

## COURSE SHEET

Course name	<b>Data-transmission Code Protection</b>
Acronym	DTCP

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					No of hours
		knowledge			skills		
		A	B	C	D	E	
1.	Introduction, data transmission system block structure, error correcting codes classification, modes of implementation.		X				1
2.	Baseband codes: goals of use, requirements, differential encoding, NRZ, RZ, PT, BPh codes, substitution codes, block codes.		X				1
3.	Error correcting code optimum decoding rule: Maximum A'Posteriori Probability (MAP) decoder, Maximum Likelihood (ML) decoder.		X				1
4.	Mathematical models of digital channels with bursts of errors, requirements, classification. Gilbert-Elliott model, Fritchman model. Multi-state Gilbert-Elliott model for channel with Rayleigh fading.		X				1
5.	Elements of algebra: groups, rings, Galois fields, vector spaces.		X				1
6.	Block linear codes: construction rules, minimum distance of code, correction and detection capacity of code. Generating matrix, canonical matrix.		X				1
7.	Dual code, McWilliams theorem. Modification of linear codes: shortening, lengthening, puncturing, extending, expurgating, augmenting.		X				1
8.	LPDC codes.		X				1
9.	Cyclic codes: polynomial formalism, quotient codes, generating polynomial, checking polynomial. Systematic cyclic codes, structure of coder and decoder of cyclic code, cyclic code decoding.		X				1
10.	BCH codes- decoding- Peterson algorithm.		X				1
11.	Reed-Solomon codes.		X				1
12.	Convolutional codes: rules of construction, description methods, systematic, non-systematic codes, standard codes, codes modifications.		X				1
13.	Turbo-codes, encoder construction, iterative decoding.		X				1
14.	Soft-decoding of block and convolutional codes.		X				1
15.	Trellis coded modulation.		X				1
<b>Total</b>							<b><u>15</u></b>

## List of Topics - Seminar

No	Topic	Level of		No of hours
		knowledge	skills	

		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
1.	Wireless channel transmission characteristics.				X		1
2.	Transmission codes spectral properties				X		1
3.	Wireless digital channel models.				X		1
4.	Possibilities of GUAVA software packet.				X		1
5.	ARQ-data transmission systems.				X		1
6.	Information feedback data transmission systems.				X		1
7.	Encoding of messages written on CD discs.				X		1
8.	Decoding algorithms for BCH codes.				X		1
9.	Decoding algorithms for Reed-Solomon codes.				X		1
10.	Turbo-code decoding algorithms.				X		1
11.	Comparison soft- versus hard-decoding.				X		1
12.	LPDC codes.				X		1
13.	Fountain codes.				X		1
14.	Tornado-codes.				X		1
15.	Transmission properties of trellis coded modulation signals.				X		1
<i>Total</i>							<b><u>15</u></b>