COURSE STRUCTURE AND DETAILED SYLLABUS

M.TECH
WIRELESS AND MOBILE COMMUNICATION

(Applicable for the batches admitted from 2018-19)

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Bollikunta, Warangal-506 005
Telangana State, India.

VAAGDEVI COLLEGE OF ENGINEERING

Autonomous
Bollikunta, Warangal

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

M.Tech (Wireless and Mobile Communication)

COURSE STRUCTURE

(R18 Regulations applicable for the batches admitted from Academic Year 2018-19 onwards)

I-SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1.	M18WM01	Advanced Data Communication	3	0	0	3
2.	M18WM02	Coding Theory and Techniques	3	0	0	3
3.	M18WM03 M18WM04 M18WM05	**Program Elective-I** Spread Spectrum Communication Detection & Estimation Theory Stochastic Process & Time Domain Analysis	3	0	0	3
4.	M18WM06 M18WM07 M18WM08	**Program Elective-II** Voice Over Internet Protocol Internetworking GPS and its Applications	3	0	0	3
5.	M18AC01	English For Research Paper Writing	2	0	0	0
6.	M18MC01	Research Methodology	2	0	0	2
7.	M18WM09	Advanced Communication Laboratory	0	0	4	2
8.	M18WM10	Advanced Data Communication & Network Laboratory	0	0	4	2
		Total Credits	**16**	**0**	**08**	**18**

II-SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1.	M18WM11	Advanced Digital Signal Processing	3	0	0	3
2.	M18WM12	Wireless Communication	3	0	0	3
3.	M18WM13 M18WM14 M18WM15	**Program Elective-III** Advanced Communication and Networks Embedded System Design Optical Communication Technology	3	0	0	3
4.	M18WM16 M18WM17 M18WM18	**Program Elective-IV** Wireless MIMO Communication Wireless LANs and PANs Software Defined Radio	3	0	0	3
5.	M18AC02	Stress Management	2	0	0	0
6.	M18WM19	Formatting and Analysis Laboratory	0	0	4	2
7.	M18WM20	Simulation Laboratory	0	0	4	2
8.	M18WM21	Mini Project	0	0	4	2
		Total Credits	**14**	**00**	**12**	**18**

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(R18 Regulations applicable for the batches admitted from Academic Year 2018-19 onwards)

III-SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1		**Program Elective-V**	3	0	0	3
	M18WM22	4G & 5G Technologies				
	M18WM23	Mobile Computing Technologies				
	M18WM24	Adhoc and Wireless Sensor Networks				
2		**Open Elective**	3	0	0	3
	M18CS05	Scripting Languages				
	M18MA01	Advanced Optimization Techniques				
	M18SE27	Waste Management				
3	M18WM25	Dissertation Phase-I	0	0	20	10
		Total Credits	**06**	**00**	**20**	**16**

IV-SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1	M18WM26	Dissertation Phase-II	0	0	32	16
		Total Credits	**00**	**00**	**32**	**16**

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM01)ADVANCED DATA COMMUNICATION

M. Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves as a general introduction for students seeking to acquire a foundation in current network technologies for local area networks (LANs), wide area networks (WANs) and the Internet.
- The course provides error detecting codes and cyclic codes.
- The course provides an introduction to hardware, software, terminology, components, design, and connections of a network. Network concepts such as the OSI model, topologies, and major protocols, as well as the basic functions of system administration and operation are also included.
- The course provides Uni-cast routing algorithms and protocols.
- The course is operating system independent and provides an introduction to several popular network operating systems.

Unit I:

Data Communication, Networks and Network Types, Internet History, Standards and Administration, Protocol Layering, TCP/IP protocol suite, OSI Model. Digital Data Transmission, DTE-DCE interface.

Data Link Layer

Introduction, Data Link Layer, Nodes and Links, Services, Categories of Links, sub layers, Link Layer Addressing, Address Resolution Protocol.

Unit II:

Error Detection and Correction: Types of Errors, Redundancy, detection versus correction, Coding Block Coding: Error Detection, Vertical redundancy cheeks, longitudinal redundancy cheeks, Error Correction, Error correction single bit, Hamming code.

Cyclic Codes: Cyclic Redundancy Check, Polynomials, Cyclic Code Encoder Using Polynomials, Cyclic Code Analysis, Advantage of Cyclic Codes, Checksum

Data Link Control: DLC Services, Data Link Layer Protocols, HDLC, Point to Point Protocol

Unit III:

Switching: Introduction to Switching, Circuit Switched Networks, Packet Switching, Structure of switch

Multiplexing : Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing.

Connecting devices: Passive Hubs, Repeaters, Active Hubs, Bridges, Two Layer Switches, Routers, Three Layer Switches, Gateway, Backbone Networks.

Wired LANS: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10 Giga bit Ethernet

Unit IV:

Media Access Control (MAC) Sub Layer

Random Access, ALOHA, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA),Controlled Access- Reservation, Polling- Token Passing, Channelization - Frequency Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), Code - Division Multiple Access (CDMA).

Spectrum Spreading: Spread Spectrum-Frequency Hopping Spread Spectrum and Direct Sequence Spread Spectrum.

Unit V:

Networks Layer: Packetizing, Routing and Forwarding, Packet Switching, Network Layer Performance, IPv4 Address, Address Space, Classful Addressing, Classless Addressing, Dynamic Host Configuration Protocol (DHCP), Network Address Resolution(NATF), Forwarding of IP Packets, Forwarding based on Destination Address, Forwarding based on Label, Routing as Packet Switches. **Unicast Routing** : Introduction, **Routing Algorithms**-Distance Vector Routing, Link State Routing, Path Vector Routing, **Unicast Routing Protocols**- Routing Information Protocol(RIP), Open Short Path First Version 4.

