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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Electrical Engineering |
| **GENERAL INFORMATION** |
| Study program  | Electrical Engineering and Computing |
| Study Module (if applicable) | Telecommunications |
| Course title | Antennas and propagation |
| Level of study | [x] Bachelor [ ]  Master’s [ ]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | 4 |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | Dončov S. Nebojša, Stanković Ž. Zoran |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [x] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| The acquisition of theoretical and practical knowledge of radiation and reception of EM waves using antennas and EM waves propagation radiated by antennas. Understanding the EM nature and working method of the antenna in the transmitting and receiving mode. Knowledge of different types of antennas that are used in telecommunications. Ability to apply the antenna design and measurements procedures. Knowledge of nature of EM wave propagation and how the waves propagate over the earth's surface. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Classification of antennas. Wire antennas. Horn antennas. Reflector antennas. Lens antennas. Printed antennas. Broadband antennas. Frequency independent antennas. Antenna arrays. Adaptive antenna systems. Methods of antenna analysis and antenna synthesis. Software tools for the design of antennas and scattering objects. Antenna measurements. Examples of practical antennas in fixed and mobile wireless communications systems. The influence of antenna parameters and the environment on the trajectory of EM waves. Ground waves. Methods for the prediction of electric field level of the ground waves. Spatial waves. Diffraction effects. Methods for the prediction of electric field including diffraction effects. Propagation models in specific regions. Propagation of radio waves through the ionosphere. Calculation of wave trajectory parameters in the ionosphere. Auditory exercises: Practical problem solving in the field of antennas analysis, antennas synthesis and EM wave propagation analysis. Labs: Antenna measurements, practical work with software tools for the antenna design and software tools for the EM wave propagation analysis. |
| **LANGUAGE OF INSTRUCTION** |
| [ ] Serbian (complete course) [x]  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** | **15** | **Oral examination** | **20** |
| **Teaching colloquia** | **40** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |