4th Year Odd Semester

EEE 4000 Project and Thesis
Contact hours/week: (3+6) Credits (1.5+3)
A project/thesis course will be assigned to the students in 4th year odd semester class and it will continue till 4th year even semester. 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, references etc. A grade X shall be awarded for this course in 4th year odd semester. Final assessment on this course will be done in 4th year even semester.

EEE 4100 Industrial Training
Contact hours/week: 2 Credits:1
Students will be attached with the industries/service agencies for two weeks after completing their Third year odd semester (before starting Third year even semester/during any vacation in Third year even semester) to gain practical knowledge.

EEE 4107 Digital Signal Processing
Contact hours/week: 3 Credits: 3
Introduction to Digital Signal Processing (DSP): Discrete-time signals and systems, analog to digital conversion, impulse response, finite impulse response (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 zeroes and inverse Z-transform.
Correlation: Circular convolution, auto correlation and cross correlation.
Digital Filters: FIR filters- linear phase filters, specifications, design using window, optimal and frequency
sampling methods; IIR filters- specifications, design using impulse variant, bi-linear z-transformation, least square methods and finite precision effects.

EEE 4108 Digital Signal Processing Sessional
Contact hours/week: 3 Credits: 3
Sessional based on the theory of course EEE 4107.

EEE 4117 Radio and TV Engineering
Contact hours/week: 3/2 Credits: 0.75

Introduction to radio communication, History, Frequency management. Design of radio transmitter and receiver circuits using scattering-parameter methods. Circuits include oscillators, radio frequency amplifiers and matching networks, mixers and detectors. Design of amplitude, frequency, and pulse-modulated communication systems, including modulators, detectors, and the effects of noise.
Television: Introduction, principle of operation, transmitter and receiver, Receiving and transmitting antenna. Camera tube, Picture tube, Electron beam scanning, T-lines, balun, duplexer, Vestigial side-band filters.
Introduction to color TV, VCR, CCTV, CATV, MATV, TV Booster.

EEE 4118 Radio and TV Engineering Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4117.

EEE 4141 Power System II
Contact hours/week: 3 Credits: 3
Design and constructional features of overhead power transmission lines and underground cables. DC and AC power distribution. 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.

EEE 4142 Power System II Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4142.

EEE 4143 High Voltage Engineering
Contact hours/week: 3 Credits: 3
Ionization and decay process: Townsend’s first and second ionization coefficient. Electric breakdown in gases. Townsend’s criterion for spark breakdown. Sparking potential. Penning effect. Corona discharges, power loss calculation. Breakdown of solid and liquid dielectrics. Generation of high voltage: Alternating voltage, transformer cascade. Series resonant circuit for high voltage ac testing. Test of dc and ac cable. Transient Voltage: Impulse wave shape. Impulse voltage generator and its mathematical analysis. Design
consideration of impulse generators. Triggering of impulse generators. DC voltage doubler and cascade circuits. Electrostatic generator, voltage stabilization. Measurement of high voltage. Electrostatic voltmeter, sphere gap. Potential divider. High Voltage testing of power system equipment. Oil testing.

Design consideration of transmission line based on direct stroke. High voltage transient in transmission line. High voltage lightning arrester. Insulation co-ordination.

EEE 4144 High Voltage Engineering Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4143.

