ELEC4704 COURSE CATALOG INFO

Course Code : ELEC4704				**Course Name :** Communication Simulation Techniques and Laboratory			
Semester	**Lecture (Le+T+L)**	**Local Credit**	**ECTS**	**Language**	**Category**	**Instructional Methods**	**Prerequisites**
7 or 8	(2+0+2)	3	5	English	Elective	Lecture and Laboratory	Corequisite: ELEC3701
Course Content	Experimental analysis and realization of analog (AM, DSB, SSB, FM/PM) and digital (ASK, PSK, FSK, QAM) modulators and demodulators using communications hardware blocks. Masurement of noise, error rate and error correction performance. Simulation of digital and analog communication systems using MATLAB.						
Course Outcomes	**CO 1.** Model communication systems, i.e, transmitter-channel-receiver **CO 2.** Design basic modulator and demodulator circuits, simulate modulation and demodulation techniques **CO 3.** Evaluate the performance of selected analog and digital modulation techniques **CO 4.** Use MATLAB, for modeling, simulation, and design of communication systems						

COURSE PLAN		
W1	Introduction to communication systems	
W2	Introduction to communication systems	Modelling an Equation
W3	AM modulation and demodulation: Theoretical background and simulation in MATLAB	AM modulation and demodulation: Experimental set-up
W4	AM modulation and demodulation: Theoretical background and simulation in MATLAB	AM modulation and demodulation: Experimental set-up
W5	DSB-SC modulation and demodulation: Theoretical background and simulation in MATLAB	DSB-SC modulation and demodulation: Experimental set-up
W6	SSB modulation and demodulation: Theoretical background and simulation in MATLAB	SSB modulation and demodulation: Experimental set-up
W7	FM modulation and demodulation: Theoretical background and simulation in MATLAB	FM modulation and demodulation: Experimental set-up

W8	PCM modulation and demodulation: Theoretical background and simulation in MATLAB	PCM modulation and demodulation: Experimental set-up
W9	The noisy channel model: Theoretical background and simulation in MATLAB	The noisy channel model: Experimental set-up
W10	Eye pattern and BER measurement: Theoretical background and simulation in MATLAB	Eye pattern and BER measurement: Experimental set-up
W11	Digital communication systems (1/4): Theoretical background and simulation in MATLAB	Digital communication systems (1/4): Experimental set-up
W12	Digital communication systems (2/4): Theoretical background and simulation in MATLAB	Digital communication systems (2/4): Experimental set-up
W13	Digital communication systems (3/4): Theoretical background and simulation in MATLAB	Digital communication systems (3/4): Experimental set-up
W14	Digital communication systems (4/4): Theoretical background and simulation in MATLAB	Digital communication systems (4/4): Experimental set-up

COURSE ASSESMENT AND ECTS WORK LOAD

Type of Work	Count	ECTS WORK LOAD	
		Time (Hour)(Including prep. time)	**Work Load**
Attendance	14	2	28
Final Exam	1	10	10
Quizzes			0
Term project			0
Reports	10	2	20
Final Project			0
Seminar			0

Assignments	5	5	25
Presentation			0
Midterms			0
Project	1	14	14
Laboratory	14	2	28
Tutorial	0	0	0
Other(Self study, Paper reviews)			0
		Total work load	125
		Total work load/25	5
		ECTS Credit	5

PROGRAM OUTCOMES - COURSE OUTCOMES RELATIONS		
PO	**Program Outcomes**	**CO**
1	**1.1.** Adequate knowledge in fundamentals of mathematics (algebra, differential equations, integrals, probability etc), science (physics, chemistry, biology etc.) and computer science (programming and simulation);	
	1.2. ability to use theoretical and applied knowledge in these areas in complex engineering problems.	
2	**2.1.** Ability to identify, formulate, and solve complex engineering problems;	1,..,4
	2.2. ability to select and apply proper analysis and modeling methods for this purpose.	1,..,4
3	**3.1.** Ability to design and integrate components of a complex system or process, as they relate to Electrical and Electronics Engineering discipline, under realistic constraints and conditions, in such a way as to meet desired requirements;	
	3.2. ability to apply modern design methods.	
4	**4.1.** Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice;	
	4.2. ability to employ information technologies effectively.	

5	**5.1.** Ability to design experiments,	
	5.2. ability to conduct experiments, gather, analyze and interpret data.	
6	**6.1.** Ability to work in intra-disciplinary teams;	
	6.2. ability to work in multi-disciplinary teams;	
	6.3. ability to take individual responsibilities.	
7	**7.1.** Ability to effectively communicate via written and oral means;	
	7.2. knowledge of at least one foreign language;	
	7.3. ability to write effective reports and comprehend written reports;	
	7.4. ability to write design and manufacturing reports	
	7.5. ability to present effectively,	
	7.6. ability to give and follow clear instructions.	
8	**8.1.** Recognition of the need for lifelong learning;	
	8.2. ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	
9	**9.1.** Consciousness to behave according to ethical principles, and about professional and ethical responsibility;	
	9.2. knowledge on standards used in engineering practice.	
10	**10.1.** Knowledge about business life practices such as project management, risk management, and change management;	
	10.2. awareness in entrepreneurship, innovation;	
	10.3. knowledge about sustainable development.	
11	**11.1.** Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering;	
	11.2. awareness of the legal consequences of engineering solutions.	