

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|--------------------------|
| Study program: Multimedia communication technologies | | | |
| Course title: Telecommunications measurement | | | |
| Professor/assistant: Slavimir N. Stošović, Ph. D | | | |
| Type of course: compulsory | | | |
| ECTS credits: 6 | | | |
| Pre-requisites: none | | | |
| Aims of the course: To prepare students to: - Understand the importance of measuring systems. - Understand modern measurement principles in telecommunication systems. - Learn the structure, elements and ways of connecting electronic measuring instrumentation for measurement in multimedia telecommunications. - Analyze performances in coaxial and optical KDS systems in order to optimize them. | | | |
| Learning outcomes: By mastering the subject, a student will be able to: - Determine the measurement method and the procedure that will be applied to digital communications networks. - Use measuring systems in multimedia telecommunication systems. - Perform self-measurement tasks in modern telecommunications - Perform an analysis of measurement results and specifications. Defining adequate methods for measuring, processing and presentation of measurement data. | | | |
| Syllabus <i>Theoretical part</i> Specificity in measurement in telecommunications. Analog and digital systems and signals. A / D and D / A conversions. Acquisition of measurement data. Signal spectrum. Measurements in the spectral domain. Spectrum analyzers: the principle of operation and typing. Application of the spectrum analyzer. Frequency measurement. Measuring high frequencies. The heterodyne and Transfer-oscillator method. Measuring RF signal strength. Thermopreparators. Measurement of noise parameters. Measurements in cable systems. Localization of irregularities on transmission lines. Measuring the level of radio and TV signals. Electromagnetic compatibility and EMC standards. Methods of measurement and testing of EMC. Measurements in optical communications. Optical spectrum analyzer. Optical reflectometry. Measurements in digital communications systems. BER characterization. Measurements for broadband access networks. Measurements on computer networks. Protocol analyzers. Automation of measurement. Examples of automated measuring systems. Virtual instrumentation. <i>Practical part</i> Development of simulated telecommunication network project and measurement of communication parameters - Simulink and Matlab. Creation of the project of a virtual measuring instrument for measuring the signal in the spectral domain - Simulink and Matlab. Practical work on OTDR and splicer. | | | |
| Literature 1. Radenković, B., Elektronska merna instrumentacija, Niš, 2005 2. Dončov N., Merenja u telekomunikacijama – skripta, Elektronski fakultet Niš 2009. 3. Drndarević, V., Personalni računari u sistemima merenja i upravljanja, Akad. misao, 2003. 4. Antić B., Nikolić M., Pjevalica N., Pjevalica V., Merenja u pristupnoj mreži za širokopojasni prenos, FTN Novi Sad, 2008. | | | |
| Number of active classes | | | Other forms of teaching: |
| Lectures: | Practical classes: | Research work: | |
| Teaching methods Combination of interactive approach with practical problem solving. | | | |
| Grading system (maximum 100 points), grading scale from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points. | | | |
| Pre-exam obligations | points | Final exam | points |
| activity during theoretical lectures | 20 | written exam | 20 |
| practical training | 20 | oral exam | 10 |
| colloquium(s)/seminar papers | 30 | | |
| Sum | 70 | Sum | 30 |