



# FAG5124 Net Optimization and Deformation Monitoring 7.5 credits

Net optimering och deformationsmonitorering

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

## Establishment

Course syllabus for FAG5124 valid from Spring 2019

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Advanced Theory of Errors

Satellite Positioning

## Language of instruction

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

# Intended learning outcomes

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

- apply different criteria for optimizing the geodetic net,
- evaluate the collected data (outliers detection, errors, etc.) for deformation analysis,
- analyse and interpret the results obtained from deformation net (geometrical and physical interpretation),
- perform simulation and optimization of geodetic networks and test the sensitivity of the net to detect deformation,
- set up proper stochastic models for geodetic network adjustments,
- use proper alarm system in deformation projects,
- perform a deformation monitoring project.

## Course contents

The purpose is to achieve ability to perform an optimal planning and realization of a geodetic network for deformation monitoring. The main content of the course are:

- Study on optimum figure of geodetic network for increasing its sensitivity to detect deformation,
- Optimization and design of monitoring networks with geodetic and nongeodetic observables,
- The functional relationship between the deformation models and the observed quantities,
- Different criteria for deformation monitoring (precision, reliability, sensitivity and economy),
- Single and multi objective optimization models (SOOM and MOOM),
- Automatic displacement monitoring algorithms,
- Geometrical and physical analyses of deformation,
- Deformation detection and alarm system.

## Course literature

- Kuang S. L. (1996). Geodetic network analysis and optimal design: concepts and applications, Ann Arbor Press, Inc., Chelsea, Michigan.
- Grafarend E.W. and Sanso F. (1985). Optimization and Design of Geodetic Networks, Springer.

- Fan H. (2010). Theory of Errors and Least Squares Adjustment. Lecture Note. ISBN 91-7170-200-8. Chapters 5 and 6.

- Scientific papers downloadable via the university's library

## Examination

- PRO1 - Project, 5.0 credits, grading scale: P, F
- SEM1 - Seminar, 2.5 credits, grading scale: P, 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.

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

## Other requirements for final grade

A written report and/or project report.

## 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.