



Faculty of Technology and Science
Mathematics

Syllabus

Course Approval

The syllabus was approved by the Faculty Board of Technology and Science on 10 May 2007, and is valid from the Autumn semester of 2007 at Karlstad University.

Course Code: MAGB15

Numerical Methods, 7.5 ECTS Credits

(Numeriska metoder, 7.5 Swedish credit points)

Degree Level: Bachelor

Progression Level: B

Language of Instruction

The language of instruction is Swedish or English.

Prerequisites

Algebra A, 7.5 ECTS, Analysis EA1, 7.5 ECTS, and Analysis EA2, 7.5 ECTS; or Mathematics for Engineers, at least 15 ECTS; or the equivalent.

Major Field of Study

Mathematics

Aims

Upon completion of the course a student should be able to

- identify mathematical problems that are impossible to solve with analytical methods and, if needed, rewrite the problems in a form suitable for a numerical solution method.
- derive, analyze, and apply standard numerical methods.
- implement numerical algorithms in MATLAB or in some programming language such as C or Fortran.

Course Content

Numerical solution methods are discussed from a theoretical viewpoint in lectures and exercises, and are illustrated by basic examples. Supervised computer sessions give the student an opportunity to implement the methods and investigate how more advanced problems can be solved.

Numerical solution of non-linear equations. Interpolation. Least squares methods. Numerical differentiation and integration. Numerical solution methods of ordinary differential equations, and introduction to numerical solution methods for partial differential equations.

Reading List

See separate document.

Examination

Examination is in the form of a written exam and mandatory assignments. The number of examination opportunities for passing the course is limited to three per academic year.

Grades

One of the grades U (Fail), G (Pass), or VG (Distinction) or 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 undergraduate studies at Karlstad University stipulate the obligations and rights of students and staff.

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