



Faculty of Health, Science and Technology
Mathematics

Syllabus

Geometry

Course Code:	MAGB10
Course Title:	Geometry <i>Geometri</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
MAA (Mathematics)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2018-08-22, and is valid from the Spring semester 2019 at Karlstad University.

Prerequisites

Attended courses in Mathematics 30 ECTS cr, including MAGA52 Calculus and Geometry 7.5 ECTS cr, with 7.5 credits completed, or equivalent

Learning Outcomes

Upon completion of the course, students should be able to:

- explain and discuss an axiomatic-deductive system based on Euclid's Elements and analyse geometry from a historical perspective,
- explain and apply important geometric definitions and theorems in Euclidean geometry and perform and analyse proofs of geometric theorems,
- solve problems in Euclidean geometry and compare and assess different solutions and approaches,
- perform and analyse constructions with compass and ruler as well as mathematical software and give an account of some classic unsolvable geometry problems,
- solve geometric problems in analytical geometry with a focus on conic sections and their equations,
- apply vector geometry and analytical geometry to solve problems regarding distance and angles on a spherical surface, and
- formulate, prove and apply theorems in differential geometry of curves in space.

Content

- Axiomatic deductive systems
- Historical perspectives on geometry
- Classic Euclidean geometry and geometrical problem solving: definitions, theorems and proofs with a focus on the geometry of circles and triangles
- Constructions with compass and ruler as well as dynamic software programs

- Analytical geometry with a focus on conic sections and their equations
- Non-Euclidean geometries with a focus on spherical geometry: spherical coordinates and vector geometry applied to an idealised globe and spherical trigonometry
- Smooth curves in space: curvature and torsion, Frenet-Serret's formula and the fundamental theorem of differential geometry of smooth curves in space.

Reading List

See separate document.

Examination

Assessment is based on a written exam, and on an individual assignment involving dynamic software presented in writing.

Grades

One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.