School of Economics and Management

EEH046F, Geographic information systems, 7.5 credits
Geografiska informationssystem, 7,5 högskolepoäng
Third Cycle / Doktorandnivå

Details of approval

Approved by the Board of the Department of Economic History, Lund University School of Economics and Management 2023-01-17 to be valid from 2023-08-31, autumn semester 2023.

General Information

This is an optional course at the PhD programme.
The language of instruction is English.

Learning outcomes

The purpose of the course is to provide basic theoretical and practical knowledge of concepts and methods within geographic information systems (GIS), and how this knowledge can be applied within economic demography. Knowledge and skills include storage, processing, modeling, visualization, and analysis of spatial information. The overall aim of the course is that the student, after completion of the course, should have acquired basic theoretical knowledge and practical skills that can be used for applications within economic demography and related fields, as well as competence for further studies and use of GIS.

Knowledge and understanding

- Explain basic and central spatial concepts
- Describe data models for geographic data (raster and vector data) and compare advantages and disadvantages with regard to storage, analysis and visualization.
- Be able to explain how map projections are used.
- Explain georeferencing and how information can be gathered from maps.
- Describe theoretical and practical aspects of how Geographic Information Systems (GIS) can be applied within economic demography.
- Explain how relevant geographic variables, including ones at the micro-level, can be created and later used in demographic analysis.

- Explain basic spatial analysis methods, with particular application to economic demography.
- Explain and problematize spatial autocorrelation.
- Explain basic methods in cartography and visualization of spatial data, including visualization of geocoded demographic data.
- Discuss and problematize concepts for analyzing and visualizing geographic and demographic data, including demographic microdata, over long periods of time (spatiotemporal data).

Competence and skills

- Collect (e.g., by digitizing objects from maps), organize and manage digital spatial data.
- Based on a problem statement, be able to independently and in a group carry out basic analyzes of linked geographic and demographic data in raster and vector formats using standard and free software for GIS (QGIS).
- Create geographic variables that can be included in demographic analyses.
- Cartographically, graphically and in simple text be able to present results and workflow from collection to analysis of geographic data for specialists and laymen.
- Interpret and discuss linked geographic and demographic data from a statistical perspective.

Judgement and approach

- Be aware of the importance of using geographic information and analysis in economic demography and related subject fields.
- Understand the importance of, as well as have achieved a critical approach to, geographic data, its sources, and analysis results.
- Judge the importance of using geographic information and analysis in economic demography and other related fields.

Course content

Several projects in demography have a connection to spatial information. To include a spatial aspect in demographic studies, a prerequisite is that geographic data have been collected, stored and structured in a way that allow for performing statistical analyses. Once these prerequisites are fulfilled, it is possible to create geographic variables to be included in demographic analyses, conduct spatial analyses for the demographic data, and spatially visualizing the results.

This course provides the student with basic practical and theoretical knowledge and skills in spatial data, spatial analysis and visualization, and Geographic Information Systems (GIS), with a particular focus on applications in economic demography. Understanding of analysis and visualization of spatial elements is emphasized. The course also provides preparatory insights into how spatiotemporal demographic microdata can be managed, analyzed and visualized. The course provides a theoretical and practical basis for further work and studies related to geographic concepts and data.

Teaching and assessment

The course consists of mandatory group meetings. During each meeting, theoretical and practical aspects related to the management, analysis and visualization of linked geographic and demographic data are discussed. In preparation for each meeting, students will work on related tasks, and this work is then discussed with faculty and

students at the meeting. The student is expected to actively participate in the discussions. At the meetings, guidance is also given linked to the tasks. Some of the work is done with the help of free and opensource software in GIS, for example Quantum GIS.

At the end of the course, students will complete an individual project. Within the project, they will define a research question, manage and manipulate geographic data, create relevant geographic variables, and perform a spatial and demographic analysis necessary to answer the research question. The project is described in a report, where the research questions are defined, the data and method are described, and the results are presented and discussed. The students present their work to the group and comment on each other's work.

Grading is based on individual performance via written assignments, papers, presentations and other compulsory activities. The examination is continuous. In this tutorial, equal emphasis is placed on the active participation in discussions at the group meetings and oral presentations. Examination may draw on teaching as well as the course literature.

The University views plagiarism very seriously, and will take disciplinary actions against students for any kind of attempted malpractice in examinations and assessments. The penalty that may be imposed for this, and other unfair practice in examinations or assessments, includes suspension from the University.

Grading scale
Marking scale: Fail or Pass.

Prerequisites

Further information