TEXT BOOKS:

1. Data Communication and Networking - B. A. Forouzan, 5th, 2013, TMH.
2. Data and Computer Communication - William Stallings, 8th ed., 2007, PHI.

REFERENCE BOOKS:

1. Data Communication and Computer Networks - Prakash C. Gupta, 2006, PHI.
2. Data Communication and Networking - B. A. Forouzan, 2nd, 2013, TMH.

Course Outcomes:

After the completion of this course, the students should be able to

- Demonstrate the Layered Architecture of Computer Networks.
- Apply all the error correction and detection mechanisms.
- Explain various switching and Multiplexing techniques.
- Implement the MAC mechanisms for data sharing to network among several computers and understand the effectiveness of spread spectrum communication.
- Implement the various Internet Protocol addressing techniques of network layers and Understand Routing Algorithms , Uni-cast Routing Protocols in network layers.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM02)CODING THEORY AND TECHNIQUES

M. Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves the Mathematical model of Information and Entropy.
- The course serves LDPC Codes, Concatenated convolution codes, Iterative decoding of product codes and turbo decoding
- The course provides Spatial Multiplexing such as Iterative APP Preprocessing BLAST Detection.

UNIT – I:
Coding for Reliable Digital Transmission and storage
Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.
Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT - II:
Cyclic Codes : Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT – III:
Convolutional Codes: Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT – IV:
Turbo Codes :LDPC Codes- Codes based on sparse graphs, Decoding for binary erasure channel, Log-likelihood algebra, Brief propagation, Product codes, Iterative decoding of product codes, Concatenated convolutional codes- Parallel concatenation, The UMTS Turbo code, Serial concatenation, Parallel concatenation, Turbo decoding

UNIT - V:
Space-Time Codes:
Introduction, Digital modulation schemes, Diversity, Orthogonal space- Time Block codes, Alamouti's schemes, Extension to more than Two Transmit Antennas, Simulation Results, Spatial Multiplexing : General Concept, Iterative APP Preprocessing and Per-layer Decoding, Linear Multilayer Detection, Original BLAST Detection, QL Decomposition and Interface Cancellation, Performance of Multi – Layer Detection Schemes, Unified Description by Linear Dispersion Codes.

TEXT BOOKS:

1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello,Jr, Prentice Hall, Inc.
2. Error Correcting Coding Theory-Man Young Rhee- 1989, McGraw-Hill

REFERENCE BOOKS:

1. Error Correcting Coding Theory-Man Young Rhee-1989,McGraw – Hill Publishing,19
2. Digital Communication-Fundamental and Application - Bernard Sklar, PE.
3. Digital Communication- John G. Proakis, 5th ed., 2008, TMH.
4. Introduction to Error Control Codes-Salvatore Gravano-oxford
5. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
6. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Edition, 2009, TMH.

Course Outcomes:

After the completion of this course, the students should be able to

- Understand and apply the error detection and correction capability of Linear Block Codes
- Understand the algebraic structure of Cyclic Codes and implement it
- Able to demonstrate the practical implementation of Convolution Codes
- Understand the encoding and decoding of Turbo Codes for both the Serial and Parallel concatenation.
- Understand the various Space-Time Codes detection techniques of Spatial Multiplexing. to improve the reliability of data transmission

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM03)SPREAD SPECTRUM COMMUNICATION
(Program Elective – I)

M. Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves Direct Sequence Spread Spectrum, Binary Shift Register Sequences for gold codes.
- This course serves tracking loops Tau-Dither and Double Dither Non- Coherent Tracking Loop. Synchronization Techniques using a Matched Filter.
- This course serves Interference Combat Detection Schemes and cancellation techniques using CDMA,
- Block Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

UNIT -I:

Introduction to Spread Spectrum Systems: Fundamental Concepts of Spread Spectrum Systems, Pseudo Noise Sequences, Direct Sequence Spread Spectrum, Frequency Hop Spread Spectrum, Hybrid Direct Sequence Frequency Hop Spread Spectrum, Code Division Multiple Access.

Binary Shift Register Sequences for Spread Spectrum Systems:

Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT -II:

Code Tracking Loops: Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non- Coherent Tracking Loop, Double Dither Non-Coherent Tracking Loop.

UNIT -III:

Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT -IV:

Cellular Code Division Multiple Access (CDMA) Principles: Introduction, Wide Band Mobile Channel, The Cellular CDMA System, Single User Receiver in a Multi User Channel, CDMA System Capacity,

Multi-User Detection in CDMA Cellular Radio: Optimal Multi-User Detection, Linear Suboptimal Detectors, Interference Combat Detection Schemes, Interference Cancellation Techniques.

UNIT -V:

Performance of Spread Spectrum Systems in Jamming Environments: Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding.

Performance of Spread Spectrum Systems with Forward Error Correction: Elementary Block Coding Concepts, Optimum Decoding Rule, Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth - "Introduction to Spread Spectrum Communication- Pearson, 1st Edition, 1995.
2. Mosa Ali Abu-Rgheff – "Introduction to CDMA Wireless Communication." Elsevier Publications, 2008.

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem - "Modern Communication and Spread Spectrum," McGraw Hill,1986.
2. Andrew j. Viterbi - "CDMA: Principles of spread spectrum communication," Pearson Education, 1st Edition,1995.
3. Kamilo Feher - "Wireless Digital Communication," PHI, 2009.
4. Andrew Richardson - "WCDMA Design Handbook," Cambridge University Press, 2005.
5. Steve Lee - Spread Spectrum CDMA, McGraw Hill, 2002.

Course Outcomes:

After the completion of this course, the students should be able to

- Analyze the Fundamental Concepts of Spread Spectrum Systems .
- Understand the various Code Tracking Loops for synchronization between the transmitter and receiver.
- Design an Optimum Synchronizer for initial synchronization of the received spreading code
- Understand the operational principle of Multi-User Detection in CDMA Cellular Radio
- Analyze the Performance of Spread Spectrum communication in Jamming Environments and Forward Error Correction

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM04)DETECTION & ESTIMATION THEORY
(Program Elective – I)

M. Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves the concepts of Markov Sequences , and Gaussian Processes.
- This course provides Probability of Error Classifier using Bayes Decision Rule, Neyman-Pearson Classifier.
- This course provides Linear and nonlinear Minimum Mean Squared Error Estimators using Digital Wiener Filters, Kalman Filters.
- This course serves statistical calculations such as Distribution of Estimators, Tests of Hypotheses, Simple and Multiple Linear Regression. Estimation of Autocorrelation Functions, Power Spectral Density Functions.

UNIT –I:
Random Processes: Discrete Linear Models, Markov Sequences and Processes, Point Processes, and Gaussian Processes.

UNIT –II:
Detection Theory: Basic Detection Problem, Maximum A posteriori Decision Rule, Minimum Probability of Error Classifier, Bayes Decision Rule, Multiple-Class Problem (Bayes)- minimum probability error with and without equal a priori probabilities, Neyman-Pearson Classifier, General Calculation of Probability of Error, General Gaussian Problem, Composite Hypotheses.

UNIT –III:
Linear Minimum Mean-Square Error Filtering: Linear Minimum Mean Squared Error Estimators, Nonlinear Minimum Mean Squared Error Estimators. Innovations, Digital Wiener Filters with Stored Data, Real-time Digital Wiener Filters, Kalman Filters.

UNIT –IV:
Statistics: Measurements, Nonparametric Estimators of Probability Distribution and Density Functions, Point Estimators of Parameters, Measures of the Quality of Estimators, Introduction to Interval Estimates, Distribution of Estimators, Tests of Hypotheses, Simple Linear Regression, Multiple Linear Regression.

UNIT –V:
Estimating the Parameters of Random Processes from Data: Tests for Stationarity and Ergodicity, Model-free Estimation, Model-based Estimation of Autocorrelation Functions, Power Spectral Density Functions.

TEXT BOOKS:
1. Random Signals: Detection, Estimation and Data Analysis – K. Sam Shanmugan & A.M. Breipohl, Wiley India Pvt. Ltd, 2011.
2. Random Processes: Filtering, Estimation and Detection – Lonnie C. Ludeman, Wiley India Pvt. Ltd., 2010.

REFERENCE BOOKS:

1. Fundamentals of Statistical Signal Processing: Volume I Estimation Theory– Steven.M.Kay, Prentice Hall, USA, 1998.
2. Fundamentals of Statistical Signal Processing: Volume I Detection Theory– Steven.M.Kay, Prentice Hall, USA, 1998.
3. Introduction to Statistical Signal Processing with Applications – Srinath, Rajasekaran, Viswanathan, 2003, PHI.
4. Statistical Signal Processing: Detection, Estimation and Time Series Analysis – Louis L.Scharf, 1991, Addison Wesley.
5. Detection, Estimation and Modulation Theory: Part – I – Harry L. Van Trees, 2001, John Wiley & Sons, USA.
6. Signal Processing: Discrete Spectral Analysis – Detection & Estimation – Mischa Schwartz, Leonard Shaw, 1975, Mc Graw Hill.

Course Outcomes:

After the completion of this course, the students should be able to

- Explain the concepts of Markov Sequences , Gaussian Processes.
- Outline the fundamental concepts of probability errors and error classifiers.
- Analyze the Linear and nonlinear Minimum Mean Squared Error Estimators using Digital Wiener Filters, Kalman Filters.
- Measure statistical data such as Distribution of Estimators, Tests of Hypotheses, Simple and Multiple Linear Regression.
- Estimate the parameters of random processes from data.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM05) STOCHASTIC PROCESS & TIME DOMAIN ANALYSIS
(Program Elective – I)

M.Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves Chebyshev Inequalities, Chi-square tests of hypotheses concerning distribution.
- This course serves auto Covariance and Auto Correlation functions, Cross Power Spectral Density, transition diagrams Gambler's ruin as a Markov chains.
- This course serves Queuing System, Delay Distribution, Mean Delay for M/M/I and M/G/I systems.

UNIT -I:
Stationary Random Processes from a Probability Point of View: Probability Density and Probability Distribution Functions of a Random Variable, Expected Value of Random Variable, Markov and Chebyshev Inequalities, Computer Methods for Generating Random Variables, Multidimensional Random variables, Chi-square tests of hypotheses concerning distribution.

UNIT -II:
Random Processes Analyzed in the Time Domain: Continuous and Discrete Time, Stationarity, Auto Covariance and Auto Correlation functions, Continuity, differentiation, Integrals of Random Processes.
Some special cases: The Poisson process, the Normal (Gaussian) Process.

UNIT -III:
Random Processes Analyzed in the Frequency Domain: The Fourier Transform, Spectral Density, The Cross Power Spectral Density.
Linear Systems with random input: Impulse response, Transfer function, the relation between the spectral density for the input and for the output

UNIT -IV:
Markov Chains: Markov Processes: Discrete time Markov chains, state transition probability matrix, n-step state transition probability, transition diagrams, classification of states, limiting state probabilities, Continuous-time Markov chains, Gambler's ruin as a Markov chains

UNIT -V:
Basic Queuing Theory: Elements of a Queueing System, Little's Formula, M/M/1, Queue- Delay Distribution in M/M/1 System, M/M/1 System with Finite Capacity, M/G/1 Queueing system- Residual Service Time, Mean Delay in M/G/1 Systems.

TEXT BOOKS:
1. Probability, Random Variables, and Random Signal Principles – Peebles, P. Z (1993)- Third edition or later – New York – McGraw-Hill
2. Fundamentals of Applied Probability and Random Processes – Oliver C. Ibe, Elsevier, 2009
3. Probability and Random Processes for Electrical Engineering - Alberto Leon-Garcia, 2nd Ed, Pearson

REFERENCE BOOKS:
1. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis, S.

Unnikrishna Pillai – TMH, 2008
2. Probability and Random Processes with Applications to Signal Processing – Henry Stark, John W. Woods, 3rd Edition, Pearson
3. Probability and Stochastic Processes – A Friendly Introduction for Electrical and Computer Engineers – Roy D. Yates, David J. Goodman

Course Outcomes:
After the completion of this course, the students should be able to

- Formulate various random processes like Chebyshev Inequalities, Chi-square tests of hypotheses concerning distribution.
- Analyze random processes in time domain.
- Relate the input and output for spectral density of random processes in frequency domain.
- Classify various Markov chains and explains transition diagram.
- Assess Queuing System, Delay Distribution, Mean Delay for M/M/I and M/G/I systems.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM06)VOICE OVER INTERNET PROTOCOL
(Program Elective –II**)**

M.Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves Transmission Control Protocol, UDP,RTP, The H.323 Architecture, H.245 Standards, Usage of SDP With SIP.
- This course serves regarding Overview of QOS solutions ,Multi-protocol Label Switching and Routing,
- This course provides M3UA and M2UA Operation Interworking Soft switch and SS7.

UNIT –I:

Overview of IP Protocol Suite: The Internet Protocol, The Transmission Control Protocol(TCP), The User Datagram Protocol (UDP), The Real-time Transport Protocol (RTP), IP multicast, IP version 6 (IP v6), Interworking IPv4 and IPv6, The VoIP Market, VoIP Challenges.

UNIT -II:

H.323 and H.245 Standards: The H.323 Architecture, Call Signaling-Call Scenarios, H.245 Control Signaling Conference calls- The Decomposed Gateway.

UNIT –III:

The Session Initiation Protocol (SIP): SIP architecture- Overview of SIP Messaging Syntax- Examples of SIP Message sequences- Redirect Servers- Proxy Servers. The Session Description Protocol (SDP)- Usage of SDP With SIP.

UNIT -IV:

Quality of Service (QoS): Need for QOS – End-to-end QoS, Overview of QOS solutions- The Resource reservation Protocol (RSVP)- Diffserv- The Diffserv Architecture- Multi-protocol Label Switching (MPLS)- The MPLS Architecture- MPLS Traffic Engineering- Label Distribution Protocols and Constraint- Based Routing.

UNIT -V:

VoIP and SS7: The SS7 Protocol Suite- The Message Transfer Part (MTP), ISDN User Part (ISUP) and Signaling Connection Control Part (SCCP), SS7 Network Architecture- Signaling Points(SPs)- Single Transfer Point (STP), - Service Control Point(SCP)- Message Signal Units (MSUs)- SS7 Addressing, ISUP, Performance Requirements for SS7, Sigtran- Sigtran Architecture- SCTP- M3UA Operation- M2UA Operation- M2PA Operation- Interworking SS7 and VoIP Architectures- Interworking Soft switch and SS7- Interworking H.323 and SS7.

TEXT BOOK:

Carrier Grade Voice over IP – Daniel Collins, 2nd ed., TMH.

REFERENCE BOOKS:

1. Understanding Voice over IP Technology – Nicholas Wittenberg – Cengage, 1st Ed., 2010. 2 Voice Over WLANS – The Complete Guide – Michael, F. Finnevan, Elsevier, 2008.

Course Outcomes:

After the completion of this course, the students should be able to
- Classify Transmission Control Protocol, UDP,RTP.
- Explain the architecture of H.323 Architecture, H.245 Standards,MPLS.

- Outline the usage of SDP With SIP.
- Assess the overview of QOS solutions ,Multi-protocol Label Switching and Routing.
- Compare M3UA and M2UA Operations and Describe the functioning of Interworking Soft switch and SS7.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM07)INTERNETWORKING
(Program Elective –II**)**

M.Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves as a general introduction for students seeking to acquire a foundation in current network technologies for local area networks (LANs), wide area networks (WANs) and the Internet.
- This course provides Forwarding, and Routing of IP Packets, Transmission Control Protocol services and features, segment, TCP times.
- This course provides Flow, Error and Congestion Control, Inefficiency in Mobile IP ,Link State Routing, Uni-cast and Multicast- Broadcast routing.
- This course provides knowledge about internet and importance of file transfer protocol. Remote Login TELNET, World Wide Web- HTTP Architecture. Security in the internet firewalls.

