



# HÖGSKOLAN I GÄVLE

## Geodetic Instruments 7.5 cr

*Geodetiska mätinstrument 7,5 hp*

Set by Faculty of Engineering and Sustainable Development

### Version

**Set at**

**Valid from**

3/22/11

**VT2011**

<b>Level</b>	G1F
<b>Education level</b>	First cycle
<b>Course identifier</b>	SB203B
<b>Credits</b>	7.5 cr
<b>Main field of study</b>	Geomatics
<b>Subject group</b>	Geographic Information Technology and Surveying
<b>Disciplinary domain</b>	Technology 100.0 %

### Learning outcomes

The purpose of this course is to give the student sound knowledge of modern geodetic instruments, particularly the use of global navigation satellite systems (GNSS).

After successful completion of the course the student shall be able to:

- 1 describe the function of, test and operate levelling instruments and total stations
- 2 explain the sources of uncertainty in levelling and in total station measurements
- 3 describe existing GNSS available for geodetic positioning
- 4 explain the function of inertial navigation systems and principles of inertial positioning
- 5 explain the principles of and sources of uncertainty in GNSS observations (static and kinematic)
- 6 carry out observations, perform calculations and evaluate the results from static GNSS observations using an appropriate software
- 7 perform real time kinematic (RTK) observations
- 8 handle properly different kinds of batteries used in geodetic instruments and be aware of their environmental impact
- 9 identify laser classes used by geodetic instruments and undertake necessary precautions when using them.
- 10 critically read, analyze and reflect on a relevant research paper related to Geodetic Instruments, summarize the content of the paper and his reflections in a written report, and

present the report at a seminar.

**Course content**

- Levelling instruments, particularly digital levels, and total stations: classification, function, management, sources of uncertainty and control procedures.
- GNSS: function, applications, position calculations, transformation of data between different reference frames, evaluation of results, sources of uncertainty.
- Inertial navigation systems: function and applications.
- Terrestrial laser scanners: function and applications.
- Batteries and battery care, environmental considerations.
- Laser classification, safety considerations.
- Research, development and trends concerning modern geodetic instruments.

**Teaching**

Lectures, practicals and a literature study

**Prerequisites**

Field training in land surveying, 7.5 credits or equivalent

**Examination**

Written examination, Literature study (Written report and presentation at a seminar) and Practicals

**Grade**

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

**Limitations**

Each time the course is given there is one ordinary written examination and one re-examination.

**Sustainable environment**

Content with sustainable development is not relevant to this course.

**Module**

0070	Written examination	4 cr	Grade: AF
0080	Literature study	1 cr	Grade: UG
0090	Practicals	2.5 cr	Grade: UG