



# HÖGSKOLAN I GÄVLE

## Geodetic Surveying 5 cr

*Geodetisk mätningsteknik 5 hp*

Set by Faculty of Engineering and Sustainable Development

### Version

Set at	Valid from
8/22/16	VT2018
9/5/19	VT2020

<b>Level</b>	G2F
<b>Education level</b>	First cycle
<b>Course identifier</b>	SBG662
<b>Credits</b>	5 cr
<b>Main field of study</b>	Geospatial Information Science, Geomatics, Geography, Surveying Technology
<b>Subject group</b>	Geographic Information Technology and Surveying
<b>Disciplinary domain</b>	Technology 100.0 %

**Learning outcomes** The aim of the course is to provide advanced knowledge of geodetic measurements and apply basic surveying methods in detail and control surveying and to provide advanced knowledge of geodetic measurements in connection with project design and building of houses and facilities, knowledge of regulatory framework governing these measurements, and management of collected data in GIS.

After completion of the course the student shall be able to

1. explain basic surveying concepts and provide a description of the history of geodesy
2. use some commonly used geodetic instruments (terrestrial and space based) and apply basic surveying methods in detail and control surveying
3. perform basic and advanced surveying calculations
4. explain the concept of the measurement part of a cadastral surveys
5. explain the concept of digital photogrammetry and Unmanned Aerial Systems (UAS)
6. explain the concept of detail surveying tolerances
7. explain the concept of quality assurance, control and documentation, the concepts' role and the responsibility how they are used in the surveying process.

**Course content**

- Earth-ellipsoids, geoids, map projections, coordinate systems
- Rules and regulations for surveying
- Levelling: instruments, methods, computations
- Distance and angle measurement: instruments, methods, computations
- Surveying calculations: detail (polar, intersections, free station), control points (traversing, least square adjustments)
- Coordinate transformations (uniform and affine)
- GNSS: function, basic position determination, RTK
- Theory of uncertainties: measurement uncertainties, normal and rectangular distributions, combined and standard uncertainties, least square adjustment theory.
- Quality assurance: control and documentation
- Analogue and digital photogrammetry, Unmanned Aerial Systems (UAS)

**Teaching** Lectures, exercises, laboratory sessions, and project

**Prerequisites** Introduction to Studies on Advanced Level in Geospatial Information Science, 5 credits, or equivalent

**Examination** Assignments (laboratory sessions and exercises, project, and written examination)

**Grade** A, B, C, D, E, Fx, F

**Other regulations** Degree criteria for final grade will be given by examiner or course responsible latest at the beginning of the course.

**Sustainable environment** A minor part of the course content deals with sustainable development.

<b>Module</b>			
0010	Assignments (laboratory sessions and exercises)	1.5 cr	Grade: UG
0030	Written examination	2 cr	Grade: AF
0040	Project Work	1.5 cr	Grade: UG