Application for funding of faculty common course 2020
Ansökan om medel för fakultetsgemensam forskarutbildningskurs 2020

English course title Hands-on Statistical Inference
Kursnamn på engelska

Swedish course title Statistisk inferens i praktiken
Kursnamn på svenska

Extent (credits) 5 hp
Omfattning (högskolepoäng)

Language of instruction English
Undervisningsspråk

Recommended prerequisites Programming experience (preferably Python) and working knowledge of foundational statistics. E.g. courses “Statistical Methods in Physics” (Physics and Astronomy), Statistical Methods in Natural Sciences (Biology/Chemistry/Earth Science), Statistical Inference for Bioinformatics (Technology/Bioinformatics), Statistics and Data Analysis Methods (Earth Science). The course “Scientific Programming in Python with Applications in Physics” and/or PG level course "Advanced Scientific Programming with Python" would be useful but not necessary. The course complements the PG level course “Modern statistics in natural sciences” which focuses on frequentist regression methods and experimental design.

Rekommenderade förkunskaper

General course objective/s and learning outcomes (Also specify which PhD examination goals that are addressed/covered. Describe how.)
Kursens syfte och mål (Beskriv vilka mål för examen på forskarnivå som beaktas och på vilket sätt.)

Objectives:
- provide a toolbox of statistical inference methods with focus on applications
- allow the participants to work on a current research problem of their own and gain directly relevant skills to bridge the gap to practical applications
- allow the participant to produce scientific results in a project that can directly contribute toward publishable research
- encourage interdisciplinary interaction and collaboration

Learning outcomes:
On completion of the course, the student should be able to

- describe statistical models
- choose methods and models to evaluate different types of empirical data
- use appropriate, contemporary analytical and computational tools to perform statistical inference computations
- visualise, present and interpret the results from statistical inference computations in a discipline-appropriate manner both orally and in writing

The above outcomes contribute to PhD examination goals:
- A2: proficiency in statistical modelling and computations is an important part of familiarity with research methodology
• B1: capacity for scholarly analysis and synthesis in many cases requires a capacity to choose methods and models discriminately, and to assess the appropriateness of methods and tools used by others
• B2: planning and using appropriate methods is directly addressed by the second and third point in learning outcomes
• B3: the project work in the course should directly contribute to the compilation of a thesis
• B4: the last learning outcome above directly contributes to developing ability in presenting and discussing research in a national and international context (English language of instruction and presentation)

Course contents
Kursinnehåll

Instruction (course structure)
Undervisning (kursens uppläggning)
An even mix of self-study, lectures, seminars and hands-on workshops. A student-active, interactive approach will be followed in line with positive experiences from previous course session. An online workspace such as Slack will be used extensively to additionally facilitate course work and interaction based on experiences from previous session (see course report on www.msahlen.net/statinf18)

Assessment (form of examination)
Examination (examinationsformer)
Hand-in assignment (1.5 hp); Workshop participation (1.5 hp); Project presentation and report (2 hp)

Course examiner (name, e-mail) Doc. Martin Sahlén, martin.sahlen@physics.uu.se
Examinator (namn, e-post)

Department with main responsibility Department of Physics and Astronomy
Huvudansvarig institution

Contact person/s (course responsible teacher) (name, e-mail) Martin Sahlén, martin.sahlen@physics.uu.se
Kontaktperson/er (kursansvarig lärare) (namn, e-post)

Course dates/period HT-2020
Kurs datum/period

Maximum number of participants 20
Antal platser

Submit the application for admission to Martin Sahlén, martin.sahlen@physics.uu.se
Skicka anmälan till kursen till

Submit the application not later than 2020-08-28
Skicka anmälan senast