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| **UNIVERSITY OF NIŠ** | | | | | | |
| **Course Unit Descriptor** | | **Faculty** | | | Faculty of Science and Mathematics | |
| **GENERAL INFORMATION** | | | | | | |
| Study program | | | | **Mathematics** | | |
| Study Module (if applicable) | | | |  | | |
| Course title | | | | Numerical methods for ordinary and partial differential equations | | |
| Level of study | | | | Bachelor  Master’s  Doctoral | | |
| Type of course | | | | Obligatory  Elective | | |
| Semester | | | | Autumn Spring | | |
| Year of study | | | | II | | |
| Number of ECTS allocated | | | | 12 | | |
| Name of lecturer/lecturers | | | | Jelena V. Manojlović | | |
| Teaching mode | | | | Lectures Group tutorials  Individual tutorials  Laboratory work  Project work  Seminar  Distance learning  Blended learning  Other | | |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** | | | | | | |
| *Course is an advanced introduction to applications and theory of numerical methods for solution of initial value problems and boundary problems for ordinary differential equations and initial-boundary value problems for parabolic, hyperbolic and elliptic partial differential equations. As learning outcomes student should be able to apply various difference schemes using computational software program* Mathematica *as well as to perform complete stability analysis of finite difference schemes and to master the basic theory for understanding these methods* | | | | | | |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** | | | | | | |
| **Ordinary differential equations** - linear multistep methods (order of accuracy, consistence, convergence, zero-stability, absolute and relative stability, stiffness), predictor-corrector methods, Runge-Kutta methods, finite difference methods for two point boundary value problem of linear second order ODE  **Partial differential equations** - finite difference methods for the wave equations & hyperbolic PDE, the heat equation, the advection equation & parabolic PDE, the Poisson equations & elliptic PDE - order of accuracy, consistence, convergence, stability of finite difference schemes | | | | | | |
| **LANGUAGE OF INSTRUCTION** | | | | | | |
| Serbian (complete course)  English (complete course)  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)  Serbian with English mentoring Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |
| **ASSESSMENT METHODS AND CRITERIA** | | | | | | |
| **Pre exam duties** | **Points** | | **Final exam** | | | **Points** |
| **Activity during lectures** |  | | **Written examination** | | |  |
| **Seminars** |  | | **Oral examination** | | | **60** |
| **Teaching colloquia** | **40** | | **OVERALL SUM** | | | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** | | | | | | |