



**LUNDS UNIVERSITET**  
Lunds Tekniska Högskola

*Course syllabus*

## **Geodesi** **Geodesy**

**VGMF10, 7,5 credits, G2 (First Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED V

**Date of Decision:** 2023-03-21

### **General Information**

**Elective Compulsory for:** L3

**Elective for:** IBYI3, IBYV3, L4-gi, V4-at, V4-tv

**Language of instruction:** The course will be given in English on demand

### **Aim**

The aim of the course is to provide in-depth knowledge of concepts and methods used in satellite geodesy (GPS) and geodetic surveying with applications to real problems. Furthermore, it aims to equip students with fundamental knowledge in the methods of geo-data collection and mapping with Unmanned Aerial Vehicle (drone) and laser scanning (Lidar).

### **Learning outcomes**

*Knowledge and understanding*

For a passing grade the student must

be able to:

- have an understanding and knowledge of the connection between satellite positioning and terrestrial surveying.
- formulate various types of mathematical models for geodetic problem-solving with the help of ordinary least-squares (OLS) and other computational models.
- understand and draw up solutions to various practical problems according to the rules and norms.
- explain methods of geo-data collection and mapping using drone and Lidar

*Competences and skills*

For a passing grade the student must

be able to:

- analyze and interpret the results obtained from calculations of different types of errors and adjustment theory.
- assess the reliability of ordinary least-squares calculations.

## Contents

The fundamental principles and definitions of geodesy, reference systems and map projections, control point surveying, transformations, plane and levelling measurements, and theory of errors and adjustment. Satellite positioning methods, data collection and mapping with terrestrial surveying as well as new techniques based on drone and Lidar system. Considerable emphasis is placed on the connection between locations based on airborne (e.g. Lidar, drone), satellite borne (e.g. GPS) and terrestrial techniques.

The teaching consists of lectures, exercises and fieldwork.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** Written exam, satisfactory assignments and participation in fieldwork. For grade 3, it is needed to get approved on all assignments and field works. The written examination in the end of the course is not required for grade 3. For extra grades (4 and 5), however, the final written examination is needed.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

## Admission

**Admission requirements:**

- EXTA50 Surveying or VGMA05 Geodetic Surveying or VGMF15 Geodetic Surveying

**Assumed prior knowledge:** FMAB20 Linear Algebra OR FMAA55 Linear Algebra

**The number of participants is limited to:** No

**The course overlaps following course/s:** VGM021

## Reading list

- Charles D. Ghilani: Elementary surveying: an introduction to geomatics. Pearson, 2017, ISBN: 978-0134604657. 15 th ed.
- Handouts and scientific articles and reports.

## Contact and other information

**Course coordinator:** Sadegh Jamali, [sadegh.jamali@tft.lth.se](mailto:sadegh.jamali@tft.lth.se)

**Course homepage:** <http://www.tft.lth.se>