

<b>Study program: Communication technologies</b>			
<b>Course title: Digital TV Systems</b>			
<b>Professor/assistant: Zoran Milivojević, Ph.D</b>			
<b>Type of course: compulsory</b>			
<b>ECTS credits: 6</b>			
<b>Pre-requisites: Analogue TV systems, Elementary Telecommunications</b>			
<b>Aims of the course:</b>			
The aim is to introduce students to basic terms referring to digital systems for recording, coding, compression, transmission, receiving and reproduction of TV and tone signals.			
<b>Learning outcomes:</b>			
Servicing and maintaining systems for digital TV color signal transmission, installation and maintenance of systems for receiving satellite TV programs and maintenance of KDS systems.			
<b>Syllabus</b>			
<u>Theoretical part</u>			
Digital TV- term. Significance of digital TV in modern society. Development of digital TV. Structure of digital TV systems. Transmitter. Receiver. Digitalization of video signal. Multiplexing of digital signals. Source coding. Reduction of bit rate. RLC coding. VLC coding. Two-dimensional DCT. Coding matrix. Static picture compression. JPEG compression. Compression of picture with movement. MPEG standard. Types of MPEG pictures. Parameters of movement. MPEG-2 coder. MPEG-2 decoder. Audio signal coding. MPEG audio coder. MPEG audio decoder. Source multiplexing. MPEG-2 digital stream. ES package. PES package. TS package. Channel coding. Scrambling. RS coding. Convolution coding. Digital modulation. Amplitude shift keying (ASK). Frequency shift keying (FSK). Phase shift keying (PSK). Quadrature amplitude modulation (QAM). Digital signal transmission. Satellite transmission (DVB-S). Cable transmission (DVB-C). Transmission via earth broadcasting transmitter (DVB-T). Digital TV receivers. Satellite TV receivers. Cable TV receivers. Receivers for TV signals via broadcasting transmitter.			
Digitalization of analogue signals. Sampling. Quantization. Coding. Compression. Hierarchy of digital systems. Synchronization. Performance of PCM. Delta modulation. Differential pulse code modulation. Digital transmission in baseband. Decoding. Regeneration. Scrambling. Systems with amplitude and phase modulation. Laser. Detectors of light. Regeneration of light signal. Optical fiber. Attenuation in optical fiber.			
<u>Practical part</u>			
Practice. Visits to a satellite station. Visits to KDS distributors. Visits to a television studio.			
<b>Literature</b>			
<ol style="list-style-type: none"> <li>1. Topalović, M., <i>Digitalna televizija</i>, RTS Beograd, 1992.</li> <li>2. Benoit, H., <i>Digital Television</i>, Focal Press, Oxford, 2002.</li> </ol>			
<b>Number of active classes 60</b>			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	
<b>Teaching methods</b>			
Combination of interactive approach with practical problems solving.			
<b>Grading system</b> (maximum 100 points), <b>grading scale</b> 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.			
<b>Pre-exam obligations</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
activity during theoretical lectures	<b>10</b>	written exam	
practical training	<b>10</b>	oral exam	<b>30</b>
colloquium(s)/seminar papers	<b>50</b>		
<b>Sum</b>	<b>70</b>	<b>Sum</b>	<b>30</b>