



Faculty of Health, Science and Technology
Mathematics

Syllabus

Course Approval

The syllabus was approved by the Faculty Board of Health, Science and Technology on 19 March 2014, and is valid from the Spring semester of 2015 at Karlstad University.

Course Code: MAGA46

Mathematics for Engineers II, 7.5 ECTS Credits

(Matematik för ingenjörer II, 7.5 Swedish credit points)

Degree Level: Bachelor

Progressive Specialisation: G1F (First cycle, has less than 60 credits in first-cycle course/s as entry requirements)

Language of Instruction

Swedish

Prerequisites

Mathematics for Engineers I, 7.5 ECTS, or equivalent.

Major Field of Study

MAA (Mathematics)

Learning Outcomes

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

- differentiate products, fractions, and compositions of the elementary functions and perform implicit differentiation,
- apply derivatives to solve extreme value problems, and related rates problems,
- use the most common integration methods, such as partial integration, variable substitution and fractional decomposition,
- use integrals in applications such as calculating work, plane areas and rotation volumes,
- solve first order linear or separable ordinary differential equations,
- solve linear ordinary differential equations with constant coefficients,
- check results and partial results and verify that they are correct or reasonable,
- combine concepts, theorems, and experiences from examples, find analogies, and make generalisations.

Content and Form of Instruction

Instruction is in the form of lectures and calculation workshops.

-Definition of the derivative and calculation rules, chain reaction rules, derivative of elementary functions, implicit derivation.

-Function studies: extending and diminishing functions, extreme points, concavity.

-Applications of derivatives: tangents and normals, extreme value problems, linearisations, related rates, Taylor polynomial.

Integrals: primitive functions, the main theorem of the analysis, variable substitution, partial integration,

integration of rational functions.

-Applications of integrals: work, area calculation of plane surfaces and rotation volume.

-Ordinary differential equations: first order linear and separable differential equations respectively and linear differential equations with constant coefficients.

Reading List

See separate document.

Examination

Assessment is based on a written exam. The number of examination opportunities for earning a Pass grade is limited to three per academic year.

Grades

One of the grades U (Fail), 3 (Pass), 4 (Pass not without distinction), or 5 (Pass with distinction) 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 assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

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

Required course for the engineering programmes building construction, electronics, energy and environmental science, innovation and design, surveying and geographical IT, mechanics, mecatronics, and computer science.

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