Study programmes: Bachelor studies – Mathematics

Course name: 4.15 – Numerical Analysis 2B

Lecturers: Sandra Živanović, Zorica Stanimirović, Milan Dražić

Status: Compulsory

ECTS: 5

Attendance prerequisites: none

Course aims: Acquiring general and specific knowledge of numerical methods for solving partial differential equations.

Course outcome: Upon completion of the course, the student has basic knowledge in numerical methods for solving partial differential equations. He is trained to solve problems from practice using numerical software packages.

Course content:

ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS

Basic a priori estimates. Variational and projection methods: Galerkin, Ritz, Least squares method, Collocation method. Finite difference method. Finite differnce "cross" scheme. Approximation and convergence. Higher accuracy scheme. Solving the difference problem (direct and iterative methods). Finite element method. Boundary element method.

PARABOLIC PARTIAL DIFFERENTIAL EQUATIONS

Basic a priori estimates. Semidiscrete methods (method of lines). Approximation, stability and convergence. Finite difference method. Approximation, absolute and conditional stability, convergence. Solving the difference problem. Economy of schemes.

HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS

Basic a priori estimates. Semidiscrete methods (method of lines). Approximation, stability and convergence. Finite difference method. Approximation, absolute and conditional stability, convergence. Solving the difference problem. Economy of schemes.

Literature:

B. Jovanović, D. Radunović, *Numerička analiza,* Matematički fakultet, Beograd, 2003.

Number of hours: 4	**Lectures**: 2	**Tutorials**: 2

Teaching and learning methods: Frontal

Assessment (maximal 100 points)

Course assignments	**points**	**Final exam**	**points**
Lectures	-	Written exam	30
Exercises / Tutorials	-	Oral exam	40
Colloquia	30	Written-oral exam	-
Essay / Project	-		