Faculty of Health, Science and Technology
Mathematics

Syllabus

Mathematics with Applications in Chemistry

Course Code:	MAGA13
Course Title:	Mathematics with Applications in Chemistry *Matematik med tillämpningar inom kemi*
Credits:	15
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 2019-02-15, and is valid from the Autumn semester 2019 at Karlstad University.

Prerequisites
Registered on 60 ECTS credits in Chemistry, of which 30 ECTS credits must be completed, and upper secondary level Mathematics 4 or D, or equivalent

Learning Outcomes
Upon completion of the course, students should be able to:
1. formulate and explain definitions and theorems in one-variable analysis and apply them in calculations and problem-solving, as well as prove a given selection of the theorems covered in the course,
2. combine knowledge of concepts and theorems with experience of examples, identify analogies and make generalisations, and model some authentic processes involving change,
3. solve problems in one-variable analysis using dynamic mathematics software, and
4. implement selected parts of the course content regarding one-variable analysis and basic statistics on

chemistry problems.

Content
The concept of function and ways to introduce it. Function domain, function range, injectivity, surjectivity, bijectivity and invertability. Combination of functions and calculation of function inverse. The elementary functions; polynomial function, power function, exponential function, logarithm function, and corresponding equations and ineqalities. Trigonometric functions and the inverse trigonometric functions, hyperbolic functions, and the corresponding equations.

Limit, continuity, derivative, and derivation rules. Curve construction, extreme value problems, and Taylor's formula. Primitive function, integral and integration methods, and generalised integrals.

Number sequences and series, and basic convergence criteria. Applications, modelling, and problem-solving using one-variable analysis concepts, also with the help of dynamic mathematics software.

Basic statistical data processing relevant for chemistry problems.

Reading List
See separate document.

Examination
Assessment is based on an individual written exam, two group assignments using dynamic software which are presented in written reports, and an individual written hand-in assignment.

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.