SYLLABI BOOK

For
Post Graduate Course in
Electronics & Communication Systems
(w. e. f. July, 2016)

Department of Electronics & Communication Engineering
Faculty of Technology
Dharmsinh Desai University
Nadiad – 387 001, Gujarat, India.
http://www.ddu.ac.in

TEACHING SCHEME FOR THE COURSE

M.TECH. ELECTRONICS & COMMUNICATION SYSTEMS (w. e. f. July, 2014)

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. I	ME 135	Advance Digital Signal Processing	3	2	60	40	25	125	4
	ME 132	Image Processing	3	2	60	40	25	125	4
	ME 141	Wireless Communication Technology	3	2	60	40	25	125	4
	ME 140	Probability Theory & Random Processes	3	2	60	40	25	125	4
	ME 136	Internetworking	3	2	60	40	25	125	4
	ME 118	Pedagogic Practice	--	2	--	--	50	50	2
	ME 138	Term Project	--	--	--	--	50	50	1
							Total	725	23

SEMESTER-II

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. II	ME 241	Advanced Wireless Networks	3	2	60	40	25	125	4
	ME 243	Advance Wireless Communication Systems	3	2	60	40	25	125	4
	ME 234	Advance Microwave Engineering	3	2	60	40	25	125	4
	ME 240	ASIC Design	3	2	60	40	25	125	4
	ME 242	Fiber Optic Communication & Sensor Systems	3	2	60	40	25	125	4
	ME 228	Pedagogic Practice	--	2	--	--	50	50	2
	ME 239	Term Project	--	--	--	--	50	50	1
							Total	725	23

SEMESTER-III

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	The.	Sess.	Pra.	T.W.		
Sem. III	ME 311	Project	--	28	--	--	225	125	350	8
	ME 312	Pedagogic Practice	--	2	--	--	--	50	50	2
							Total		400	10

SEMESTER-IV

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	Theory	Sess.	Pra.	T.W.		
Sem. IV	ME 411	Project	--	28	--	--	300	150	450	10
	ME 412	Pedagogic Practice	--	2	--	--	--	50	50	2
								Total	500	12

M.TECH. SEMESTER-I (ECS)

SUBJECT: ADVANCE DIGITAL SIGNAL PROCESSING (ME 135) (Credit : 4.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] OVERVIEW:
Z-transform, DFT, FFT, IIR design methods, FIR design methods.

[B] FILTER STRUCTURES FOR IIR AND FIR FILTERS, DIRECT FORM I AND II, PARALLEL AND CASCADE FORMS, LATTICE

[C] FINITE WORD-LENGTH EFFECTS IN DIGITAL FILTERS:
Fixed and floating point representation of numbers, quantization noise in signal representations, finite word-length effects in coefficient representation, round-off noise, SQNR computation and limit cycle.

[D] MULTI-RATE SIGNAL PROCESSING:
Decimation and interpolation; polyphase decomposition; digital filter banks: Nyquist filters, two channel quadrature mirror filter bank and perfect reconstruction filter banks, sub-band coding.

[E] OPTIMAL AND ADAPTIVE FILTERING:
Minimum mean square error and linear minimum mean square error criteria, FIR Wiener filter and linear prediction, steepest descent algorithm and LMS algorithm. Applications: Adaptive Modelling and System Identification, Inverse Adaptive Modeling, Deconvolution, Adaptive Inverse Control, Adaptive Interference Cancelling.

[F] POWER SPECTRAL ANALYSIS AND APPLICATIONS

[G] HILBERT TRANSFORMS AND APPLICATIONS

[H] WAVELET TRANSFORMS AND APPLICATIONS

[I] INTRODUCTION TO DIGITAL SIGNAL PROCESSORS:
Characteristics of DSP algorithms and hardware requirements, von Neumann architecture, Harvard architecture, parallelism and hardware units of typical digital signal processor. Architectural details of TMS320C6x.

Text Books:

1. Discrete-Time Signal Processing, 2nd Edition
   By: A. V. Oppenheim and R. W. Shafer
   Publisher: Prentice Hall of India
2. Digital Signal Processing: A computer-Based Approach, 2nd Edition
   By: S. K. Mitra
   Publisher: Tata McGraw Hill
3. Analog and Digital Signal Processing, 1st Edition
   By: Ashok Ambardar
   Publisher: THOMSON Brooks
4. Adaptive Filter Theory, 4th Edition
   By: Simon Haykin
   Publisher: Prentice Hall of India

Ref. Books:

1. Digital Signal Processing, 3rd Edition
   By: J.G. Proakis and D. G. Manolakis
   Publisher: Prentice Hall of India
2. Statistical Digital Signal Processing & Modeling, 1st Edition
   By: M. H. Hayes
   Publisher: John Wiley & Sons

M.TECH. SEMESTER-I (ECS)

SUBJECT: IMAGE PROCESSING (ME 132) (Credit : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION:
Examples of Fields that Use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

[B] DIGITAL IMAGE FUNDAMENTALS:
Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.

