



Mall för kursplan/Template for course syllabus

Kurs på forskarnivå/Third-cycle (doctoral) course
Vetenskapsområdet för medicin och farmaci/
Disciplinary Domain of Medicine and Pharmacy

Mall fastställd av KUF/template approved by KUF 2022-12-13

Course code:	FMF0063
Course title:	Introduction to Scientific Research
Credits:	10 hp
Level:	Third-cycle (doctoral) education
Course coordinator:	Laia Caja Puigsubira, John Pettersson
Department responsible:	Department of Medical Biochemistry and Microbiology
Language of instruction:	English / Swedish
Research track:	ALL
Description of course content:	<p>The course is mandatory for doctoral students accepted in Medicine and Pharmacy faculties and provides an integrated introduction to doctoral studies with general and specific information on faculty organization, biostatistics, philosophy of science, research ethics, and communication in science and education. Moreover, a brief introduction to machine learning, computer security as well as to Uppsala University Innovation will be provided. The aim is to provide the student with a broad basic knowledge (understanding and skill) of some fundamental elements involved in graduate studies and scientific work at the Medical and Pharmacy Faculties of Uppsala University.</p> <p>The ISR Course is given as lectures on general topics and as daily group discussions focusing on research problems. In addition, the students will prepare and present scientific tasks for the whole course audience, thereby initiating general discussions of various aspects of research work.</p> <p>The ISR course is given twice a year. The course language is English or Swedish (every third term).</p>
Types of instruction:	Lectures, group-work, student presentations, oral/written feedback.
Intended learning outcomes:	<p><i>After completing the course, students should be able to</i></p> <p>(Biostatistics)</p> <ul style="list-style-type: none">• formulate scientific questions and hypotheses• explain strengths and weaknesses of various study designs, and interpret results• explain how to evaluate a scientific paper• describe and understand different types of variables and scales• explain the normal distribution and its transformation into standardized normal distribution



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- explain the concepts of sampling distribution and the Central Limit Theorem
- describe the principles for determining optimal group size and statistical “power”
- recognize type I and type II errors in statistical hypothesis testing
- correctly choose and apply statistical methods such as Student’s t-test, analysis of variance (ANOVA) with appropriate post hoc method and non-parametric tests
- briefly describe methods for analysis of bivariate and multivariate material
- briefly describe methods qualitative research

(Research ethics)

- describe and apply ethical guidelines for human and animal studies
- identify and apply ethical problems in the research process and describe ethical requirements for publication
- describe methods for dealing with scientific misconduct
- briefly explain the legal regulations of research
- briefly explain the philosophical aspects of scientific research

(Communication in science and education)

- explain the principles for scientific co-authorship
- describe the principles and processes for writing a scientific paper and publish a scientific paper
- perform a literature search in bibliographic data bases
- know how to communicate and disseminate scientific results to different audiences using different channels (abstract, poster, oral presentation, popular science, wikipedia, social media)
- be aware of the rights and obligations for University students and of the university’s pedagogical program.
- recall various pedagogical techniques to facilitate and stimulate learning as well as active student participation
- briefly explain basic reflective practice

Examiner:

Dorothe Spillmann

Compulsory components:

All scheduled interactive lectures, group- and plenary discussions, presentations and the subsequent general discussions is required. In some cases (valid excuse, up to 16 hours), absence can be completed



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	by preparing a compensation assignment after contacting the corresponding teacher.
Assessment format:	Active participation at all compulsory components and tasks.
Reading list:	Current scholarly articles as specifically directed.
Admission requirements:	Admission to third-cycle education in the Disciplinary Domain of Medicine and Pharmacy, and completion of the course "Introduction to Doctoral Studies".
Maximum participants:	40
Selection:	Applicants admitted to postgraduate studies at the domain of Medicine&Pharmacy have priority, and are ranked based on their date of admittance to postgraduate studies according to Ladok.
Other information:	
Contact:	Laia Caja Puigsubira, John Pettersson
Approved, date and number:	[here KUF states the date when the syllabus was approved and reg. number]