VIII Semester B.E.

ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION 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

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION 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** Design Concepts, Digital Hardware, Design Process, Introduction to CAD tools, Design Entry, Synthesis, Functional Simulation, introduction to VHDL, Representation of Digital Signals in VHDL and Introduction to VHDL code.	9
2	**VHDL for Combinational circuits** 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.	9
3	**Synchronous Sequential circuits** Basic Design Steps, State diagram, State table, State assignment, Choice of flip-flops, Design of Moore and Mealy circuits using VHDL.	9
4	**Asynchronous Sequential circuits** Primitive flow table, Transition table, State reduction, Concept of Races, Critical races, Hazards, Design of Asynchronous circuits.	9
5	**Programmable Logic Devices** Programmable logic array, Programmable array logic. Architecture of Complex Programmable logic devices (CPLD), Field programmable gate array (FPGA).	9
	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.

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: ET803
Title of the Course: Wireless 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

Unit	Contents	Hours
1	**Services And Technical Challenges**	
	Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.	9
2	**Wireless Propagation Channels**	
	Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.	9
3	**Wireless Transceivers**	
	Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.	9
4	**Signal Processing In Wireless Systems**	
	Principle of Diversity, Macro diversity, Signal Combining Techniques, Transmit diversity, Equalizers- Linear and Decision Feedback equalizers, Review of Channel coding and Speech coding techniques.	9
5	**Advanced Transceiver Schemes**	
	Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards	9
	Total	45

Text Books:

1. Andreas. F. Molisch, “Wireless Communications”, John Wiley – India, 2006.
2. Simon Haykin & Michael Moher, “Modern Wireless Communications”, Pearson Education, 2007.
3. Rappaport T. S., “Wireless communications”, Pearson Education, 2003.

Reference Books:

1. Gordon L. Stuber, “Principles of Mobile Communication”, Springer International Ltd., 2001.
2. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2007.

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: ET804
Title of the Course: Satellite 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	3	3	10	10	80	100

Units	Contents	Hours
1	**Orbital Mechanism:** Kepler's three Laws of planetary motion, motion locating the satellite in the orbit and with respect to the earth, , orbital elements, calculation of Geo-stationary orbits radius, leo, elliptical orbit, Link Angle Determination, Limits of visibility, Sub satellite point, Launching Procedures -launch vehicles and propulsion.	09
2	**Space Segment And Satellite Link Design:** Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, C/N calculations,, system noise, inter modulation, Propagation Characteristics and Frequency considerations-,System reliability and design lifetime.	09
3	**Satellite Access:** Modulation and Multiplexing: Voice, Data, Video, and Analog – digital transmission systems, Digital video Broadcasts, multiple accesses: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication.	09
4	**Earth Segment**: Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, Test methods, Measurements on G/T, C/No, EIRP, Antenna Gain.	09
5	**Satellite Navigation And GPS**: Orbital considerations of GPS satellites, Radio and Satellite Navigation, GPS time, GPS receivers, C/A code, satellite signal acquisition, GPS navigation, GPS signal levels, telemetry accuracy, GPS return operation.	09
	Total	45

Text Books:

1. Satellite Communication by T. Pratt Wiley India edition.
2. Satellite Communication system by William L Pritchard Pearson education.
3. Satellite Communication system by M Richeria Macmillan.

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: EN805/ET805 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	3	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 Systems 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

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION 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

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: EN 805/ET 805 Elective – II (iii)
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.

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: EN802/ET 805 Elective –II (iv)
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:** **L**ight 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

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.

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: ET 705 Elective – I (v)
Title of the Course: Elective –I: 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**

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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

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: EN 807/ET 806

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**.**

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: ET807
Title of the Course: Wireless communication (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 experiments based on the theory syllabus of Wireless communication.

List of suggested experiments

1. ASK, FSK, PSK, QPSK digital modulators
2. Code Division Multiple Access (CDMA)
3. Global System for Mobile Communication (GSM)
4. Spread Spectrum – DSSS Modulation & Demodulation
5. Study of Propagation Path loss Models: Indoor & Outdoor (Using MAT LAB Programming)

EIGHT SEMESTER B.E. ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course Code: ET808
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.