[C] IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:
Background, Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

[D] IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:
Background, the Fourier Transform and the Frequency Domain analysis of image, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation.

[E] IMAGE RESTORATION:
A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering. Geometric Mean Filter, Geometric Transformations.

[F] COLOR IMAGE PROCESSING:
Color Fundamentals, Color Models, Pseudo color Image Processing, Basics of Full-Color Image Processing.

[G] IMAGE COMPRESSION:
Fundamentals, Image Compression Models, Elements of Information Theory, Error-Free Compression, Lossy Compression, Image Compression Standards.

[H] MORPHOLOGICAL IMAGE PROCESSING:
Preliminaries. Dilation and Erosion. Opening and Closing. The Hit-or-Miss Transformation. Some Basic Morphological Algorithms. Extensions to Gray-Scale Images.

[I] IMAGE SEGMENTATION:
Detection of Discontinuities. Edge Linking and Boundary Detection. Thresholding. Region-Based Segmentation.

[J] REPRESENTATION AND DESCRIPTION:
Representation. Boundary Descriptors. Regional Descriptors. Use of Principal Components for Description. Relational Descriptors.

Text Book:

1. Digital Image Processingm, 2nd Edition
   By: Rafel C. Gonzalez
   Publisher: Addition Wesley Publishing Co.

Ref. Books:

1. Image Processing, 1st Edition
   By: Pearson Education
   Publisher: Tata McGraw Hill
2. Digital Picture Processing, 1st Edition
   By: Azriel Resenfeld, Avinash C.Kak
   Publisher: Academic Press, New York.
3. Digital Image Processing, 1st Edition
   By: Kenneth R. Castleman
   Publisher: Pearson Education
4. Fundamental of Digital Image Processing, 1st Edition
   By: Anil K. Jain
   Publisher: Pearson Education

M.TECH. SEMESTER-I(ECS)

SUBJECT: WIRELESS COMMUNICATION TECHNOLOGY (ME 141) (Credit : 4.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION: Applications and Requirements of Wireless Services, Technical Challenges of Wireless Communications, Noise- and Interference-Limited Systems
[B] WIRELESS PROPAGATION CHANNELS: Statistical Description of the Wireless Channel, Channel Models
[C] Modulation and Demodulation
[D] Diversity
[E] Channel Coding and Speech coding
[F] Equalizers
[G] MULTIPLE ACCESS AND ADVANCED TRANSCEIVER SCHEMES: Multiple Access and the Cellular Principle, Spread Spectrum Systems
[H]Detection and estimation

Text Books:

(1) Wireless Communications: Principles and Practice, Theodore S. *Rappaport,* Pearson Education India

(2) Detection, Estimation, and Modulation Theory, Part 1 Harry L. Van Tree, John Wiley & Sons

Ref. books:

1. WIRELESS COMMUNICATIONS' Second Edition, Andreas F. Molisch, A John Wiley and Sons, Ltd
2. WIRELESS COMMUNICATIONS, Andrea Goldsmith, Stanford University, Cambridge University Press
3. Fundamentals of Wireless Communications, David Tse, University of California, Berkeley, Pramod Viswanath, University of Illinois, Urbana-Champaign

M.TECH. SEMESTER-I (ECS)

SUBJECT: PROBABILITY THEORY AND RANDOM PROCESSES (ME140) (Credit : 4.0)

SYLLABUS & SCHEME (w.e.f. 2011)

[A] INTRODUCTION TO PRBABILITY

Definition, scope and history; limitation of classical and relative-frequency-based definitions, Sets, fields, sample space and events; axiomatic definition of probability, Combinatorics: probability on finite samples, Joint and conditional probabilities, independence, total probability; Bayes' rule and applications.

