ELEC2201 COURSE CATALOG INFO

Course Code : ELEC2201				**Course Name :** Circuit Theory I			
Semester	**Lecture (Le+T+L)**	**Local Credit**	**ECTS**	**Language**	**Category**	**Instructional Methods**	**Prerequisites**
3	(3+1+0)	3	6	English	Core	Lecture	PHYS1102, MATH1102
Course Content	Voltage and current, ideal basic circuit elements. Reference directions, power and energy. Ohm's law and Kirchoff 's laws. Time-invariant resistive circuits with dependent / independent sources. Equivalent resistance calculations, Delta-to-Wye equivalent circuits. Node-voltage and mesh-current methods, source transformation, superposition. Thevenin and Norton equivalent circuits. The operational amplifier. Inductance, capacitance and mutual inductance. Natural and step response of first and second-order circuits.						
Course Outcomes	**CO1.** Describe the concepts of electric voltage, current, power and energy, and apply Kirchoff's laws that govern them, to solve the general electrical behavior of circuits. **CO2.** Identify and model basic circuit elements and describe their terminal behavior. **CO3.** Describe circuits using a system of algebraic or differential equations. **CO4.** Apply analysis techniques in electrical circuits to solve for the response of the circuits. **CO5.** Identify the best technique for the analysis for a given circuit. **CO6.** Design circuits that meet certain requirements or perform simple tasks, using basic tools of circuit analysis.						

COURSE PLAN	
W1	Basis of scientific thinking
W2	Passive circuits: Kirchhoff's laws
W3	Passive circuits: Kirchhoff's laws
W4	Circuit elements: 2- and multi-terminal, R, L, C, dependent sources
W5	Ideal transformer, Operational amplifiers, Gyrators
W6	Circuit analysis techniques: Node-voltage method
W7	Circuit analysis techniques: Loop-current method
W8	Circuit theorems: Thevenin, Norton, maximum power, linearity etc.
W9	Natural and step response of first (RC, RL) order circuits (RLC)
W10	Natural and step response of first (RC, RL) order circuits (RLC)
W11	Natural and step response of second order circuits (RLC)

W12	Natural and step response of second order circuits (RLC)
W13	Natural and step response of second order circuits (RLC)
W14	Phasors and Sinusoidal steady state

COURSE ASSESMENT AND ECTS WORK LOAD			
Type of Work	**Count**	**ECTS WORK LOAD**	
		Time (Hour)(Including prep. time)	**Work Load**
Attendance	14	3	42
Final Exam	1	20	20
Quizzes	5		14
Term project			0
Reports			0
Final Project			0
Seminar			0
Assignments	8	3	24
Presentation			0
Midterms	2	12	24
Project			0
Laboratory		0	0
Tutorial	14	1	14
Other(Self study, Paper reviews)	14		14
		Total work load	152
		Total work load/25	6.08
		ECTS Credit	6

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. ability to use theoretical and applied knowledge in these areas in complex engineering problems.	1,2,3
2	**2.1.** Ability to identify, formulate, and solve complex engineering problems;	4
	2.2. ability to select and apply proper analysis and modeling methods for this purpose.	4,5
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.	
4	**4.1.** Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice;	4,5,6
	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	Prof. Dr. Yorgo Istefanopulos	Prof.Dr. Ahmet Aksen