



# FSF3670 Semi-Riemannian Geometry 1 7.5 credits

## Semi-riemanssk geometri 1

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 FSF3670 valid from Autumn 2018

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Prerequisite for the course is a strong knowledge of differential geometry (differential manifolds, tensors, differential forms) corresponding for example to the advanced level course SF2722 "Differential geometry".

## 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 have a sufficiently deep knowledge of semi-riemannian geometry to be able to start working on research projects in the area.

## Course contents

Semi-Riemannian manifolds, semi-Riemannian submanifolds, Riemannian and Lorentzian geometry, constructions of semi-Riemannian manifolds, symmetry and constant curvature, isometries, calculus of variations.

## Disposition

The course can be given as a series of lectures (possibly with presentations given by the participants), or as a self-studies course with supervision.

## Course literature

The course is primarily based on the book

- O'Neill, Barrett "Semi-Riemannian Geometry With Applications to Relativity", Academic Press, Orlando 1983.

Also used in the course are the books:

- Petersen, Peter, "Riemannian geometry". Third edition. Graduate Texts in Mathematics, 171. Springer, Cham, 2016.
- Sakai, Takashi. "Riemannian geometry". Translations of Mathematical Monographs, 149. American Mathematical Society, Providence, RI.
- Besse, Arthur L. "Einstein manifolds". Ergebnisse der Mathematik und ihrer Grenzgebiete (3) 10. Springer-Verlag, Berlin, 1987.

## Examination

- HEM1 - Home assignments, 7.5 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.

Homework assignments and oral test or presentation.

## Other requirements for final grade

Homework assignments completed, and satisfactory performance at oral test or presentation.

## **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.