VIII Semester B.E.

Electronics Engineering

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN801/ET801
Title of the Course: Computer Networks

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Introduction:** Protocol hierarchies, connection oriented & connectionless services, service primitives, relationship of services to protocols, OSI reference model, TCP/IP model, connection oriented networks: X .25, frame relay & ATM.	9
2	**Physical Layer & Data Link Layer:** Guided transmission media, wireless transmission media, data link design issues: framing, flow control, error detection and correction, HDLC.	9
3	**Medium Access Control Sublayer:** Multiple access protocols such as aloha, CSMA, CSMA/CD, collision free protocols, limited contention protocol, wavelength division multiple access protocol, Ethernet, IEEE 802.11, IEEE 802.16, IEEE 802.18	9
4	**Network Layer And Transport Layer:** Virtual circuit and datagram network, network layer design issues, routing algorithms : hierarchical routing, flooding, least cost routing, distance vector routing, congestion control & QoS, IP protocol & IP addressing, ARP, RARP, elements of transport protocol, TCP & UDP.	9
5	**Application Layer & Network Security:** Domain name system, electronic mail, world wide web, multimedia, cryptography, symmetric key algorithm, public key algorithm, digital signature, communication security, mail security, web security, social issues.	9
	Total	45

Text Books:

1. Computer Networks – Andrew Tanenbaum, Pearson Education.
2. Data & Computer Communication - William Stalling, Pearson Education.

Reference Books:

1. TCP / IP Protocol Suite – Forouzan, Tata McGraw Hill.
2. Computer networking with internet protocols & Technology – William Stalling, Pearson Education.
3. Element of Network Protocol Design – M. G. Gouda, Wiley Interscience Publication.
4. Telecommunication Networks Protocols Modeling & Analysis – M. Schwartz, Pearson Education

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET805/EN802
Title of the Course: Digital Image Processing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Fundamentals of Digital Image:** Light and electromagnetic spectrum, Image sensing and acquisition, simple image formation model, image sampling and quantization, representing digital images, spatial resolution, Intensity resolution, basic relationships between pixels.	09
2	**Image Transformation And Spatial Filtering**: Image negatives, Log transformations, Gamma transformation, histogram equalization, the mechanism of spatial filtering, generating special filter marks, smoothing spatial filters, sharpening spatial filters.	09
3	**Filtering In Frequency Domain**: Basics of the fourier series and transforms, DFT of one variable, The 2-D DFT and its inverse, properties of the 2-D DFT, Basics of filtering in the frequency domain, image smoothing and image sharpening using frequency domain filters, wavelet transform as filtering tool.	09
4	**Image Compression:** Coding redundancy, Spatial and temporal redundancy, Irrevelant information, Measuring image information, general image compression system, Huffman coding, Golomb coding, Arithmetic coding, Digital watermarking and its applications.	09
5	**Image Restoration:** Spatial and frequency properties of noise , noise probability, density functions, Gaussian noise ,Rayleigh noise, Erlang noise, exponential noise, uniform noise, impulse ,noise, restoration in the presence of noise using spatial filters, periodic noise reduction by frequency domain filtering, Image segmentation, point detection, line detection, edge detection, operators thresholding.	09
	Total	45

Text Books:

1. Digital Image Processing, Rafel C. Gonzalez and Richard E. Woods, 3rd edition Pearson Edition,
2. Fundamentals of digital image processing, A.K. Jain (PHI) Eastern economy edition.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN803/ET802
Title of the Course: Digital System Design

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	4	3	10	10	80	100

Unit	Contents	Hours
1	**Introduction to VHDL**	9
	Design Concepts, Digital Hardware, Design Process, Introduction to CAD tools, Design Entry, Synthesis, Functional Simulation, introduction to VHDL, Representation of Digital Signals in VHDL, Introduction to VHDL code.	
2	**VHDL for Combinational circuits**	9
	Assignment Statements, Selected Signal Assignment, Conditional Signal Assignment, Generate Statements, Concurrent and Sequential Assignment Statements, Process Statements, Case Statements, Design of Full adder, four bit adder Multiplexers, decoders, encoders, Code converters, Flip-flops, Registers, Counters.	
3	**Synchronous Sequential circuits**	9
	Basic Design Steps, State diagram, State table, State assignment, Choice of flip-flops, Design of Moore and Mealy circuits using VHDL.	
4	**Asynchronous Sequential circuits**	9
	Primitive flow table, Transition table, State reduction, Concept of Races, Critical races, Hazards, Design of Asynchronous circuits.	
5	**Programmable Logic Devices**	9
	Programmable logic array, Programmable array logic, Architecture of Complex Programmable logic devices (CPLD), Field programmable gate array (FPGA).	
	Total	45

Text Books:

1. Fundamentals of Digital logic with VHDL design-Stephen Brown, Zvonco Vranesic TMH

Reference Books:

1. Circuit Design with VHDL-Volnei A. Pedroni-Prentice Hall Publications.
2. Principles of Digital Systems Design using VHDL- Charles Roth Lizzy John-Cengage Learning
3. Digital System Design with VHDL-Mark Zwolinski_Pearson Education.
4. Introductory VHDL from Simulation to Synthesis -Sudhakar Yalamanchilli -Pearson Education
5. An Engineering Approach to Digital Design-William Fletcher-Prentice Hall Publications.
6. VHDL Programming by Example Douglas Perry TMH
7. VHDL Primer - J. Bhasker -B. S. Publications.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN804
Title of the Course: Embedded System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Embedded system Introduction:** Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing.	08
2	**System Architecture:** Introduction to AVR Microcontroller: History and Features, Detailed AVR architecture and Assembly language Programming.	09
3	**Study of on Chip Peripherals:** Study of on-chip peripherals like I / O ports, timers, interrupts, on-chip ADC, DAC, Watch-Dog Timer, Power down Modes.	09
4	**Interfacing and Programming:** (Simple Programs) Programming on-chip peripherals: Timer, Interrupts, Serial Port, PWM, SPI.	09
5	**Real Time Operating System :** Introduction to Real – Time Operating Systems: OS services, Process Management, Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.	10
	Total	45

Text Books:

1. Rajkamal - Embedded Systems, TMH.
2. The AVR Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson Publication.

Reference Books:

1. DR.K.V.K.K. Prasad - Embedded / real time system, Dreamtech.
2. Steve Heath - Embedded System Design, Neuwans.
3. David Simon - Embedded systems software primer, Pearson

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN805/ET804 Elective –II (i)

Title of the Course : Elective –II**:** Neural Networks And Fuzzy System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Fundamental Concepts and Models of Artificial Neural Systems:** Biological Neurons and Their Artificial Models, Models of Artificial Neural Networks, Learning and Adaptation, Neural Network Learning Rules, Overview of Neural Networks.	9
2	**Single-Layer Perceptron Classifiers:** Discriminant Functions, Linear Machine and Minimum Distance Classification, Training and Classification using the Discrete Perceptron: Algorithm and Example, Single Layer Continuous Perceptron Networks for Linearly Separable Classifications.	9
3	**From Classical (CRISP) Sets to Fuzzy sets:** Introduction, Crisp Sets: An overview, Fuzzy sets: Basic Types, Fuzzy sets: Basic Concepts, characteristics and significant of the Paradigm shift. Fuzzy sets versus Crisp sets: Additional properties of α-cuts, Representation of Fuzzy sets, Extension Principles for Fuzzy sets.	9
4	**Operations of Fuzzy sets:** Types of Operations, Fuzzy complements, Fuzzy Intersections: t-norms, Fuzzy Unions: t-Conorms, Combinations of operations, Aggregation Operations.	9
5	**Fuzzy Arithmetic:** Fuzzy Numbers, Linguistic Variables, Arithmetic, Operations on Intervals and Arithmetic Operations on Fuzzy Numbers, Lattice Fuzzy Numbers and Fuzzy Equations.	9
	Total	45

Text Books:

1. Introduction to Artificial Neural System s by J.M. Zurada, Jaico Publishing House, India
2. Fuzzy Sets and Fuzzy Logic, Theory and application by George J. Klir and Bo Yuan , PHI

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN805 /ET805 Elective –II (ii)

