Faculty of Health, Science and Technology
Mathematics

Syllabus

Mathematics for Teachers: Geometry

Course Code:	MAGK20
Course Title:	Mathematics for Teachers: Geometry
	Matematik för lärare: Geometri
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has at least 60 credits in first-cycle course/s as entry requirements (G2F)

Major Field of Study:
MAA (Mathematics)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2018-08-23, and is valid from the Spring semester 2019 at Karlstad University.

Prerequisites
150 ECTS credits, including Mathematics 30 ECTS credits

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.

The course MAGK20 cannot be included in the same degree programme as the courses MAGL05, MAGL12, MAGB10 or any other basic course in geometry.