UNIVERSITY OF GOTHENBURG

DEPARTMENT OF EARTH SCIENCES

GV2500 Data Analysis for Earth Sciences, 7.5 credits

Dataanalys för geovetare, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Earth Sciences on 2020-01-14 and was last revised on 2023-02-17 to be valid from 2023-08-28, autumn semester of 2023.

Field of education: Science 100%
Department: Department of Earth Sciences

Position in the educational system

The course includes 7,5 credits at the undergraduate level and is a compulsory course in the N1GVS Bachelor's Programme in Earth Sciences. The course is offered as an elective course subject to availability.

The course can be part of the following programme: 1) Bachelor's Programme in Earth Sciences (N1GVS)

Main field of studies	*Specialization*
Earth Sciences	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Entry requirements

Admission to the course requires basic knowledge of statistical analysis in a successfully completed course, for example GVN400 Investigation Methods in Earth Sciences, or equivalent, and at least 60 credits in the main field of Earth Sciences. Students with equivalent education, can after review and approval, be given access to the course.

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

- describe the descriptive statistics, hypothesis tests, and data-modelling and graphical techniques that are most important for Earth Sciences.
- recognize essential programming terminology and syntax.
- describe and take account of particular issues that arise in earth-science data analysis: periodicity, correlation and auto-correlation, and handling missing data.

Competence and skills

- write scripting code to analyze earth-science data: import raw data, conduct analysis and statistical tests, and create graphs.
- use and interpret hypothesis tests, confidence intervals and correlation indices.
- translate between one-dimensional data perspectives: time-series graphs, distribution visualizations, parametric models and descriptive statistics.
- compose analysis descriptions that use scientific terminology and conventions.

Judgement and approach

- create graphs and tables that clearly convey analysis results.
- select appropriate methods for data analysis.
- perform analysis of geological, hydrological and climate-related data, including data selection and pre-treatment.

Course content

Course content summary:

- Basic statistical measures and tests, statistical significance, confidence, intervals, common graphical representations (histogram, cumulative frequency, time series and multi-axis graphs).
- Elementary coding. What is a script, what are variables, use of multidimensional variables, indexing, logic tests, loops and data aggregation, commenting and -of course! - making graphs. Data and code organization.
- Scientific writing. How to describe and summarize results, how to write a caption, how to make a presentable graph. How to make a scientific data reusable by writing metadata and documentation.
- How to select appropriate data analysis methods for geological, hydrological and climate-related data that take into account specific issues that arise in analysis of earth-science data: periodicity, correlation and autocorrelation, and handling of missing data.

Form of teaching

The teaching consists of lectures, computer-based exercises, reading of literature, and supervision.

Language of instruction: English

Assessment

The student will be examined by:

Component 1: Computer based Exercises (Datorbaserade övningar), 2,5 hp: U/G

Component 2: Assignments (Inlämningsuppgifter), 2,5 hp: U/G/VG

Component 3: Examination (Tentamen), 2,5 hp: U/G/VG

If a student who has twice received a failing grade for the same examination component wishes to change examiner ahead of the next examination session, such a request should be made to the department in writing and should be approved by the department unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

If a student has received a recommendation from the University of Gothenburg for study support for students with disabilities, the examiner may, where it is compatible with the learning outcomes of the course and provided that no unreasonable resources are required, decide to allow the student to sit an adjusted exam or alternative form of assessment.

In the event that a course has ceased or undergone major changes, students are to be guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, but no more than two years after the course has ceased/been changed. The same applies to internships and professional placements (VFU), although this is restricted to just one additional examination session.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
For the grade Pass (G) in the course the grade Pass (G) is required for all components in the course. For the grade Pass with Distinction (VG), the grade Pass with Distinction (VG) is required on component 2 Assignments and component 3 Examination.

Course evaluation

The students are given the opportunity to make a anonymous written evaluation of the course and just-in-time feedback.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

Additional information

Students admitted to N1GVS Bachelor's Programme in Earth Sciences are given priority for admission to the course.