



Faculty of Social and Life Sciences  
Geo-Science

## Syllabus

### Course Approval

The syllabus was approved by the Faculty Board of Social and Life Sciences on 21 March 2007, and is valid from the Autumn semester of 2007 at Karlstad University.

**Course Code:** NGGB41

**GPS, Global navigation satellite systems, 7.5 ECTS Credits**  
**(GPS, Globala navigationssystem, 7.5 Swedish credit points)**

**Degree Level:** Bachelor

**Progressive Specialisation:** G1F (First cycle, has less than 60 credits in first-cycle course/s as entry requirements)

### Language of Instruction

The language of instruction is mainly Swedish.

### Prerequisites

Course NGGA24 (Geodesy) or equivalent.

### Major Field of Study

MÅT (Surveying and Mapping), NGA (Physical Geography)

## Learning Outcomes

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

- give an account of the principles of Global Navigation Satellite Systems (GNSS),
- give an account of and address any critical issues relating to planning, data collection, and data analysis,
- give an account of various types of instruments and their use,
- calculate financial prognoses for GNSS-based and alternative data collection methods as future users or suppliers of geodata,
- give an account of and use the Swedish control point networks and reference systems in conjunction with GNSS technology.

## Content and Form of Instruction

Instruction is in the form of lectures, practical exercises, and lab work.

The course presents basic theories about the functions of Global Navigation Satellite Systems (GNSS, e.g. GPS), such as signal types, codes, carrier wave measurement, satellite configuration requirements, and atmospheric impact. Some central focal points include project planning, choosing appropriate methods and instruments of measurement, measurement strategies, satellite signal analysis, satellite status, and atmospheric conditions.

Students carry out measurements in the field using techniques such as static measurement, real time measurement with carrier waves, code measurement, and the differential method. Measurement data is calculated using baseline calculation, session leveling, network leveling, and adjustment to principal coordinate systems.

Students also learn other applications, for example the collection of measurement data for various purposes such as navigation, GIS (positioning / attribute data), coordinate transformation and detail surveys for cartography databases.

The course also covers questions relating to local and global coordinate systems with special focus on projection systems and geodetic data. Control point networks such as national, regional, and construction site networks are also studied. The course presents examples of financial prognostication in connection with measurement projects through the computation of job cost estimates. This section will also cover the Public Procurement Act.

## Reading List

See separate document.

## Examination

Examination is in the form of written tests and assignments.

## Grades

One of the grades Pass with Special Distinction (5), Pass with Distinction (4), Pass (3), 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 assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

## Course Certificate

A course certificate will be provided upon request.

## Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

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

The course is mandatory for the GIS-engineering programme and the survey and mapping programme.

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