



# HÖGSKOLAN I GÄVLE

## Geodetic Measurement Uncertainty Theory and Network Adjustment 7.5 cr

*Geodetisk mätosäkerhetsteori och nätutjämning 7,5 hp*

Set by Faculty of Engineering and Sustainable Development

### Version

**Set at**

**Valid from**

2/26/18

**HT2019**

<b>Level</b>	G1F
<b>Education level</b>	First cycle
<b>Course identifier</b>	SBG314
<b>Credits</b>	7.5 cr
<b>Main field of study</b>	Geomatics, Surveying Technology
<b>Subject group</b>	Geographic Information Technology and Surveying
<b>Disciplinary domain</b>	Technology 100.0 %

**Learning outcomes** After completion of the course the student shall be able to

1. account for and explain fundamental terms and concepts in measurement uncertainty theory and geodetic network adjustment
2. setup and apply stochastic models in geodetic network adjustment
3. apply least squares adjustment and calculation/estimation of measurement uncertainty in problems described by linear and linearized mathematical models
4. identify and handle gross errors and systematic and random effects occurring in geodetic data
5. adjust and analyse one and two dimensional geodetic networks
6. apply relevant hypothesis tests in the network adjustment process

	7. carry out and evaluate simulations and improvement measures in geodetic networks.
<b>Course content</b>	<p>Measurement uncertainty and sources of uncertainty in geodetic observations  Fundamental terms and concepts in measurement uncertainty theory and network adjustment  Combined uncertainty of measurements  Statistical distributions and relevant hypothesis tests in adjustment to of geodetic networks  Adjustment strategies, the least squares method  Mathematical and stochastic models, setting of weights  Methods for identifying and handling gross errors as well as systematic and random effects in geodetic data  The network adjustment process and analysis and evaluation of adjustment results  Simulation of geodetic networks and improvement measures  Project work: network adjustment, report writing</p>
<b>Teaching</b>	Lectures, practicals, exercises and project work
<b>Prerequisites</b>	<p>Geodetic Computation Methods 7,5 credits  Basic Land Surveying 7,5 credits  Field Training in Land Surveying 7,5 credits</p> <p>or any equivalent</p>
<b>Examination</b>	<p>0010 Written examination 4,5 credits, grade A-F  0020 Exercises and practicals 1,5 credits, grade Pass or Fail  0030 Project Work 1,5 credits, grade Pass with distinction, Pass or Fail</p>
<b>Grade</b>	A, B, C, D, E, Fx, F
<b>Other regulations</b>	Grading criteria are provided by the examiner or the course responsible upon course start.
<b>Sustainable environment</b>	A minor part of the course content deals with sustainable development.
<b>Module</b>	
	0010 Written Examination 4.5 cr Grade: AF
	0020 Exercises and practicals 1.5 cr Grade: UG
	0030 Project work 1.5 cr Grade: UV