[B] RANDOM VARIABLES

Definition of random variables, continuous and discrete random variables, cumulative distribution function (cdf) for discrete and continuous random variables; probability mass function (pmf); probability density functions (pdf) and properties, Jointly distributed random variables, conditional and join density and distribution functions, independence; Bayes' rule for continuous and mixed random variables, Function of random variable, pdf of the function of the random variable, Function of two random variables; Sum of two independent random variables, Expectation: mean, variance and moment of a random variable, Joint moments, conditional expectation, covariance and correlation; independent, uncorrelated and orthogonal random variables, Random vector: mean vector, covariance matrix and properties, Some special distributions: Uniform, Gaussian and Rayleigh distributions; Binomial, and Poisson distributions; Multivariate Gaussian distribution, Vector-space representation of random variables, linear independence, inner product, Schwarz Inequality, Elements of estimation theory: Linear minimum mean-square and Orthogonality principle in estimation; Moment-generating and characteristic functions and their applications, Bound and approximations: Chebysev inequality and Chernoff Bound.

[C] SEQUENCE OF RANDOM VARIABLE AND CONVERGENCE

Almost sure (a.s.) convergence and strong law of large numbers; convergence in mean square sense with examples from parameter estimation; convergence in probability with examples; convergence in distribution, central limit theorem and its significance.

[D] RANDOM PROCESS

Random process: realizations, sample paths, discrete and continuous time processes, examples, Probabilistic structure of a random process; mean, autocorrelation and autocovariance functions, Stationarity: strict-sense stationary(SSS) and wide-sense stationary(WSS) processes, Autocorrelation function of a real WSS process and its properties, cross-correlation function, Ergodicity and its importance, Spectral representation of a real WSS process: power spectral density, properties of power spectral density; cross-power spectral density and properties; auto-correlation function and power spectral density of a WSS random sequence, Linear time-invariant system with a WSS process as an input: stationarity of the output, auto-correlation and power-spectral density of the output; examples with white-noise as input; linear shift-invariant discrete-time system with a WSS sequence as input, Spectral factorization theorem, Examples of random processes: white noise process and white noise sequence; Gaussian process; Poisson process, Markov Process

Text Books:

1. Probability Random Variables and stochastic Processes A.papoulis, , 2nd Ed McGraw Hill

Ref. Books:

1. Probability and Random Processes for Elecrtical Engineer, Alberto leon Gracia 2nd Ed PE India.
2. Stochastic Processes,Vol. I and II , A. Larson and B. O. Schubert, , Holden- Day

M.TECH. SEMESTER -I (ECS)

SUBJECT: INTERNETWORKING (ME 136) (Credit : 4.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] OVERVIEW:
Overview of TCP/IP protocol suite and mapping of layers with OSI Model, Basic concepts of Data Link Layer Protocols, Different TCP/IP Layers and their major Functionalities, Various addressing used in TCP/IP.

[B] IP ADDRESSING & DELIVERY OF IP PACKETS:
IPv4 addressing scheme and notations, IPv6 addressing scheme and notations, Classful and Classless IP addressing, Special IP addresses, Subnetting and Supernetting, CIDR notations, Connection oriented Vs Connection less services, Direct and Indirect IP delivery, Dynamic and Static Routing Methods, Different Routing Methods and routing tables, IPv6 addressing.

[C] NETWORK LAYER PROTOCOLS:
Fundamentals of ARP, RARP, IP, ICMP and IGMP protocols including header format and usefulness of various fields in the header. Protocol Package and descriptions of various modules of all above protocols, Proxy ARP, IP Options , IP fragmentation and Defragmentation, ICMP error reporting messages , ICMP Query Messages, IGMP messages and operation, Protocol Encapsulation.

[D] TRANSPORT LAYER PROTOCOLS:
Point to Point Vs End to End communication, Connection less Vs Connection Oriented Services, Fundamentals of TCP and UDP protocols including header format and usefulness of various fields in the header, Process to Process Communication, Use of UDP and UDP operations , Encapsulation and Decapsulation of UDP, Multiplexing and Demultiplexing at Transport Layer , TCP Services , TCP operations - Flow Control, Error Control , TCP issues and Solutions , TCP timers , TCP congestion Control , TCP State Transition Diagram.

[E] ROUTING PROTOCOLS:
Interior and Exterior routing protocols , Unicast and Multicast Routing Protocols , RIP , OSPF and BGP – Operation, Message/Packet formats , Related Issues , Spanning Tree and Shortest Path Algorithms.

[F] APPLICATION LAYER PROTOCOLS:
Fundamentals of BOOTP, DHCP , DNS , SNMP and SMTP protocols. Protocol Operations and usefulness of the same for the services offered over an entire system.

[G] CLIENT SERVER MODEL AND SOCKET INTERFACE:
Concept of Process , Process Creation (Forking) and Process Identification , Concurrent and Iterative mode of services , Socket Introduction , Socket Types , Byte Ordering , Address Transformation and Byte manipulations , Socket System calls , Example of Connectionless/Connection oriented Iterative/Concurrent Server/Client Socket Programs.

Text Book:

1. TCP/IP Protocol Suite, 3rd Edition
   By: Behrouz A. Forouzan
   Publisher: Tata McGraw Hill

Ref. Book:

1. Internetworking with TCP/IP Vol.1, 2, 3, 2nd Edition
   By: Douglas Comer
   Publisher: Prentice Hall of India
2. Unix Network Programming, 1st Edition
   By: W. R. Stevens
   Publisher: Prentice Hall of India
3. TCP/IP Illustrated Vol. I, 1st Edition
   By:W. R. Stevens
   Publisher: Pearson Education

M.TECH. SEMESTER-I (ECS)

SUBJECT: TERM PROJECT (ME 138) (Credit : 1.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory	Sessional	Practical/T.W.	Total
--	--	--	--	--	50	50

Each student will take up a software project based on Object Oriented Design.

M.TECH. SEMESTER-II (ECS)

SUBJECT: ASIC DESIGN (ME 240) (Credit : 4.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION TO ASICS:
Types of ASICs , ASIC Design Flow & Introduction to VLSI Technology.

[B] CMOS LOGIC:
Theory & Logic circuit design using CMOS transistors, CMOS Design rules , Combinational and Sequencial logic using CMOS, Datapath logic Cells , I/O cells.

[C] ASIC DESIGN:
CMOS Transistor RC model, AC & DC analysis of CMOS logic , Theory of logical Effort.

[D] PROGRAMMABLE ASICS:
The Antifuse Technology, SRAM Technology, EPROM and EEPROM Technology, Practical Issues in FPGA/CPLD.

[E] ASIC TEST:
Boundary Scan Test , Fault modeling and simulation, ATPG & PODEM, Built in self test.

[F] FLOORPLANNING AND ROUTING:
Physical Design Flow, Measurement of delay , input output planning , power and Clock planning.

[G] ASIC ROUTING:
Global routing , Detailed routing methods , Routine constraints , Clock routing , power routing, circuit extraction and DRC.

[H] PROGRAMMABLE ASIC LOGIC CELLS:
Introduction to Actel ACT logic modules, Speed grading in Actel ACT modules, Xlinx LCA modules and analysis, Logic Expanders and Power dissipation issues in Altera Max series.

[I] PROGRAMMABLE ASIC I/O CELLS:
Introduction AC and DC I/O blocks with Totem pole output and Clamp diodes , Noise Margins , Metastability and Supply bounce , Power dissipation and power on reset concepts, Boundary scan for Xilinx I/O blocks.

[J] PROGRAMMABLE ASIC INTERCONNECT:
AC and DC analysis of interconnects.

Text Book:

1. Application Specific Integrated Circuits, 6th Indian Edition
   By: Michael John Sebastian Smith
   Publisher: Pearson Education

Ref. Books:

1. Introduction to VLSI Circuits and Systems, 1st Edition
   By: John P. Uyemura
   Publisher: Wiley
2. Digital Integrated Circuits- A Design Perspective, 2nd Edition
   By: J. M. Rabnbaey, A. Chandrakassan & B. Nikolic
   Publisher: Prentice Hall of India

M.TECH. SEMESTER-II (ECS)

SUBJECT: FIBER OPTICS COMMUNICATION & SENSOR SYSTEMS (ME 242) (Credit : 4.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION TO FIBER:
Fiber structures and wave guiding fundamentals, optical source, power launching and coupling, photo detectors, optical receivers transmission link analysis.

[B] MULTICHANNEL SYSTEMS:
WDM Lightwave systems, WDM Components, System performance issues, TDM, CDM and sub carrier multiplexing.

[C] SOLITON SYSTEM:
Fiber Solitons, Soliton-based communication, Loss Managed Soliton.

[D] OPTICAL SWITCHING AND NETWORKS:
Introduction, applications, technologies, sonet, wavelength routed network.

[E] ALL-OPTICAL TIME-DIVISION MULTIPLEXING TECHNOLOGY:
Role of All-optical TDN technology, Key Technologies for it's systems.

[F] OPTICAL FIBER SENSOR TECHNOLOGY:
Multimode optical fiber sensors, distributed fiber optic sensors.

[G] FIBER OPTICS APPLICATIONS:
LANs, Broadband networks, sensing systems, system measurements.

Text Books :

1. Fiber Optics Communications, 4th Edition
   By: Gerd Keiser
   Publisher: Tata McGraw Hill
2. Optical Fibers and Fiber Optic Communication Systems, 2nd Edition
   By: Subir Kumar Sarkar
   Publisher: S. Chand

Ref. Books:

1. Optical Fiber Communication: Principles and Systems, 1st Edition
   By: A. Selvarajan, S Kar, T Srinivas
   Publisher: Tata McGraw Hill
1. Optical Fiber Communication: Principles and Practice, 2nd Edition
   By: John M. Senior
   Publisher: Prentice Hall of India
2. WDM Optical Networks, 1st Edition
   By: C. Siva Ram Murthy and Mohan Gurusamy
   Publisher: Prentice Hall of India

M.TECH. SEMESTER-II(ECS)

SUBJECT: ADVANCED WIRELESS COMMUNICATION SYSTEMS (ME 243) (Credit : 4.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] Multi-Carrier systems: Orthogonal Frequency Division Multiplexing (OFDM),etc..
[B] Multi-antenna Systems
[C] Relaying, Multi-Hop, and Cooperative Communications
[D] Cognitive Radio
[E] GSM – Global System for Mobile Communications
[F] IS-95 and CDMA 2000
[G] WCDMA/UMTS
[H] 3GPP Long-Term Evolution
[I] WiMAX/IEEE 802.16
[J] Wireless Networks

Text Books:

(1) WIRELESS COMMUNICATIONS' Second Edition, Andreas F. Molisch,
A John Wiley and Sons, Ltd

Ref. books:

(1) WIRELESS COMMUNICATIONS, Andrea Goldsmith, Stanford University, Cambridge University Press

(2) Fundamentals of Wireless Communications, David Tse, University of California, Berkeley, Pramod Viswanath, University of Illinois, Urbana-Champaign

(3) Wireless Communications: Principles and Practice, Theodore S. *Rappaport,* Pearson Education India

M.TECH. SEMESTER-II (ECS)

SUBJECT: ADVANCE MICROWAVE ENGINEERING (ME 234) (Credit : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] IMPEDANCE TRANSFORMATION AND MATCHING:
Smith Chart, Impedance Matching with Reactive Elements – Single-stub Matching, Double-stub Matching Network, Impedance Matching with Lumped Elements, Design of Complex Impedance Terminations, Quarter-Wave Transformers, Theory of Small Reflections, Approximate Theory of Multisection Quarter-Wave Transformers, Binomial Transformer, Chebyshev Transformer with exact results, Tapered Transmission Lines (Exponential Taper, Taper with Triangular Distribution).

[B] TRANSMISSION LINES:
Microstrip Transmission Line (Low Frequency Solutions, Microstrip Attenuation, High-Frequency Properties of Microstrip Lines, Attenuation), Coupled Microstrip Lines, Strip Transmission Lines, Coupled Strip Lines, Coplanar Transmission Lines.

[C] WAVEGUIDES:
Rectangular Waveguide - TE Waves, Power, Attenuation, Dominant TE_{10} Mode, TM Modes, Circular Waveguides – TM Modes, TE Modes, Wave Velocities – Phase Velocity, Group Velocity, Energy- Flow Velocity, Ridge Waveguide.

[D] PASSIVE MICROWAVE DEVICES:
Terminations (Variable Short Circuit), Attenuators (Electronically Controlled Attenuators), Phase Shifters (Rotary Phase Shifter, Electronically Controlled Phase shifters), Directional Couplers (Design, Coupled-line, Branch-line, Lange), Hybrid Junctions (Magic T, Hybrid Ring), Power Dividers, Microwave Propagation in Ferrites, Three-port Circulators with Field Analysis.

[E] ELECTROMAGNETIC RESONATORS:
Resonant Circuits, Transmission-Line Resonant Circuits (Series, Short-circuited, Open-circuited, antiresonance), Microstrip Resonators, Circular Disk Resonator, Microwave Cavities (Rectangular, Cylindrical), Dielectric Resonators, Equivalent Circuits for Cavities (Aperture-Coupled, Loop-Coupled).

