PhD Courses at Natural Sciences and Technical Sciences, 2025

(May be subject to minor changes)

J.nr.	Title	Course leader	ECTS	Learning outcome	Semester
NT 613	Basic academic and professional English writing for natural sciences and technical sciences - Online	Morten Pilegaard	2.5	At the end of the course, the student should be able to: Knowledge about guidelines and conventions governing the structuring of research papers in natural sciences and technical sciences. Knowledge of principles of cohesion and thematic structure in general and in research papers within the field of natural sciences and technical sciences in particular. Knowledge of some of the main differences between native and non-native English language speakers' use of syntax and grammar. Ability to avoid common errors of syntax and grammar in English-language texts written by native English and non-native English researchers and scholars within the field of natural sciences and technical sciences. Ability to produce structurally and linguistically appropriate posters, abstracts and papers within the field of natural sciences and technical sciences.	Spring(on-site)/fall (online)

NT 614	Advanced professional writing and editing in English for natural sciences and technical sciences - Online	Morten Pilegaard	2.5	The advanced English professional writing and editing course with a particular focus on text production, peer feedback and advanced editing, wherefore outcomes and competences are focused on abilities: Ability to use existing guidelines and conventions governing the structuring of research papers in natural sciences and technical sciences. Ability to analyse and describe typical structural and linguistic features of poster, abstract and paper and to produce said genres in contexts relevant to natural sciences and technical sciences 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 within natural sciences and technical sciences.	Spring(on-site)/fall (online)
NT 608	Science Teaching (Mandatory)	Rikke Frøhlich Hougaard and Karen Louise Møller	2.5	At the end of the course, you should be able to: •Plan lessons in own teaching according to principles for student-centered learning and course learning outcomes •Identify and use relevant teaching techniques and technologies to support student learning and active participation •Develop strategies to create a good learning environment in own teaching •Use effective assessment and feedback strategies to support student learning •Collaborate with colleagues to identify and evaluate solutions to challenges in own teaching	Spring/fall

NT 607	Science Writing and Communication	Ashley Pearcy Buitenwerf	4	Students should be able to: •Define a strategy for approaching and completing manuscripts •Understand the components of a typical scientific research paper and the process of writing and publishing manuscripts •Structure and write a scientific manuscript that is concise and engaging •Assess and evaluate their writing (and others') for clear, cohesive delivery of their research •Understand the presentation of a poster (layout and content) and its goals •Learn the components of a grant proposal and how to captivate reviewers	Spring/fall
NT 617	Science Writing Toolkit	Ashley Pearcy Buitenwerf	1	Students should be able to: •Understand the intent and content of components of a typical scientific research paper •Apply a toolkit of writing guidelines to clearly, cohesively deliver their research •Investigate writing strategies and identify personal approaches to writingrsonal approaches to writing	Spring/fall
NT 609	Public Speaking: Creating a talk worth listening to	Ashley Pearcy Buitenwerf	1	At the end of the course, the student should be able to: •Develop a talk worth listening to, by content and visual aid •Approach public speaking with their own personality, but with a set of tools to help guide them towards a talk worth listening to •Have more confidence in public speaking	Fall

NT 612	Project Management: A Practitioner's Approach to the Managerial Process	Per Svejvig		5	At the end of the course, the student should be able to: Describe, analyze and apply technical and sociocultural project management methods, models and tools related to the managerial process of a project List, select and apply relevant methods, models, and tools to manage the lifecycle of an project Manage and execute low to medium complex projects	Spring(on-site)/fall (online)
NT 611	Introduction to R	Rodrigo Labouriau		1	At the end of the course, the student should be able to: Read and write data in R, perform basic operations with variables, vectors, make simple tabulations, use and create simple functions, use repeated and conditional calculations, reshape and merge data sets, draw simple graphs in R, and use and install packages in R.	Spring/fall Not planned yet.
NT 610	Basic Statistical Analysis	Rodrigo Labouriau		4	At the end of the course, the student should be able to: 1) Identify the key assumptions and critically evaluate some chosen (simple) statistical models 2) Perform basic inference and conclude from those models under supervision 3) Present (orally) and report (written) the results of those analyses.	Spring/fall Not planned yet.

