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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Occupational Safety in Niš |
| **GENERAL INFORMATION** |
| Study program  | Environmental Protection |
| Study Module (if applicable) | / |
| Course title | Environmental Electromagnetic Radiation |
| Level of study | ☒Bachelor ☐ Master’s ☐ Doctoral |
| Type of course | ☒ Obligatory ☐ Elective |
| Semester  | ☒ Autumn ☐Spring |
| Year of study  | III |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | Dejan Krstić, Dejan Petković |
| Teaching mode |  ☒Lectures ☒Group tutorials ☐ Individual tutorials ☐Laboratory work ☒ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☒ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Acquiring knowledge from the theory of macroscopic electromagnetic fields in linear isotropic and stationary environments and from quantum radiation theory. Providing the necessary knowledge for taking the course Protection against electromagnetic radiation.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| **INTRODUCTION: Electrostatic field,Electrical induction vector, third Maxwell’s equation, Magnetic field, magnetic induction flux, fourth Maxwell’s equation, Magnetic field in matter, Ampere’s Law generalization, dielectric shift current, first Maxwell’s equation, Electromagnetic induction, Faraday’s Law generalization, second Maxwell’s equation, Stationary electric field, charge continuity equation, Charge carriers, Ohm’s Law in local form, Complete system of equations of macroscopic EM field in stationary environments. WAVE EQUATION: Wave equation for potentials and transfer speed of EM disturbance, Solution of wave equation, solution analysis, plane, cylindrical, and spherical waves, Simple periodical EM waves and Helmholtz equation, Helmholtz equation solution, EM wave properties in dielectrics, semi‐ conductive, conductive, and ionized environment, Reflection, transmission, and absorption of EM waves. EM RADIATION: Electrical dipole and electrical component of EM wave, Current element and magnetic component of EM wave, Hertzian dipole and dipole as a harmonic oscillator, Radiation zones and dipole radiation characteristics. EM SPECTRE AND CORPUSCULAR QUANTUM RADIATION: LF radiation, RF radiation, IR radiation, optical radiation, UV radiation, ionizing radiation, Wave‐quantum laws of radiation, corpuscular quantum movement in atoms, thermal radiation, optical radiation, thermal radiation laws, ionization energy, Occupational EM radiation sources, RF radiation, laser radiation, radioactive decay law, radioactive radiation, dosimetry of ionising radiation.** |
| **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** | **5** | **Written examination** | **20** |
| **Practical teaching** | **10** | **Oral examination** | **35** |
| **Teaching colloquia** | **15+15** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |