General Information

Main field: Technology.
Compulsory for: E3
Elective Compulsory for: I3
Elective for: BME4, M4, N4
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 using computers forms a central part of the course.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to choose suitable computational methods to solve simple problems that occur in mathematical models in, e.g., electronics
- be able to construct computable approximations
- be able to independently implement and apply these algorithms.

Competences and skills
For a passing grade the student must

- be able to independently select and apply computational algorithms using a computer, and be able to evaluate both accuracy and relevance of the numerical results.
- report solutions to problems and numerical results in written form.
• write a logically well structured report in suitable terminology on the construction of basic mathematical methods and algorithms.
• write a well structured report in suitable terminology on the numerical solution of a mathematical problem.

**Contents**

Software for scientific computing, error analysis, computer arithmetic, condition number, systems of linear equations, the method of least squares, calculation of eigenvalues, solution of nonlinear equations using fixed point or Newton iterations, interpolation, ordinary differential equations, basic signal processing using FFT.

**Examination details**

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)
**Assessment:** 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**

**Assumed 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:** FMNF05, FMN050, FMN011, FMN041, FMN081, FMN130, FMNF01, FMNN10

**Reading list**


**Contact and other information**

**Director of studies:** Studierektor Anders Holst, Studierektor@math.lth.se
**Course administrator:** Studerandeexpeditionen, expedition@math.lth.se
**Course homepage:** http://www.maths.lu.se/utbildning/numerisk-analys/courses-in-numerical-analysis/