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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 [x]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | II |
| Number of ECTS allocated | 12 |
| Name of lecturer/lecturers | Jelena V. Manojlović |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [x]  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** |
| [x] Serbian (complete course) [ ]  English (complete course) [ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)[x] 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** |