Course syllabus

Numerisk analys
Numerical Analysis

FMNF05, 6 credits, G2 (First Cycle)

Valid for: 2017/18
Decided by: PLED F/Pi
Date of Decision: 2017-04-06

General Information

Main field: Technology.
Compulsory for: D3
Elective for: C4
Language of instruction: The course will be given in English on demand

Aim

The aim of the course is to teach basic computational methods for solving simple and common mathematical problems using computers and numerical software. This includes the construction, application and analysis of basic computational algorithms. Problem solving with computers is a central part of the course.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to construct computable approximations of mathematical models which are common in science and engineering.
- be familiar with numerical algorithms to handle the above approximations.
- be able to independently implement and apply such algorithms, using mathematical software, e.g. Octave or Matlab.

Competences and skills
For a passing grade the student must

- be able to independently select and apply computational algorithms and implement
them on a computer.
• be able to evaluate both accuracy and relevance of numerical results.
• report solutions to problems and numerical results in written form.

**Judgement and approach**
For a passing grade the student must

• write a logically well structured report in suitable terminology on the construction of basic mathematical models and algorithms.
• write an well structured report in suitable terminology on the numerical solution of a mathematical problem.

**Contents**
Error analysis, numerical methods for systems of (non-) linear equations, the least squares method, polynomial interpolation, splines, Bezier curves, numerical integration, computation of eigenvalues. the Discrete Fourier transform, discrete cosine transforms.

**Examination details**
**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)
**Assessment:** The grade is based on homework reports and a written exam.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

**Admission**
**Required prior knowledge:** FMAB20 Linear Algebra, FMAA01/05 Calculus in One Variable, FMAB30 Calculus in Several Variables, and experience with MATLAB.
**The number of participants is limited to:** No
**The course overlaps following course/s:** FMN041, FMN050, FMN081, FMNF01, FMN011

**Reading list**

**Contact and other information**
**Director of studies:** Anders Holst, Studierektor@math.lth.se
**Course coordinator:** Carmen Arevalo, carmen@maths.lth.se
**Course homepage:** http://www.maths.lth.se/na/courses/FMN011