UNIT -I:

Internetworking Concepts: Principles of Internetworking, Connectionless Internetworking, Application level Interconnections, Network level Interconnection, Properties of the Internet, Internet Architecture, Wired LANS, Wireless LANs, Point-to-Point WANs, Switched WANs, Connecting Devices, TCP/IP Protocol Suite.
IP Address: Classfull Addressing: Introduction, Classfull Addressing, Other Issues, Sub-netting and Super-netting
Classless Addressing: Variable length Blocks, Sub-netting, Address Allocation. Delivery, Forwarding, and Routing of IP Packets: Delivery, Forwarding, Routing, Structure of Router.
ARP and RARP: ARP, ARP Package, RARP.

UNIT -II:

Internet Protocol (IP): Datagram, Fragmentation, Options, Checksum, IP V.6.

Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Flow Control, Error Control, Congestion Control, TCP Times.

Stream Control Transmission Protocol (SCTP): SCTP Services, SCTP Features, Packet Format, Flow Control, Error Control, Congestion Control. **Mobile IP:** Addressing, Agents, Three Phases, Inefficiency in Mobile IP. **Classical TCP Improvements:** Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/ Fast Recovery, Transmission/ Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.

UNIT -III:

Unicast Routing Protocols (RIP, OSPF, and BGP: Intra and Inter-domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP.

Multicasting and Multicast Routing Protocols: Unicast - Multicast- Broadcast, Multicast Applications, Multicast Routing, Multicast Link State Routing: MOSPF, Multicast Distance Vector: DVMRP.

UNIT -IV:

Domain Name System (DNS): Name Space, Domain Name Space, Distribution of Name Space, and DNS in the internet. **Remote Login TELNET:** Concept, Network Virtual Terminal (NVT). **File Transfer FTP and TFTP:** File Transfer Protocol (FTP). **Electronic Mail:** SMTP and POP.

Network Management-SNMP: Concept, Management Components, World Wide Web- HTTP Architecture.

UNIT -V:

Multimedia: Digitizing Audio and Video, Network security, security in the internet firewalls. Audio and Video Compression, Streaming Stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/Video, RTP, RTCP, Voice Over IP. Network Security, Security in the Internet, Firewalls.

TEXT BOOKS:

1. TCP/IP Protocol Suite- Behrouz A. Forouzan, Third Edition, TMH.
2. Internetworking with TCP/IP Comer 6th Edition PHI, Volume -1.

REFERENCE BOOKS:

1. Mobile Communication, Jochen Schiller, 2nd edition, Pearson Education 2003.
2. Data Communication & Networking – B.A. Forouzan – 4nd Edition – TMH
3. High Speed Networks and Internets- William Stallings, Pearson Education, 2002.
4. Data and Computer Communication, William Stallings, 7th Edition., PEI.
5. The Internet and Its Protocols – Adrin Farrel, Elsevier, 2005.

Course Outcomes:

After the completion of this course, the students should be able to

- Explain local area networks (LANs), wide area networks (WANs) ,Internet and distinguish ARP and RARP
- Learn Function of Forwarding, Routing of IP Packets, Transmission Control Protocol services and features of SCTP .
- Compare Uni-cast and Multicast- Broadcast routing.
- Explain the concepts of DNS,TELNET, FTP and HTTP architecture.
- Assess knowledge about internet and importance of Multimedia.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM08) GPS AND ITS APPLICATIONS
(Program Elective –II**)**

M.Tech: I-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course provides calculation of velocity and position using GPS, psuedorange and frequency estimation. Antenna designing and types of error calculations using dual frequency GPS reciever.
- This course provides determining Geo orbit, GEO uplink and downlink systems.
- This course serves applications of Global positioning system.

UNIT I: INTRODUCTION
Basic concept, system architecture, GPS and GLONASS Overview, Satellite Navigation, Time and GPS, User position and velocity calculations, GPS, Satellite Constellation, Operation Segment, User receiving Equipment, Space Segment Phased development, GPS aided Geoaugmented navigation (GAGAN) architecture.

UNIT II: SIGNAL CHARACTERISTICS
GPS signal components, purpose, properties and power level, signal acquisition and tracking , Navigation information extraction, pseudorange estimation, frequency estimation, GPS satellite position calculation, Signal structure, anti spoofing (AS), selective availability, Difference between GPS and GALILEO satellite construction.

UNIT III: GPS RECEIVERS & DATA ERRORS
Receiver Architecture, receiver design options, Antenna design, GPS error sources, SA errors, propagation errors, ionospheric error, tropospheric error, multipath, ionospheric error, estimation using dual frequency GPS receiver, Methods of multipath mitigation, Ephemeris data errors, clock errors.

UNIT IV: DIFFERENTIAL
GPS
Introduction, LADGPS, WADGPS, Wide Area Augmentation systems , GEO Uplink subsystem , GEO downlink systems , Geo Orbit determination , Geometric analysis , covariance analysis , GPS /INS Integration Architectures

UNIT V:
GPS APPLICATIONS
GPS in surveying, Mapping and Geographical Information System, Precision approach Aircraft landing system, Military and Space application, intelligent transportation system.

GPS orbital parameters, description of receiver independent exchange format (RINEX) , Observation data and navigation message data parameters, GPS position determination, least squares method

TEXT BOOKS
1. Mohinder S.Grewal, Lawrence R.Weill, Angus P.Andrews, "*Global positioning systems, Inertial Navigation and Integration*", John Wiley & sons, 2007.
2. *Global* Navigation Satellite *System*, Gottapu Sasibhuhsana Rao, McGraw-Hill Education, 2010.

REFERENCES
1. E.D.Kaplan, Christopher J. Hegarty, "*Understanding GPS Principles and Applications*", Artech House Boston 2005.

