ELEC2212 COURSE CATALOG INFO

Course Code : ELEC2212				**Course Name :** Circuit Theory II			
Semester	**Lecture (Le+T+L)**	**Local Credit**	**ECTS**	**Language**	**Category**	**Instructional Methods**	**Prerequisites**
4	(4+1+0)	4	7	English	Core	Lecture	ELEC2201 OR ELEC2205
Course Content	Phasor transform and sinusoidal steady state analysis of circuits. Ideal transformers. Power calculations for circuits with sinusoidal sources, complex power. Impedance matching for maximum power transfer. Laplace transform. Transient and steady state analysis of time invariant circuits using Laplace transform. Transfer function and impulse response. Convolution integral in circuit analysis. Frequency response and frequency selective circuits. Passive and active filter circuits. Two-port circuit characterization and analysis of terminated two-port circuits.						
Course Outcomes	**CO 1.** Model circuits driven by sinusoidal sources in the frequency domain using phasor concepts to determine the sinusoidal steady state response of a linear circuit **CO 2.** Perform power calculations in sinusoidal steady state and determine conditions for maximum power transfer **CO 3.** Apply Laplace transform techniques to circuit analysis **CO 4.** Calculate the transfer function and impulse response of a circuit and apply convolution to determine the response of the circuit **CO 5.** Obtain the frequency response of RL, RC and RLC circuits that act as filters **CO 6.** Design passive and active filter circuits to meet specifications of cutoff frequency and passband gain						

COURSE PLAN	
W1	Sinusoidal sources, phasor representations, characteristics of circuit elements in frequency domain, impedance and reactance. Kirchoff's laws. Techniques of circuit analysis in the frequency domain.
W2	Transformers. Power calculations for circuits with sinusoidal sources.
W3	Laplace transform, its properties, inverse Laplace transform.
W4	Analysis of time varying circuits using Laplace transform, s-domain representation of circuit elements, the transfer function.
W5	The convolution integral, using the transfer function to find steady state sinusoidal responses, impulse functions in circuit analysis.
W6	Frequency selective circuits, frequency response plots. Review.
W7	Concept of filtering, lowpass and highpass filters.

W8	Bandpass and bandstop filters, active filter circuits.
W9	Active filter and higher order filter design.
W10	Butterworth filter design.
W11	Fourier series representation of periodic functions.
W12	The Fourier transform.
W13	Two port analysis
W14	Review

COURSE ASSESMENT AND ECTS WORK LOAD			
Type of Work	**Count**	**ECTS WORK LOAD**	
		Time (Hour)(Including prep. time)	**Work Load**
Attendance	14	4	56
Final Exam	1	20	20
Quizzes	5	2	10
Term project			0
Reports			0
Final Project			0
Seminar			0
Assignments	8	2	16
Presentation			0
Midterms	2	15	30
Project	1	15	15
Laboratory		0	0
Tutorial	14	1	14
Other(Self study, Paper reviews)	14	1	14

	Total work load	175
	Total work load/25	7
	ECTS Credit	7

COURSE ASSESMENT AND ECTS WORK LOAD		
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);	1,2,3
	1.2. ability to use theoretical and applied knowledge in these areas in complex engineering problems.	1,..,5
2	**2.1.** Ability to identify, formulate, and solve complex engineering problems;	4,5
	2.2. ability to select and apply proper analysis and modeling methods for this purpose.	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;	6
	3.2. ability to apply modern design methods.	6
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.	

Revison Date	**Prepared by**	**Approved by**
1.9.2019 1.6.2021	Doç. Dr. Ramazan Köprü	Prof.Dr. Ahmet Aksen