Electrical Engineering Department
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ELECTRICAL ENGINEERING DEPARTMENT CURRICULA FIRST AND SECOND YEARS

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FIRST YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ENG170G1	Mathematics (2)	**3**	**2**	**5**	٣٠	-	٧٠	١٠٠	٣
2	ELE122G	Principles of Electrical Engineering	4	2	6	50	-	100	150	3
3	GEN170G1	English Language(2)	-	2	2	20	-	35	50	2
٤	ENG170G2	Physics	٤	٢	٦	٥٠	-	١٠٠	١٥٠	٣
٥	ELE112G	Lab(1)	-	٤	٤	٣٠	٣٠	٤٠	١٠٠	٢
٦	ELE113G	Properties of Electrical Materials	٣	٢	٥	٥٠	-	١٠٠	١٥٠	٣
		Total	14	١٤	٢٨				٧٠٠	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ENG170G3	Mathematics(3)	**3**	**2**	**5**	30	-	70	100	3
٢	ELE121G	Electronics (1)	4	2	6	50	-	100	150	3
3	MPE112G1	Mechanical Engineering	٤	٢	٦	٥٠	-	١٠٠	١٥٠	٣
4	ELE111G	Computer programming(1)	٣	٣	٦	٥٠	٣٠	٧٠	١٥٠	٣
5	ELE123G	Lab(2)	-	4	4	30	30	40	100	2
6	GEN170G1	Engineering Legislations	2	-	2			30	50	2
		Total	16	13	29				700	

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SECOND YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ENG270G1	Mathematics(4)	**3**	**2**	**5**	٣٠	-	٧٠	١٠٠	٣
٢	ELE211G	Electrical Circuits	٤	٢	٦	٥٠	-	١٠٠	١٥٠	٣
٣	ELE 212G	Electromagnetic Fields	٣	٢	٥	٣٠	-	٧٠	١٠٠	٣
٤	ELE213G	Measuring Instruments	٢	١	٣	٣٠	٢٠	5٠	١٠٠	٢
٥	ELE214G	Logic Design	٣	٢	٥	٣٠	30	٩٠	١٥0	٣
٦	MPE270G1	Mechanical Engineering(2)	٤	٢	٦	٥٠	-	100	١٥٠	٣
٧	GEN#70G1	Elective Humanities (1)	٢	-	٢	-	-	٥٠	٥٠	٢
		Total	٢١	١١	٣٢				٨٠٠	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ENG270G2	Mathematics(5)	**3**	**2**	**5**	30	-	70	100	3
٢	ELE 221G	Electronics(2)	4	2	6	50	-	100	150	3
٣	ELE 222G	Computer Applications	4	2	6	50	30	70	150	3
٤	ELE223G	Lab(3)	-	4	4	30	30	40	100	2
٥	ELE224G	Electrical Machines (1)	4	2	6	50	-	100	150	3
٦	GEN270G2	English language (3)	-	2	2	15	-	35	50	2
		Total	15	14	29				700	

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FIRST YEAR

FIRST SEMESTER

ENG 170G1 Mathematics (2)   (3+2)

Infinite series- functions expansion- differentiation applications- maximum and minimum limits- Lagrange multiplications- restricted maximum and minimum limits applications- covers- high rank differential equations-complex variable functions- vectors analysis: standards and vector fields- vector diversion- standard fields talus- vector fields alignment- Gausss's theory- Green's theory – Stocke's theory.

ELE 122G Principles of electrical engineering   (4+2)

Display of vector factors- charges- Coulomb's law- intensity of electrical field- electrical flux – Gauss law- static electrical field in insulators- field distribution- Maxwell's equations of repulsion- theory of repulsion- Laplace modulus- direct electrical current- current intensity- energy and Joule's law- resistance and electric conductivity- Laplace's equations of conductive media- static magnetic fields- magnetic flow- vector relations of magnetic field- inductors.

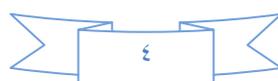### GEN 170G1 English Language (2)   (0+2)

A comprehensive curriculum to teach English language to Engineering students with concentrating on electrical engineering and computer terminology- grammar- grammatical structures- writing an essay- teaching using computers- using multimedia on computers to teach English- developing reading capabilities .

ENG 170G2 Physics   (4+2)

Traditional physics curriculum that covers: heat- radiation- light-

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electroluminescent effect- electromagnetic theory- x- rays –waves and particles- wave theory of light propagation- bases of integradation- diffraction and polarization of light- bascis of laser- basic concepts of solid state physics.

ELE 112G Lab (1)   (0+4)

Performing experiments which cover : basics of electric circuits- basics of electronics and electronic elements- knowing the principles of computer systems and their components, their terminals as well as computer programming- methods of testing them.

ELE 113G Electrical properties of materials   (3+2)

Materials classification and their structural specification- properties of materials and similarities- free electrons theory- layers theory-electric isolator processes- photo processes in material- magnetic materials- iron magnetism-thermal impacts-super conductivity.

SECOND SEMESTER

ENG170G3 Mathematics (3)   (3+2)

Laplace transform- Laplace inverse transform- Laplace transform of derivatives and integrations- solving differential integrating equations- Delta function- periodic functions applications- serial solutions of differential equations- special functions: beta and gamma functions- Bessel functions- first & second Bessel functions- Legendre equation- polynomial or diagonal systems functions- partial differentiation-wave equation in one direction- variable separation- Dalimpert method to solve wave equation- spreading heat in one direction- Laplace in polar coordinates.

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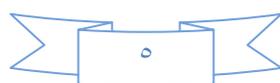
ELE 121G Electronics (1)   (4+2)

Levels of energy-transmission of charges carriers- diodes- characteristics and applications of bipolar devices- transistor's operation- static and dynamic characteristics- thyristor- unipolar devices- MOSFET-JFET transistors-main specifications – optoelectronic devices- radiation transmission- photo absorption- light emitting diodes- semiconductor Laser- light detector- light cells – laser characteristics and applications- integrated circuits technology crystal growth- oxidization-film precipitation-dispersion- printing- circuits and engraving.

MPE 170G1 Mechanical engineering (1)   (4+2)

Principles of thermodynamics- fluid movement- ideal gas-first law of thermodynamics- reversible processes- irreversible processes- second thermodynamics law – thermal cycle- thermal equality degree- movement theory of the gases- transforming head through connectivity- algebra load and radiation-thermal exchange- principles of liquids mechanics- liquids specifications- Bernoulli's equation and its applications- dimensional analysis-pattern and analysis dynamics.

ELE 111G Computer programming (1)   (3+3)

This curriculum provides the main concepts of programming-analyzing problems and develop programs plans- confirming the wide understanding of basic styles of modern programming and languages- structural programming through Pascal- framework of the program-repetition – matrices- procedures and functions records- dealing with files- parameters – connected lists- auto-repetition- retrieval.

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ELE 123G Lab (2)   (0+4)

Performing experiments that cover: basics of electronics and logical circuits- using measuring and testing instruments- methods of measuring-elements and styles of testing computer programs.

GEN 170G2 Engineering legislations   (2+0)

This curriculum deals with laws, responsibilities and rights which the engineer is interested in: discussing legalized contracts, explaining laws and legislation that concern engineering in all fields-examples: the covered laws include: engineering syndicates laws, contracts, city planning laws, construction laws, roads filling laws, dividing owned lands laws, protecting agricultural laws, industrial security, security, operations, cranes. Protecting environment, insurance laws (accidents – fires) investment laws, irrigation laws, relation between the owner and the tenant, job laws, industrial union

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SECOND YEAR

FIRST SEMESTER

ENG 270G1 Mathematics (4) (3+2)

Fourier series- numerical analysis- ending differences- Newton integration methods- oscillatory polynomial, digital differentiation & integration, small squares methods, curves connections, linear programming, probabilities theory & statistics, random variables, probability density function moments, Gaussian distribution, Beswain's distribution, matrices analysis.

ELE 211G Electric circuits (4+2)

Kirchoff's laws- network analysis- network theory-analysis using (Pspice)-condensers, inductors, response to first & second orders circuits-sine wave curve and phase- stable power analysis- three phase circuits- transformers-outputs analysis- frequency response- Laplace transforms- Fourier analysis.
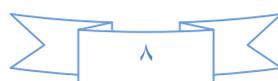
ELE 212G Electromagnetic fields (3+2)

Revision of vector analysis, static magnetic fields and static electric fields in space and material Media-magnetic field- Maxwell equations- dispersion of waves in permeable and impermeable level and media- Maxwell equations applications- wave guides.

ELE 213G measuring instruments (2+1)

Measurement and errors accuracy of measurement. Statistic analysis of errors, systems of measurement units-instruments used in direct current-direct current bridges-measuring and displaying signals instruments – (Oscilloscope)-electronic measurement equipments-generation and analysis of electric signals-oscillators and signal generators .

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ELE 214G Logic design   (3-2)

Nature operation of logic digital units work-numbers, system, Boolean algebra, Karnaugh map-elements of decision making-memory elements- lock-flip- flop- designing simultaneous sequential circuits- integrated and logic circuits-dislodging recorders- counters-sequential circuits-addition – subtraction- memory circuits .

MPE 270G1 Mechanical engineering (2)   (3+2)

Theory of Machines- joints- gears- controllers and balance of the revolving masses-design latches of the bolts, revolving organ and keys- gearing-movement by friction-power nails- belts, bearings.

FIRST SEMESTER

GEN 270G2 Mathematics (5)   (3+2)

Sets- series- algorithms and auxiliary coding-vectors, matrices, determinants- relations and functions, Drawing theory, network system-applications on the computer depends on the methods of justifications-finding roots- digital integrations- solving differential equations-linear algebra and matrices operations.

ELE 221G Electronics (2)   (4+2)

Characteristics of the current and voltage in MOSFET and JFET (its operation) –ideal MOS-surface effects –effect of the narrow channels-different types of MOS-feeding circuits of FET- analog and digital applications of FET, manufacturing monolithic circuits: elements of the monolithic system, charge coupled devices- integrated circuits with VLSI-testing connection and construction of the integrated circuits- organized main circuits (transistors). Main organization circuits with classic 723- design distributing heat and power

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of the regulators and power circuits- unregulated feeder-voltage reference- uni junction transistors-(PNPN) valve- silicon controlling rectifier- closing thyristor's gate. Two directions instrument- radiating luminous valve-luminous valve- luminous trivalve- light duplications- semiconductor cell- related instruments- light break- digital screens .

ELE 222G Computer applications   (4+2)

Advanced programming in a scientific language of the computers- two dimensions matrices and their use in analyzing the electric circuits-files-organizing, designing files and their applications- windows system and administrating the sources of the computer- study of some applications of the computer in the field of electrical engineering Pspice, AUTOCAD.

ELE 223G Lab (3)   (0+4)

The experiments in this level cover: the concepts of computers architecture-methods of connecting the computers to the outer units and the necessary circuits for that – communications circuits-electronic instruments-control circuits-control through computers- electronic units characteristics-control operations using the computer.

ELE 224G Electric machines (1)   (4+2)

Direct current machines: classification- general arrangement- magnetic circuit-coils- electromotive force- reaction of production element-and change current-direct current motors- methods of excitation- magnetic curve-moment and speed- starting movement- characteristics-controlling speed- direct current generators: separate and self excitation in direct current generators- parallel operation- loss –do machine efficiency condition- maximum efficiency conditions-transformers- main types, installment- transforming process principle-electromotive power equations- magnetic power- NO load operation, operation with load- defining the factors of operating the circuits on efficiency- organizing

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efficiency voltage- three phases transformers- operation in parallel- special kinds.

GEN 270G2 English Language (3)   (0+2)

A comprehensive curriculum in writing report in English- the curriculum develops the ability of the student to write short practical needs, trains the students on summarizing information, in graduation it presents a more complicated structures.

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ELECTRICAL POWER AND MACHINES CURRICULA

THIRD YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	EPE311G	Transmission & Distribution of Electrical power	**3**	**2**	**5**	60	-	90	150	3
٢	EPE312G	Electrical Machines (2)	٤	٢	٦	60	-	90	150	3
٣	EPE313G	Power Electronics (1)	٤	٢	٦	60	-	90	150	3
٤	EPE314G	Automatic Control (1)	٣	٢	٥	30	-	70	100	3

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٥	EPE315G	High Voltage Engineering	٣	٢	٥	30	-	70	100	3
٦	EPE316G	Lab(4)	-	٤	٤	20	٢٠	20	100	2
		Total	١٧	١٤	٣١				750	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	EPE321G	Switchgear and Protection	**4**	**2**	**6**	60	-	90	150	3
٢	ECE371G1	Computer (3)	3	2	5	30	30	40	100	3
٣	EPE31#T1	Elective Course (1)	4	2	6	60	-	90	150	3
٤	EPE31#T2	Elective Course (2)	4	2	6	60	-	90	150	3
٥	EPE325G	Lab(5)	-	4	4	20	20	60	100	2
٦	GEN371G1	English Language (4)	-	2	2	15	-	35	50	2
7	GEN#71T2	Humanities (2)	2	-	2	-	-	50	50	2
		Total	17	14	31				750	

FOURTH YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	EPE 411G	Utilization of Electrical Energy	**4**	**2**	**6**	٣٠	-	٧٠	١٠٠	٣
٢	EPE 412G	Automatic Control (2)	٤	٢	٦	٣٠	-	٧٠	١٠٠	٣
٣	EPE 41#T1	Elective Course(1)	٤	٢	٦	٦٠	-	٩٠	١٥٠	٣
٤	EPE 41#T2	Elective Course(2)	٤	٢	٦	٦٠	-	90	150	3

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٥	EPE 415G	Tests and Standard Specifications (1)	-	٤	٤	٢٥	٢٥	٧٥	١٢٥	٢
٦	EPE 416G	Project*	٢	-	٢	٥٠	-	-	٥٠	٣
		Total	١٨	١٢	٣٠				٦٧٥	

- Continues Course

SECOND SEMESTER

| Serial | Course Code | Course Name | Hours | | | Grades | | | | Test Time |
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	EPE42#T3	Elective Course(1)	**4**	**2**	**6**	60	-	90	150	3
٢	EPE42#T4	Elective Course(2)	4	2	6	60	-	90	150	3
٣	EPE42#T5	Elective Course(3)	4	2	6	60	-	90	150	3
٤	EPE424G	Tests and Standard Specifications (2)*	-	4	4	25	25	75	125	3
٥	GEN#71T1	Humanities(3)	2	-	2	-	-	50	50	2
6	GEN471G2	English Language(5)	-	2	2	15	-	35	50	2
٧	EPE427G	Project	2	-	2	50	-	100	150	-
		Total	16	12	28				825	

THIRD YEAR

FIRST SEMESTER

EPE311G Transmission & Distribution of Electrical power

Transmission lines parameters: resistance, inductance and capacitance. Calculation of short, medium and long transmission lines. Mechanical design. Overhead transmission lines insulators. Corona. Distributors: DC & AC distributors, voltage drop, power losses, underground cables, DC transmission technology.

EPE312G Electrical Machines (2)

AC windings: double-layer lap windings, double-layer wave windings, short-pitch double-layer lap and wave windings, fractional slot windings. Induced EMF in AC coils: full-pitch, chorded, distributed, and short-pitch and distributed. MMF in AC windings: single winding, full-pitch

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windings, short-pitch windings, three-phase windings. Three-phase synchronous machines: construction, equivalent circuit of unsaturated machines, phasor diagram of unsaturated and saturated cylindrical rotor machines, phasor diagram of unsaturated and saturated salient rotor machines, voltage regulation, power, torque, synchronous power and torque, hunting, parallel operation of synchronous machines, operational characteristics. Three-phase induction machines: construction, principle of operation, standstill and running conditions, equivalent circuit, determination of equivalent circuit parameters, dynamics and stability, induction generator, induction brakes, induction voltage regulator, unbalanced supply operation, protection.

EPE313G   Power Electronics (1)

Power semiconductors: types and construction, performance of switching states of diodes, power transistors and Thyristors. Characteristics and ratings of diodes and Thyristors. Protection of power semiconductors switches and their circuits against temperature rise, over current and over voltage. Rectifier circuits: operation and performance analysis of the uncontrolled and controlled rectifiers (naturally-commutated Thyristor circuits), effect of supply and load inductances on the performance. Forced commutation circuits of Thyristors. Inverter circuits: operation and performance analysis of single-phase and three-phase voltage source inverters, operation and performance analysis of single-phase and three-phase current source inverters.

EPE314G   Automatic Control (1)

Introduction, mathematical basics, block diagrams, signal flow graphs, analog computer, mathematical model for physical systems, analysis of state variables for linear dynamic systems, time domain analysis of control systems, transient response, stability of control system, discrete systems, and Z transform.

EPE315G   High Voltage Engineering

Introduction, conduction and breakdown in gases, conduction and breakdown in liquid dielectrics, breakdown in solid dielectrics, generation of high voltages and currents, measurements of high voltages and currents, overvoltage phenomenon and insulation coordination in electric power systems, grounding systems.

EPE316G   Lab(4)

Three-phase transformers: separation of iron loss into hysterias component and eddy current component, harmonic and unbalanced load conditions, the effect of iron core on harmonics,

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transformation from 3-phase to 2-phase, coil connections, load testing, equivalent circuit and regulation.

DC motors: torque-speed characteristics of separately-excited, series and shunt dc motors, determination of moment of inertia, speed control using thyristor.

High voltage: voltage distribution along chain insulation, measurements of insulation resistance, surface and bulk resistance, corona phenomenon, high voltage ac measurements, measurements of earth resistance.

Measurements of transmission line characteristics: measurements of resistance, inductive and capacitive reactances, measurements of voltage drops, power loss for transmission line under different load conditions, measurements of capacitance/phase for 3-phase cable, corona voltage measurements of transmission line, measurements of voltage distribution over suspended insulators, study of control fundamentals, transfer function derivation for (transformers, motors, … etc), analog computer trainer, logic circuit trainer and its installation.

THIRD YEAR

SECOND SEMESTER

EPE321G Switchgear and Protection
Protection fundamental: inverse minimum definite time (IDMT) relay and its application, high rupturing capacity fuses, Pilot Wire Protection, Impedance Relays, Microwave Protection, Types of circuit breakers, bus bar protection, transformer protection, generators protection, generator and transformer protection, AC motors protection.

ECE371G1 Computer (3)

EPE31#T1   Elective Course (1)

EPE31#T2   Elective Course (2)

EPE325G   Lab(5)

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Three-phase induction machines: winding resistance measurement, no load test, locked rotor test, parameters calculations, determining friction losses and iron losses, direct load test using electro-induction locking, direct load test using loading, slipping measurement, methods of starting, induction generators, single and three phase uncontrolled rectifiers, three phase reversals, ac voltage regulators, characteristics of current transformers, characteristics of reversed time stabilizer in over-current protection (scale, adjusting, undetermined minimum point), characteristic and adjusting the differential protection, characteristics of different types of distance protections, direct current analysis to represent the symmetrical components, alternating current analysis to connect between symmetrical circuits, alternating current analysis for symmetrical studies of load flow.

GEN371G1 English Language (4)

GEN#71T2   Humanities (2)

GEN 371: Economics of Electrical Energy Utilization   (3+1)

Principles of economics, The importance of engineering economics, Kelvin's law, Calculation of towers, conductors and loss of power costs, Calculation of substation and overhead transmission lines insulators costs, Determination of transmission voltage in view of the cost, project profits, economic feasibility, economical comparison, economical life time, performance applications, administration definite, schools of administration, quantity and quality in administration. Importance of administration in engineering, manager, leader, criteria for good manager, decision maker. Technical sides and human behaviour for studying the administrative behavior.

EPE 322: Analysis and Design of Electrical Machines   (4+2)

Universal motors and their design, 2-phase induction motors, 1-phase induction motors and their design, design of a small 1-phase transformer, linear induction motors, stepper motors and their design.

EPE 324: Computer Applications in Electrical Power and Machines   (4+2)

Computer-aided analysis of electrical machines: steady-state performance of DC, induction and synchronous machines, concepts of analog and digital computer, representation using flow chart. Programming principles: direct programming, solution of linear and non-linear equations, methods of solution of linear and algebraic equations, solution of differential equations by partial fraction,

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programming of different elements in electrical power, programming of element calculation in circuit, programming of symmetrical and unsymmetrical methods in calculation of power flow, solution of differential equation by partial fraction with finite time method, finite elements, method of optimal solution, method of charge representation, concept of limits elements.

FOURTH YEAR

FIRST SEMESTER

EPE 411G Utilization of Electrical Energy

Lighting, Home Illumination, Street Lighting, Electrical Traction, Chemical, Medical and Electrochemical Techniques, Alternative Power Resources, Transportation Using Railways, Agricultural and Orchards Applications.

EPE 412G Automatic Control (2)

Root locus technique, construction of the complete root loci, roots of a polynomial, applications, root contour (multiple parameter variation), design of P-, PD-, PI– and PID controller using root locus technique, frequency domain characteristics (M_p, ω_p, band width, phase margin and gain margin). frequency domain analysis of control systems, Nyquist stability criterion. applications, stability of multi-loop systems. frequency domain design of control systems, Bode plot, design of phase lead controller, phase lag controller and phase lag – lead controller, applications.

EPE 41#T1 Elective Course(1)

EPE 41#T2 Elective Course(2)

EPE 415G Tests and Standard Specifications (1)

Synchronous generators: no-load and short-circuit tests for 3-phase generators, load test for 3-phase generators, motoring and generation under rated loads, load and load angle characteristics, synchronous reactance, direct- and quadrature- axis reactance components, transient and sub-transient reactances, synchronizations, voltage step-up and step-down converters using MOSFET transistors. Electrical machines specifications: performance and rated values, experimentally-based calculation of losses and efficiency, protection classifications, terminals marks, direction of rotation, noise range.

EPE 416G Project*

After finishing the selected project, the student presents a detailed report explaining his project.

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FOURTH YEAR

SECOND SEMESTER

EPE42#T3 Elective Course(1)

EPE42#T4 Elective Course(2)

EPE42#T5 Elective Course(3)

EPE424G   Tests and Standard Specifications (2)*

Electrical machines and power electronics: DC motor control: speed feedback, speed and current feedback. Single-phase Induction Motor (IM): capacitor start IM, permanent capacitor IM, universal motors, stepper motors, brushless dc motors, voltage control of IM, VSI-induction motor drives.

Standard specifications: internal thermal protection, performance evaluation of 3-phase squirrel-cage IM (up to 600 V), cooling methods, equipments of power converters, assembly and general requirements, naturally cooled power converters, application guide, transformers, methods of performance specifications and test requirements of UPS, high-voltage semiconductor testing for electric power transmission, reference levels and EMI measurements transmitted by conduction.

GEN#71T1 Humanities(3)

GEN471G2 English Language(5)
EPE427G   Project

EPE 411: Power Electronics (2)   (4+2)

Static switches**:** reversing switches, circuits with non-ideal supply. AC voltage controller: methods of control, operation and performance analysis of single phase and three-phase AC voltage controller, transformer static tap changers. DC choppers**: s**tep-down and step-up choppers, operation and performance of the step-down and step-up choppers, analysis of different types of DC regulators, analysis of thyristor chopper circuits.

EPE 415: High Voltage Engineering(2)   (3+2)

Breakdown in gases, breakdown in liquid dielectrics, breakdown in solid dielectrics, distribution of voltage on Suspension Insulators.

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GEN 470: Environmental Impacts of Electrical Energy   **(3+1)**

Introduction to science environment, how to evaluate project according to the environmental rules, evaluation methods, evaluation of environmental performance, Environmental Control law and its applications, case study.

ELECTIVE COURSES

TABLE (1)

EPE 441: Power Electronics (3)   **(2+2)**

Thyristor forced commutation techniques, dc choppers: analysis and operation of step-up and step-down choppers, analysis of thyristor dc chopper circuits. Inverters: operation and analysis voltage- and current- source inverters, series resonant inverters, thyristor-based forced commutated current source inverters, variable dc link inverters, protection of power semiconductor circuits, protection against temperature rise, voltage surges and current spikes.

EPE 442 Electric Motor Drives (1)   **(3+2)**

Elements of motor drive systems, mechanical characteristics of electric motor drive systems, motor ratings in motor drive systems, load-motor drive system stability, single phase rectifiers dc motor drive system, controlled three-phase rectifiers dc motor drive systems.

EPE 444: Electrical Power System Analysis   **(2+2)**

Per unit system, symmetrical components, symmetrical and unsymmetrical faults, load flow studies, economic operation of power systems, stability studies, transient stability, dynamic stability, optimal operation for power systems, control in voltage stabilizers, generator speed control.

EPE 446: Numerical Analysis of Electromagnetic Fields   **(2+2)**

Introduction, digital and mathematical exponential, partial differential equation, field theory, solution of partial differential equation using finite difference method and finite element method and variable method, solution of linear equation.

TABLE (2)

EPE 443: Computer Applications in High Voltage Engineering   **(2+2)**

Introduction, electrical field calculations for different gaps, charge simulation method, finite element method, finite difference method, Monte Carlo method, electric field around high voltage

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transmission lines, corona losses, radio interference, audible noise, practical applications for gas insulated switches, practical applications for magnetic field calculations around and under electric power transmission lines.

EPE 445: Circuit Breakers and Substation   (2+2)

Introduction, high voltage bus bar, current transformer (CT) and its application, potential transformer (PT) and its application, circuit breakers, testing high voltage circuit breakers, isolators, earth switch, load break switch, lightning arresters, sub-stations earthing, gas insulation sub-station (GIS).

EPE 447: Computer Applications in Power System Engineering   (2+2)

Programming with different model of generator and transmission lines, short circuit calculation, calculation of power flow with balanced and unbalanced loads, stability study for a generator connected to infinite system, study the effect of voltage regulators on unregulated voltage, power system stabilizer studies on dynamic stability.

TABLE (3)

EPE 448: Applications of Power Electronics   (4+2)

Design Considerations in rectifiers, inverters, AC voltage controllers and choppers circuits, DC and AC power supplies, DC and AC motors control.

EPE 449: Electric Drive Systems (2)   (4+2)

DC motor drive systems using dc choppers - Induction motor drive systems: speed control by varying the terminal voltage, speed control using voltage-source and current-source inverters. Synchronous motor drives, variable frequency motor drives, speed control of reluctance motors.

EPE 450: Control of Electric Machines   (2+2)

Principles of variable speed drive systems: requirements of a good speed drive system, the main factors affecting the drive system, load torque and speed characteristics, trends in design and application of AC drive systems.

Fully controlled rectifier circuits feeding DC motors: separately excited DC motor fed from controlled rectifier which is fed from single phase or three-phase supply, DC motor control using DC choppers, principal equations of motor operation, drive systems using DC choppers.

Closed loop control of DC motors: single quadrant and four quadrants variable speed drives.

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Induction motor control using AC voltage controllers*: fans, pumps and cranes drive systems, AC voltage controller starters, loss reduction.

Voltage source inverters fed induction motor control*: three-phase voltage source inverters, breaking and four quadrant control, voltage source inverter drives.

Current source inverter fed induction motor control**: current source inverter drive systems, variable frequency synchronous machines drive systems, stepper motors drive systems.

TABLE (4)

EPE 451: Advanced Studies in High Voltage Engineering   (2+2)

Introduction: generation of high voltages and currents, over voltage phenomenon, insulation co-ordination in electrical power systems, high voltage testing of electrical apparatus, design, planning and layout of high voltage laboratories, earthing (grounding) systems.

EPE 452: Load Forecasting in Electrical Power Systems   (2+2)

Forecasting and management: introduction, future facing, forecasting rule, introduction to quantitative forecasting, smoothing methods by using simple time series, methods of analysis of predicted time series, simple restitution methods, and multiple restitution methods.

EPE 453: Dynamic Modeling of Power Systems   (4+2)

Two reaction theory, Park's transformation, synchronous generator model, transformer model in voltage space, transmission line modeling, active and reactive power representation, different signal models, dynamic modeling for lumped mass rotor, different models for automatic voltage regulators, different models for stabilizers.

EPE 454: Advanced Studies in Electrical Power System Analysis   (4+2)

Effect of loading on the stability limit in power systems, effect of supplementary signals in increase of dynamic stability limit in power systems, transient voltage and sudden changes due to switching on and switching off for power lines, phenomena of transient magnetizing current on no load, and unsymmetrical opening and closing by using single pole switch.

ELECTIVE COURSES OF HUMANITIES

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GEN 371: Economics and Management (2+-)

Principles of Economics, The importance of Economy for Engineering, Costs, Project Benefits, Economic feasibility, Economic comparison, Economic life, Applications in the performance, Definitions of Directors, School administration, Destinations in the quantitative and qualitative management, Importance of management in engineering, Director, Commander, standards of good manager, Decision-making, technical and humanitarian aspects of the study of managerial behavior.

GEN 372: Business Administration (2+-)

The study of financial principles and their applications in the projects, focusing on financial analysis and capital management, budget, long-term financing, policy foundations, internal budgets

GEN 373: Engineering economic analysis (2+-)

Factors, Engineering Feasibility, Engineering Economic Analysis, Analysis of Alternatives, Estimates of the Engineering Requirements and Cost.

GEN 374: Training visual and Formation (2+-)

The course aims to develop the imaginative capacity in profile visible to the student through the study of elements of formation and the factors that affect the formation work and aesthetic values and the fundamentals of the compatibility of formation and the elements of understanding the aesthetic of the blocks and the surfaces, colors through the applied models.

GEN 375 Project Feasibility Studies (2+-)

General Scope of Different Types for Feasibility Studies, Capital Feasibility study, Technical Feasibility Study, Marketing Feasibility Study, Economical Feasibility Study, Administrative Fields, General Applications for the Decisions on Income and Economical Statements.

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THIRD YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE311G	Communication (1)	4	2	6	60	-	90	150	3
٢	ECE312G	Electromagnetic Waves	4	2	6	40	-	60	100	3
٣	ECE313G	Electronics(3)	4	2	6	80	-	120	200	3
٤	ECE314G	Lab (4)	-	4	4	20	-	30	50	2
٥	GEN375G1	English Language(4)	-	2	2	15	-	35	50	3
٦	ECE31#T1	Elective Course (1)	3	2	5	60	-	90	150	3
٧	GEN#72G2	Elective Course humanities(2)	2	-	2	20	-	30	50	2
		Total	17	14	31				750	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE321G	Communication(2)	4	2	5	60	-	90	150	3
٢	CSE214G1	Computer (3)	4	2	6	40	-	60	100	3
٣	ECE322G	Control Engineering	2	2	4	60	-	90	150	3
٤	ECE423G	Lab (5)	-	4	4	20	-	30	50	2
٥	ECE31#T2	Elective Course (2)	4	2	6	60	-	90	150	3
٦	ECE31#T3	Elective Course (3)	4	2	6	60	-	90	150	3
		Total	18	14	32				750	

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FOURTH YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE411G	Communication (3)	3	2	5	40	-	60	100	3
٢	ECE412G	Electronics (4)	3	2	4	40	-	60	100	3
٣	CSE413G1	Computer (4)	3	2	5	40	-	60	100	3
٤	ECE413G	Antenna and wave propagation	3	2	4	40	-	60	100	3
٥	GEN472G1	English Language (5)	-	2	2	15	-	35	50	2
٦	ECE41xT1	Elective Course(1)	3	2	6	60	-	90	150	3
٧	ECE41xT2	Elective Course(2)	3	2	6	60	-	90	150	3
		Total	18	14	32				750	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE421G	Communication (4)	4	2	6	40	-	60	100	3
٢	ECE422G	Industrial electronics	4	2	6	40	-	60	100	3
٣	ECE423G	Lab(6)	-	4	4	15	15	20	50	2
٤	ECE42xT3	Elective Course(3)	3	2	5	50	-	100	150	3
٥	ECE41xT4	Elective Course(4)	3	2	5	50	-	100	150	3
٦	ECE429G	Project	2	2	4	60	140		200	
		Total	16	14	30				750	

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THIRD YEAR

FIRST SEMESTER

ECE 311G communication (1)   (4+2)

Communications methods- audio communications methods- Shanon- Hartly law for micro communications- basic needs of communications methods- analog signals and codes- wire and wireless single and double communications methods- rerecording sound and accidental distortion- methods of generating sound- inside and outside sound generation- interference and its effect on broadcasting .

ECE 312G Electromagnetic waves   (4+2)

Maxwell equations- Lorentz law of polar powers- Poynting theory- non electromagnetic waves- static solutions of Maxwell equations- radiation of dipole Hertzian- sorts of media- poplar media- unified media characteristics- waves in plasma-surrounding conditions- reflection and transmission of vertical incident waves-non vertical projection of plane waves in a media with no loss.

ECE 313G Electronics (3)   (4+2)

Classification of amplifiers feedback- method of analyzing feedback amplifiers- frequency interference- Hybrid models on high frequency- common emitter amplifier behavior- common collector operating on high frequency- approximate analysis in self-multiself repeated feeding- stable feeding, Bode Plot, similarity using spice, interference with undesired frequency- classification of efficiencies for (Class A- Class B), operating AB class , integrated circuits of power amplifiers, controlled amplifiers .

ECE 314G Lab (4)   (4+0)

Digital and analog communication- signals sources- filters and oscillator circuits- amplitude modulation, frequency modulation, pulse code modulation, radar reception for amplitude modulation.

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FIRST SEMESTER

ECE 321G Communications (2)   (4+2)

Methods of addressing audience- sound amplifiers-high accuracy recording instrument- different methods of recording sound- sound amplifiers and methods of connections to avoid sound interruption- stereophony- formation and modification in receiving wireless waves- sorts of receivers- acoustic completions- interference and means of controlling them in receivers.

ECE 322G Control Engineering   (3+2)

History of automatic control-examples of automatic control systems- differential equations of natural systems- Laplace methods equations of transforming functions of linear systems- mass diagram of systems- representing systems through signals diversity- open direct systems and feedback systems- sensitivity and interference of signals- fixed errors of the state- description of feedback in control systems- balance of the linear systems which have feedback- root routes methods-frequency induction methods- balance in frequency domain current-current variables of dynamic systems- current vectors of differential equations- balance in time domain- leading and lagging facts of circuits- design of control systems in time domain- PID controllers- computers in control systems.

ECE 323G Lab (5)   (4+0)

Frequency modulation transmitter- amplitude- modulation transmitter- grouped circuits of an amplitude and frequency modulation receivers- conversion from analog to digital- control of direct current motor-control stepper motor- thermal control – speech analysis- cascaded transistor amplifier-frequency response of audio amplifiers-Microsystems- integrated analog transformer.

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ECE 311T1 electronic engineering assisted by the computer (4+2)

Marketing considerations- developmental ways- constructional ways- supplying consumers; electronic workers control – variety design- natural design-silicon merge of the used elements in design systems assisted by the computer- current systems assistant by the computer- merge of manufacturing by computer aids- technical methods of testing assisted by the computer- integration between design and manufacturing assisted by the computer- administrative systems of electronic engineering environment assisted by the computer- electronic engineering technology assisted by the computer.

ECE 312G Acoustics engineering and ultrasounds (4+2)

Propagation of sound waves- light energy conversions- pipes-holes- waves envelops and filters- noise – hearing and speaking – architectural acoustics-applications of sound emission- industrial applications of ultrasounds .

(Elect & comm. 313 c) Design of computer circuits (4+2)

Introduction to digital electronics- technology of manufacturing integrated circuits- characteristics of using digital circuits using dual- pole transistor, overview of the logic gates families, their sorts and characteristics- gates which are manufactured from transistor metal- Oxide- semiconductor, characteristics of NMOS CMOS , PMOS. Regenerating logic circuits: dual fixed circuits- locks- Flip flops- Schmitt trigger- multi vibrator circuits- temporary integrated circuits-semiconductors memories-many sorts for read only memory ROM- reading memory – static and dynamic writing – sources and organizations- lost power- invalidation equipments of the support- transmission lines conditioning- uninterrupted power supply UPS.

(Elect & comm. 321 Design and execution of printed circuits boards (4+2)

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Sizes of printed circuits boards- surface methods – resistance, condensers and coils of conducting printed circuits boards- distance of the conductors- real sources and earth conductors- positional and pending components- collective cooling and density requirements-surface testing- design laws of different printed circuits boards and applications- analog and digital, high frequency-automatic technique and programming of designing boards of printed circuits- taking care of the boards before the model transformation – photoprinting – silkscreen printing – manufacturing of electronic boards- automatic mechanical operations- printed circuits boards technology- multi layer boards- technical ways of welding – technical methods of integrated components.

(Elect & comm. 323) Microprocessor systems   (3+2)

Theory and design of microprocessors- semiconductors technology- architectural formation – assembly language- developing programs- design of input and output methods – applications –connections.

(Elect & comm. 324) Introduction to opto- electronics (4+2)

Diodes that emit light – display technologies and circuits- laser – light formations and light detection- light yoke and its applications-characteristics and applications of fiber optics.

(Elect & comm. 325) Communication circuits in fiber optics (4+2)

Semi conductor materials for light sources- radioactive union operations- M-S joints and non- harmonized joints- unconnected sources (diodes that emit light)- connected sources (injection laser)- formation methods of light sources- fiber optics radiation and characteristics-light accumulation detectors.

(Comp 326) Programming languages   (3+2)

Principles of programming languages- programming languages processes- formation and meaning of the language- phases of the compliers- types and

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structures of data- control structures- operation time considerations- memory management – revision to some of the languages: Pascal– prologue- liceb – Ada.

(Elect & comm. 411) Power electronics   (4+2)

Semi conductors power switches- rectifiers and controlled rectifiers- multiphase circuits and bridge, conversion tool by controlling the phase- conversion of the direct current to a direct current (interrupted) – conversion of the direct current to a direct current (continuous) by changing the frequency-conversion tool from an alternating current to a direct current – sources of energy-control of direct current engines- AC current engines.

(Elect & comm. 411) Optical wave guides   (4+2)

Basic of communication with fiber optics- the method of wave propagation- mehod of producing cables and the produced materials- mthods of measuring the fixed and variables of optical wave guides.

(Elect & comm. 413) Organizing computers   (4+2)

Introduction- computer orders-timer processing – input & outputs- interruption, design of a simple computer - basic of assembly language and characteristics- compiler's characteristics – macros – organizing the central processor: transporter, arithmetic and logical operations unit, stack – forms of orders- types of addresses – organizing the microprocessors – organizing control of micro programs, control design of arithmetic processor – methods of dealing with signal numbers – organizing inputs and outputs – hierarchical memory- connective memory – assumptive memory – liquid memory – circuits of managing memory.

(Elect & comm. 414) Digital control systems   (4+2)

Linear differential equations- interrupted conversion function- interrupted patterns of partial data systems- analytical systems of partial data using z transformation – design using conversion technology – design by empty state-

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numbered impacts- determining system variables – Ideal control and multiple variables- choice of partitioning rate- nonlinear control – material components of digital control systems- developing programming – integrity of the system- manufacturing – building the program – case study design.

(Elect & comm. 415) Communication systems   (4+2)

Satellite systems – earth microware connections – instruments and technologies of microwaves.

(Elect & comm. 416) Computer terminal units   (3+2)

Input and output terminals- display screens and audio outputs- keyboards and connected inputs- printers and plotters – tapes and punched cards – special input and output terminals – storage media – magnetic disks – magnetic tapes-light disks – automization of tapes and disks libraries – maintenance of material and programming components.

(Elect & comm. 421) Introduction to design of very high density integrated circuits   (4+2)

Absorption layers-methods of design and technology – turnover of compatible logical circuits using a metal – Oxide semiconductor – compatible networks using complementary metal –oxide – semi –conductor – connecting manufacturing to deign rules of designing a complementary metal – oxide and semiconductor – electric parameters – energy and delay –delay of a changing register – introduction networks – non digital operators – arithmetic operators – memory systems – testing execution rule – methods of preparation and implementation.

(Elect & comm. 422) Telephone systems   (4+2)

Wire telephone – telephone circuits – subscribes circuits – cables which are used in communicating to exchanges- used tones – the telephone circuits that is used to

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communicate between the subscribers and different methods of communication, electronic method of communication –methods of communication between cities.

(Elect & comm. 424) Direction and control   (4+2)

Basics of numerical control – classification of numerical control systems- numerical control receiver – programming of the piece – operators – feedback instruments – closed circuits in surrounding systems – numerical control using the computer- basic concepts of robot – control of robot – robot programming –smart robots – flexible manufacturing systems –design systems assisted by the computer – manufacturing assisted by computers.

(Elect & comm. 425) Microwave electronics   (4+2)

Microwave frequency –microwave systems –electric and magnetic waves equations – Poynting's theory – propagration of planar waves – transmission lines of microwaves- multi axe cable connections of microwaves.

Circular and rectangular wave guides – microwaves gaps-different microwave circuits – double directions wave guides – bipolar transistors ultra microwaves – transformed electron instruments – linear radiation valves of the microwaves – transit field valve of microwaves – integrated circuits of single microwaves.

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ECE311G Communication (1)

Communication methods, Audio communication method, Shanon-Hartly law for micro-communications, Basic needs of communications methods, Analog signals and codes, Wire and wirless single and double communication methods, Recording sound and accidental distortion, Methods of generating sound, Inside and outside sound generation, Interference and its effect on broadcasting.

ECE312G Electromagnetic Waves

Maxwell equations, Lorentz law of polar powers, Poynting theory, non electromagnetic waves, Static solutions of Maxwell equations, Radiation, of dipole hertzian, Types of Mediums, Polar medium, Unified medium characteristics, Waves in plasma, Surrounding conditions, Reflection and transmission of vertical incident waves, Non vertical projection of plane waves in a lossless medium.

ECE313G Electronics(3)

Classification of amplifiers, Feedback, Method of analyzing feedback amplifiers, Frequency interference, Hybrid models on high frequency, Common emitter amplifier behavior, Common collector operating on high frequency, Approximate analysis in self-multiself repeated feeding, Stability, Bode plot, Similarity using spice, Interference with undesired frequency, Classification of efficiencies for (class A - class B), Operating AB class, Integrated circuits of power amplifiers, Controlled amplifiers.

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ECE314G Lab (4)

Digital and analog communications, Signal sources, Filters and oscillator circuits, Amplitude modulation, Frequency modulation, Pulse code modulation, Radar reception for amplitude modulation.

GEN375G1 English Language(4)

ECE31#T1 Elective Course (1)

GEN#72G2 Elective Course humanities(2)

THIRD YEAR

SECOND SEMESTER

ECE321G Communication (2)

Methods of addressing audience, Sound amplifiers, High accuracy recording instruments, Different methods of recording sound, Sound amplifiers and

CSE214G1 Computer (3)
ECE322G Control Engineering
ECE423G Lab (5)
ECE31#T2 Elective Course (2)
ECE31#T3 Elective Course (3)

ECE 111: Electronic Engineering Fundamentals   (4+2)

Electric conduction mechanisms in conductors and semiconductors-semiconductor doping-energy bands-charges dynamics in semiconductor-bipolar junction and transistor fundamentals-electric machines fundamentals: generators and motors.

ECE 112: Electric Circuits (1)   (4+2)

The wave behavior- passive electric circuits-Kirchhoff's laws- different techniques for solving electrical circuits- node voltage technique-mesh current technique-the power in alternating current circuits-the effective and average value of sinusoidal waves-compound power-maximum power

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factor-Electric circuits behavior-nonlinear resistance-the effect of temperature on resistances and changing its value with temperature.

ECE 113C: Computer Programming (1)   (4+2)

Introduction to programming concepts, Program flow charts, structured programming in one of the program+ming languages, Loops, Arrays, Procedures (Functions), Records, Linked lists, Pointers and Recursion.

MPE/CVG 181: Mechanical and Civil Engineering   (3+2)

Principles of thermodynamics, Fluid movement, Ideal gas, First law of thermodynamics, Reversible processes, irreversible processes, Second law of thermodynamics, Heat cycle, Thermal equilibrium degree, Gases movement theory, Conduction, Convection, Radiation, Heat exchange, Principles of fluid mechanics

Principles of Architectural and building construction, Building types, Materials used in construction, partitions and its specifications, Methods of thermal insulations, moisture, noise and environmental effects, Methods to prepare a fire protection buildings, Specifications required to prepare the buildings to be a communication centers and its location of usages, Architectural and civil drawings and their testing and commissioning.

ENG181 Mathematics (2)(A)   (3+2)

Infinite series, Functions expantion, Diffretiation applications, Maximum and minimum limits, Lagrange multiplications, Restricted maximum and minimum limits applications, High order differential equations, Complex variable functions, Vectors analysis, Standards and vector fields, Vector diversion, Standard fields talus, Vector field alignment, Gauss's theory, Green's theory, Stocke's theory.

GEN 181: Engineering Legislation   (2+-)

Laws and responsibilities concerning with engineers – Decision of law of contracts –explanation of laws concerning of engineering in any of that fields.

Syndicate of engineer laws – contracts town planning laws – building construction laws , High ways laws – land distribution laws – agriculture land laws – safety rules and regulation for industrial fields , operation of cranes – environmental protection , insurance laws (accident , fires) investment laws , irrigation laws , the relation between owners , rental-employment laws – industrial union.

First Year

Second Semester

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ECE 121: Electronic (1)   (4+3)

Bipolar junction applications-Transistor theory of operation-transistor dynamic and static characteristics-Thyristor-Unijunction devices-the basic characteristics-light emitting devices principles-Laser from semiconductors- light detectors-photocells-Laser characteristics and applications-the integrated circuits technology-the crystal growing-oxidation-film predeposition - Diffusion-and circuit printing and etching

ECE 122: Electric circuits (2)   (3+2)

Three phase system-loads in three phase systems- unbalanced operation in electric circuits-transit and steady state in electric circuits-electric circuits analysis using the computer program PSPICE

ECE 123: Lab (1)   (0+4)

Electronics basics-logic circuits-using measurement and testing instruments-measurement techniques-elements and techniques in testing and programming the computer

ECE 124C: Computer Applications (1)   (3+4)

Study of computer applications in the field of information systems and the Internet, Study of the languages required to build and manage interactive web sites.

ENG182 Mathematics (2)(B)   (3+2)

Complex Variable Functions, Complex Quantities Algebra, Multivalues Functions, Analytical functions and Couchy's theory, Complex Series, Taylor and Lourant's seires, Zeroes and Singular points, Infinite series.

GEN 182: English Language (2)   (-+2)

A comprehensive curriculum to teach English language to engineering students with concentrating on electrical engineering and computer terminology, Grammar, Grammatical structures, Writing and essay, Teaching using computers, Using multimedia on computers to teach English, Developing reading capabilities.

SECOND YEAR

FIRST SEMESTER

ECE 211: Electric and Electronic Measurement   (4+2)

Definitions-the functions and characteristics of measurement instruments-the standard measurements- statistical analysis for errors in measurement-oscilloscope- signal generator-digital

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measurement instruments-recording measurement instruments-transducers-data conversion – computer based testing.

ECE 212: Fundamentals of Electromagnetic (4+2)

Direction analysis-static electric field main relations-Gauss's law-Laplace equation-Poisson equation-electrostatic energy-magnetic field theorem-magnetic induction- Faraday's laws-analogy between the electric and magnetic fields-time continuity equations-boundary conditions-time alternating fields and Maxwell's equations

ECE 213C: Computer organization (1) (3+2)

Introduction, Machine Instructions, Timing methodologies, Operating Systems, Input/Output, Organization, Interrupts, Basic Structures of Computers, Assembly language, Assemblers, Macros, Processing Unit Organization, Buses, Arithmetic and Logic Unit (ALU), Stack, Instruction Set Formats, Addressing Modes, Microprocessor Organization, Micro-programmed Control Organization, Control Memory, Address Sequencing, Micro-program sequencer, Microinstruction Formats, Processor design, Signed Numbers Representations, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

ECE 214C: Computer Programming (2) (4+2)

Fundamentals of Object Oriented Programming in any programming language (e.g. Java), Classes, Inheritance, Input and Output Techniques, Programming for Windows

ENG281 Mathematics (3)(A) (3+2)

Laplace and Inverse Lapalce transformations, Laplace transform of derivatives and integration, Solving of differential and integrating equations, Special Functions, Beta and Gamma Functions, Bessel's functions and Legender's polynomials, Partial Differential Equations, Integral Conversion: Fourier, Laplace, Bessel, Hankle, Hulbert.

GEN 28X: Elective Course of Humanities (1) (2+0)

SECOND YEAR

SECOND SEMESTER

ECE 221: Signal Analysis (4+2)

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Signal representation in time and frequency domain-Continuous and discrete signals-periodic signals- Continuous and discrete Fourier transformations-spectrum representation-a periodic functions-sampling and spectrum analysis-power and energy spectrum.

ECE 222: Electronics (2)   (4+3)

JFET and MOSFET characteristics and theory of operation-MOSFET types-FET biasing-FET digital and analog applications-IC fabrication-VLSI IC –IC testing-power supply circuits design-Unregulated power supply-voltage references-PNPN diode-Thyristor applications-Bidirectional devices-semiconductor cell and related devices.

ECE 223: Lab (2)   (0+4)

Using oscilloscope - resonance circuits-zener diode circuits troubleshooting-optical electronics devices-the counters-the amplifiers-the integrated circuits regulators-JFET transistors-computer programming and organization applications

ECE 224C: Logic Circuits   (4+2)

Binary Number Systems, Boolean Algebra, Karnaugh Maps, Memory Elements, Latches, Flip-Flops, Synchronous Sequential Circuit, Integrated Circuits Logic Families, Shift Registers, Counters, Sequential Circuits, Combinational Circuits, Adders, Subtractors, Memory.

ENG282: Mathematics (3)(B)   (3+2)

Prtial Differential Equations, Wave Equations, Methods of seperation of variables, Laplace and poassoinan equations, Using of Integration Conversion in Solving Differential Equations, Numerical Analysis, Least Square, Numerical integration, Finite Difference Method, Probabilities and Statistical Theories, Random Variables, Cummulative Distribution Function, Moments, Gaussian Distibution, possonian Distribution, Matrics Analysis.

GEN 280: Technical Reports (1)   (0+2)

A comprehensive curriculum to teach the engineering students on technical English writing. The curriculum develop the ability of the students to write a short practical requirements, training the students on briefing the data.

THIRD YEAR

FIRST SEMESTER

ECE 311: Communication Systems   (4+2)

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Amplitude, frequency and phase modulation-PCM-DPCM-TDM-FDM-ASK-FSK-PSK

ECE 312: Electronic Circuits (A) (4+2)

Hybrid parameters-high frequency amplifiers impedance-Tuned and intermediate amplifiers-Bode plot and the frequency response-Matched oscillators-Mixing and modulation circuits-Power amplifiers.

ECE 313: Electromagnetic waves (4+2)

Time varying fields-wave propagation in different media- wave propagation in lossless and lossy polarized materials-wave transition and reflection on planner -wave guide fundamentals.

ECE 314: Lab (3) (A) (0+4)

Single stage and multistages transistor amplifier circuits-feedback amplifiers-amplifiers frequency response and and bandwidth –operational amplifiers

ECE 34X: Elective Course (1) from Table(1) (4+2)

GEN 38X: Elective Course Humanities (2) (2+-)

THIRD YEAR

SECOND SEMESTER

ECE 321: Control Systems (1) (3+2)

Classical control systems using frequency response and Laplace's transformations-Design and analysis using Nyquist plots, Bode and root locus-systems stability-time and frequency response-state variables and feedback.

ECE 322: Electronic Circuits (B) (3+3)

Operational amplifier circuits-Differential amplifiers-signal generators-voltage regulators-active filters-phase locked loop circuits-using programming packages in analyzing and designing the electronic circuits

ECE 323: Communication Networks (3+2)

Networks designs fundamentals-Network architecture-the characteristics of WAN, MAN and LAN

ECE 324: Lab (3) (B) (0+4)

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Oscillators-mixers-voltage controlled oscillators- Phase locked loop circuits -tuned amplifiers-amplitude modulators and demodulators

ECE 34X: Elective Course (2) from Table(2) **(4+2)**

EPE 381: Electrical Power and Machines **(3+1)**

DC Machines, Magnetic circuit, Windings, E.M.F, DC Motors, Exiting methods, B-H curve, Torque and Speed, Starting, Speed Control, DC Generators, separately exited Motors, Self exited machines, Parallel operation, Efficiency of DC machines, Losses, Maximum efficiency, Transformers, Types, Construction, EMF equations, Efficiency.

FOURTH YEAR

FIRST SEMESTER

ECE 411: Antenna and wave propagation **(3+2)**

Transmitting and receiving antennas fundamentals-linear antennas- array antennas- microwave antennas

ECE 412: Digital Signal Processing **(3+2)**

Discrete signals-continuous and discrete transformation-fast Fourier transform (FFT)-flow graph-quantization effects-linear transformation-digital filters-windows and sampling- optimal simulation methods.

ECE 413: Microprocessor systems **(3+2)**

Design and theory of operation of microprocessor –memory-input and output ports-assembly language.

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ECE 414: Project   **(-+3)**

ECE 34X: Elective Course (3) from Table(3)   **(4+2)**

ECE 34X: Elective Course (4) from Table(4)   **(4+2)**

FOURTH YEAR

SECOND SEMESTER

ECE 421: Digital Communication   **(2+2)**
Digital and analog communication systems-analysis and simulation of discrete –communication channels coding-time and frequency domain in digital modulation- Interference and noise effects

ECE 422: Advanced Electronic Systems   **(2+2)**
Design and analysis of digital and analog electronic systems-audio and visual systems using microwaves- satellites- Mobile telephone and personal computer technologies

ECE 423: Optical Communication   **(3+2)**
Physical principles-light emitting and laser junctions-optical detectors-optical fibers-optical communication techniques-performing optical communication session

ECE 424: Lab (4)   **(0+4)**
Basic Active filters-phase locked loop circuits- frequency synthesizers-sampling and encryption-TDMA-FDMA.

ECE 414: Project   **(-+5)**

ECE 34X: Elective Course (5) from Table (5)   **(4+2)**

ELECTIVE COURSES OF HUMANITIES

GEN 281: Industrial Sociology   **(2+0)**
How to organize the work under the different Establishments, topics including the integration of the development of science and technology of social organization of labor, labor relations, management strategies and the interaction of workers.

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GEN 282: Organizational Behavior (2+0)

Human performance in organizations, theories of motivation, the movement of groups, power and communications, ethical performance in organizations.

GEN 381: Project Management (2+0)

Definitions, the project as part of a strategic plan, the relations between the programs, projects, budgets, regulatory plans, organizational processes of project planning, quantitative methods for project management such as, CPM, PERT, project requirements, materials, manpower, facilities, funding, scheduling the project, organizing project, project implementation, project control, performance evaluation.

GEN 382: Environmental Effect (2+0)

Introduction to science environment, how to evaluate project according to the environmental rules, evaluation methods, evaluation of environmental performance, Environmental Control law and its applications, case study.

GEN 383: Engineering Ethics (2+0)

The nature of values and ethical considerations, theories of moral values of the engineer in society, ethics in the professional work environment, safety, risk, responsibility, career choice, code of ethics, case study.

ELECTIVE COURSES

TABLE (1)

ECE 341: Introduction in Large Scale Integration Circuits (4+2)

Basic units in analog and digital integrated circuits-analysis and synthesis of analog and digital systems-analog and digital system architecture-basic cells planning and simulation methods -using programming packages in design.

ECE 342: Advanced electronic measurements (4+2)

Integrated measurement Amplifiers .Comparators – S/H circuits-Digital to Analog converters-Analog to Digital converters. Electrical variables. Filtering & Signals conditioning-passive components-sensors and systems

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ECE 343: Computer aided Electronic design (4+2)

The electronic systems-the standard components in electronics and communication-schematics and printed circuits design-using the programming packages

TABLE (2)

ECE 344: Microwaves Fundamentals (4+2)

Cylindrical and rectangular wave guides-main passive elements-microstrip

ECE 345: Optical Semiconductor (4+2)

The dynamic of charge carriers in semiconductors- Light emitting junction frequency response- laser characterstics and fundamentals

ECE 346: Transmission Lines Techniques and Theory (4+2)

Electromagnetic wave propagation over Transmission Lines-reflection Standing waves -terminal matching techniques- Smith chart application

TABLE (3)

ECE 441: Microwaves Electronics (3+2)

Microwaves transistors and amplifiers-low noise amplifiers-microwaves oscillators- microstrip-mixers and detectors.

ECE 442: Principles of Medical Engineering (3+2)

Safety and Isolation in Medical Devices, Methods of Deleting Noises, Heart Assistant Devices, Measurements of Physiological and Bio-Sensors, Bio-Signal Processing, Scanning Methods

ECE 443: Selected Topics (1) (3+2)

TABLE (4)

ECE 444: Industrial Electronics (3+2)

Four layer devices- power electronic devices gate control- dc to Ac converter and vice versa- Different industrial control systems.

ECE 445: Adaptive filtering (3+2)

Optimum linear filter-Calman and Fayner filters-steepest roll-off method-LSM-algorithms.

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ECE 446: Surface acoustic wave devices (3+2)

Elastic SAW, Inter-digital transducers, SAW filter types, RADAR applications, Spread Spectrum Systems

TABLE (5)

ECE 447: Robot Engineering (3+2)

Coordinate systems and transformation- robot kinematics-inverse kinematics-robot dynamics-motion path planning-robot motion control-control of robot derivers.

ECE 448: Selected Topics (2) (3+2)

ECE 449: Radar Systems (3+2)

Discrimination techniques in radar measurement-Range, angle and speed measurement-analysis of searching methods and tracking -the characteristics of reflected signals from targets

TABLE (6)

ECE 450: Space communication (3+2)

Geostationary orbit satellites-stability of angular motion- propagation loss and antenna directivity-noise and losses in atmospheric air-pulse modulation and band width-base band communications-multiple access and coding-channel bandwidth and filtering- Satellites and direct broadcasting.

ECE 451: High Frequencies Electronics (3+2)

High frequencies oscillators and amplifiers designing Techniques-Tuned circuits with distributed elements-Introduction to high frequency and microwaves

ECE 452: Mobile phones communication (3+2)

Mobile Phone Communications-The probability of signal losing-VHF & UHF ground communications-channel properties-digital mobile communications-network capacity calculations-space call distribution.

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COMPUTER ENGINEERING CURRICULA

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FIRST YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE111	Principles of Electronic Engineering	4	2	6	٣٠	30	٩٠	150	3
٢	ECE112	Electrical Circuit (1)	4	2	6	٣٠	30	٩٠	150	3
٣	ECE113C	Computer Programming	4	2	6	٣٠	30	٩٠	150	3
٤	MPE/STRU181	Civil and Mechanical Engineering	3	2	5	٤٥	-	80	125	3
٥	ENG181	Mathematics (2)(A)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN181	Engineering Legislation	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

SECOND SEMESTER

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Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE121	Electronics(1)	4	3	7	٤٥	30	١٠٠	175	3
٢	ECE122	Electrical Circuit (2)	3	2	5	٢٥	25	٧٥	125	3
٣	ECE123	Lab (1)	-	4	4	٣٠	20	٥٠	100	2
٤	ECE124C	Computer Applications(1)	3	4	7	٤٥	30	100	175	3
٥	ENG181	Mathematics (2)(B)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN182	English Language(2)	-	2	2	١٥	-	٣٥	٥٠	٢
		Total	١٣	١٧	٣٠				٧٥٠	

SECOND YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE211	Electrical and Electronic Measurements	4	2	6	٣٠	30	٩٠	150	3
٢	ECE212	Principles of Electromagnetic	4	2	6	٣٠	30	٩٠	150	3
٣	ECE213C	Computer Organization(1)	3	2	5	٢٥	25	٧٥	125	3
٤	ECE214C	Computer Programming(2)	4	2	6	٣٠	30	90	150	3
٥	ENG281	Mathematics (3)(A)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN28x	Elective Humanities	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

