	Code	Course	Course Topics	1	2	3	4	5	6	7
Term 3	**EE 231**		Assesment Method	Written Exam, Assignments and Laboratory Group Work.						
		Electrical Circuits I	Basic DC circuits elements and its connection.					✓	✓	
			Ohm's law and Kirchhoff laws.					✓	✓	
			Circuit analysis technique.	✓				✓	✓	
			Determination of the suitable load which provide maximum power transfer.	✓	✓			✓	✓	
			RLC circuit and The relation between voltage and current.	✓						
Term 4	**EE 232**		Assesment Method	Written Exam, Assignments and Laboratory Group Work.						
		Electrical Circuits II	Revision on alternate current series circuit and rest of other methods.					✓	✓	
			Complex power and maximum power calculations.	✓						
			Three-phase balanced and unbalanced systems and its power calculation.	✓						
			Natural and step response in RLC circuits.	✓				✓	✓	
	EE 233		Assesment Method	Written Exam and Assignments.						
		Electric & Magnetic Field I	Vector revision and 3-D coordinates (systems).	✓						
			Columb's law and field intensity.	✓	✓					
			Flux density and Gauss's law theory for electrical field.	✓	✓					
			Divergence theory.	✓						
			Conductors , Dielectrics and Capacitance.	✓	✓					
			Boundry condition.	✓						
			Current density and resistance calculations.	✓						
			Poisson's and laplace equations.	✓	✓					
	EE 211		Assesment Method	Written Exam, Assignments and Laboratory Group Work.						
		Elect. Meas & Inst. I	Accuracy of measurement and error analysis.	✓					✓	
			Absolute & secondary.	✓						
			Moving coil.	✓					✓	
			Dynamometer.	✓						
			Induction instruments.	✓						
			Measurement of active power and power factor.	✓						
			DC and AC bridges.	✓					✓	
			Current and potential transformers.	✓						
			Oscilloscope.						✓	
	EE 312		Assesment Method	Written Exam, Assignments and Laboratory Work.						
		Elect. Meas & Inst. II	Signal conditioning circuit.	✓	✓				✓	
			Transducers.	✓		✓			✓	
			Filters (active and passive).	✓	✓				✓	
			Convertes (ADC and DAC).	✓						
			Digital measurment (digital voltmeter and counter).	✓					✓	
			Assesment Method	Written Exam, Assignemnts and Laboratory Work.						

Term	Code	Course	Topic/Assessment	1	2	3	4	5	6	7
Term 5	**EE 321**	**Electrical Machines I**	Magnetic circuit principles.	✓						
			Theory of operation of DC machines.	✓			✓			
			Types of DC motors and Generators.	✓					✓	
			Assesment Method — Written Exam, Assignemnts and Laboratory Work.							
	EE 341	**Introduction to Power**	Elements of Power System.	✓			✓			✓
			Power system Transmission systems.	✓			✓			
			Economics of power system.	✓	✓		✓			
			Parameters of O.H.T.L. & its's design.	✓						
			Corona Phenomena.	✓			✓			
			Mechanical design of power system Tramsmission.	✓	✓					
			Assesment Method — Written Exam, Assignemnts and Research.							
	EE 332	**Network Analysis**	Complex frequency method for different wave forms.	✓						
			Laplace transform and electric circuit sources.	✓						
			Linear and Ideal Transformers.	✓						
			Two port networks and it's different equation forms.	✓						
Term 6			**Assesment Method** — Written Exam and Assignments.							
	EE 323	**Powe Electronics I**	Basics of Power Electronics.	✓				✓	✓	
			Thyristors & Their Firing angle.	✓						
			Single/Three phase Converter.	✓	✓				✓	
			Power Factor Improvement.	✓						
			Assesment Method — Written Exam, Assignemnts, Laboratory Work and Mini-Project.							
	EE 342	**Power System I**	Per Unit System.	✓						
			Reactive Power Control.	✓	✓		✓		✓	
			Power Flow Analysis using Gauss-Siedel.	✓	✓				✓	
			Power Flow Analysis using Netwon Raphson.	✓	✓				✓	
			Economic Dispatch.	✓	✓		✓		✓	
			Assesment Method — Written Exam and Assignments.							
	EE 322	**Electrical Machines II**	Single phase transformer : theory, operation and autotransformer.	✓		✓			✓	
			Three phase induction machines : theory , operation and modes of operation.			✓				
			Three phase induction motors.	✓		✓			✓	
			Application as induction generator.	✓			✓			✓
			Assesment Method — Written Exams, Assignments and Laboratory Work.							
	EE 311	**Fundamentals of Control Engineering**	Introduction to controlled systems (open and closed) systems.	✓						
			Mathimatical modeling of physical system.	✓	✓	✓			✓	
			Block digram reduction.	✓	✓	✓			✓	
			First order system.	✓	✓	✓			✓	
			Second order system.	✓	✓	✓			✓	
			Error and steady state error.	✓	✓	✓			✓	
			Routh's criteria.	✓	✓	✓			✓	
			Stability study using bode plot.	✓	✓	✓			✓	

Term	Code	Course	Topic / Assessment Method							
Term 7	**EE 333**	**Electric & Magnetic Field II**	Assesment Method	Written Exams, Assignemnts and Matlab Simulation.						
			Steady Magnetic Field (Biot-Savart law,ampere's law, Curl , magnetic field density and magnetic flux).	✓						✓
			Magnetic Forces and Torques.	✓						
			Magnetic matrilas and magnetic circuits.	✓						
			Time varying magnetic filed (Farady's law of induction - motional emf).	✓						✓
			Maxwell's equation.	✓						✓
	EE 441	**Power System II**	Assesment Method	Written Exams and Assignemnts.						
			Transient in RL.	✓						
			Fault Analysis.	✓						
			Selection of Circuit Breaker.	✓						
			Symmetrical components.	✓						
			Unsymmetrical fault.	✓						
			Power system stability under faulty condition.	✓						
	EE 422	**Electrical Machines III**	Assesment Method	Written Exams, Assignments and Matlab Simulation.						
			Three phase : construction , theory and performance.	✓			✓			
			Three phase synchronous machines construction.	✓						
			Synchronouns generator operation.	✓		✓	✓		✓	✓
			Three phase synchronization problems.				✓			
			Synchronouns motor operation.	✓					✓	
			Starting of synchronons motor.	✓			✓			
	EE 423	**Power Electronics II**	Assesment Method	Written Exams, Assignments and Laboratory Work.						
			AC Voltage control.	✓	✓				✓	
			DC Choppers.	✓				✓	✓	
			PWM Inverter.	✓		✓				
	EE411	**Control System I**	Assesment Method	Written Exams, Assignments, Laboratory Work and Mini-Project.						
			Root locus analysis	✓	✓	✓			✓	
			Lead compansator design using R.C method	✓	✓	✓			✓	
			Lag compansator design using R.C method	✓	✓	✓			✓	
			Lead compansator design using Bode Plot method	✓	✓	✓			✓	
			lag compansator design using bode plot (frequency response)	✓	✓	✓			✓	
			Polar plot analysis	✓	✓	✓			✓	
			Nyguist stability	✓	✓	✓			✓	
			PI controller design	✓	✓				✓	
			PD controller design	✓	✓				✓	
			PID controller design	✓	✓				✓	
			Assesment Method	Written Exams, Assignments and Matlab Simulation.						
			Architecture of microprocessor and microcontrollers	✓			✓			
			Memory Organization and microcontroller programming							✓
			Input/output ports with applications	✓	✓				✓	

Term 8	**EE 413**	**Microprocessor Based Process Control**	Timer modules and counters with applications	✓	✓				✓	
			Interrupts: Software and hardware with applications	✓	✓				✓	✓
			Operational amplifiers and signal conditioning circuits	✓				✓	✓	
			Analog to Digital converter and Data acquisition with applications	✓	✓				✓	
			Serial port interface with applications	✓	✓				✓	
		Assesment Method	Written Exams, Assignments and Mini-Project.							
	EE 412	**Control System II**	State Model of Linear Systems using Physical Variables	✓						
			State Space Representation using Physical Variables	✓	✓				✓	
			State Space Representation using Canonical Variables	✓	✓				✓	
			Properties of Transition Matrix	✓						
			Solution of State Equations	✓	✓				✓	
			Introduction to Pole Placement in State Feedback Design	✓	✓				✓	
			Introduction to Nonlinear Control Systems	✓	✓				✓	
			Describing Function and the Phase Plane Methods	✓	✓				✓	
		Assesment Method	Written Exams, Assignments and Matlab Simulation.							
	EE 442	**Powe System Protection I**	General Principles of Protection		✓		✓			
			Operation of the different types of relays	✓	✓		✓			
			Circuit breakers and fuses		✓					
			Protection of the various components of power system	✓	✓		✓			
		Assesment Method	Written Exams, Assignments and Etap Simulation.							
	EE424	**Electrical Drives I**	Single Phase DC motor Drives	✓						
			Semi and Full converter DC drives	✓	✓				✓	
			Dual Converter	✓						
			Reversible drives	✓						
			Three-Phase Drives	✓						
			Closed Loop Control of DC Drives			✓				
			DC Choper drives for DC Motors	✓						
			Induction Motor Drives,Operation & Performance	✓						
			Voltage & Freq. Control	✓						
			Stepper Motor	✓		✓				✓
		Assesment Method	Written Exams, Assignments and Research.							
	EE 523	**Fundamentals of Renewable Energy**	Classification and history of renewable energy re¬sources.		✓		✓			
			Wind energy basics				✓			
			Fixed speed wind turbines	✓	✓				✓	
			Variable speed wind turbines		✓		✓			
			Vector control of Power electronics converters for wind generators	✓	✓				✓	
			Solar energy basics	✓	✓				✓	
			Photovoltaic and fuel cells		✓		✓			
			Power electronics in solar systems	✓	✓				✓	

[Elective Courses]

Course	Course Name	Topic	1	2	3	4	5	6	7
		Hydropower		✓		✓			
		Biomass		✓		✓			
		Grid integration for electricity generated from re¬newable energy.		✓					
		Effect of government regulation (grid code) on the renewable energies industry				✓			
		State of the industry	✓	✓				✓	
EE 542	**Assesment Method**	Written Exams, Quizzes							
	Electrical Power Station	Conventional P.S: Thermal and Internal Combustion	✓	✓		✓			✓
		Hydrulic	✓	✓		✓			✓
		Nucler	✓	✓		✓			✓
		Renewable Energy P.S: wind, photovoltaic and solar thermal	✓			✓			✓
EE 543	**Assesment Method**	Written Exams							
	Electrical Power Distribution	Voltage Profile & Regulation	✓	✓					
		Distributed Substation Design, Load Distribution & Service Area of Distributed Substation		✓					
		Operation of Distributed Substation		✓					
		Low Voltage Distribution in Residential and Commercial Areas	✓	✓					✓
EE 542	**Assesment Method**	Written Exams, Mini-Project.							
	Control Application in Power Engineering	Control problems in electrical power system		✓					
		Modeling system components in power system dynamics	✓	✓					
		Excitation control systems QV control		✓					
		Generation control systems PF control	✓	✓				✓	
EE 515	**Assesment Method**	Written Exams							
	Computer Control of Dynamic Systems	Sampling Theory study	✓	✓					
		Z-Transformation and Discreet state space analysis	✓	✓				✓	
		Discreet state space studies Drscretization	✓	✓				✓	
		Deadbeat response and pole placement design	✓	✓				✓	
		Application of computer control of dynamic system (such as PLC,SCADA, DCS)	✓	✓	✓	✓	✓	✓	✓
EE 541	**Assesment Method**	Written Exams,Assignments							
	Power Systems Protection II	Review of static/digital versus electomechanical relays	✓						
		Components detectors and applications, hardware of digital relays		✓					
		Mathematical background for digital protection	✓						
		Digital relays for motor, transmission line and machine protection	✓	✓				✓	
		Integration of protection and control in substations	✓	✓				✓	
		Traveling wave based protection	✓						
EE 547	**Assesment Method**	Written Exams							
	Utilization of Electrical Energy	Terms used in illumination and laws of illumination		✓					
		Design of illumination schemes	✓	✓				✓	
		Electric heating, arc furnaces and electric welding		✓					
		Traction system characteristics and control		✓					
		Electrolytic processes. Refrigeration and air conditioning		✓					

	Code	Course Name	Topic	1	2	3	4	5	6	7
[Elective Courses]			Electric safety engineering		✓					
			Assesment Method — Written Exams, Mini-Project.							
	EE 548	Design of Electrical and Electromechanical Systems for Commercial and Industrial Installations	Characteristics of industrial & commercial loads	✓						
			Selection of distribution system and wiring systems	✓	✓				✓	
			System protection and coordination	✓	✓				✓	
			Controllers and MCC	✓	✓				✓	
			Power factor correction		✓					
			Lighting, HVAC, Lifts and escalators	✓	✓				✓	
			Grounding, Special Loads	✓	✓				✓	
			Safety and Fire Alarm Safety		✓					
			Codes and Standards	✓	✓					
			Assesment Method — Written Exams,Mini-Projects and Etap Simulation.							
	EE 512	Automated Industrial Systems (1)	Automated hierarchical levels and components				✓			✓
			Introduction to PLC.S.				✓			✓
			Hardware configuration and descriptions				✓		✓	✓
			Programming and testing basic functions	✓	✓	✓			✓	
			Programming and testing advanced functions	✓	✓	✓			✓	
			Industrial Applications using PLCs	✓	✓	✓			✓	
			Assesment Method — Written Exams,Mini-Projects.							
	EE 545	High Voltage Engineering	Generation and measurement of high voltage AC and DC	✓	✓				✓	
			Sources of transients in power system	✓						
			Travelling waves	✓						
			Insulations, lattice diagram and surge arresters	✓						
			High voltage switchgears	✓	✓				✓	
			Assesment Method — Written Exams,Assignments.							
	EE554	Power System 3	Cost of Generation	✓			✓			
			Dispatch	✓			✓			
			Power SystemHarmonics	✓	✓					
			Reliability	✓						
			Load Forecasting	✓						

OutCome	Defintion
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies