



# AG2926 Map Projections and Reference Systems 7.5 credits

## Kartprojektioner och referenssystem

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for AG2926 valid from Autumn 2021

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

Second cycle

## Main field of study

Built Environment

## Specific prerequisites

A completed bachelor's degree in civil engineering, urban planning, geomatics, geography, engineering physics, computer science, statistics, economics, and/or mathematics

Documented knowledge in Geodetic Surveyin Corresponding to the content in cours AG1818 together with Eng B/6 according to the Swedish upper secondary school system.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

After the course, the student should

- understand mathematical foundations in various types of map projections
- be able to calculate geodetic and projection coordinates
- be able to evaluate advantages and disadvantages of different projections
- have obtained understanding of how geodetic reference systems are constructed and possible problems
- be able to analyse relationship and difference between different reference systems
- be able to carry out transformation between different reference systems

## Course contents

- Spherical geometry and geometry of the earth ellipsoid
- Geodetic coordinates and geodetic lines
- General projection theory
- Azimuthal, conical and cylindrical projections
- UTM
- Astronomy and concept of time
- Geodetic triangulation
- Geoid and height systems
- Rotation of the Earth
- Celestial and terrestrial reference systems (ITRF, WGS 84, SWEREF 99, etc)
- 3D coordinate transformation with the Helmert model
- Estimation of transformation parameters

## Examination

- LAB1 - Laboratory work, 3.0 credits, grading scale: P, F
- PRO1 - Project work, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Other requirements for final grade

Written examination (TEN1), 3.0 credits  
Passed laboratory reports (Ã–VN1), 3.0 credits  
Passed project report (PRO1) 1.5 credits

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.