Course Outcomes:

After the completion of this course, the students should be able to

- Measure velocity and position using GPS receiver.
- Explain the concept of GPS satellite position and signal structure.
- Distinguish GPS and GALILEO satellite construction.
- Categorize Geo orbit, GEO uplink and downlink systems and Compare LADGPS and WADGPS
- Illustrate the operation of Global positioning system and its applications.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18AC01) ENGLISH FOR RESEARCH PAPER WRITING

M.Tech: I-Semester **L T P C**
2 0 0 0

Course Objectives:

- To understand the nuances of language and vocabulary in writing a Research Paper.
- To develop the content, structure and format of writing a research paper.
- To give the practice of writing a Research Paper.
- To enable the students to evolve original research papers without subjected to plagiarism.

UNIT I:
ACADEMIC WRITING: What is Research? - Meaning & Definition of a research paper– Purpose of a research paper – Scope – Benefits – Limitations – outcomes.

UNIT II:
RESEARCH FORMAT: Title – Abstract – Introduction – Discussion - Findings – Conclusion – Style of Indentation – Font size/Font types – Indexing – Citation of sources.

UNIT III:
RESEARCH METHODOLOGY: Methods (Qualitative – Quantitative) – Literature Review – Who did what – Criticizing, Paraphrasing & Plagiarism.

UNIT IV:
PROCESS OF WRITING A RESEARCH PAPER: Choosing a topic - Thesis Statement – Outline – Organizing notes - Language of Research – Word order, Paragraphs – Writing first draft – Revising/Editing - Typing the final draft

UNIT V:
HOW TO & WHERE TO GET PUBLISHED: Reputed Journals – National/International – ISSN No, No. of volumes, Scopes Index/UGC Journals – Free publications - Paid Journal publications – /Advantages/Benefits

TEXT BOOKS:

1. MLA Hand book for writers of Research Papers, East West Press Pvt. Ltd, New Delhi, 7th Edition.
2. C. R Kothari, Gaurav, Garg, Research Methodology Methods and Techniques, New Age International Publishers. 4th Edition.
3. Lauri Rozakis, Schaum's Quick Guide to Writing Great Research Papers, Tata McGraw Hills Pvt. Ltd, New Delhi.
4. N. Gurumani, Scientific Thesis Writing and Paper Presentation, MJP Publishers

REFERENCES:

1. NPTEL: https://onlinecourses.nptel.ac.in/noc18_mg13/preview

Course Outcomes:
After the completion of this course, the students should be able to

- Understand the nuances of language and vocabulary in writing a Research Paper

- Develop the content, structure and format of writing a research paper
- Analyze and practice writing a Research Paper
- Enable the students to plan for original research papers without subjected to plagiarism

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18MC01)RESEARCH METHODOLOGY

M. Tech: I-Semester **L T P C**
2 0 0 2

Prerequisites: English

Course Objectives:

- To develop an understanding of IPR/ research methodology in the process of creation of patents through research.
- To develop further research capabilities.
- To learn better report writing skills and Patenting.

UNIT I:

RESEARCH METHODOLOGY: Objectives and Motivation of Research, Significance of Literature review, Types of Research, Research Approaches, and Research Methods verses Methodology, Research and Scientific Method, Importance of Research Methodology, Research Process, Criteria of Good Research.

UNIT II:

RESEARCH DESIGN: Meaning of Research Design, Need of Research Design, Feature of a Good Design Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Data collection methods, Collection of primary data, Secondary data, Data organization, Methods of data grouping, Diagrammatic representation of data, Graphic representation of data.

UNIT III:

RESEARCH REPORT WRITING: Format of the Research report, Synopsis, Dissertation, References/Bibliography/ Webliography, Research Proposal Preparation: Writing a Research Proposal and Research Report, Writing Research Grant Proposal.

UNIT IV:

NATURE OF INTELLECTUAL PROPERTY: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

UNIT V:

PATENT RIGHTS: Scope of Patent Rights. Licensing and transfer of technology. Patentinformation and databases. New Developments in IPR: Administration of Patent System.

TEXT BOOKS:

1. C.R Kothari, "Research Methodology, Methods & Technique". New Age International Publishers, 2004.
2. R. Ganesan, "Research Methodology for Engineers", MJP Publishers, 2011.
3. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", Aspen Publishers, 2016.
4. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008.
5. Satarkar, S.V,."Intellectual property rights and copy right". ESS Publications, 2000.

REFERENCES:

1. Ranjit Kumar, "Research Methodology: A Step by Step Guide for beginners", SAGE Publications Ltd.
2. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007

COURSE OUTCOMES:

Upon completion of this course, students should demonstrate the ability :

- Develop an understanding of IPR/ research methodology in the process of creation of patents through research.
- Develop further research capabilities.
- Design Important Concepts Related to Research Design.
- Learn better report writing skills and Patenting.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM09)ADVANCED COMMUNICATION LABORATORY

M. Tech: I-Semester **L T P C**
0 0 4 2

Course Objectives:

- To provide an introduction in designing of the physical layer in a communication system.
- To design and analyze various modulation and demodulation techniques.
- To select coding technique for efficient transmission and reception and to provide required security.
- To specify the communication system for a given requirement.

Note: Minimum of 10 Experiments have to be conducted

1. Determination of output of convolution Encoder/Decoder for a given sequence.
2. Determination of BER using CDMA Trainer kit.
3. Design of FSK system.
4. BPSK Modulation and Demodulation techniques.
5. QPSK Modulation and Demodulation techniques.
6. DQPSK Modulation and Demodulation techniques.
7. 8-QAM Modulation and Demodulation techniques.
8. Determination of Losses in Optical fiber.
9. Characteristics of LASER diode.
10. Characteristics of LED diode.
11. Determination of parameters using global positioning system trainer.
12. Study of serial communication using communication module.

COURSE OUTCOMES:
After the completion of this course, the students should be able to

- Design the physical layer in a communication system.
- Demonstrate various modulation and demodulation techniques.
- Analyze To select coding technique for efficient transmission and reception and to provide required security.
- To simplify the communication system for a given requirement

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM10) ADVANCED DATA COMMUNICATION AND NETWORK LABORATORY

M.Tech: I-Semester **L T P C**
0 0 4 2

Course Objectives:

- To impart practical working knowledge of Wireless Communication Simulation and Analysis using Mathematical computing languages such as MATLAB.
- To Solve and Analyze Communication Channels, Circuits and Applications by writing Mathematical Equations and Programs.
- To develop hands on working experience with reference to simulating wireless networks using MATLAB environment.

Note: Minimum of 10 Experiments have to be conducted using MATLAB

1. Simulation of output of convolution Encoder for a given sequence.
2. Simulation of output of convolution Decoder for a given sequence.
3. Implementation of Matched Filters.
4. Optimum receiver for the AWGN channel.
5. Simulation of PSK system with M=4
6. Simulation of DPSK system with M=4
7. Performance evaluation of simulated CDMA system.
8. Measurement of Bit Error Rate using Binary Data.
9. Verification of minimum distance in Hamming code.
10. Simulation of adaptive linear equalizer.
11. Simulation of OFDM transmitter and receiver

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- To analyze practical working knowledge of Wireless Communication Simulation and Analysis using Mathematical computing languages such as MATLAB.
- To Solve and Analyze Communication Channels, Circuits and Applications by writing Mathematical Equations and Programs.
- To Demonstrate various codes like hamming code.
- To develop hands on working experience with reference to simulating wireless networks using MATLAB environment

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM11) ADVANCED DIGITAL SIGNAL PROCESSING

M.Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course serves Multistage Implementation of Sampling Rate Conversion and Filter design.
- This course provides an interfacing of digital systems with different sampling rates and transmultiplexers Over Sampling A/D and D/A Conversion.
- This course serves the non-parametric methods of power spectral estimation using Bartlett, Welch & Blackman-Tukey methods.
- This course serves the Forward prediction error, Backward prediction error, Reflection coefficients for lattice realization
- This course provides the relation between auto correlation & model parameters, AR Models - Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation

UNIT –I:
Review of DFT, FFT, IIR Filters and FIR Filters:
Multi Rate Signal Processing: Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Multistage Implementation of Sampling Rate Conversion, Filter design & Implementation for sampling rate conversion.

UNIT –II:
Applications of Multi Rate Signal Processing: Design of Phase Shifters, Interfacing of Digital Systems with Different Sampling Rates, Implementation of Narrow Band Low Pass Filters, Implementation of Digital Filter Banks, Sub band Coding of Speech Signals, Quadrature Mirror Filters, Trans-multiplexers, Over Sampling A/D and D/A Conversion.

UNIT -III:
Non-Parametric Methods of Power Spectral Estimation: Spectra from finite duration observation of signals, Non-parametric Methods: Bartlett, Welch & Blackman-Tukey methods, Comparison of all Non-Parametric methods

UNIT –IV:
Implementation of Digital Filters: Introduction to filter structures (IIR & FIR), Frequency sampling structures of FIR, Lattice structures, Forward prediction error, Backward prediction error, Reflection coefficients for lattice realization, Implementation of lattice structures for IIR filters, Advantages of lattice structures.

UNIT –V:
Parametric Methods of Power Spectrum Estimation: Autocorrelation & Its Properties, Relation between auto correlation & model parameters, AR Models - Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation, Finite word length effect in IIR digital Filters – Finite word-length effects in FFT algorithms.

TEXT BOOKS:
1. Digital Signal Processing: Principles, Algorithms & Applications - J.G.Proakis & D. G. Manolakis, 4th Ed., PHI.
2. Discrete Time Signal Processing - Alan V Oppenheim & R. W Schaffer, PHI.
3. DSP – A Practical Approach – Emmanuel C. Ifeacher, Barrie. W. Jervis, 2 ed., Pearson Education.

REFERENCE BOOKS:

1. Modern Spectral Estimation: Theory & Application – S. M .Kay, 1988, PHI.
2. Multi Rate Systems and Filter Banks – P.P.Vaidyanathan – Pearson Education.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya, 2000,TMH.
4. Digital Spectral Analysis – Jr. Marple

COURSE OUTCOMES:

- Recall basic concepts of DFT, FFT, IIR and FIR filters.
- Explain Multi Rate signal processing and their applications..
- Distinguish the non-parametric methods of power spectral estimation using Bartlett, Welch & Blackman-Tukey methods.
- Estimate the Forward prediction error, Backward prediction error.
- Compare auto correlation & model parameters

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM12) WIRELESS COMMUNICATION

M.Tech: II Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves The Cellular Concept-System Design Fundamentals such as Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity.
- This course serves Mobile Radio Propagation with Large-Scale Path Loss using Knife-edge Diffraction Model, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model.
- This course provides Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Doppler Spread-Fast fading, slow fading.
- This course provides Advantages and disadvantages of Wireless Local Area Networks
- This course provides Fundamentals of Equalization and diversity in a communication Receiver.

UNIT -I:

The Cellular Concept-System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring .

