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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) | Mathematical models in physics |
| Course title | Numerical analysis of differential equations |
| Level of study | [ ] Bachelor [x]  Master’s [ ]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | II |
| Number of ECTS allocated | 7.5 |
| Name of lecturer/lecturers | Jelena V. Manojlović |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Course is an introduction to the most important concepts of numerical analysis of ordinary differential equations and partial differential equations. The most important numerical methods for initial value problems and boundary value problems for ODE will be studied and finite difference methods for initial-boundary value problems for parabolic, hyperbolic and elliptic PDE. 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.* |
| **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, the heat equation, the advection equation, the Poisson equations - order of accuracy, consistence, convergence, stability of finite difference schemes |
| **LANGUAGE OF INSTRUCTION** |
| [x] 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** | **60 (depending on teaching colloquia)** |
| **Seminars** |  | **Oral examination** | **40** |
| **Teaching colloquia** | **60** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |