COURSE SHEET

Course name	**Measurements in Networks**
Acronym	MN

Level:

1. (BSc)	*2. (MSc)*
	X

Field of study:

Electronics and Telecommunications	*Control Engineering and Robotics*	*Informatics*
X		

Person responsible for the course:

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List of Topics - Lecture

No	*Topic*	*Level of knowledge*			*skills*		*No of hours*
		A	*B*	*C*	*D*	*E*	
1.	Metrology fundamentals in digital telecommunication network.		*X*				0.5
2.	Characteristics of measured parameters and measurement methods.		*X*				0.5
3.	Measurements of wave and work parameters for items in telecommunications network. Measurement conditions, test signals. Symmetric and asymmetric circuits.		*X*				1
4.	Impedance measurements, technical and laboratory methods.		*X*				1
5.	Measurements of insertion or composite loss, gain and group delay. Linear distortions.		*X*				1
6.	Measurements of sources of signal transmission disturbances, return loss, unbalance about earth, crosstalk attenuation.		*X*				1
7.	Nonlinear distortions, measurement methods and circuits.		*X*				1
8.	Measuring methods in pulse code modulation systems. Measurements conditions.		*X*				0.67
9.	Measurements of digital systems in A-A, A-D, D-A and D-D sections.		*X*				0.67
10.	Error rate measurement on digital links.						0.67
11.	Phase fluctuations in digital systems, phase jitter and wander, measurements methods.		*X*				0.67
12.	MTJ parameter and jitter transfer characteristics measurement in regenerative repeaters.		*X*				1
13.	Transmission network failures localization. Noise immunity of regenerative repeater evaluation.						0.5
14.	Principles of "in service" transmission quality evaluation.		*X*				0.5
15.	Measurements of SDH systems specific parameters. Examination object and target.		*X*				0.5
16.	Calculation examples for Reference Performance Objective RPO for point-to-point digital path. Finding Bring Into Service BIS parameter.		*X*				0.67
17.	Q quality factor in optical DWDM telecommunication. OSNR measurement, Measurements of selected transmissions parameters of DWDM systems in optical network.		*X*				1
18.	Measurements of information transmission quality in Ethernet based transport network.		*X*				0.67
19.	Evaluation of transmission quality for xDSL systems.		*X*				0.5
20.	Speech transmissions quality measurements and quantities in VoIP technology packet networks. Used measurement methods.		*X*				1
						Total	**15**

List of Topics - Lab

No	*Topic* [c]	*Level of* [d]					*No of hours* [e]
		knowledge			*skills*		
		A	*B*	*C*	*D*	*E*	
1.	Measurement equipment and measure principles for telecommunications analog and digital systems.				*X*		1
2.	Measurements of composite loss and composite gain. Attenuation distortions.				*X*		2
3.	Measurements of phase shift and group delay distortions.				*X*		2
4.	Measurements of complex impedance and its magnitude.				*X*		2
5.	Measurements of return loss and unbalance about earth. Measurements of crosstalk attenuation in transmission lines.				*X*		2
6.	Nonlinear distortions measuring methods. Finding of amplifier useful level.				*X*		2
7.	Measurements of quantizing distortions in PCM channel. Finding of overload point level for PCM multiplexer. Channel parameters.				*X*		2
8.	Work measurements of PCM system link. Noise immunity of regenerative repeater evaluation. Phase jitter and its accumulation.				*X*		2
					Total [f]		**15**