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Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE221	Signal Analysis	4	2	6	٣٠	30	٩٠	150	3
٢	ECE222	Electronics(2)	4	3	7	٤٥	30	١٠٠	175	3
٣	ECE223	Lab (2)	-	4	4	٣٠	20	٥٠	100	2
٤	ECE224C	Logic Circuits	4	2	6	٣٠	30	90	150	3
٥	ENG282	Mathematics (3)(B)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN280	Technical Reporting(1)	-	2	2	١٥	-	٣٥	٥٠	٢
		Total	١٥	١٥	٣٠				٧٥٠	

THIRD YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE311C	Microprocessor Systems	4	2	6	٣٠	30	٩٠	150	3
٢	ECE312C	Control Systems (1)	4	2	6	٣٠	30	٩٠	150	3
٣	ECE313C	Operating Systems	4	2	6	٣٠	30	٩٠	150	3
٤	ECE314C	System Analysis and Design (1)	3	2	5	٤٥	-	80	125	3
٥	ECE315C	Data Structures	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN38x	Elective Course Humanities (3)	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

SECOND SEMESTER

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Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE321C	Electronic Circuits(1)	3	2	5	٤٥	-	٨٠	125	3
٢	ECE322C	Computer Architecture	4	2	6	٥٠	-	١٠٠	150	3
٣	ECE323C	Database Design	3	2	5	٢٥	25	٧٥	125	٣
٤	ECE324C	Lab (3)	-	4	4	٣٠	20	50	100	2
٥	ECE34xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
٦	EPE381	Electrical power and Machines	3	1	4	٣٠	-	٧٠	١٠٠	٣
		Total	١٧	١٣	٣٠				٧٥٠	

FOURTH YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE411C	Computer Graphics	3	2	5	٢٥	25	٧٥	125	3
٢	ECE412C	Artificial Intelligence	3	2	5	٢٥	25	٧٥	125	3
٣	ECE413C	Computer Networks(1)	3	2	5	٢٥	25	٧٥	125	3
٤	ECE414C	Project	-	3	3	٦٠	-	-	-	-
٥	ECE44xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
٦	ECE44xC	Elective Course(2)	4	2	6	٥٠	-	١٠٠	١٥٠	٢
		Total	١٧	١٣	٣٠				٦٧٥	

SECOND SEMESTER

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Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE421C	Compilers	4	2	6	٤٠	20	٩٠	150	3
٢	ECE422C	Lab(4)	-	5	5	٢٥	25	٧٥	125	2
٣	ECE414C	Project	-	5	5	٧٠	120	-	250	-
٥	ECE44xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
٦	ECE44xC	Elective Course(2)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
		Total	١٢	١٦	٢٨				٨٢٥	

FIRST YEAR

FIRST SEMESTER

ECE 111: Electronic Engineering Fundamentals   (4+2)

Electric conduction mechanisms in conductors and semiconductors-semiconductor doping-energy bands-charges dynamics in semiconductor-bipolar junction and transistor fundamentals-electric machines fundamentals: generators and motors.

ECE 112: Electric Circuits (1)   (4+2)

The wave behavior- passive electric circuits-Kirchhoff's laws- different techniques for solving electrical circuits- node voltage technique-mesh current technique-the power in alternating current circuits-the effective and average value of sinusoidal waves-compound power-maximum power factor-Electric circuits behavior-nonlinear resistance-the effect of temperature on resistances and changing its value with temperature.

ECE 113C: Computer Programming (1)   (4+2)

Introduction to programming concepts, Program flow charts, Structured programming in one of the programming languages, Loops, Arrays, Procedures (Functions), Records, Linked lists, Pointers and Recursion.

MPE/STRU 181: Mechanical and Civil Engineering   (3+2)

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Principles of thermodynamics, Fluid movement, Ideal gas, First law of thermodynamics, Reversible processes, irreversible processes, Second law of thermodynamics, Heat cycle, Thermal equilibrium degree, Gases movement theory, Conduction, Convection, Radiation, Heat exchange, Principles of fluid mechanics

Principles of Architectural and building construction, Building types, Materials used in construction, partitions and its specifications, Methods of thermal insulations, moisture, noise and environmental effects, Methods to prepare a fire protection buildings, Specifications required to prepare the buildings to be a communication centers and its location of usages, Architectural and civil drawings and their testing and commissioning.

ENG181 Mathematics (2)(A)   (3+2)

Infinite series, Functions expantion, Diffretiation applications, Maximum and minimum limits, Lagrange multiplications, Restricted maximum and minimum limits applications, High order differential equations, Complex variable functions, Vectors analysis, Standards and vector fields, Vector diversion, Standard fields talus, Vector field alignment, Gauss's theory, Green's theory, Stocke's theory.

GEN 181: Engineering Legislation   (2+-)

Laws and responsibilities concerning with engineers – Decision of law of contracts –explanation of laws concerning of engineering in any of that fields.

Syndicate of engineer laws – contracts town planning laws – building construction laws , High ways laws – land distribution laws – agriculture land laws – safety rules and regulation for industrial fields , operation of cranes – environmental protection , insurance laws (accident , fires) investment laws , irrigation laws , the relation between owners , rental-employment laws – industrial union.

First Year

Second Semester

ECE 121: Electronic (1)   (4+3)

Bipolar junction applications-Transistor theory of operation-transistor dynamic and static characteristics-Thyristor-Unijunction devices-the basic characteristics-light emitting devices principles-Laser from semiconductors- light detectors-photocells-Laser characteristics and applications-the integrated circuits technology-the crystal growing-oxidation-film predeposition -Diffusion-and circuit printing and etching

ECE 122: Electric circuits (2)   (3+2)

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Three phase system-loads in three phase systems- unbalanced operation in electric circuits-transit and steady state in electric circuits-electric circuits analysis using the computer program PSPICE

ECE 123: Lab (1) (0+4)
Electronics basics-logic circuits-using measurement and testing instruments-measurement techniques-elements and techniques in testing and programming the computer

ECE 124C: Computer Applications (1) (3+4)
Study of computer applications in the field of information systems and the Internet, Study of the languages required to build and manage interactive web sites.

ENG182 Mathematics (2)(B) (3+2)
Complex Variable Functions, Complex Quantities Algebra, Multivalues Functions, Analytical functions and Couchy's theory, Complex Series, Taylor and Lourant's seires, Zeroes and Singular points, Infinite series.

GEN 182: English Language (2) (-+2)
A comprehensive curriculum to teach English language to engineering students with concentrating on electrical engineering and computer terminology, Grammar, Grammatical structures, Writing and essay, Teaching using computers, Using multimedia on computers to teach English, Developing reading capabilities.

SECOND YEAR

FIRST SEMESTER

ECE 211: Electric and Electronic Measurement (4+2)
Definitions-the functions and characteristics of measurement instruments-the standard measurements- statistical analysis for errors in measurement-oscilloscope- signal generator-digital measurement instruments-recording measurement instruments-transducers-data conversion – computer based testing.

ECE 212: Fundamentals of Electromagnetic (4+2)

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Direction analysis-static electric field main relations-Gauss's law-Laplace equation-Poisson equation-electrostatic energy-magnetic field theorem-magnetic induction- Faraday's laws-analogy between the electric and magnetic fields-time continuity equations-boundary conditions-time alternating fields and Maxwell's equations

ECE 213C: Computer organization (1) (3+2)

Introduction, Machine Instructions, Timing methodologies, Operating Systems, Input/Output, Organization, Interrupts, Basic Structures of Computers, Assembly language, Assemblers, Macros, Processing Unit Organization, Buses, Arithmetic and Logic Unit (ALU), Stack, Instruction Set Formats, Addressing Modes, Microprocessor Organization, Micro-programmed Control Organization, Control Memory, Address Sequencing, Micro-program sequencer, Microinstruction Formats, Processor design, Signed Numbers Representations, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

ECE 214C: Computer Programming (2) (4+2)

Fundamentals of Object Oriented Programming in any programming language (e.g. Java), Classes, Inheritance, Input and Output Techniques, Programming for Windows

ENG281 Mathematics (3)(A) (3+2)

Laplace and Inverse Lapalce transformations, Laplace transform of derivatives and integration, Solving of differential and integrating equations, Special Functions, Beta and Gamma Functions, Bessel's functions and Legender's polynomials, Partial Differential Equations, Integral Conversion: Fourier, Laplace, Bessel, Hankle, Hulbert.

GEN 28X: Elective Course of Humanities (1) (2+0)

SECOND YEAR

SECOND SEMESTER

ECE 221: Signal Analysis (4+2)

Signal representation in time and frequency domain-Continuous and discrete signals-periodic signals- Continuous and discrete Fourier transformations-spectrum representation-a periodic functions-sampling and spectrum analysis-power and energy spectrum.

ECE 222: Electronics (2) (4+3)

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JFET and MOSFET characteristics and theory of operation-MOSFET types-FET biasing-FET digital and analog applications-IC fabrication-VLSI IC –IC testing-power supply circuits design-Unregulated power supply-voltage references-PNPN diode-Thyristor applications-Bidirectional devices-semiconductor cell and related devices.

ECE 223: Lab (2)   (0+4)

Using oscilloscope - resonance circuits-zener diode circuits troubleshooting-optical electronics devices-the counters-the amplifiers-the integrated circuits regulators-JFET transistors-computer programming and organization applications

ECE 224C: Logic Circuits   (4+2)

Binary Number Systems, Boolean Algebra, Karnaugh Maps, Memory Elements, Latches, Flip-Flops, Synchronous Sequential Circuit, Integrated Circuits Logic Families, Shift Registers, Counters, Sequential Circuits, Combinational Circuits, Adders, Subtractors, Memory.

ENG282: Mathematics (3)(B)   (3+2)

Prtial Differential Equations, Wave Equations, Methods of seperation of variables, Laplace and poassoinan equations, Using of Integration Conversion in Solving Differential Equations, Numerical Analysis, Least Square, Numerical integration, Finite Difference Method, Probabilities and Statistical Theories, Random Variables, Cummulative Distribution Function, Moments, Gaussian Distibution, possonian Distribution, Matrics Analysis.

GEN 280: Technical Reports (1)   (0+2)

A comprehensive curriculum to teach the engineering students on technical English writing. The curriculum develop the ability of the students to write a short practical requirements, training the students on briefing the data.
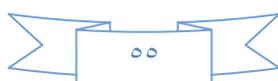
THIRD YEAR

FIRST SEMESTER

ECE 311C: Microprocessor Systems   (4+2)

Microprocessor theory and design, Semiconductors technology , Architecture, Assembly language, Input/Output, Peripheral design, Applications and connections.

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ECE 312C: Control Systems (1)   (3+2)

Introduction of control systems and feedback systems concepts, Modeling of discrete-time systems using difference equations and the Z-transform, Samples of test signals, State-space analysis, Time-response of control systems, Control systems stability, Digital controller design.

ECE 313C: Operating Systems   (4+2)

Hardware principles, processes concepts, processes scheduling, Memory Organization and management for single user and multi user systems, virtual memory organization and management, hard disk scheduling and usage in an optimum method, file systems management, studying of some of the most commonly used operating systems.

ECE 314C: System Analysis and Design (1)   (4+2)

Information requirements analysis, Physical and logical data flow diagrams, Processes' specifications, Writing and presenting systems proposal, Some practical applications.

ECE 315C: Data Structures   (3+2)

Practical data structures and its analysis, Lists, Sets, Trees, Priority queue, Stacks, Linked stacks, Balanced trees data structures, Advanced tree structures, Recurrence relations, Advanced sorting algorithms, Big *O,* Worst case analysis, Lower bounds analysis, Basic principles of Algorithm design, Divide and conquer, Backtracking, Dynamic Programming.

GEN 38X: Elective Course Humanities (3)   (2+0)

THIRD YEAR

SECOND SEMESTER

ECE 321C: Electronic Circuits (1)   (3+2)

Hybrid parameters-high frequency amplifiers impedance-Tuned and intermediate amplifiers-Bode plot and the frequency response-Matched oscillators-Mixing and modulation circuits-Power amplifiers.

ECE 322C: COMPUTER ARCHITECTURE   (4+2)

High performance of computer architecture including pipeline architecture, High speed memory systems, Vector processors, Parallel processors and interconnection networks.

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ECE 323C: Database Design   (3+2)

Introduction to database concepts and operations, basic principles, database architecture, storage structure and indexing, database structure: hierarchal, network, relational, Relational database and SQL languages, relational Algebra and calculus, Normalizations, Keys, functional dependency, Multi-valued functional dependency, Design of a simple Database, Overview of data retrieval languages.

ECE 324C: Laboratory (3)   (-+4)

The experiments in this course include the following topics: Data Communication, Control Systems, computer circuits, signal analysis, operating systems, computer architecture, programming analysis.

EPE 381: Electrical Power and Machines   (3+1)

DC Machines, Magnetic circuit, Windings, E.M.F, DC Motors, Exiting methods, B-H curve, Torque and Speed, Starting, Speed Control, DC Generators, separately exited Motors, Self exited machines, Parallel operation, Efficiency of DC machines, Losses, Maximum efficiency, Transformers, Types, Construction, EMF equations, Efficiency.

FOURTH YEAR

FIRST SEMESTER

ECE 411C: Computer Graphics   (3+2)

Computer graphics concepts, Graphics packages and its binding with standard software languages, 2D and 3D algorithms, Mathematics for modeling, Mathematics for transformation, Mathematics for projection, Mathematics for clipping, introduction to modeling, texture mapping, rendering, shading and lighting, different practical applications.

ECE 412C: ARTIFICIAL INTELLIGENCE   (3+2)

Principles of Artificial Intelligence, probabilistic search, knowledge coding, expert system engineering, natural language processing, knowledge representation, Robot, AI languages application, Neural networks.

ECE 413C: Computer Networks(1)   (3+2)

An introduction to the principles of communication networks, Network Standards, Phone Networks, ISDN and B-ISDN, Signals, LANS and WANS, Evaluating Networks performance.

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ECE 414C: Graduation Project (-+3)

The Student is asked to design and implement a project in one of the areas related to his study, The project should represent a real Engineering application and encourage the ability to work and produce within a team. The student should follow an Engineering approach based on a scientific basis to implement the project. When finishing it, should make and present a detailed report about his work.

FOURTH YEAR

SECOND SEMESTER

ECE 421C: COMPILERS (4+2)

simple sentence construction, symbol tables, scanning tokens, scanning sentences, code generation, error identification, code optimization, runtime environment, bootstrapping and porting

ECE 422C: Laboratory (٤) (-+5)

The experiments in this course include the following topics: components of computer networks, network protocols, computer architecture, Applications Of Artificial Intelligence, Database design.

ELECTIVE COURSES FOR THIRD YEAR

ECE 341C: System Analysis and design (2)

Data coding, task scheduling, training, system test and update, some practical applications.

ECE 342C: Programming languages

Principles of programming languages, architecture of programming languages, processing time, memory management, study of one programming language.

ECE 343C: Software Engineering

Lifecycle of programs and applications, Customer needs evaluation, Different program structures, Program properties and measurement techniques, Project management and its applications.

ECE 344C: Selected topics in computer engineering

This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

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ELECTIVE COURSES FOR FOURTH YEAR

ECE 441C: Image processing

Fundamentals, Digital image processing, Applications, 2D transformations, preprocessing techniques, edge detection, Applications of some practical problems.

ECE 442C: Peripheral Devices

Input and Output devices, Monitors, audio output, keyboard and related devices, printers, plotters, Tape devices, storage media, magnetic disks and tapes, Optical devices, maintenance of peripheral devices.

ECE 443C: Computer security

Security attacks and methods of defense, Encryption and decryption techniques, Viruses, security of operating systems and databases, Security of PCs, networks and communications, Ethics of security.

ECE 444C: Operations Research and Management Systems

Quantitative decision-making, Modeling of the classical selection, Replacement, Maintenance, Reliability Problems, Stochastic Methods, Simulation, Expert Systems, Decision analysis, Project management, PERT Techniques, Computer Methods in Project Management, Scheduling, Resources Analysis.

ECE 445C: Distributed Processing

Architecture of distributed systems, operating systems of distributed systems, Networks and distributed databases.

ECE 446C: Advanced Control Systems

Differentiation of maximum values, Variable differentiation and continuous ideal differentiation, Value principle and Hamiliton-Jacobian theory, Examples of ideal control systems, Separate variable differentiation and the principle of the separate maximum value, Linear and non-linear programming, dynamic programming methods, Applications on Artificial intelligence in control systems.

ECE 447C: Neural networks

Introduction to human and artificial neural networks, Parallel processing, Main components of neural networks, Classification of neural networks, Backpropagation and counter propagation techniques, Supervised and unsupervised learning algorithms, Processing data for learning,

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Different architectures of neural networks, Hopfield and Boltzmann models, Some applications of neural networks.

ECE 448C: Information systems

Concepts and components of information systems, Factors of engineering feasibility, Engineering economic analysis, Analyzing alternatives, Cost estimation techniques.

ECE 449C: Selected topics in computer engineering

This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

ECE 451C: Robotics Systems

Statics and dynamics of robots, Path planning, Sensors, Control of robots (Force and motion), Robotics vision, Robotics programming languages.

ECE 452C: Engineering Systems Simulation

Introduction to modeling and simulation of continuous and interrupted systems, and hybrid systems, Simulation languages, Practical applications.

ECE 453C: Artificial Intelligence programming

Introduction to LISP and Prolog, Programming applications in AI.

ECE 454C: EXPERT SYSTEMS

review of AI principles, knowledge representation methods, logical programming, expert system architecture (knowledge base, working memory, inference engine, inference methods)

ECE 455C: Management Information Systems

Structures rules and organizational policy, Sources of Computer Systems: computer Systems, Distributed Systems, Information Foundations, the user final computation, Management and Organization, foundations of management information systems, information support systems, decision support systems, information executive systems, Artificial Intelligence applications, Expert Systems, Library Information Systems, Development and Management of Information Systems.

ECE 456C: Software Engineering

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Design Quality Assurance, Design Review, Quality Matrix Design, Evaluation of the dealing with users, programming training, Computer-Aided Engineering Programming, Software Testing, Software Management, Measuring the efficiency of programs.

ECE 457C: Systems Engineering

Systems Sciences, introduction about historical evolution and relations with skills, Operations Research, Systems Analysis and System Engineering, The principles of the basic structure: System Applications in different domains, computer multi-systems, Communication Systems, Industrial Systems, Commercial Systems.

ECE 458C: Computer Vision

Image features, the discovery of lines and contours,   Image segmentation and transformation, Features Extraction of Images, Practical Application of computer vision for Pattern Recognition and Classification.

ECE 459C: Selected Topics in Computer Engineering

This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

ECE 460C: Computer Networks (2)

Advanced topics in computer networks, Computer networks protocol, Distribution systems, Engineering and applications, Introduction in internet protocol, Transmission engineering protocol, Security in networks.

ELECTIVE COURSES OF HUMANITIES

GEN 281: Industrial Sociology   (2+0)

How to organize the work under the different Establishments, topics including the integration of the development of science and technology of social organization of labor, labor relations, management strategies and the interaction of workers.

GEN 282: Organizational Behavior   (2+0)

Human performance in organizations, theories of motivation, the movement of groups, power and communications, ethical performance in organizations.

GEN 381: Project Management   (2+0)

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Definitions, the project as part of a strategic plan, the relations between the programs, projects, budgets, regulatory plans, organizational processes of project planning, quantitative methods for project management such as, CPM, PERT, project requirements, materials, manpower, facilities, funding, scheduling the project, organizing project, project implementation, project control, performance evaluation.

GEN 382: Environmental Effect   (2+0)

Introduction to science environment, how to evaluate project according to the environmental rules, evaluation methods, evaluation of environmental performance, Environmental Control law and its applications, case study.

GEN 383: Engineering Ethics   (2+0)

The nature of values and ethical considerations, theories of moral values of the engineer in society, ethics in the professional work environment, safety, risk, responsibility, career choice, code of ethics, case study.