Title of the Course: Elective –II: Micro Electro Mechanical Systems

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Introduction:** Intrinsic Characteristics of MEMS – Energy Domains and Transducers- Sensors and Actuators –Introduction to Micro fabrication - Silicon based MEMS processes – New Materials – Review of Electrical and Mechanical concepts in MEMS – Semiconductor devices – Stress and strain analysis– Flexural beam bending- Torsional deflection.	9
2	**Sensors And Actuators-I:** Electrostatic sensors – Parallel plate capacitors – Applications – Interdigitated Finger capacitor –Comb drive devices – Thermal Sensing and Actuation – Thermal expansion – Thermal couples –Thermal resistors – Applications – Magnetic Actuators – Micro magnetic components.	9
3	**Sensors And Actuators-II:** Piezoresistive sensors – Piezoresistive sensor materials - Stress analysis of mechanical elements –Applications to Inertia, Pressure, Tactile and Flow sensors – Piezoelectric sensors and actuators –piezoelectric effects –piezoelectric materials – Applications to Inertia , Acoustic, Tactile and Flowsensors.	9
4	**Micromachining:** Silicon Anisotropic Etching – Anisotrophic Wet Etching – Dry Etching of Silicon – Plasma Etching –Deep Reaction Ion Etching (DRIE) – Isotropic Wet Etching – Gas Phase Etchants – Case studies –Basic surface micromachining processes – Structural and Sacrificial Materials – Acceleration of sacrificial Etch – Striction and Antistriction methods – Assembly of 3D MEMS – Foundry process.	9
5	**Polymer And Optical MEMS:** Polymers in MEMS– Polimide - SU-8 - Liquid Crystal Polymer (LCP) – PDMS – PMMA – Parylene –Fluorocarbon - Application to Acceleration, Pressure, Flow and Tactile sensors- Optical MEMS –Lenses and Mirrors – Actuators for Active Optical MEMS.	9
	Total	45

Text Book:

1. Chang Liu, 'Foundations of MEMS', Pearson Education Inc., 2006.

Reference Books:

1. Nadim Maluf, "An introduction to Micro electro mechanical system design", Artech House, 2000.
2. Mohamed Gad-el-Hak, editor, "The MEMS Handbook", CRC press Baco Raton, 2000.
3. Tai Ran Hsu, "MEMS & Micro systems Design and Manufacture" Tata McGraw Hill, New Delhi, 2002.
4. Julian w. Gardner, Vijay k. varadan, Osama O. Awadelkarim, micro sensors MEMS and smart devices, John Wiley & son LTD,2002

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET705/EN805 Elective –II (iii)

Title of the Course: Elective –II: Radio Frequency Circuit Design

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Characteristics of passive components for RF circuits:** Skin effect, Resistors, Capacitors, inductors, Passive RLC networks, Resonant RLC networks, RLC network as impedance transformers, equivalent circuit representation of Transmission lines, S-parameter model, Smith Chart and its applications.	9
2	**Active RF components:** Schottky diode, PIN diode, Tunnel diode, Varactor diode, IMPATT diode, Gunn diode, MESFET, HEMT, PHEMT.	9
3	**Low Noise Amplifier design:** Noise types and their characterization, LNA topologies, power constrained Noise optimization, Linearity and large-signal performance.	9
4	**RF Power amplifiers:** General properties, Class A, AB and C Power amplifiers, Class D, E and F amplifiers, Modulation of power amplifiers	9
5	**Oscillators and Mixers:** High frequency oscillator configuration, Fixed frequency oscillators, Dielectric resonator oscillators, YIG- Tuned oscillators, Gunn Element oscillators, Mixer basic concepts, single ended mixer design, single balanced mixer, Integrated active mixers.	9
	Total	45

Reference Books:

1. The Design of CMOS Radio Frequency Integrated Circuits, Lee Thomas H, Cambridge University Press.
2. RF circuit design- Theory and applications, Reinhold Ludwig, Gene Bogdanov, Pearson
3. Design of Analog CMOS integrated circuits, Razavi Behzad, McGraw Hill
4. VLSI for wireless communication, Bosco Leung, Pearson Education

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN805 Elective-II (iv)

Title of the Course: Elective-II: Opto-Electronics Devices And Communication

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Introduction to optical Fibers:** Introduction to Step Index and Graded Index Fibers. Multimode Fibers, Propagation in Fibers Ray Mode, Numerical Aperture and Multipath Dispersion, Electromagnetic Wave Equation in SI and GI Fibers.	9
2	**Signal Degradation**: Manufacture of Fibers, Fiber Joints, Splices and Connectors. Attenuation, Material Dispersion, Waveguide Dispersion, Pulse Broadening, Mode Coupling.	9
3	**Optical Sources and Coupling:** Direct and Indirect Band Gap Materials, LED Structures , Light Source Materials, Quantum Efficiency and LED Power, Laser Diodes, Modes and Threshold Conditions, Rate Equations, External Quantum Efficiency, Resonant Frequencies and Temperature effects, Introduction to Quantum Laser, Fiber Amplifiers, Power Launching and Coupling, Lencing Schemes.	9
4	**Optical Receivers:** Pin and APD Diodes, Photo-Detectors, Noise SNR Detector Response Time, Avalanche Multiplication Noise, Comparison of Photo Detectors , Fundamental Receiver operation, Preamplifiers, Receiver Configuration, Quantum Limit.	9
5	**Digital Transmission System**, Point to Point Links, WDM, Data Buses, Star and T-Coupler, NRZ, RZ and Block Codes. Measurement in Optical Fibers, Attenuation, Dispersion, Refractive Index Profile, Basic Concepts of SONET/SDH Network.	9
	Total	45

Text Books:

1. Optical Fiber Communication –G. Keiser McGraw Hill Publication

Reference Books:

1. Optical Communication Principles and Practice – J. senior, Prentice Hall of India.
2. Optical Communication System – J. Gower Prentice Hall of India.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN805 Elective – II (v)
Title of the Course: Elective – II: Antenna and Radar Systems

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	0	3	3	3	3	10	10	80	100

Unit	Contents	Hours
1	**Antenna Basics** The Radio Communication Link, Field From Oscillating Dipole, Antenna Field Zone, Shape-impedance Consideration, Linear, Elliptical and Circular Polarization, Pointing Vector for Elliptical and Circularly Polarized Waves.	9
2	**The Antenna Family** Loops, Dipoles and Slots, Opened-Out Coaxial-Line Antennas, Opened-Out 2-conductor (Twin-Line) Antennas, Opened-Out Waveguide Antennas(Aperture Type), Flat-Sheet Reflector Antennas, Parabolic Dish and Dielectric Lens Antennas.	9
3	**Antenna Measurements** Basic Concepts, Reciprocity in Antenna Measurements, Near-Field and Far-Field, Coordinate System, Typical Source of Error in Antenna Measurements, Phase Error and Amplitude Taper Due to Finite Measurement Distance, Reflections, Other source of Error ,Measurements Ranges, Elevated Ranges, Ground-Reflection Ranges, Anechoic Chambers and Absorbing Materials.	9
4	**Radar System** **Basic Principles**-Fundamentals, RADAR Performance Factors, P**ulsed System-** Basic Pulsed RADAR System, Antennas and Scanning, Display Method, Pulsed RADAR System, Moving target Indication(MIT).	9
5	**Other Radar System** CW Doppler RADAR, Frequency Modulated CW RADAR, Phased Array RADAR, Planner Array RADAR.	9
	Total	45

Text Books:

1. K. D. Prasad, Antenna and Wave Propagation, Satya Prakashan

Reference Books:

1. John D. Kraus, Electromagnetic, Tata McGraw Hill, Book Co. New York.
2. Rajeshwari Chatterjee, Antenna Theory and Practice, New Age International (P) Limited.
3. Electronic Communication System – Kennedy & Davis, Tata McGraw Hill Fourth Edition.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN 806
Title of the Course: Digital Image Processing (Practical)

Course Scheme					**Evaluation Scheme(Laboratory)**		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	3	3	2	25	25	50

Note: Minimum 10 Practical based on the prescribed syllabus.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN807
Title of the Course: Digital System Design (Practical)

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	3	3	2	25	25	50

It includes at least 8 programs based on the theory syllabus of Digital System Design where students will write VHDL programs, compile them, perform functional simulation and download onto CPLD or FPGA.

List of suggested programs

1. Implementation of full adder.
2. Implementation of four bit adder.
3. Implementation of 4 to 1 Multiplexer.
4. Implementation of 16 to 1 multiplexer.
5. Implementation of 2 to 4 Decoder.
6. Implementation of 4 to 16 Decoder.
7. Implementation of Encoder.
8. Implementation of Priority encoder.
9. Implementation of Flip-flop.
10. Implementation of Counters.
11. Implementation of Registers.
12. Implementation of Moore circuits.
13. Implementation of Mealy circuits.

EIGHTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN808
Title of the Course: Major Project Phase -II (Practical)

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	6	3	6	75	75	150

- The Major Project work Phase-II is to be conducted in continuation of the project work Phase-I which is to be carried out in the institution/industry/research laboratory.
- The duration of project work should be a minimum of two semesters (Project Phase –I & II).
- There will be a mid-semester evaluation of the project work done after about two months. An interim project report is to be submitted to the department during the mid-semester evaluation. The mid-semester evaluation will be done by the department project committee/project guide; this will carry weightage in final evaluation.
- Each student / project group has to submit to the department a project report in the prescribed format after completion of the project work. The final evaluation and viva-voce will be conducted by the project committee/Guide on the stipulated date at the end of the semester.
- Each student / project group has to make a demonstration on the work carried out, before the project committee for project evaluation. The end semester evaluation will be done by the project committee including the guide.