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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | **Physics** |
| Study Module (if applicable) |  |
| Course title | **Principles of Quantum Scattering Theory** |
| Level of study | [ ] Bachelor [ ]  Master’s [x]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | First |
| Number of ECTS allocated | 12 |
| Name of lecturer/lecturers | Ivan Mančev |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| This course is intended for any PhD student who wants a thorough grounding in quantum theory of nonrelativistic scattering. The common denominators of the most influential theoretical studies in the past literature on collisions are principles of quantum scattering theory. This course is special in that it intertwines many fundamental and important stands ranging from mathematically rigorous general physical principles of quantum scattering theory, through illustrations presenting the results of the most comprehensive computations. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
|  The Scattering operator. Asymptotic orthogonality and asymptotic convergence of scattering states. Scattering of two spinless particles. Invariance principles and conservation lows. Green's functions and their connection with Moller operators and scattering operators. Bohr expansions. The stationary scattering states. Coulomb scattering. Correct boundary conditions. Multi-channel problem. Lippman-Schwinger equation. Distorted wave method. Identical particles. Dispersion relations. |
| **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** |  |
| **Practical teaching** |  | **Oral examination** | **60** |
| **Teaching colloquia** | **40** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |