

Study program: Communication technologies			
Course title: Cable Telecommunication Systems			
Professor/assistant: Nikola Sekulović, Ph. D			
Type of course: compulsory			
ECTS credits: 7			
Pre-requisites: none			
Aims of the course: Introducing students with constructive and transmission characteristics of twisted pairs, coaxial lines and optical fiber cables, working principles and methods for implementation of various cable telecommunication systems.			
Learning outcomes: Students are trained to define elements and structure of cable telecommunication systems and analyze their performance.			
Syllabus			
<u>Theoretical part</u> Communication system performance indicators. Transmission medium and its impact on quality of service. Comparative characteristics of wired media. Cables with twisted pairs - methods for twisting of insulated conductors, classification, application, transmission characteristics, categorization of UTP, new types of cabling, primary and secondary parameters, amplitude distortion, condition of minimum attenuation, Pupinization. Public Switched Telephone Network (PSTN) - general structure, circuit-switched network, local telephone exchanges. Organization of the national telephone network. Modulation techniques. Modem standards. Technology and types of DSL. Coaxial cables - physical description, transmission characteristics, application, primary and secondary parameters, optimal dimensions of coaxial line, classification of coaxial cables. Cable distribution systems - architecture and topology, hybrid fiber coaxial (HFC) network, modifications to the system in order to provide interactive services, realization of final distribution network, line and distribution amplifiers. Optical fiber cables - structure of optical fiber, light propagation through optical fiber, numerical aperture, profile of the refractive index, classification of optical fibers, causes of attenuation in fiber, optical windows, laying of optical fiber cables. Elements of optical communication systems. WDM, CWDM, DWDM. Passive optical network (PON). FTTx networks. EDFA amplifiers.			
<u>Practical part</u> Primary and secondary parameter calculations for twisted pairs and coaxial lines. Realization of amplitude and phase corrector. Realization of final distribution network, computation of elements of line amplifiers and power supplying. Calculation of attenuation of regenerative section, power budget and margin of optical systems.			
Literature			
1. V. Šćepanović, <i>Telekomunikacioni kablovi</i> , Javno preduzeće PTT Srbija, 1994. 2. N. Dončov, <i>Kablovski i optički komunikacioni sistemi</i> , Autorizovana predavanja, Elektronski fakultet, Niš, 2009. 3. B. Milovanović, Z. Marinković, <i>Projektovanje telekomunikacionih sistema</i> , Autorizovana predavanja, Elektronski fakultet, Niš, 2005.			
Number of active classes			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	
Teaching methods Lectures, computational exercises with examples from practice, consultations.			
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	10	written exam	20
practical training	10	oral exam	10
colloquium(s)/seminar papers	50		
Sum	70	Sum	30