NT 616	Mixed Models	Rodrigo Labouriau	3	At the end of the course, the student should be able to: 1) Describe and discuss the use and applicability of classic statistical models for dependent responses based on random components, including: Gaussian linear mixed models, generalised linear mixed models and simple multivariate generalised linear mixed models. 2) Conduct (under supervision) statistical analysis of data with dependence structure using the models abovementioned, including: a) the identification of pertinent models for answering the biologic/scientific question of interest, b) formulation of the statistical models used and identification of the key assumptions related to those statistical models, c) conduction of the analysis using modern software (R), d) model control and verification of the key assumptions, and e) draw reasonable conclusions from those analyses and report written and orally the results obtained.	Fall. Not planned yet.
NT 619	Introduction to Python for Data Science	Davide Mottin	1	At the end of the course, the student should be able to: Read and write data in Python, perform basic operations with variables, data structures Use and create simple functions Find and use libraries Create and work with Jupyter notebooks, data preprocessing cleaning and simple statistics Finding help in the community (tutorials, examples, fora).	Fall

| NT 620 | Basic Data Science in Python | Davide Mottin | 2 | At the end of the course, the student should be able to:

Identify the key assumptions and critically evaluate some data science methods and models
Identify appropriate data sources, establish data quality, identify suitable data science approaches, devise experiments and draw conclusions
Present (orally) and report (written) the results of those analyses. | Fall |

| | Circle U. Sustainable Change Makers | Morten Foss | | 3 | At the end of the course, the participant should be able to:

Identify and critically evaluate sustainable innovation issues within various environments, utilizing a wide range of techniques, concepts and models
Come up with and present innovative solutions and apply competitive strategies using an entrepreneurial mindset
Describe the benefits of sustainable business models
Demonstrate an understanding of possible uses of new and emerging technologies in sustained innovation
Demonstrate an understanding of the special challenges in the implementation of sustainable solutions in healthcare
Demonstrate an understanding of the modern artificial intelligent solutions taking sustainable challenges into account
Promote and facilitate the adoption and maintenance of the strong sustainable change maker orientation with measurable sustainability metrics: SDGs (UN sustainable development goals), TBL (Triple Bottom Line), and ESGs (Environmental, social, and corporate governance)
Summarize various strands of sustainable innovation knowledge and skills in developing an effective business solution with case solving methodology
Design and perform an efficient business pitch
Work in international and multidisciplinary teams | Fall |

N 602	GSNS Onboarding programme – workshop: Becoming a scientist	To be announced	0,5	In this workshop, we make the objectives of the PhD education explicit and equip students with strategies and tools to develop as independent scientists. In session 1, we discuss the skills and competences of a PhD – and their importance to society. In session 2, students present their research projects in small, cross-departmental groups and for each project discuss the opportunities for developing independence. Session 3 has a focus on the collaboration with supervisors and presents ways to negotiate roles and address progression during the education.	Spring/fall
N 605	GSNS Onboarding programme – workshop: Well-being and Work-Life Balance	Lynn Watson/ Bodil Øster	0,25	What does science tell us about the benefits and challenges of living a busy life? How can you achieve work-life balance during your PhD and make your environment work for you? This session will give you the opportunity to consider your own work schedule and how you can incorporate tools that might work for you.	Spring/fall
N 603	GSNS Onboarding programme – workshop: Getting the most out of your PhD – a career perspective	Vibeke Broe	0,25	A PhD is a time to submerge into interesting research and exciting new contexts, but it is also a time to tend to your future career. Your PhD is a step towards your next job regardless of your professional background and your thoughts on career direction. This session will aim at encouraging you to build career management skills during your PhD: strengthen your knowledge and understanding of how adding a career perspective to your PhD is beneficial both for your professional development as a researcher and for ensuring that you have the skills, knowledge and experience necessary for your next career step.	Spring/fall