EEE 4161 Digital Electronics II
Contact hours/week: 3 Credits: 3
TTL: TTL NAND gate operation, current-sourcing and current-sinking action, totem pole output circuit, TTL NOR gate, standard TTL characteristics, supply voltage and temperature range, voltage levels, power dissipation, propagation delay, fan out, introduction to improved TTL series, TTL loading and fan out, other TTL characteristics, connecting TTL outputs together, open collector output, Tri-state, TTL driving CMOS, problem with TTL.
ECL: Basic ECL circuit, CL OR/NOR gate, ECL characteristics, fan out, speed of operation.
CMOS Logic Families: Introduction to the working principle of enhancement type NMOS, PMOS and depletion MOS. Comparison of NMOS and PMOS with respect to speed. Design of NOMS inverter with resistive load, with NMOS enhancement load and with NMOS depletion load. Egde time and speed calculation for NMOS inverter with depletion load. CMOS inverter: Circuit diagram, operation, transfer characteristic and noise margin. Design of basic CMOS gates (NAND gate and NOR gate) with specified parameters (rise time and fall time). Circuit implementation from logic equations. NMOS pass transistors and CMPS pass gate. Implementation of multiplexer by NMOS and CMOS pass gate. Buffer circuit. CMOS gates driving TTL gates and comparison of CMOS logics with TTL logics. Design of basic logic gates using CMOS and BiCMOS.
Interfacing Data Converters: Digital to Analog Converters (D/A): The binary weighted resistor D/A converter. The R/2R ladder D/A converter. The inverted ladder D/A converter. Specification for D/A converters (resolution, linearity, settling time and accuracy).
Analog to Digital Converters (A/D): Flash converters, Successive approximation converter and Dual slope converter. A/D converter specifications (analog input voltage, input impedance, accuracy, conversion time etc.). A comparison of converter types. Sample and hold circuit (S/H), interconnecting the S/H circuit and the A/D converter.

EEE 4162 Digital Electronics II Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4161.

EEE 4163 VLSI
Contact hours/week: 3 Credits: 3
Introduction to Microelectronics and MOS Technology, Basic Electrical Properties and Circuit Design Processes of MOS and Bi CMOS Circuits, Inverter Circuits, Sub-System Design Processes and Layout, Scaling of MOS Circuits: Scaling Models and Scaling Factors, Limitation of Scaling.
Computational Elements: Design of an ALU Sub-System, Adder, Multipliers, Memory Registers, Dynamic & Static Flip-Flops, Bus Arbitration and Aspects of System Timing. CMOS Fabrication, Practical Aspects of Design Tools and Test-Ability CMOS Design, Behavioral Description, Structural Description, Physical Description and Design Verification. Introduction to Ga-As Technology: Ultra-Fast Circuits and Systems. VHDL background and basic concepts, structural specifications of hardware design organization and
parameterisation.

EEE 4164 VLSI Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4163.

EEE 4181 Microwave Engineering
Contact hours/week: 3 Credits: 3
UHF Transmission Lines: Voltage and current in ideal transmission lines, reflection, transmission, standing wave, impedance transformation, smith chart, impedance matching and lossy transmission lines. Microwave Components: Cavities, Slow wave structures, Waveguide Tees, Directional Couplers, Circulators and Isolators, S-parameter. Microwave tubes: Klystron amplifier, multicavity klystron amplifier, Reflex Klystron oscillator, magnetron, TWT amplifier, BWO. Semiconductor microwave devices: Tunnel diodes, Gunn-Effect diodes, IMPATT diodes. Microwave measurements.

EEE 4182 Microwave Engineering Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4181.

EEE 4183 Digital Communication
Contact hours/week: 3 Credits: 3
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, bandwidth, power efficiency, modulation and coding trade-off. Receiver for AWGN channels: Correlation demodulator and maximum likehood 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.

EEE 4184 Digital Communication Sessional
Contact hours/week: 3/2 Credits: 0.75
Sessional based on the theory of course EEE 4183.

IPE 4111 Project and Operations Management
Contact hours/week: 2 Credits: 2
Project identification and selection, planning, appraisal, project implementation, project organization,
budgeting, scheduling using bar diagram, CPM, PERT, resource allocation, information system and project control, project termination, matrix organization, project manager, contract negotiation and conflict resolution, evaluation of an investment project, project failure and risk control.
Production systems, product/service life cycle, forecasting models, bill of materials, material and inventory
management: Inventory models, ABC analysis, coding and standardization. Aggregate planning, MPS, MRP, capacity planning, operating scheduling, facility location algorithm, facility layout techniques, work study.