LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

GIS för samhällsbyggnad och miljö
GIS for Built and Natural Environments

EXTG75, 7,5 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

Elective for: MWLU2, RH4, V4-vr, W4-vr
Language of instruction: The course will be given in English

Aim

The aim of the course is to achieve basic knowledge of concepts and methodology in management and analysis of geographical data using geographical information systems, (GIS). The course also aims at giving a brief overview of physical geography and how GIS and remote sensing can be used to study landscape processes.

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 briefly describe how these are stored in computers,
- be able to describe the implication of different map projections,
- be able to explain basic methods for spatial analysis,
- be able to thoroughly describe simple spatial interpolation methods,
- be able to briefly describe principals for data collection using remote sensing, and exemplify how this can be used for landscape studies,
- have a brief overview of how landscape processes can be studied with spatial analysis.

Competences and skills
For a passing grade the student must

- be able to use a geographic information system as a tool for geographical analysis,
- independently and in a group be able to perform simple GIS analysis, using a standard software, to solve a predefined problem,
- be able to cartographically and graphically present geographical data for specialists and lay persons,
- be able to perform and present simple statistical evaluation of spatially interpolated data,
- be able to exemplify how the techniques treated during the course can be used within the student's speciality in civil engineering.

Judgement and approach
For a passing grade the student must

- show awareness of, and confidence in, using geographic information and analysis within surveying,
- be able to critically assess geographical data and have achieved a critical attitude towards analysis results,
- be able to assess the utility of GIS and remote sensing within project planning, environmental assessment and other issues of relevance for the student's future profession,
- show awareness of the interaction between natural landscape processes and anthropogenic activities, and how these can be studied with geographical data and analysis.

Contents

The course gives a good foundation for future work with spatial digital data. Lectures cover the basic theory of spatial phenomena, geographical data and analysis and remote sensing within studies of landscape processes. The understanding of representation and analysis of spatial elements is emphasised. A major part of the course consists of practical exercises with some of the most common GIS software products. Some of the issues treated are map projections and geodetic reference systems, geographical data in digital form (maps, remote sensing and table data), basic analysis of geographical data in raster and vector format and cartographical presentation of digital map data. Through these exercises general spatial issues concerning the society and the environment can be exemplified and studied. Through the independent literature study the student gets a possibility to set the new knowledge in relation to his/her speciality within civil engineering.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: The course grade is based on the result of a written examination test at the end of the course and on a literature assignment. In order to pass the course the student is also required to complete compulsory exercises and assignments. Students who fail the ordinary test will have an opportunity to take another test 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.

Admission

Assumed prior knowledge: 120 credits within civil engineering or equivalent.
The number of participants is limited to: 40
Selection: Completed university credits within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.
The course overlaps following course/s: EXTA45, EXTF80, TEK270, EXTF01

Reading list

- Harrie L. (red.): Geografisk informationsbehandling - teori, metoder och tillämpningar, 7:e upplagan. Studentlitteratur, 2020, ISBN: 9789144088778.
- Dept. of physical geography and ecosystem science: Exercise instructions, EXTG75. Dept. of physical geography and ecosystem science, 2023. Available online via learning platform.
- Kang-tsung Chang: Introduction to geographic information systems. McGraw-Hill, New York, 2014, ISBN: 9781259010613. For non Swedish speaking students. Later editions also works fine.

Contact and other information

Course coordinator: Helena Elvén Eriksson, helena.elven_eriksson@nateko.lu.se
Course administrator: Karin Larsson, karin.larsson@nateko.lu.se
Course homepage: http://www.nateko.lu.se/extf01
Further information: Teaching consists of lectures, practical computer exercises using GIS and an independently executed literature study. The practical exercises and the literature study are compulsory. Assessment takes the form of a written examination test.