MATH-251(b)

Numerical analysis

Herbst Michael

Cursus	Sem.	Type
Chemistry	BA6	Opt.
Electrical and Electronical Engineering	BA4	Obl.
HES - EL	E	Obl.
Materials Science and Engineering	BA4	Obl.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The students will learn key numerical techniques for solving standard mathematical problems in science and engineering. The underlying mathematical theory and properties are discussed.

Content

The topics covered include:

- Properties and issues with numerical computation
- Finding roots and fixed points
- Polynomial interpolation
- Solving linear and non-linear equations
- Gradient-based methods for solving linear and eigenproblems
- Numerical integration and differentiation
- Basic numerical techniques for solving differential equations

Assessment methods

Written

Resources

Bibliography

- Tobin A. Driscoll, Richard J. Braun *Fundamentals of Numerical Computation*, SIAM (2022). Web version: https://tobydriscoll.net/fnc-julia/
- A. Quarteroni, R. Sacco, F. Saleri "Numerical Mathematics", Springer (2007).
- MIT's Introduction to computational thinking: https://computationalthinking.mit.edu/

Ressources en bibliothèque

- Find the references at the Library

Websites

- https://matmat.org/teaching/numerical-analysis

Moodle Link

- https://go.epfl.ch/MATH-251_b