhD completion plan, reflecting on how to use a two level approach to planning and controlling progress and remove bottlenecks and risks in the second half of the PhD.	Spring/ Fall
A1003	PhD to PostDoc	Constance Kampf	5,5	At the end of the course, the participants will be able to draft a career canvas in order to lay the groundwork for their future academic career as a researcher in Health. Key skills in focus include building international research networks, laying groundwork for research opportunities, and understanding how funding works in the Health Sciences.	Spring
A1004	Getting the most out of your PhD – a career perspective	Vibeke Broe	0	Understand why and how to work with the professional development How to work with goal setting and how to achieve goals Understand how to incorporate career thinking in your PhD Workload: The full workload of the course is expected to be 3 hours	Spring/ Fall

A1005	Preparing for Career Transitions	Vibeke Broe	Half-way in your PhD, you now know what being a PhD student really is about. It is also a turning point where questions such as “what options do I have”, “how can I make the most of my doctoral degree” and “how do I make a sensible choice for my future career “ may start to pop up and cause both excitement and concern. This workshop aims at giving you the tools to answer those questions and to support you in being able to make an informed choice for the next step in your career. In the workshop, you will consider 1. your professional development so far and whether there competences you would like to improve during your part b, and 2. How you can start preparing for the transition by building your network, understanding your options and increasing your awareness of what a “good” job/work life is to you.	Spring/ Fall
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