Hajee Mohammad Danesh Science and Technology University, Dinajpur,Bangladesh.

Summary of Courses for Undergraduate Program of B.Sc. in Electrical and Electronic Engineering (EEE)

Level	Semester	Theory		Sessional		Total Credits
		No. of Courses	Credits	No. of Courses	Credits	
1		5	15.0	4	5.0	20.0
1		5	14.0	4	5.5	19.5
2		6	17.0	2	3.0	20.0
2		5	15.0	4	5.5	20.5
3		6	17.0	3	4.5	21.5
3		5	14.0	4	6.0	20.0
4		5	16.0	2	3.0	19.0
4		5	15.0	3	4.0	19.0
Total		**42**	123.0	26	36.5	159.5

Courses offered to the undergraduate student of EEE program

Level-1 Semester-l

Course code	Course title	Credits
EEE 105	Electrical Circuit-l	3.0
EEE 106	Electrical Circuit-l Sessional	1.5
ACH 117	General Chemistry	3.0
ACH 118	General Chemistry Sessional	1.0
MAP 115	Mechanics,Waves and Oscillations,Optics and Thermal Physics	3.0
MAP 116	Mechanics,Waves and Oscillations,Optics and Thermal Physics	1.0
MAP 129	Calculas-l	3.0
MAP 131	Calculas-ll	3.0
AIE 124	Engineering Drawing	1.5
Total		20.0

Level-1 Semester-ll

Course code	Course title	Credits
EEE 107	Electrical Circuit-ll	3.0
EEE 108	Electrical Circuit-ll Sessional	1.5
EEE 110	Electrical Circuit Simulation Laboratory	1.5
MAP 133	Modern Physics,Electricity and Magnetism	3.0
MAP 134	Physics Sessional	1.0
CSE 117	Computer programming	3.0
CSE 118	Computer programming Sessional	1.5
MAP 135	Ordinary and partial Differential Equations	3.0
SSL 121	Sociology	2.0
Total		19.5

Level-2 Semester-l

Course code	Course title	Credits
EEE 211	Electronics-l	3.0
EEE 212	Electronics-l Sessional	1.5
EEE 213	Electrical Machine-l	3.0
EEE 214	Electrical Machine-l Sessional	1.5
EEE 215	Electromagnetic Fields and Waves	3.0
MAP 213	Linear Algebra	3.0
SSL 223	English	3.0
ECN 277	Fundamentals of Economics	2.0
Total		20.0

Level-2 Semester-ll

Course code	Course title	Credits
EEE 217	Electrical Machine-ll	3.0
EEE 218	Electrical Machine-ll Sessional	1.5
EEE 219	Electronics-ll	3.0
EEE 220	Electronics-ll Sessional	1.5
ECE 215	Signals and Systems	3.0
AIE 227	Mechanical Engineering Fundamentals	3.0
AIE 228	Mechanical Engineering Fundamentals Sessional	1.5
STT 223	Basic statistics and probability	3.0
STT 224	Basic statistics and probability Sessional	1.0
Total		20.5

Level-3 Semester-l

Course code	Course title	Credits
EEE 307	Optoelectronics	3.0
EEE 309	Digital Electronics	3.0
EEE 310	Digital Electronics Sessional	1.5
EEE 311	Transmission & Distribution of Electrical Power	3.0
ECE 351	Communication Theory	3.0
ECE 352	Communication Theory Sessional	1.5
EEE 300	Electrical Services Desing	1.5
EEE 315	Electrical Properties of Material	3.0
ACT 305	Financial and Managerial Accounting	2.0
Total		21.5

Level-3 Semester-ll

Course code	Course title	Credits
EEE 317	Industrial and Power Electronics	3.0
EEE 318	Industrial and Power Electronics Sessional	1.5
ECE 353	Digital Signal Processing	3.0
ECE 354	Digital Signal Processing Sessional	1.5
CSE 331	Microprocessor and Interfacing	3.0
CSE 332	Microprocessor and Interfacing Sessional	1.5
EEE 323	Power System-l	3.0
EEE 324	Power System-l Sessional	1.5
MGT 309	Industrial Management	2.0
Total		20.0

Level-4 Semester-l

Course code	Course title	Credits
EEE 400	Project/Thesis	3.0
EEE 403	Solid State Devices & VLSI	4.0
EEE 405	Control System	3.0
EEE 406	Control System Sessional	1.5
Elective l	One course from Elective l	3.0
Elective ll	One course from Elective ll (Theory+ Sessional)	3.0
		1.5
Total		19.0

Level-4 Semester-ll

Course code	Course title	Credits
EEE 400	Project/Thesis	3.0
EEE 407	Microcontroller Based System Design	3.0
EEE 408	Microcontroller Based System Design Sessional	1.5
Elective lll	One course from Elective lll (Theory+ Sessional)	3.0
		1.5
Elective lV	One course from Elective lV	3.0
Elective V	One course from Elective V	3.0
EEE 444	Industrial Training	1.0
Total		19.0

Elective Course Divisions:

Five elective courses (Elective l – Elective V) are offered to the student according to the following lists.

Elective l

Course code	Course title	Credit
EEE 409	Power System ll	3.0
EEE 483	Optical Fiber Communication	3.0
CSE 443	Computer Networks	3.0

Elective ll

Course code	Course title	Credit	
		Indiv.	Total
EEE 413	Power System Protection	3.0	4.5
EEE 414	Power System Protection Sessional	1.5	
ECE 485	Digital Communication	3.0	4.5
ECE 486	Digital Communication Sessional	1.5	
CSE 453	Computer Networks	3.0	4.5
CSE 454	Computer Networks Sessional	1.5	

Elective lll

Course code	Course title	Credit	
		Indiv.	Total
EEE 417	Non-conventional Energy	3.0	4.5
EEE 418	Non-conventional Energy Sessional	1.5	
ECE 487	Microwave Engineering	3.0	4.5
ECE 488	Microwave Engineering Sessional	1.5	
CSE 441	Microprocessor system Design	3.0	4.5
CSE 442	Microprocessor system Design Sessional	1.5	

Elective lV

Course code	Course title	Credit
EEE 433	Power Plant Engineering and Economy	3.0
ECE 489	Telecommunication Engineering	3.0
CSE 451	Multimedia Communication	3.0

Elective V

Course code	Course title	Credit
EEE 435	Electrical Machine lll	3.0
ECE 491	Mobile Cellular Communication	3.0

Detailed Syllabus

B.Sc in Electrical and Electronic Engineering (EEE)
Hajee Mohammad Danesh Science and Technology University, Dinajpur,Bangladesh.

Level-1 semester-l

EEE 105 Electrical Circuits-I 3.0 Credits

Circuit Variables and elements: Voltage, current, power, energy, independent and dependent sources, resistance. Basic laws: Ohm's law, Kirchhoff's current and voltage laws .Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation.

Techniques of circuit analysis: Nodal and mesh analysis including supernode and supermesh. Network theorems: Source transformation, Thevenin's, Norton's and superposition theorems with applications in circuits having independent and dependent sources, maximum power transfer condition and reciprocity theorem. Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses.

Magnetic quantities and variables: Flux, permeability and reluctance, magnetic field strength, magnetic potential, flux density, magnetization curve. Laws in magnetic circuits: Ohm's law and Ampere's circuital law. Magnetic circuits: series, parallel and series-parallel circuits.

EEE 106 Electrical Circuits-l (Sessional) 1.5 Credits

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 105.

ACH 117 General Chemistry 3.0 Credits

Atomic Structure, quantum numbers, electronic configuration, periodic table. Properties and uses of noble gases. Different types of chemical bonds and their properties. Molecular structures of compounds. Selective organic reactions.

Different types of solutions and their compositions. Phase rule, phase diagram of monocomponent system. Properties of dilute solutions. Thermo chemistry, chemical kinetics, chemical equilibria. Ionization of water and pH concept. Electrical properties of solution.

ACH 118 General Chemistry Sessional 1.0 Credit

Laboratory experiments based on ACH 117.

MAP 115 Mechanics, Waves and Oscillations, Optics and Thermal Physics 2.0 Credits

Mechanics: Linear momentum of a particle, linear momentum of a system of particles, conservation of linear momentum, some applications of the momentum principle; Angular momentum of a particle, angular momentum of a system of particles, Kepler's law of planetary motion, the law of universal Gravitation, the motion of planets and satellites, Schrodinger time independent equation, expectation value, Probability, Particle in zero potential, calculation of energy.

Waves and oscillations: Differential equation of simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, spring mass system, torsional pendulum; two body oscillation, reduced mass, damped oscillation, forced oscillation, resonance, progressive wave, power and intensity of wave, stationary wave, group and phase velocities.

Optics: Defects images: spherical aberration, astigmatism, coma, distortion, curvature, chromatic aberration. Theories of light; Interference of light: Young's double slit experiment, displacement of fringes and its uses, Fresnel bi-prism, interference in thin films, Newton's rings, interferometers;

Diffraction: Diffraction by single slit, diffraction from a circular aperture, resolving power of optical instruments, diffraction at double slit N-slits, , diffraction grating; polarization: Production and analysis of polarized light, Brewster's law, Malus law, polarization by double refraction, Nicol prism, optical activity, Polarimeters.

Thermal Physics: Heat and work- the first law of thermodynamics and its applications; Kinetic Theory of gases- Kinetic interpretation of temperature, specific heats of ideal gases, equipartition of energy, mean free path, Maxwell's distribution of molecular speeds, reversible and irreversible processes, Carnot's cycle, second law thermodynamics, Carnot's theorem, entropy, Thermodynamic functions, Maxwell relations, Clausius and Clapeyron equation.

MAP 116 Mechanics, Waves and Oscillations, Optics and Thermal Physics Sessional 1.0 Credit

Laboratory experiments based on MAP 115.

MAP 129 Calculus-1 3.0 Credits

Differential Calculus: limits, continuity and differentiability, successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem. Mean value theorem. Taylor's and Maclaurin's theorems in finite and infinite forms. Lagrange's form of remainders. Cauchy's form of remainders. Expansion of functions, intermediate form of L, Hospital's rule. Partial differentiation. Euler's theorem. Tangent and normal. Sub-tangent
and subnormal in Cartesian and polar co-ordinates. Determination of maximum and minimum values of functions. Curvature. Asymptotes. Curve tracing.

Integral calculus: Integration by the method of substitution. Standard integrals. Integration by successive reduction. Definite integrals, it's properties and uses in summing series. Walli's formulae. Improper integrals, beta function and gamma function. Area under a plane curve and area of aregion enclosed by two curves in Cartesian and polar co-ordinates.
Volumes and surface areas of solids of revolution.

MAP 131 Calculus-ll 3.0 credits

Complex variable: Complex number system. General functions of a complex variable. Limits and continuity of a function of complex variable and related theorems. Complex differentiation and the Cauchy-Riemann equations.

Infinite series. Convergence and uniform convergence. Line integral of a complex function. Cauchy's integral formula. Liouville's theorem. Taylor's and Laurent's theorem. Singular points. Residue. Cauchy's residue theorem.

Vector analysis: multiple product of vectors. Linear dependence and indepence of vectors. Differention and integration of vectors together with elementary applications. Line, surface and volume integrals. Gradient of a scalar function, divergence and curl of a vector function, various formulae. Integral forms of gradient. Divergence and curl. Divergence theorem. Stoke's theorem. Green's theorem and Gausse's theorem.

AIE 124 Engineering Drawing 1.5 credits

Introduction – lettering, numbering and heading; instrument and their use; Sectional views and isometric views of solid geometrical figures. Plan , elevation and section of multistoried building; building survives drawings; detailed drawing of lattice towers.

Level 1 Semester-ll

EEE 107 Electrical Circuit-ll 3.0 credits

Sinusoidal functions: instantaneous current, voltage, power, effective current and voltage, average power, phasor and complex quantities, impedance, real and reactive power, power factor. Analysis of single phase AC circuit: series and parallel RL, RC and RLC circuits, nodal and mesh analysis, application of network theorems in AC circuits, circuits with non- sinusoidal excitations, transients in AC circuits, passive filters. Resonance in AC circuits: series and parallel resonance. magnetically coupled circuits. Analysis of three phase circuits: three phase supply, balanced and unbalanced circuits, power calculation.

EEE 108 Electrical circuit –ll sessional 1.5 credits

In this course student will perform experiments to verify practically the theories and concepts learned in EEE 107.

EEE 110 Electrical Circuit Simulation Laboratory 1.5 Credits

Simulation laboratory based on EEE 105 and EEE107 theory courses. Student will verify the theories and concepts learned in EEE 105 and EEE 107 using simulation software like PSpice and Matlab. Students will also perform specific design of DC and AC circuits theoretically and by simulation.

MAP 133 Modern Physics, Electricity and Magnetism 3.0 credits

Modern Physics: Galilean relativity and Einstein's special theory of relativity; Lorentz transmission equations, length contraction, time dilation and mass- energy relation, photoelectric effect, Compton effect ,De Broglie matter waves and its success in explaining Bohr's theory, Pauli's exclusion principle, Constituent of atomic nucleus, Nuclear binding energy, different types of radioactivity, radioactivity decay law, nuclear reactions, nuclear fission and fusion, atomic power plant.

Electricity and Magnetism: Electric charge and Coulomb,s law, electric field, concepts of electric flux and gauss's law. Some applications of gauss,s law, gauss's law in vector form, electric potential, relation between electric field and electric potential, capacitance and dielectrics, gradient, Laplace's and poisson's equation, current, current density, resistivity, the magnetic field, Ampere's law, Biot-Savart law and their applications, Law of electromagnetic induction-Maxwell's equation.

MAP 134 Physics Sessional 1.0 credits

Laboratory experiments based on MAP 133.

CSE 117 Computer Programming 3.0Credits

Introduction to digital computers. Programming language, algorithms and flow charts. Structured Programming using C: variables and constants, operators, expressions, control statements, functions, arrays, pointers, structure unions, user defined data types, input-outp t and files. Object- oriented programming using C++.introduction, classes and object; polymorphism; function and operator overloading; inheritance.

CSE 118 Computer Programming Sessional 1.5 credits

This course consists of two parts. In the first part std ent will perform experiment to variety practically the theories and concepts learned in CSE 117. In the second part, students will learn program design.

MAP 135 Ordinary and Partial Differential Equations 3.0 Credits

Ordinary Differential Equations: Degree and order of ordinary differential equations, formation of differential equations. Solution of first order differential equations by various methods. Solution of general linear equations of second and higher orders with constant coefficients. Solution of homogeneous linear equations. Solution of differential equations of the higher order when the dependent or independent variables are absent.

Solution of differential equation by the method based on the factorization of operators. Frobenius method.

Partial differential Equations: Introduction. Linear and non linear first order equations. Standard forms. Linear equations of higher order. Equations of the second order with variable coefficients. Wave equations. Particular solution with boundary and initial conditions.

SSL 121 Sociology 2.0 Credits

Introduction: Society, Science and Technology- an overview; Scientific Study of Society; Social Elements, Society, Community, Association and Institution; Mode of Production and Society Industrial Revolution, Development of Capitalism.

Culture and Socialization: Culture; Elements of Culture; Technology and Culture; Culture Lag; Socialization and Personality; Family; Crime and Deviance; Social Control. Technology, Society and Development; Industrialization and Development; Development and Dependency Theory; Sustainable Development; Development and Foreign Borrowing; Technology Transfer and Globalization, Modernity and Environment; Problem and Prospects.

Pre-industrial, Industrial and Post- industrial, Society; Common Features of Industrial Society; Development and Types of Social Inequality in Industrial Society; Poverty, Technology and Society; Social Stratification and Social Mobility; Rural and Urban Life and their Evaluation.

Population and Society: Society and Population; Fertility, Mortality and Migration; Science, Technology and Human Migration; Theories of Population Growth-Demographic Transition Theory, Malthusian Population Theory; Optimum Population Theory; Population Policy.

Level 2 Semester-I

EEE 211 Electronics-I 3.0 Credits

P-N Junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principles of p-n junction diode, conflict potential, current-voltage characteristics of a diode, simplified DC and AC diode models, dynamic resistance and capacitance.

Diode circuits: Half and full wave rectifiers, rectifiers with filter capacitors, characteristics of a zener diode, Zener shunt regulator, clamping and clipping circuit.

Bipolar Junction: Transistor (BJT) as a circuit element, current components, BJT characteristics and region of operation. BJT as an amplifier, biasing the BJT for discrete circuit, small signal equivalent circuit models, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits. Voltage and current gain, input and output impedance of a common base, common emitter and common collector amplifier circuits. Metal Oxide Semiconductor Field Effect Transistor (MOSFET) as circuit element, structure and physical operation of an enhancement MOSFET, threshold voltage, body effect, current-voltage characteristics of an enhancement MOSFET, biasing discrete and integrated MOS amplifier circuit, single-stage MOS amplifier, MOSFET as a switch, CMOS inverter, Junction Field-Effect Transistor (JFET).Structure and physical operation of JFET transistor characteristics, pinch-off voltage. Differential and multistage amplifiers. Description of differential amplifiers, small signal operation, differential and common mode gain, RC coupled mid-band frequency amplifier.

EEE 212 Electronics-I Sessional 1.5 Credits

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 211.

EEE 213 Electrical Machine-I 3.0 Credits

Transformer: Ideal transformer ,transformation ratio, no-load and load vector diagrams, actual transformer-equivalent circuit, regulation, short circuit and open circuit tests.

Three phase induction motor: Rotating magnetic field, equivalent circuit, vector diagram, torque-speed characteristics, effect of changing rotor resistance and reactance on torque-speed curves, motor torque and developed rotor power, no load test, blocked rotor test, starting and breaking and speed control.

Single phase induction motor: Theory of operation, equivalent circuit and starting.

EEE 214 Electrical Machine-I Sessional 1.5 Credits

In this course students will perform experiments to verify practically the theories and concepts learned in EEE-213.

EEE-215 Electromagnetic Fields and Waves 3.0 Credits

Static electric field. Postulates of electrostatics, Coulombs law for discrete and continuously distributed changes, Gauss's law and the application ,electric potential due to charge distribution, conductors and dielectrics in static electric field, flux density-boundary conditions, capacitance, electrostatic energy and forces, energy in terms of field equations, capacitance calculation of different geometrics, boundary value problems ,Poisson's and Laplace's equation in different co-ordinates systems; Steady electric current; Ohm's law, continuity equations, Joule's law, resistance calculation, Static magnetic field, Postulates of magneto statics, Biot- Savart's law, Ampere's law and applications, vector magnetic potential, magnetic dipole, magnetization, magnetic field intensity and relative permeability, boundary conditions for magnetic field, magnetic energy, magnetic force, torque and inductance of different geometrics. Time varying fields and Maxwell's equations; Faraday's law of electromagnetic induction, Maxwell's equations-differential and integral forms, boundary conditions,potential function ,time harmonic fields and Poynting theorem.

Plane electromagnetic wave: plane wave in loss less media- Doppler effect, transverse electromagnetic wave, polarization of plane wave; plane wave in lossy media- low- loss dielectrics, good conductors; group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

MAP 213 Linear Algebra 3.0 Credits

Introduction to systems of linear equations. Gaussian elimination.

Definitions of matrices. Algebra of matrices. Transpose of a matrix and inverse of a matrix. Factorization. Determinants. Quadratic forms. Matrix polynomials. Euclidean n-space. Linear transformation from IRn to IRm. Properties of linear transformation from IRn to IRm. Real vector spaces and subspaces. Gram-Schmidt process and QR-decomposition. Eigenvalues and eigenvectors. Diagonalization . Linear transformations. Kenel and Range. Application of linear algebra to electric networks.

SSL 223 English 3.0 Credits

General discussion: Introduction, various approaches to learning English.

Grammatical Problems: Constructions of sentences, grammatical errors, sentence variety and style, conditionals, vocabulary and diction.

Reading skill: Discussion readability, scan and skin reading, generating ideas through purposive reading, reading of selected stories.

Writing skill: Principles of effective writing; organization, planning and development writing, composition, profile writing, amplification.

General strategies for the writing process: Generating ideas, identifying sentences and purposes, construction arguments, stating problems and finalizing.

Approaches to Communication: Communication today, business communication, different types of business communication.

Learning skill: The phonemic systems and correct English pronunciation.

Speaking skill: Practicing dialogue, story telling, Effective oral presentation.

Report writing: Defining a report, classification of a report, structure of a report and writing of reports.

ECN 277 Fundamentals of Economics 2.0 Credits

Introduction to economics, economics and engineering. Different economic systems. Fundamental economic problems. Basic elements of demands, supply and product market. Theory of utility and preferences, consumer's surplus. Theory of production and cost. Theory of the firm and market
structure optimization.

Introducing macroeconomics: National income recounting, the simple Keynesian analysis of national income, employment and inflation. Savings, investment and decision making. Fiscal policy and monitory policy, money and interest rate, income and spending.

Economics of development and planning.

Level-2 Semester-II

EEE 217 Electrical Machine-II 3.0 Credits

Synchronous Generator: Excitation systems, equivalent circuit, vector diagram at different loads, factors affecting voltage, regulation, synchronous impedance, synchronous impedance method of predicting voltage regulation and its limitations.

Parallel operation: Necessary condition, synchronizing, circulating current and vector diagram. Synchronous motor, operation, effect of loading insider and different excitations conditions, effect of changing excitation, V-curves and starting D.C generator. Types, no-load voltage characteristics, build-up of a self excited shunt generator, critical field resistance, load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation. DC motor, Torque , conduct emf, speed, torque-speed characteristics, starting and speed regulation, introduction to wind turbine generators. Construction and basic characteristics of solar cells.

EEE 218 Electrical Machine-ll Sessional 1.5 Credits

In this course consists of two parts. In the first part, students will perform experiments to Verify practically the theories and concepts learned in EEE 217.In the second part, Students will design simple systems using the principles learned in EEE 217.

EEE 219 Electronics-ll 3.0 Credits

Frequency response of amplifiers: Poles, zeros and Bode plots, amplifier transfer function, techniques of determining 3 dB frequencies of amplifier circuits, frequency response of single-stage and cascade amplifiers, frequency response of differential amplifiers.

Operational amplifiers(Op-Amp):properties of ideal Op-Amps, non-inverting and inverting amplifiers. Inverting integrators, differentiator, weighted

summer and other applications of Op-Amp circuits, effects of finite open loop gain and bandwidth on circuit performance, logic signal operation of Op-Amp,

DC imperfections. General purpose Op-Amp: DC analysis, small-signal analysis of different stages, gain and frequency response of 741 Op-Amp. Negative feedback properties, basic topologies, feedback amplifiers with different topologies, stability, frequency compensation.

Active filters: Different types of filters and specifications, transfer functions, realization of first and second order low, high and bandpass filters using Op- Amps. Signal generators: Basic principle of sinusoidal oscillation, Op-Amp RC oscillators, LC and crystal oscillators. Power Amplifiers: Classification of output Stages. class A,B and AB output stages.

EEE 220	Electronics-ll Sessional	1.5 Credits

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 219.

ECE 215	Signals and Systems	3.0 Credits

Classification of signals and systems: signals-classification, basic operation on signals, elementary signals, representation of signals using impulse function; systems-classification. Properties of Linear Time Invariant (LTl) systems; Linearity, causality, time invariance, memory stability, invertibility. Time domain analysis of LTI systems: Differential equations-system representation, order of the system, solution techniques, zero state and zero input response, system properties; impulse response-convolution Integral, determination of system properties; state variable-basic concept, state equation and time domain solution.

Frequency domain analysis of LTl systems: Fourier series-properties, harmonic representation, system response, frequency response of LTI systems; Fourier transformation-properties, system transfer function, system

response and distortion-less systems. Applications of time and frequency domain analysis solution of analog electrical and mechanical systems, amplitude modulation and demodulation, time-division and frequency- division multiplexing. Laplace transformation: properties, inverse transform, solution of system equations, system transfer function, system stability and frequency response and application.

AIE 227	Mechanical Engineering Fundamentals	3.0 Credits

Introduction to sources of energy: Steam generating units with accessories and mountings; steam turbines.

Introduction to internal combustion engines and their cycles, gas turbines.

Refrigeration and air conditioning: applications; refrigerants, different refrigeration methods.

Fluid machinery: impulse and reaction turbines; centrifugal pumps, fans, blowers and compressors.

Basic of conduction and convection: critical thickness of insulation.

AIE 228	Mechanical Engineering Fundamentals Sessional	1.5 Credits

In this course students will perform experiments to verify practically the theories and Concepts sal based on AIE 227.

STT 223	Basic Statistics and Probability	3.0 Credits

Introduction. Sets and probability. Random variable and its probability distributions. Treatment of grouped sampled data. Some discrete probability distributions. Normal distribution. Sampling theory. Estimation theory. Tests of hypotheses. Regression and correlation. Analysis of variance.

STT 224	Basic Statistics and Probability Sessional	1.0 Credit

Sessional based on STT 223.

Level 3 Semester-l

EEE 307 Optoelectronics 3.0 Credits

Optical Properties of Semiconductor: Direct and indirect band-gap materials, radiative and non- radiative recombination, optical absorption, photo- generated excess carriers, minority carrier life time, luminescence and quantum efficiency in radiation.

Properties of Light: Particle and wave nature of light, polarization, interference, diffraction and blackbody.

Light Emitting Diode(LED): Principles, materials for visible and infrared LED, internal and external efficiency, loss mechanism, structure and coupling to optical fibers.

Stimulated Emission and Light Amplification: Spontaneous and stimulated emission, Einstein relations, population inversion, absorption of radiation, optical feedback and threshold conditions.

Semiconductor Lasers: Population inversion in degenerate semiconductors, laser cavity, operating wavelength, threshold current density, power output, hetero-junction lasers, optical and electrical confinement. Introduction to quantum well lasers.

Photo Detectors: Photoconductors, junction photo-detectors, PIN detectors, avalanche photodiodes and Phototransistors.

Solar Cells: Solar energy and spectrum ,silicon and Schottkey solar cells.

Modulation of Light: Phase and amplitude modulation, electro-optic effect, acoustic-optic effect and magneto-optic devices, introduction to integrated optics.

EEE 309 Digital Electronics 3.0 Credits

Introduction to number systems and codes. Analysis and synthesis of digital logic circuits: Basic logic functions, Boolean algebra, combinational logic

design, minimization of combinational logic. Implementation of basic logic gates in CMOS and BiCMOS: DC characteristics, noise margin and power dissipation. Power Optimization of basic gates and combinational logic circuits. Modular combinational circuit design pass transistor, pass gates, multiplexer, demultiplexer and their Implementation in CMOS , decoder, encoder, comparators, binary arithmetic elements and ALU design.

Programmable logic devices: logic arrays, field programmable logic arrays and programmable read only memory. Sequential circuits: different types of latches, flip-flops and their design using ASM approach, timing analysis and power optimization of sequential circuits. Modular sequential logic circuit design: shift registers, counters and their applications.

EEE 310	Digital Electronics Sessional	1.5 Credits

This course consists of two parts. In this part ,students will perform experiments to verify practically the theories and concepts learned in EEE 309.In the second part, students will design simple using the principles learned in EEE 309.

EEE 311	Transmission & Distribution of Electrical Power	3.0 Credits

Transmission systems: Types of conductors, resistance, definition of inductance of conductor due to internal flux, flux linkages between two points external to an isolated conductor, inductance of a single phase two wire line.

Capacitance of transmission lines: Capacitance of a three phase with equilateral spacing and unsymmetrical spacing, effect of earth on the capacitance of three phase transmission lines, bundled conductors, parallel- circuit three phase lines.

Current and voltage relations on a transmission line: Representation of lines, the short transmission line ,the medium transmission line the long transmission line, solution of differential equation, interpretation of the equations, hyperbolic form of the equations, the equivalent circuit of a long line, direct current transmission.

General line equation in terms of ABCD constants, relations between constants, relations between constants, charts of line constants, constants of combined networks, measurement and advantages of generalized line constants.

Power circle diagram: Receiving and sending end power circle diagrams, transmitted Maximum power, universal power circle diagrams, use of circle diagrams.

Voltage and power factor control in transmission systems: Tap changing transformer, induction regulators, moving coil regulators, booster transformer, power factor control, static condensers in series or parallel, synchronous condensers, Ferranti effect.

Insulate d cables: Cables versus overhead lines ,insulating materials, electrostatic stress grading, three core cables, measurement of capacitance, cable testing.

Insulator of overhead lines: Types of insulators, their constructions and performances, potential distribution, special types of insulators, testing of insulators.

Distribution: Distributer calculation, copper efficiencies, radial ring mains and inter connections.

Mechanical characteristics of transmission lines: Sag and stress analysis, ice and wind loading, supports at different elevations, conditions of erection, effect of temperature changes.

ECE 351	Communication Theory	3.0 Credits

Overview of communication systems: Basic principles fundamental elements, system limitations, message source, bandwidth requirements, transmission media types , bandwidth and transmission capacity. Noise: Source, characteristics of various types of noise and signal to noise ratio. Information theory: Measure of information, source encoding, error free

communication over a noisy channel, channel capacity of a continuous system and channel capacity of a discrete memoryless system.

Communication systems: Analog and digital. Continuous wave modulation:

Transmission types-base-band transmission, carrier transmission; amplitude modulation-introduction, double side band, single side band, vestigial side band, quadrature; spectral analysis of each type, envelope and synchronous detection: angle modulation- instantaneous frequency, frequency modulation (FM) and phase modulation(PM),spectral analysis, demodulation of FM and PM. Pulse modulation sampling –sampling theorem, Nyquist criterion, aliasing, instantaneous and natural sampling; pulse amplitude modulation-principle, bandwidth requirements; pulse code modulation(PCM)-quantization principle, quantization noise, non-uniform quantization, signal to quantization error ratio, differential PCM, demodulation of PCM; delta modulation (DM)-principle, adaptive DM; line coding-formats and bandwidths.

Digital modulation: Amplitude-shift keying-principle, ON-OFF keying, bandwidth requirements, detection, noise performance; phase-shift keying (PSK)-principle. bandwidth requirements, detection, differential PSK, quadrature PSK, noise performance; frequency-shift keying(FSK)-principle, continuous and discontinuous phase FSK, minimum-shift keying, bandwidth requirements, detection of FSK Multiplexing: Time-division multiplexing (TDM)-principle, receiver synchronization frame synchronization, TDM of multiple bit rate systems: frequency-division multiplexing(FDM)-principle,
de-multiplexing; wavelength-division multiplexing, multiple-access network- time –division multiple-access(TDMA),frequency-division multiple access (FDMA);code-division multiple access(CDMA)-spread spectrum multiplexing, coding techniques and constraints of CDMA. Communication system design; design parameters, channel selection criteria and performance simulation.

ECE 352 Communication Theory Sessional 1.5 Credits

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in ECE 351.In the second part, students will design simple systems using the principles learned in ECE 351.

EEE 300 Electrical Services Design 1.5 credits

Writing system design , drafting, estimation. Design for illumination and lighting.

Electrical installations system design: substation, BBT and protection, air-conditioning, heating and lifts. Design for intercom, public address systems ,telephone system and LAN. Design of security systems including CCTV, fire alarm, smoke detector, burglar Alarm, and sprinkler system. A design problem on a multi-storied building.

EEE 315 Electrical Properties of Materials 3 credits

Crystal structures: Types of crystals, lattice and basis, Bravais lattice and Miller indices. Classical theory of electrical and thermal condition: Scattering mobility and resistivity, temperature dependence of metal resistivity, Mathiessen's rule, Hall effect and thermal conductivity.

Introduction to quantum mechanics: Wave nature of electrons, Schrodinger's equation, one dimensional quantum problems-infinite quantum well, potential step and potential barrier, Heisenberg's uncertainty principle and quantum box. Band theory of solids: Band theory from molecular orbital, Bloch theorem, Kronig-Penny model, effective mass, density-of-states. Carrier statistics: Maxwell-Boltzmann and Fermi Dirac distributions, Fermi energy. Modern theory of metals: Determination of Fermi energy and average energy of electrons, classical and quantum mechanical calculation of specific heat. Dielectric properties of materials: Dielectric constant, polarization-electronic, ionic and orientational ; internal

field. Clausius-Mosotti equation, spontaneous polarization, frequency dependence of dielectric constant, dielectric loss and piezoelectricity. Magnetic properties of materials: Magnetic moment, magnetization and relative permittivity, different types of magnetic materials, origin of ferromagnetism and magnetic domains. Introduction to superconductivity: Zero resistance and Meissner effect. Type I and Type ll superconductors and critical current density.

ACT 305	Financial and Managerial Accounting	2 credits

Financial Accounting: Objectives and importance of accounting, branches of Accounting, accounting as an information system, computerized system and applications In accounting. Recording System: Double entry mechanism, accounts and their Classification, accounting equation, accounting cycle journal, ledger, trial balance. Preparation of financial statements considering adjusting and closing entries. Accounting concepts and conventions.

Financial statements analysis and interpretation: Ration analysis-tests for profitability, liquidity, solvency and overall measure.

Costs and Management Accounting: Cost concept and classification. Segregation and mixed cost. Overhead cost: meaning and classification, allocation of overhead cost, overhead recovery method. Job order costing: preparation of job cost sheet and quotation price. Inventory valuation: absorption costing and variable costing technique.

Cost volume profit analysis: meaning , breakeven analysis, contribution margin Approach, sensitivity analysis. Short-term investment decisions: Relevant and Differential cost analysis; Linear programming. Long-term investment decisions: Capital budgeting, various techniques of evaluation of capital investment, investment appraisal under uncertainty, risk management, capital rationing. Concept of working capital, need for working capital, management of cash, stock debtors.

Level-3 Semester-II

EEE 317 Industrial and Power Electronics 3 Credits

Power electronics :

Power semiconductor switches and triggering devices : BJT ,MOSFET , SCR , IGBT,GTO, TRIAC, UJT and DIAC, Rectifiers : Uncontrolled and controlled single phase and three Phase. Regulated power supplies: Linear- series and shunt , switching buck, buckboost, boost and cuk regulators . AC voltage controllers , single and three phase Choppers . DC motor control.
Single phase cycloconverter. Inverters : single phase and three phase current and voltage source. AC motor control ,stepper motor control . Resonance inverters . Pulse width modulation control of static converters.

Industrial electronics: Magnetic amplifier and its application. Control of temperature and other non electric quantities , Elements of microprocessor based control systems for industries.

Industrial Heating : Different types of heating and their application .

PLC: Controllers, Hardware, Internal Architecture, Programming, Testing and Debugging, Commercial PLC.

Robots and other motion control system: Types of robots ,Types of robot control and Types of robot programs, CNC machine, Basic Parts of a robot system, I/O circuits and requests of robot system, Case studies in Industrial electronics and industrial data communication.

EEE 318 Industrial and Power Electronics Sessional 1.5 Credits

Laboratory experiments based on theory and concepts learnt in EEE 317.
Design of simple systems Using the principles learned in EEE 317.

ECE 353 Digital Signal Processing 3.0 credits

Introduction to digital signal processing(DSP): Discrete-time signals and systems, analog to digital conversion, impulse response, finite impulse (FIR) and infinite impulse response(IIR) of discrete-time Systems, difference equation convolution, transient and steady state response. Discrete transformations: Discrete Fourier series, discrete-time Fourier series, discrete Fourier transform(DFT) and properties, fast Fourier transform(FFT), inverse fast Fourier transform, z-transformation-properties, transfer function, poles and zeros and inverse z-transform. Correction: circular convolution, auto-correlation and cross correction. Digital Filters : FIR filters-linear phase filters, specifications, design using window. Optimal and frequency sampling methods; IIR filters-specifications, design using impulse invariant, bi-linear z-transformation, least-square methods and finite precision effects.

ECE 354 Digital signal Processing Sessional 1.5 credits

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in ECE 353. In the second part, students will design simple systems using the principles learned in ECE 353.

CSE 331 Microprocessor and Interfacing 3 Credits

Introduction to microprocessors, Intel 8086 microprocessor: Architecture, addressing modes, instruction sets, assembly language programming, system design and interrupt interfacing, programmable peripheral interface, programmable timer, serial communication interface, programmable interrupt controller, direct memory access, keyboard and display interface. Introduction to micro-controllers.

CSE 332 Microprocessor and Interfacing Laboratory 1.5 Credits

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learner in CSE 331. In the second part, students will design simple systems using the principles learned in CSE 331.

EEE 323 Power System- I 3 Credits

System modeling: Review of synchronous machine, the effect of synchronous machine excitation, per unit quantities, changing the base of per unit quantities, per unit Impedance in single phase transformer and three phase transformer circuits. Per unit impedance of three winding transformers , one-line diagram, impedance and reactance diagram . Per unit and percentage method of calculations , advantages and disadvantages of per unit computations.

Network calculations: Node equation, matrix partitioning, node elimination by matrix Algebra, bus admittance and impedance matrices , modification of an existing bus impedance matrix, direct determination of a bus impedance matrix.

Load flow solution and control: Classification of buses, specification of bus voltage power, Gauss-Seidel method and Newton-Raphson method of load flow solutions. Some principles of load flow control.

Symmetrical three phase faults: Short circuit currents and the reactance of synchronous machines, internal voltages of loaded machines under transient conditions, bus impedance matrix in fault calculations, bus impedance matrix equivalent network, percentage reactance and short-circuit MVA, reactor control of short-circuit currents and location of reactors and their advantages and disadvantages.

Symmetrical components: Symmetrical components of unsymmetrical phasors, sequence impedance and sequence networks, sequence network of unloaded generators, positive and negative sequence networks, zero- sequence networks.

Unsymmetrical faults: Unsymmetrical short-circuits on an unloaded generator. Single line –to-ground fault, line-to-line fault, double line –to- ground fault , unsymmetrical faults of power systems, faults through impedance, unsymmetrical open circuits and series impedances.

Power system stability: The stability problem of power system , swing equation ,power-angle equation, equal area criterion of stability.

Multi-machine stability studies: Classical representation, step-by-step solution of the swing curve, factors affecting stability, techniques for improving stability.

EEE 324 Power system- I Sessional 1.5 Credits

Sessional based on syllabus of EEE 323.

MGT 309 Industrial management 2 credits

Management Functions and Organization: Evolution, management function, organization, theory and structure, span of control, authority delegation, manpower planning.

Personal Management: Importance, need hierarchy, motivation, leadership, wage incentives, performance appraisal, participative management.

Operation Management: production planning and control(PPC) functions, quantitative methods applied in production, quality management, location and layout planning, safety and loss management.

Cost and Financial Management: Elements of cost products, cost analysis, investment analysis, benefit cost analysis, risk analysis.

Management Accounting: Cost planning and control, budget and budgetary control.

Marketing Management: Concepts, strategy, sales promotion, patent laws.

Technology Management: management of innovation and charges, technology life cycle.

Case studies.

Level-4 Semester-I

EEE 400 Project/Thesis 3 credits

The students are required to undertake a project/Thesis in the field of Electrical and Electronic Engineering. The objective is to provide an opportunity to the students to develop initiative, creative ability, confidence and engineering judgment . The results of the work should be submitted in the form of a dissertation, which should include appropriate drawings ,charts
,tables, reference etc.

EEE 403 Solid State Devices and VLSI 4 credits

Semiconductors in equilibrium: Energy bands, intrinsic and extrinsic semiconductors, Fermi levels, electrons and hole concentrations, temperature dependence of carrier concentrations and invariance of Fermi level. Carrier transport processes and excess carriers: Drift and diffusion, generation and recombination of excess carriers, built-in-field, Einstein relations, continuity and diffusion equations for holes and electrons and quasi-Fermi level. PN junction: Basic structure, equilibrium conditions, contact potential, equilibrium Fermi level, space change, non-equilibrium condition, forward and reverse bias , carrier injection, minority and majority carrier currents, transient and AC conditions, time variation of stoned change, reverse recovery transient and capacitance. Bipolar Junction Transistor: Basic principal of pnp and npn transistors, emitter efficiency , base transport factor and currents gain, diffusion equation in the base terminal currents, coupled-diode model and charge control analysis, Ebers- Moll equations and circuit synthesis. Metal-semiconductor junction. Energy band diagram of metal semiconductor junctions, rectifying and ohmic contacts, MOS structure: MOS capacitor, energy band diagrams and flat band voltage, threshold voltage and control of threshold voltage, static C-V characteristics, qualitative theory of MOSFET: operation, body effect and current-voltage relationship of a MOSFET. Junction Field-Effect Transistor:

Introduction, qualitative theory of operation, pinch-off voltage and current-voltage relationship.

VLSI Technology: Top down design approach, technology trends and design styles. Review of MOS transistor theory. Threshold voltage, body effect, I-V equation and characteristics, latch-up problems, NMOS inverter, CMOS inverter, pass-transistor and transmission gates. CMOS circuit characteristics and performance estimation: Resistance, capacitance, rise and fall times delay, gate transistor sizing and power consumption, CMOS circuit and logic design: Layout design rules and physical design of simple logic gates. CMOS subsystem design: Adders, multiplier system. and memory arithmetic logic unit. Programmable logic arrays. I/O testing. systems. VLSI

EEE 405 Control System 3 credits

Introduction to control systems. Linear system models: transfer function, and block diagram signal flow graph (SFG). State variables: SFG to state variables, transfer function to state variable and state variable to transfer function. Feedback control system: Closed loop system, parameter sensitivity, transient characteristic of control systems, effect of additional pole and zero on the system response and system types and steady state error. Routh stability criterion. Analysis of feedback control system: Root locus method and frequency response method. Design of feedback control system: controllability and observability . root locus, frequency response and state variable methods. Digital control system: introduction, sampled data system, stability analysis, stability analysis in Z-domain.

EEE 406 Control System Sessional 1.5 credits

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 405. In the second part, students will design simple systems using the principles learned in EEE 405.

*Elective- I: (one course from three courses shown below)

*EEE 409 power system-II 3 credits Design and constructional features of overhead power transmission lines and underground cables. Stability: swing equation, power angle equation, equal area criterion, multi-machine system, step-by-step solution of swing equation, factors affecting transient stability. Flexible AC transmission system. High voltage DC transmission system. Power system harmonics.

*ECE 483 Optical Fiber Communication 3 credits
Light Propagation through Optical Fiber. Ray optics theory and mode theory.

Optical Fiber: Types and characteristics ,transmission characteristics, fiber joints and fiber couples.

Light sources: light emitting diodes and laser diodes.

Detection: PIN photo detection and avalanche photo detections.

Receiver analysis: direct detection and coherent detection, noise and limitations

Transmission Limitation: Chromatic dispersion, nonlinear refraction, four wave mixing and laser phase noises.

Optical Amplifier: Laser and fiber amplifier, applications and limitations.

Multi-channel Optical System: Frequency division multiplexing, wavelength division multiplexing and co-channel interference.

*CSE 443 Computer Architecture 3 credits
Instructions and data access method; Arithmetic Logic Unit (ALU) design: arithmetic and logical operation, floating point operations, Processor design: data paths-single cycle and multi cycle implementations; Control Unit design: hardware and micro- programmed pipeline-pipelined data path and control, hazards and exceptions. Memory Organization: cache, virtual

memory; Buses; Multiprocessors, type of multiprocessor performance, single bus multiprocessors, clusters.

*Elective-II: (one course including sessional from three courses shown below)

*EEE 413	Power System Protection	3 credits

Purpose of power system protection. Criteria for detecting faults: over current, differential current, difference of phase angles, over and under voltages, power direction, symmetrical components of current and voltages, impedance, frequency and temperature. Electromechanical, electronic and Digital relays: basic modules, over current, differential distance and directional. Trip circuits. Different protection schemes for generator transformer, motor, bus bar, transmission lines. Protection of ring mains and radial feeders. Miniature circuits breakers and fuses. Circuit breakers: principle of arc extinction. selection criteria and ratings of circuit breakers, types-air, oil, SF6 and vacuum.

*EEE 414	Power System Protection sessional	1.5 credits

Sessional based on theory and concepts learnt in EEE 413.

*ECE 485 Digital Communication 3 credits

Introduction: Communication channels, mathematical model and characteristics, probability and stochastic process.

Source Coding: Mathematical models of information, entropy, Huffman code and linear predictive coding.

Digital Transmission System: Base band digital transmission, inter-symbol interference, band width, power efficiency, modulator and coding trade –off.

Receiver for AWGN channel: Correlation demodulator, match filter demodulator and maximum likelihood receiver.

Channel capacity and coding: Channel models and capacities and random selection of codes.

Block Codes and conventional codes: Linear block codes, convolution codes and coded modulation, Spread spectrum signals and system.

*ECE 486 Digital Communication sessional. 1.5 credits.
Sessional based on theory and concepts learnt in ECE 485. Design of simple systems using the principles learnt in ECE 485.

*CSE 453 Computer Networks. 3 credits
Switching and multiplexing: ISO, TCP-IP and ATM reference models. Different data communication services: physical Layer- wired and wireless transmission media. cellular Radio: communication satellites; Data Link Layer: Elementary protocols, sliding window protocols. Error detection and correction, HDLC, DLL of internet, DLL of ATM; Multiple Access protocols, IEEE 802 protocols for LANs and MANs switches, Hubs and Bridges; High speed LAN; Network layer; Routing, Congestion control, Internetworking, Network layer in internet: IP protocol, IP addresses, ARP; NI in ATM transport layer: transmission control protocol, UDP, ATM adaptation layer. Application layer: Network security; Email, Domain Name system; simple Network, Management protocol; HTTP and World Wide Web.

*CSE 454 Computer Networks Sessional 1.5 credits
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in CSE 453. In the second part, students will design systems learned using the principles in CSE 453.

Level-4 Semester-ll

EEE 400 Project/Thesis 3.0 credits

The student are required to undertake a project/Thesis in the field of Electrical and Electronic Engineering .The objective is to provide an opportunity to the student to develop initiative , creative ability, confidence and engineering judgment. The results of the work should be submitted in
the form of a dissertation, which should include appropriate drawings , charts , tables, references etc.

EEE 407 Microcontroller Based System Design 3.0 credits

Review of 8 bit / 16 bit CISC/RISC microcontrollers: Hardwire architecture, First access register file, Instruction pipelining.

System design: Digital taximeter, prepaid energymeter, VVVF driven and the like, advances in system design.