N 601	GSNS Onboarding programme – workshop: Research Integrity	Kristian Hvidtfelt Nielsen	0,5	The workshop has two parts. The first part is the mandatory online Aarhus University course on research integrity, developed by Epigeum/Oxford University Press and customized for Aarhus University. The online course is available on Brightspace. The course consists of two modules, one on responsible research conduct and one on irresponsible research practices. The end-of-module confirmation should be uploaded to MyPhD. The second part consists of a one-day workshop provided by the Centre for Science Studies. Before the workshop, the students are required to study the assigned literature. During the workshop, the students are expected to participate in the discussions and do short presentations. The workshop will include presentations, individual work, and group tasks. The students will be divided into smaller groups of 5-6 students that will do work together throughout the workshop.	Spring/fall
N 604	GSNS Onboarding programme – workshop: Literature, data management and publication	Alexandra Fogtmann-Schulz/Morten Hjorth Gad	0,25	In this module, AU Library will introduce you to the task of working with data and publications, both your own and that of others: How to find data and publications, manage them, and what to be aware of, when you want to publish your results, including copyright and Open Access.	Spring/fall
N 622	GSNS Onboarding programme - workshop: International mobility	Mette Brynolf Cáreres	0,25	The purpose of this workshop is to focus on going abroad, e.g. mobility grant from GSNS, GSNS Rules and regulations, experiences from Head of PhD programme and PhD students, and presentation from the Travel Group about grants, taxes and reimbursement.	Spring/fall

NT 623	Mindfulness Training for PhD Students	Lykke Elisabeth Ramsdal		The purpose of mindfulness is to learn to integrate a set of skills that enhance attention to achieve greater balance, improved clarity, and better prioritization abilities. Additionally, it aims to develop a better ability to prioritize to be present in the daily life, leading to an overall increased sense of personal well-being and connection with others. Furthermore, the aim is to provide skills to manage stress and, importantly, to train awareness of stress symptoms in the body and mind as early as possible, thereby potentially limiting stress-related absenteeism.	Spring
N 600	Introduction day, Graduate School of Natural Sciences (Mandatory)	Sututhi Perrananthasivam/Mathilde Skarum-Johnsen		The Graduate School of Natural Sciences wishes to welcome all newly enrolled PhD students to the PhD programme by inviting them to an introductory day together with other PhD students enrolled in 2024. The Introduction day is mandatory for all GSNS students. The Head of PhD School will welcome and introduce the participants to the PhD school and the PhD study at the Graduate School of Natural Sciences. The latter part of the program will be devoted to the theme "Peer Mentoring Groups" and will include an introduction to the concept "Peer Mentoring Groups" and how to use them successfully	Three times/year

T 600	Introduction day, Graduate School of Technical Sciences (Mandatory)	Frederikke Kongsted Hansen		"The Graduate School of Technical Sciences/GSTS wishes to welcome all newly enrolled PhD students to the PhD programme by inviting them to an introductory day. The Introduction day is mandatory for all PhD students at GSTS. Participants will be introduced to some of the fundamental topics during a PhD. The programme of the day features - An introduction to AUPA – Aarhus University PhD Association - A crash course in the PhD planner system and what the PhD administration can help you with - An introduction to the Graduate School and the PhD prorgamme - Data management and FAIR data - Good advice on being a career wise researcher - A workshop on responsible conduct of research "	Two times a year. Not planned yet.
NT624	Introduction to Data Visualization	Hans-Jörg Schulz	1,5	Subject Knowledge: Participants will be familiar with key concepts and issues within the subject area of data visualization (see course contents). Practical Skills: o Participants will be able to generate tailored solutions for a data visualization scenario at hand (dataset, reading task) and justify their visualization design. o Participants will have proficiency in assessing given data visualizations for their strengths and limitations (representational errors, perceptual deficiencies). Academic Proficiency: This course places particular emphasis on analytical and conceptual aspects, so that participants can successfully identify and navigate the trade-offs often to be made when visualizing data.	Spring