

Syllabus

for course at advanced level

Elementary Differential Geometry
Elementär differentialgeometri

7.5 Higher Education
Credits
7.5 ECTS credits

Course code:	MM7021
Valid from:	Autumn 2019
Date of approval:	2015-08-21
Changed:	2015-08-21
Department	Department of Mathematics (incl. Math. Statistics)
Main field:	Mathematics/Applied Mathematics
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

This syllabus was approved by the Board of the Faculty of Science at Stockholm University on 21 August 2015. Technical revision by the Student Office 2019-04-25.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to 60 credits in mathematics, where Mathematics II – Analysis, part B, 7.5 credits (MM5011) and Mathematics II – Linear Algebra, 7.5 credits (MM5012), or equivalent, are included. Swedish upper secondary course English B/6 or equivalent.

Course structure

Examination code	Name	Higher Education Credits
F721	Elementary differential geometry	7.5

Course content

The course covers:

Multilinear algebra, change of variables for multiple integrals and differential forms, exterior derivative, closed and exact differential forms, Poincaré lemma, manifolds in $\mathbb{R}^n$, Stokes' theorem, introduction to De Rham cohomology and abstract manifolds, Riemannian metric, curvature of surfaces in $\mathbb{R}^3$, Cartan structural equations, Theorema Egregium, global curvature for compact surfaces.

Learning outcomes

After the course, students are expected to be able to:

- * define basic concepts in differential geometry and derive their elementary properties
- * account for and prove basic theorems for differentiable manifolds
- * explain and use methods in differential geometry to solve mathematical and applied problems.

Education

Instruction consists of lectures and exercises.

Forms of examination

a. The course is examined as follows: Knowledge assessment takes the form of written and oral examination.

b. Grades are assigned according to a seven-point goal-related grading scale:

A = Excellent
B = Very good
C = Good
D = Satisfactory
E = Sufficient
Fx = Fail (more work required before credit can be awarded)
F = Total fail

c. The grading criteria will be distributed at the beginning of the course.

d. To be awarded a pass, the minimum grade E is required.

e. Students who fail an ordinary examination are entitled to sit additional examinations as long as the course is offered. There is no restriction on the number of examinations. Examinations also include other obligatory elements of the course. Students who have passed an examination may not resit it in order to achieve a higher grade. Students who have failed on two occasions are entitled to request the appointment of a different examiner for the next examination. Any such request must be made to the departmental board.

The course has at least two examinations for each academic year in the years in which instruction is provided. Intervening years include at least one examination.

f. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination session.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the case of revisions to the course plan.

Limitations

The course may not be included in a degree together with the course Elementary Differential Geometry (MM8010).

Misc

The course is offered as a separate course.

Required reading

Course literature is decided by the departmental board and described thereafter in an appendix to the course plan.