EEE 408 Microcontroller Based System Design Sessional 1.5 credits

Sessional based on theory and concepts learnt in EEE 407. Design of simple systems using the principles learned in EEE 407.

*Elective lll: (One course including sessional from three courses shown below)

*EEE 417 Non-conventional Energy 3.0 Credits

Solar Geometry: Motion of the earth about the sun, Angle of declination, Solar time , Location of the sun relative to a horizontal plane.

Solar Intensities : solar spectrum and intensities above the atmosphere, Instrumentation for measuring solar intensities, solar intensities at earth level normal to the sun, Insolation on surfaces, Direct and Diffuse Radiation. Solar Heating & Storage Systems: Energy Flow and Efficiency of Flat-Plate collectors, Frames, Boxes, Insulation and Glazing, Absorbed plates and Heat-transfer Fluids, Sensible heat storage, Phase-change storage and Other types of storage.

Silicon Solar Cells: Principles, Efficiency and Efficiency limiting factors, Design consideration , cell fabrication, Construction of Solar Modules & Panels.

Other Cells and Materials: MIS Solar cells and other Device structures, Cell Materials.

Other Non-conventional Sources of Energy: Biomass, Wind power & Tidal power.

*EEE 418 Non-conventional Energy Sessional 1.5 Credits
Sessional based on theory and concepts learnt in EEE 417.

*ECE 487 Microwave Engineering 3.0 Credits
Transmission Lines:

Voltage and current in ideal transmission lines, reflection, transmission , standing wave, Impedance transformation , Smith chart, Impedance matching and lossy transmission Lines.

Waveguides:

General formulation, modes of propagation and losses in parallel plate, Rectangular and Circular waveguides, transis time effect, Velocity modulation, space charge wave.

Microstrips:

Structure and characteristics.

Rectangular Resonent Cavities: Energy

storage, losses and Q.

Radiation:Small current element, radiation resistance, radiation pattern and properties, Hertzian and half wave dipoles.

Antennas: Mono pole, horn, rhombic and parabolic reflector, antenna, array and Yagi-Uda antenna.

Microwave tu bes:

Klystron amplifier, multicavity klystron amplifier, Reflex Klystron oscillator, magnetron, T WT amplifier, BWO.

*ECE 488 Microwave Engineering Sessional 1.5 Credits

Sessional based on theory and concepts learnt in ECE 487.

*CSE 441 Microprocessor system Design 3.0 Credits

Review of 80x86 family of microprocessors, Instructions and data access methods in a 32 bit microprocessor; Representation of operands and operators; Instruction formats; Designing Arithmetic logic Unit; Processor design; single bus, multi-bus architecture; Control Unit Design; Hardwired, micro-programmed and pipe line; VLSI implementation of a microprocessor or part of a microprocessor design.

*CSE 442 Microprocessor system Design Sessional 1.5 Credits

This course consists of two parts. In the first part , student will perform experiments to verify practically the theories and concepts learned in CSE 441. In the second part ,students will design simple systems using the principles learned in CSE 441.

*Elective lV (One course from three courses shown below)

*EEE 433 Power Plant Engineering and Economy 3.0 Credits

Power Plants:

General layout and principles, steam turbine, gas turbine, combined cycle, hydro and nuclear. Plant performance and operation characteristics.

Selection of Location

Technical, economical and environmental factors, load forecasting.

Generation Scheduling

Deterministic and probabilistic generation, load curves-demand factor, diversity factor, load duration curve, energy load curves, load factor, capacity factor, plant factor, electricity tariff formulation and type.

ECE 489 Telecommunication Engineering 3.0 Credits

Introduction: Principle, evolution, networks, exchange and international regularly bodies.

Telephone Apparatus: Microphone, Speakers, ringer, pulse and tone dialing mechanism, side-tone mechanism, local and central batteries and advanced features.

Switching System: Introduction to analog system, digital Switching System- space division switching, blocking probability and multistage switching, time division switching and two dimensional switching, SPC. TST, STS.

Traffic Analysis: Traffic characterization, grades of service, network blocking probabilities, delay system and queuing.

Modern Telephone Services and Network: Internet telephony, facsimile, integrated services digital network; asynchronous transfer mode and intelligent networks , introduction to cellular telephony and satellite communication.

*CSE 451 Multimedia Communication 3.0 Credits

Types of media. Multimedia signal characteristic: sampling, digital representation, signal formats. Signal coding and compressing: entropy coding, transform coding, vector quantization. Coding standards: H.26x,
LPEG, MPEG. Multimedia communication network : network topologies and layers, LAN, MAN, WAM, PSTN, ISDM, ATM, internetworking devices, the internet and access technologies, enterprise networks, wireless LANs and wireless multimedia. Entertainment networks: cable, satellite and terrestrial TV networks, ADST and VDSL, high speed modems. Transport protocols: TCP,UDP,IP.lpv4, lpv6, FTP, RTP and RTCP, use of MPLS and WDMA.

Multimedia synchronization, security, QoS and resource management. . Multimedia application: The WWW, Internet telephony, teleconferencing, HDTV, email and e-commerce.

*Elective V: (One course from two courses shown below)

*EEE 435 Electrical Machine-lll 3.0 Credits Special Machines: Special universal motor, permanent magnet DC motor, unipolars and bipolar brush less DC motors, stepper motor and control circuits. Reluctance and hysteresis motors with drivers circuits, switched reluctance motor, electro static motor, repulsion motor, synchros and control
transformers. Permanent magnet synchronous motors.

Acyclic Machines: Generators, conduction pump and induction pump.

Magneto Hydrodynamic Generators: Fuel cells, thermoelectric generators, flywheels, vector control, linear motor and traction.

Photovoltaic Systems:

Stand alone and grid interfaced. Wind

Turbine Generators:

Induction generator, AC-DC-AC conversion.

*ECE 491 Mobile Cellular Communication 3.0 Credits Introduction:

Concept, evolution and fundamentals, analog and digital cellular systems.

Cellular Radio System:

Frequency reuse, co-channel interference, cell splitting and components.

Mobile Radio Propagation:

Propagation characteristics, models for radio Propagation , antenna at cell site and mobile antenna.

Frequency Management and Channel Assignment:

Fundamentals, spectrum utilization, fundamentals of channel assignment, traffic and channel assignment.

Handoffs and Dropped calls:

Reasons and types, forced handoffs, mobile assisted handoffs and dropped call rate.

Diversity Techniques:

Concept to diversity branch and signal paths, carrier to noise and carrier to interference ratio performance.

Digital Cellular Systems: Global system for mobile, time division multiple access and code division multiple access. GSM, AMPS, GPRS, EDGE, W- CDMA, 3rd generation of mobile communication, Packet switching and data communication.

EEE 444 Industrial Training 1.0 Credits

About 02(Two) weeks industrial Training.