



Faculty of Health, Science and Technology
Geo-Science

Syllabus

Spatial statistics in GIS

Course Code: NGAD10

Course Title: Spatial statistics in GIS
Spatial statistik i GIS

Credits: 7.5

Degree Level: Master's level

Progressive Specialisation: Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:

GGA (Geography)

STA (Statistics)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2025-02-10, and is valid from the Autumn semester 2025 at Karlstad University.

Prerequisites

90 ECTS credits, including 15 ECTS credits in Geographic Information Systems (GIS) or geographic information technology, and upper secondary level English 6, or equivalent

Learning Outcomes

Upon completion of the course, students should be able to:

- apply concepts in spatial statistics in combination with geodata,
- apply spatial autocorrelation, cluster analysis, and linear regression in statistical modelling,
- identify suitable techniques of spatial statistics for application in science,
- apply suitable spatial statistics techniques in the processing of spatial data,
- present their results and the knowledge and arguments that underpin them, orally and in writing,
- critically review and evaluate their own and others' work in the area using a scientific

approach, and communicate results in a final seminar with peer review, and
- compile and process relevant scientific material in the field.

Content

The course prepares students for the processing and analysis of spatial data statistics to investigate spatial patterns.

The course covers spatial data analyses in spatial statistics, intensity functions, K functions, cluster statistics, spatial interpolation, functions of spatial covariation, variogram, kriging, regression analysis, and hot-spot models. Software exercises provide students with the opportunity to perform statistical spatial analyses in order to understand the theory. Students work on a project individually or in groups. A number of individual hand-in assignments are used for discussion and problem-solving exercises in groups of students. Scientific articles are presented and discussed in groups, followed by feedback.

In their projects, students develop their own research study based on problem-solving through spatial statistical methods. Research problems for the projects are chosen in consultation with the teacher. Projects are presented both orally and in a scientific report/paper including an abstract, a background section, an introduction, a section on method, results, and discussion. Projects are assessed based on the chosen method, the written and oral presentations, and the analysis and visualisation of results.

Reading List

See separate document.

Examination

Learning outcomes are assessed based on a mandatory seminar, individual hand-in assignments, a written individual report discussed in a seminar, and peer review of another student's work.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), U (Fail) is awarded in the examination of the course. On request, one of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.