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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) | Mathematics / Mathematical models in physics |
| Course title | Partial Differential Equations |
| Level of study | [ ] Bachelor [x]  Master’s [ ]  Doctoral |
| Type of course | [x]  Obligatory [ ]  Elective |
| Semester  |  [ ]  Autumn [x] Spring |
| Year of study  | I |
| 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)** |
| *The idea of the course is to give a solid introduction to the theory and analytical solving of the first order linear and nonlinear PDE as well as to the linear second order PDE of hyperbolic, parabolic and elliptic type.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Linear and nonlinear first order PDE; Classification and canonization of the linear second order PDE;**Hyperbolic PDE:** wave equation, the D’Alembert solution of the initial problem for the wave equation, method of Riemann, existence and uniqueness of solutions of the initial value problem of the hyperbolic PDE, the Fourier method. **Parabolic PDE:** heat equations – the fundamental solution, maximum principle, the mean value problem, Poisson’s formula, existence and uniqueness and stability of solutions of the initial and the boundary value problem of the heat equation, Fourier’s method, Black-Scholes equation. **Elliptic PDE:** Laplace equation – the fundamental solution, harmonic functions, representation formula, maximum principle, mean value theorem, boundary value problem – Dirichlet and Neumann , Green's function, Poisson’s kernel and Poisson’s formula, Fourier’s method. |
| **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** | **50 (depending on teaching colloquia)** |
| **Practical teaching** |  | **Oral examination** | **50** |
| **Teaching colloquia** | **50**  | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |