Course syllabus

Numerical Analysis
Numerisk analys

FMNF10, 6.0 credits, G2 (First Cycle)

Valid for: 2024/25
Faculty: Faculty of Engineering LTH
Decided by: PLED F/Pi
Date of Decision: 2024-04-15
Effective: 2024-05-08

General Information

Main field: Technology **Depth of study relative to the degree requirements:** First cycle, in-depth level of the course cannot be classified
Mandatory for: E3
Elective mandatory for: I3
Elective for: BME4, M4, N4, R4
Language of instruction: The course will be given in English

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.

Modules
Code: 0117. **Name:** Numerical Analysis.
Credits: 6.0. **Grading scale:** TH - (U, 3, 4, 5).

Admission

Assumed prior knowledge: Linear Algebra, Calculus in One Variable, Calculus in Several Variables, and experience of programming in MATLAB or Python/NumPy.
The number of participants is limited to: No
Kursen överlappar följande kurser: FMNF05 FMN050 FMN011 FMN041 FMN081 FMN130 FMNF01 FMNN10

Reading list

- Sauer, T: Numerical Analysis - Second Edition. Pearson Education, 2013, ISBN: 9781292023588. Other printings of the second edition, with different ISBN-numbers, may also be used.

Contact

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