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| **UNIVERSITY OF NIŠ** | | | | | | |
| **Course Unit Descriptor** | | **Faculty** | | | The Faculty of Electrical Engineering | |
| **GENERAL INFORMATION** | | | | | | |
| Study program | | | | Electronics and Microsystems | | |
| Study Module (if applicable) | | | | Electronics | | |
| Course title | | | | Mixed signal integrated circuit design | | |
| Level of study | | | | ☐Bachelor ☒ Master’s ☐ Doctoral | | |
| Type of course | | | | ☐ Obligatory ☒ Elective | | |
| Semester | | | | ☒ Autumn ☐Spring | | |
| Year of study | | | | 1 | | |
| Number of ECTS allocated | | | | 6 | | |
| Name of lecturer/lecturers | | | | Petković M. Predrag, Damnjanović S. Milunka | | |
| Teaching mode | | | | ☒Lectures ☐Group tutorials ☐ Individual tutorials  ☒Laboratory work ☐ Project work ☐ Seminar  ☐Distance learning ☐ Blended learning ☐ Other | | |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** | | | | | | |
| *Adoption and systematization of knowledge necessary for designing electronic circuits which imply digital and analog signals with special emphasizes on point of interconnection between digital and analog domains. Gaining competence for mixed signal integrated circuit design. It is expected for students to learn how to use VHDL-AMS to model mixed signal circuits, dimension components of analog and digital parts, use programs for verification and physical design of integrated circuits, write project documentation and present project results.* | | | | | | |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** | | | | | | |
| VHDL-AMS basics. ADC and DAC behavioural models. Quantization noise. Convertor performances. Effective number of bits. Improving signal-to-noise ratio using feedback. Circuits for noise shaping. Improving signal-to-noise ratio with averaging. Sampling circuits. Switched Capacitor (SC) and Switched Current (SI) circuits. Programmable gain amplifiers (PGA). ADC architectures and design. Sigma-Delta (SD) modulator. MASH architecture. Decimation filters for ADCs. DAC architectures and design. Effects of signal cross-talk. Clock signal. Thermal effects. Substrate effects. Influence of parameter tolerance and component mismatch. Knowledge adopted from theoretical lectures is further improved through skills obtained working in one of the leading industry CAD/EDA standards, Mentor Graphics ASIC Design Suite, in UNIX/LINUX  **environment.** | | | | | | |
| **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** | **10** | | **Written examination** | | |  |
| **Practical teaching** | **60** | | **Oral examination** | | | **30** |
| **Teaching colloquia** |  | | **OVERALL SUM** | | | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** | | | | | | |