



Faculty of Health, Science and Technology
Geo-Science

Syllabus

GPS, Global Navigation Satellite Systems

Course Code:	NGGB41
Course Title:	GPS, Global Navigation Satellite Systems <i>GPS, Globala navigationssatellitssystem</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:

MAT (Surveying and Mapping)

NGA (Physical Geography)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2016-02-19, and is valid from the Autumn semester 2016 at Karlstad University.

Prerequisites

Passed course NGGA24 Geodesy 7.5 ECTS cr or NGGA26 Basic Geodetic Measuring Technique, 15 ECTS cr, or equivalent.

Learning Outcomes

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

- explain the principles of the Global Navigation Satellite Systems (GNSS),
- identify the critical issues relating to planning, data collection, and data analysis,
- perform planning, data collection, and data analysis,
- use different measuring methods and instrument types intended for different purposes,
- make economic calculations on GNSS-based data collection methods, and
- describe and apply the Swedish control point networks and reference systems used with GNSS technology.

Content

The course presents basic theories of 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. Central components are 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 (RTK), code measurement, and the differential method. Measurement

data are calculated using baseline processing, session adjustment, network adjustment, and transformation 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, municipal, and construction site networks are also studied. Examples of financial calculation regarding survey projects are treated through tender estimates.

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

Reading List

See separate document.

Examination

Assessment is based on a written exam, individual hand-in assignments and oral presentation in groups.

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 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.

Required course for the GIS-engineering programme and the survey and mapping programme.