

Computational Mathematics

Department responsible: Mathematics and Applied Mathematics

Status: Optional

Member of staff responsible: Prof Michael Taroudakis

Lecture hours: 42 (13*4)

ECTS: 10

Coursework: two projects

Syllabus:

- Elements of approximation theory
- Solving non-linear equations
- Solving systems of linear equations
 - Gauss elimination
 - Norms of Matrices and vectors
 - Iterative methods
- Data interpolation methods
- Numeric differentiation and integration
- Numerical methods for ordinary differential equations
 - Euler methods
 - Runge-Kutta methods
 - Multistep methods
 - Finite difference methods
- Finite difference methods for partial differential equations
 - Methods for parabolic equations and related problems
 - Methods for hyperbolic equations and related problems

Assessment method: 3 hr written examination at the end of semester (weight 70 %) and two projects during the semester (weight 30 %).

Learning outcome : The students will obtain skills to treat simple problems requiring numerical solutions. The problems will include non-linear algebraic equations, systems of linear equations, ordinary and partial differential equations. The students

will be capable of programming computer codes based on the most appropriate still simple algorithms developed to solve the above mentioned problems.