

PhD Courses at Natural Sciences and Technical Sciences, 2023AA1:E7

(May be subject to minor changes)

Title	Course leader	ECTS	Learning outcome	Semester
Basic academic and professional English writing for natural sciences and technical sciences	Morten Pilegaard	2.5	At the end of the course, the student should be able to: 1) Knowledge about guidelines and conventions governing the structuring of research papers in natural sciences and technical sciences. 2) 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. 3) Knowledge of some of the main differences between native and non-native English language speakers' use of syntax and grammar. 4) 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. 5) Ability to produce structurally and linguistically appropriate posters, abstracts and papers within the field of natural sciences and technical sciences.	Spring/ fall (online)
Advanced professional writing and editing in English for natural sciences and technical sciences	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: 1) Ability to use existing guidelines and conventions governing the structuring of research papers in natural sciences and technical sciences. 2) 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 3) Ability to apply principles of cohesion and thematic structuring in own texts. 4) Ability to analyse and produce select text types. 5) Ability to trace and correct errors of composition and grammar in English-language texts within natural sciences and technical sciences.	Spring/ fall (online)
Science Writing and Communication	Ashley Pearcy Buitenwerf	4	Students should be able to: 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
Science Outreach Beyond the scientists	Ashley Pearcy Buitenwerf	1	Students should have an understanding of how to identify potential outreach opportunities, create content for different audience types and platforms, and deliver/communicate their research to non-academic audiences. They should have an understanding of structuring the content to best deliver their message.	Spring
Public Speaking: Creating a talk worth listening to	Ashley Pearcy Buitenwerf	1	At the end of the course, the student should be able to: 1) To develop a talk worth listening to, by content and visual aid 2) To approach public speaking with their own personality, but with a set of tools to help guide them towards a talk worth listening to 3) Have more confidence in public speaking	Fall

Science Teaching (Mandatory course)	Rikke Frøhlich Hougaard	3	<p>1) Plan and implement teaching activities to support student learning according to learning outcomes</p> <p>2) Apply tools for classroom management to motivate students' active preparation and participation</p> <p>3) Use effective feedback to assess and support student learning</p> <p>4) Identify and evaluate solutions to challenges in your teaching</p> <p>5) Use peer observation and feedback to develop your teaching practice</p> <p>6) Apply educational technology and evaluate relevance in own teaching</p>	Spring/fall
Introduction to R	Rodrigo Labouriau	1	<p>At the end of the course, the student should be able to:</p> <p>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.</p>	Spring/fall
Basic Statistical Analysis	Rodrigo Labouriau	4	<p>At the end of the course, the student should be able to:</p> <p>1) Identify the key assumptions and critically evaluate some chosen (simple) statistical models</p> <p>2) Perform basic inference and conclude from those models under supervision</p> <p>3) Present (orally) and report (written) the results of those analyses.</p>	Spring/fall
Mixed Models	Rodrigo Labouriau	3	<p>At the end of the course, the student should be able to:</p> <p>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.</p> <p>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.</p>	Fall
Project Management: A Practitioner's Approach to the Managerial Process	Per Svejvig	5	<p>1) Describe, analyze and apply technical and sociocultural project management methods, models and tools related to the managerial process of a project</p> <p>2) List, select and apply relevant methods, models, and tools to manage the lifecycle of an project</p> <p>3) Manage and execute low to medium complex project</p>	Spring/fall (online)
Introduction to Python for Data Science	Davide Mottin	1	<p>At the end of the course, the student should be able to:</p> <p>Read and write data in Python, perform basic operations with variables, data structures</p> <p>Use and create simple functions</p> <p>Find and use libraries</p> <p>Create and work with Jupyter notebooks, data preprocessing cleaning and simple statistics</p> <p>Finding help in the community (tutorials, examples, fora).</p>	Fall

Basic Data Science in Python	Ira Assent	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
Introduction Day GSNS	Sututhi Perrananthasivam	0	Introduction event for all newly enrolled PhD students at Natural Sciences, Aarhus University.	Spring/fall
Introduction Day GSTS	Sututhi Perrananthasivam	0	Introduction event for all newly enrolled PhD students at Technical Sciences, Aarhus University.	Spring/fall