

ELEC4104 COURSE CATALOG INFO

Course Code : ELEC4104				Course Name : Energy Distribution Systems			
Semester	Lecture (Le+T+L)	Local Credit	ECTS	Language	Category	Instructional Methods	Prerequisites
7 or 8	(3+0+0)	3	5	English	Elective	Lecture	ELEC3101
Course Content	Power system overview. Electric industry structure. Single phase systems. Three phase systems. Complex power. Power factor correction. Y and Delta connected loads. Short medium long line models. Power factor correction. Power flow analysis. Bus admittance matrix. Power Flow Analysis via Gauss-Seidel (GS) and Newton-Raphson (NR) methods. Matlab for power systems analysis.						
Course Outcomes	<p>CO 1. Define a basic power system and its elements, i.e. generation, transmission, distribution.</p> <p>CO 2. Analyze single phase systems, balanced three phase systems and solve the problems related to power factor correction, Y and Delta connected loads in these systems</p> <p>CO 3. Analyze short/medium/long line models via voltage and current waves and solve problems related to surge impedance loading, complex power flow, power transmission capability, line compensation.</p> <p>CO 4. Analyze and solve problems related to complex power flow using bus admittance matrix and source transformation.</p> <p>CO 5. Analyze and solve problems related to complex power flow using nonlinear algebraic equations based on Gauss-Seidel (GS) and Newton-Raphson (NR) methods.</p> <p>CO 6. Solve power flow equation to find line flows and losses using GS and NR methods.</p>						

COURSE PLAN	
W1	Introduction to Power System Analysis.
W2	Ch1: The Power System Overview.
W3	Ch1: The Power System Overview.
W4	Ch2: Basic Principles.
W5	Ch2: Basic Principles.
W6	Ch3: Generator and Transformer Models, The Per-Unit System.
W7	Ch3: Generator and Transformer Models, The Per-Unit System.
W8	Ch4: Transmission Line Parameters.
W9	Ch4: Transmission Line Parameters.
W10	Ch5: Line Model and Performance.
W11	Ch5: Line Model and Performance.

W12	Ch6: Power Flow Analysis.
W13	Ch6: Power Flow Analysis.
W14	Ch6: Power Flow Analysis.

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	17	17
Quizzes			0
Term project			0
Reports			0
Final Project			0
Seminar			0
Assignments	5	2	10
Presentation			0
Midterms	2	7	14
Project			0
Laboratory		0	0
Tutorial		0	0
Other(Self study, Paper reviews)	14	3	42
		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,..,6
	2.2. ability to select and apply proper analysis and modeling methods for this purpose.	1,..,6
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.	

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