



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Geografisk informationsteknik

Geographic Information Technology

EXTF80, 12 credits, G2 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED L

Date of Decision: 2023-04-20

General Information

Main field: Technology.

Compulsory for: L2

Language of instruction: The course will be given in Swedish

Aim

The aim of the course is to get basic knowledge of concepts and methodologies within management and analysis of geographical data with geographic information systems (GIS).

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to describe different conceptual models for spatial phenomena,
- be able to describe different data models for digital geographical data (raster and vector), and how these are stored in computers,
- be able to explain how map projections are constructed and how they can be used,
- be able to describe fundamental cartographic methodology,
- be able to understand and apply basic methods for spatial analysis,
- be able to explain basic theory on spatial interpolation, and
- be able to describe quality measures for spatial data and error of propagation in spatial analysis.

Competences and skills

For a passing grade the student must

- be able to organise and manage geographical data in computers
- be able to, independently and within groups, solve predefined problems using basic analyses of geographical data, mainly in vector format, with standard GIS software, and
- be able to present results and work flow from data capture and analysis of geographical data for specialists and laymen, with maps, graphics and simple text.

Judgement and approach

For a passing grade the student must

- show awareness of, and confidence in, using geographic information and analysis within surveying, and
- be able to critically assess geographical data and have achieved a critical attitude towards analysis results.

Contents

Lectures cover the basic theory of cartography, spatial phenomena, geographical data and analysis as well as modelling and storage of geographical data. Basic geostatistics and quality aspects represented by error propagation theory are also treated. Through calculation exercises and a number of practical computer based exercises the students learn how to structure geographical data, perform basic geographical analysis and finally present geographical information. He/she will also get an overview of geographical data bases used by governmental and municipal authorities, the main usage of these data bases and how their quality can be described. In an extensive application exercise the students collect and compile data from different national and regional data distributors, compile the data and execute analysis relevant for surveying purposes.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: In order to pass the course the student is required to have passed the written individual examination test and to have completed passed exercises and assessments. Most exercises are compulsory. The final grade for the course is based on the written examination test. Students who fail the ordinary test will have an opportunity to take another test in January and also at the end of August every year.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0111. **Name:** GIT Theory.

Credits: 6. **Grading scale:** TH. **Assessment:** Result constitute the total course grade. **Contents:** Written examination in which knowledge of the basic theory of GIS, geostatistics, geodesy and quality aspect of geographical data is evaluated, as well as the students' abilities to combine the theoretical base with practical problem solution.

Code: 0211. **Name:** GIT Exercises.

Credits: 6. **Grading scale:** UG. **Assessment:** Passed compulsory practical exercises and assignments apart from application tasks. **Contents:** Practical exercises and assignments in GIS and literature databases.

Admission

Admission requirements:

- FMSF50 Mathematical Statistics, Basic Course, part 0317 Computational Ability Test

Assumed prior knowledge: FMAA05 Calculus in One Variable OR FMAB65 Calculus in One Variable B1 AND FMAB70 Calculus in One Variable B2 AND FMAB20 Linear Algebra AND EXTA50 Surveying AND EDAA20 Programming and Databases.

The number of participants is limited to: No

The course overlaps following course/s: EXTA45, EXTF01, NGEA11, NGEA12

Reading list

- Harrie L. (red.): Geografisk informationsbehandling - teori, metoder och tillämpningar, 7: upplagan. Studentlitteratur, 2020.

Contact and other information

Course coordinator: Karin Larsson, karin.larsson@nateko.lu.se

Course homepage: <http://www.nateko.lu.se/extf80>