**The Name of Institution:**     *Faculty of Electrical Engineering, University of Belgrade*

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<tr><td colspan="8" align="center">***Description of an Individual Course Unit***</td></tr>
<tr><td>**Course Code:**</td><td>13E073SAP</td><td>**Level of Course:**</td><td>Undergraduate</td><td>**ECTS**</td><td>**6**</td><td>Semester:</td><td>7</td></tr>
<tr><td>**Course Title:**</td><td colspan="4">Software tools for antenna design</td><td colspan="2">Year of Study:</td><td>4</td></tr>
<tr><td>**Prerequisites:**</td><td colspan="4">None</td><td>**Type of course:**</td><td colspan="2">Elective</td></tr>
<tr><td>**Lecturer(s):**</td><td colspan="7">Dr Branko Kolundzija, dipl. inž. Slobodan Savić</td></tr>
<tr><td>**Course Staff:**</td><td colspan="7"></td></tr>
<tr><td>**Objective of the course:**</td><td colspan="7">Introduce students to the most important software tools for 3D electromagnetic modeling and to prepare them for individual design of antennas and scatterers.</td></tr>
<tr><td>**Course Contents:**</td><td colspan="7">1. Introduction. Significance of software tools in antenna and scatterer design. Historical review.<br>2. General principles in electromagnetic modeling.<br>3. Numerical methods used in the analysis of antennas and scatterers: MoM, FEM, TLM, FDTD, PO, GO, Hybrid techniques.<br>4. Review of software tools for antenna and scatterer design: NEC, MiniNEC, SuperNEC, WireZeus, AWAS, OSU code, FEKO, IE3D, HFSS, WIPL-D.<br>5. Introduction to the software packages AWAS and WIPL-D.<br>6. Advanced techniques for antenna and scatterer design.<br>7. Assessment and improvement of the results of analysis.<br>8. Distinctiveness in the modeling of scatterers.<br>9. Distinctiveness in the modeling of special classes of antennas (wire, helicoidal, horn, reflector, and patch antennas).<br>10. Modeling of antenna arrays.<br>11. Optimization: general principles, methods, software.<br>12. Design of antennas and scatterers using AWAS i WIPL-D.</td></tr>
<tr><td>**Teaching Methods:**</td><td colspan="7">15 hours of lectures + 45 hours of supervised problem classes in the laboratory.<br>Approximately 75 hours of personal study and exercise (4 hours per week during semester, and approximately 15 hours of preparation during exam term).</td></tr>
<tr><td>**Literature:**</td><td colspan="7">B.M. Kolundzija et al., *WIPL-D Microwave: Circuit and 3D EM simulation for RF & Microwave Applications, Software and User's Manual*, Norwood, Artech House, 2005.<br>A.R. Djordjević, M.B. Bazdar, V.V. Petrović, D.I. Olćan, T.K. Sarkar, R.F. Harrington, *AWAS for Windows: Analysis of Wire Antennas and Scatterers, Software and User's Manual*, Version 2.0 Boston, Artech House 2002.<br>B.M. Kolundžija, J.S. Ognjanović, and T.K. Sarkar, *WIPL-D: Electromagnetic Modeling of Composite Metallic and Dielectric Structures, Software and User's Manual*, Boston: Artech House, 2000.</td></tr>
<tr><td>**Assessment methods:**</td><td colspan="7">Exam - Three-hour examination (30 points maximum). Successful laboratory work adds 70 points. To pass the course, at least 51 points must be achieved.</td></tr>
<tr><td>**Language of instruction:**</td><td colspan="2">Serbian</td><td>Date</td><td colspan="2">18.10.2017.</td><td colspan="2">Signatur:</td></tr>
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