[F] SOLID-STATE AMPLIFIERS:
Bipolar Transistors with biasing, Field-Effect Transistors with biasing, Circle-mapping Properties of Bilinear Transformations, Microwave Amplifier Design using S_{ij} Parameters, Amplifier power gain, Amplifier Stability Criteria, Constant Power-Gain Circles, Basic Noise Theory, Low-noise Amplifier Design, Constant Mismatch Circles, Microwave single-stage Amplifier Design, Other Aspects of Microwave Amplifier Design.

[G] PARAMETRIC AMPLIFIERS:
p-n Junction Diodes, Manley-Rowe Relations, Linearized Equations, Parametric Up-Converter, Negative-Resistance Parametric Amplifier, Noise-properties.

[H] OSCILLATORS:
Gunn Oscillators, IMPATT Diodes, Transistor Oscillators, Three-port Description of a Transistor, Oscillator Circuits & Design.

[I] MIXERS:
Linear & non-linear operation, Noise Figure, Other types of Mixers, Analysis using Harmonic Balancing.

Text Book:

1. Foundations for Microwave Engineering, 2nd Edition
   By: Robert E. Collin
   Publisher: Wiley

Ref. Book:

1. Microwave Device and Circuits, 2nd Edition
   By: Samual Y. Liao
   Publisher: Prentice Hall of India
2. Electromagnetic Wave, 2nd Edition
   By: R.S.shevgaonkar
   Publisher: Tata McGraw Hill

M.TECH. SEMESTER-II (ECS)

SUBJECT: ADVANCED WIRELESS NETWORKS (ME 241) (Credit : 4.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] WIRELESS INTERNET:
What is Wireless Internet?, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web Over Wireless

[B] AD HOC WIRELESS NETWORKS:
Introduction & Issues in Ad-hoc wireless networks, Ad Hoc wireless Internet

[C] ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS:
Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table Driven Routing Protocols, On Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, hierarchical Routing Protocols, Power Aware Routing Protocols

[D] TRANSPORT LAYER AND SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS:
Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks

[E] QUALITY OF SERVICE IN AD HOC WIRELESS NETWORKS:
Issues & Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions

[F] ENERGY MANAGEMENT IN AD HOC WIRELESS NETWORKS:
Need for Energy Management in Ad Hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transportation Power Management Schemes, System Power Management Schemes

[G] WIRELESS SENSOR NETWORKS:
Architecture, Data Dissemination, Data Gathering, Location Discovery
[H] DELAY TOLERANT NETWORKS
Application and issues , Architecture and routing algorithms

Text Book:

1. Ad Hoc Wireless Networks, Architectures and Protocols, 2nd Edition
   By: C. Siva Ram Murthy, B. S. Manoj.
   Publisher: Prentice Hall of India

Ref. Book:

1. Ad hoc Mobile Wireless Networks: Principles, Protocols and Applications, 2nd Edition
   By:Subir Kumar Sarkar,
   T. G.Basavaraju, C. Puttamadappa
   Publisher: Auerbach Publications
2. Ad hoc Networks: Technology & Protocols, 1st Edition
   By:Prasant Mohapatra,
   S.V. Krishnamurthy
   Publisher: Spriger
3. Principles of Wireless Networks, 4th Edition
   By: Kaveh Pahlavan,
   Prashant Krishnamurthy
   Publisher: Pearson Education
4. Wireless Networks, 1st Edition
   By: P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis
   Publisher: John Wiley & Sons.
5. Wireless Communications & Networks, 2nd Edition
   By: W. Stallings
   Publisher: Prentice Hall

M.TECH. SEMESTER-II (ECS)

SUBJECT: TERM PROJECT (ME 239) (Credit : 1.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory	Sessional	Practical/T.W.	Total
--	--	2	--	--	50	50

Each student will take up a project on any simulator platform as a prelude to the ME dissertation.

M.TECH. SEMESTER-III (ECS)

SUBJECT: PROJECT (ME 311) (Credit : 8.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)				
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
--	--	28	--	--	225	125	350

Each student will take up a project involving analysis, design, implementation and testing of substantial hardware, software or any combination of them related to live problems in the fields of study. A dissertation will be prepared and submitted for a viva-voce examination.

M.TECH. SEMESTER-IV (ECS)

SUBJECT: PROJECT (ME 411) (Credit : 10.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)				
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
--	--	28	--	--	300	150	450

Each student will take up a project involving analysis, design, implementations and testing of substantial hardware, software or any combination of them related to live problems in the fields of study. A dissertation will be prepared and submitted for a viva-voce examination.