UNIT –II:

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models-Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model, Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III:

Mobile Radio Propagation: Small –Scale Fading and Multipath: Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT -IV:

Equalization and Diversity: Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization- Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration- Selection Diversity, Feedback or Scanning Diversity, Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

UNIT -V:

Wireless Networks: Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper Lan, WLL.

TEXT BOOKS:

1. Wireless Communication, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI.
2. Wireless Communication-Andrea Goldsmith, 2005 Cambridge University Press.
3. Mobile Cellular Communication – Gottapu Sasibhushana Rao, Pearson Education, 2012.

REFERENCE BOOKS:

1. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, 2002, PE.
2. Wireless Digital Communication – Kamilo Feher, 1999, PHI.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.

COURSE OUTCOMES:

- Explain basic concepts of the cellular concept and Assess practical handoff considerations, interference and system capacity.
- Compare mobile radio propagation with large-scale path loss.
- Demonstrate types of Small-Scale Fading.
- Analyze the fundamentals of Equalization and diversity in a communication Receiver.
- Distinguish the advantages and disadvantages of Wireless Local Area Networks

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM13) ADVANCED COMMUNICATION AND NETWORKS
(Program Elective – III)

M. Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves the Packet Switched Networks using OSI and IP models
- This course provides functions and interfaces of ISDN and Broadband ISDN architecture and Protocols
- This course provides Main features, addressing, signaling and routing of ATM.
- This course serves Multi Protocol Label Switching (MPLS), integrated services in the Internet
- This course provides Blue Tooth Technology

UNIT I
Packet Switched Networks
OSI and IP models, Ethernet (IEEE 802.3), Token ring (IEEE 802.5), Wireless LAN (IEEE 802.11) FDDI, DQDB, SMDS: Internetworking with SMDS

UNIT II
ISDN And Broadband ISDN
ISDN - overview, interfaces and functions, Layers and services - Signaling System 7 (SS7)- Broadband ISDN architecture and Protocols.

UNIT III
ATM And Frame Relay
ATM: Main features-addressing, signaling and routing, ATM header structure-adaptation layer, management and control, ATM switching and transmission. Frame Relay: Protocols and services, Congestion control, Internetworking with ATM, Internet and ATM, Frame relay via ATM.

UNIT IV
Advanced Network Architecture
IP forwarding architectures overlay model, Multi Protocol Label Switching (MPLS), integrated services in the Internet, Resource Reservation Protocol (RSVP), Differentiated services

UNIT V
Blue Tooth Technology
The Blue tooth module-Protocol stack Part I: Antennas Radio interface, Base band, The Link controller, Audio, The Link Manager, The Host controller interface; The Blue tooth module-Protocol stack Part I: Logical link control and adaptation protocol, RFCOMM, Service discovery protocol, Wireless access protocol, Telephony control protocol.

TEXT BOOK
1. William Stallings, ”ISDN and Broadband ISDN with Frame Relay and ATM”, 4th edition, Pearson education Asia, 2002.

REFERENCE BOOKS

1. Jennifer Bray and Charles F.Sturman,"Blue Tooth" Pearson education Asia, 2001.
2. Sumit Kasera, Pankaj Sethi, "ATM Networks ", Tata McGraw-Hill, New Delhi, 2000.
3. Rainer Handel, Manfred N.Huber and Stefan Schroder ,"ATM Networks",3rd edition, Pearson education asia,2002.
4. Jean Walrand and Pravin varaiya ,"High Performance Communication networks",2nd edition, Harcourt and Morgan Kauffman,London,2000.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Recall the basic concepts of Packet Switched Networks using OSI and IP models.
- Study Function of ISDN and Broadband ISDN architecture and Protocols
- Explain the main features, addressing, signaling and routing of ATM.
- Understand the concepts of Multi Protocol Label Switching (MPLS) and integrated services in the Internet.
- Assess Blue Tooth Technology.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM14)EMBEDDED SYSTEMS DESIGN
(Program Elective – III)

M.Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course provides the Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.
- This course serves ROM, RAM, Memory according to the type of Interface
- This course serves Embedded Firmware Design Approaches and Development Languages.
- This course provides RTOS Based Embedded System Design
- This course provides Shared Memory, Message Passing, Remote Procedure Call and Sockets in TASK communication.

UNIT -I:
Introduction to Embedded Systems
Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT -II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS)
Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT -III:
Embedded Firmware:
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV:
RTOS Based Embedded System Design:
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT -V:
Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets,
Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCE BOOKS:

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Explain the Characteristics and Quality Attributes of Embedded Systems.
- Discuss core of embedded system and memory and compare ROM, RAM, Memory according to the type of Interface
- Develop Embedded Firmware Design Approaches.
- Assess RTOS architecture and its applications.
- Classify Shared Memory, Message Passing, Remote Procedure Call and Sockets in TASK communication.
- Distinguish multitasking and multiprocessing task.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM15)OPTICAL COMMUNICATION TECHNOLOGY
(Program Elective – III)

M. Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course provides the Geometrical Optics approach and Wave Theory approach, Loss and Bandwidth, Chromatic Dispersion.
- This course serves the Fiber Optic Components such as Couplers, Isolators and Circulators, Multiplexers, Bragg Gratings used for Communication & Networking
- This course serves Dispersion Limitations and Compensation Techniques.
- This course provides Subcarrier Modulation and Reed- Solomon Codes for Error Detection and Correction.
- This course provides Limitation in High Speed and WDM Systems due to Non-linearities in Fibers

UNIT –I:
Signal Propagation in Optical Fibers: Geometrical Optics approach and Wave Theory approach, Loss and Bandwidth, Chromatic Dispersion, Non Linear effects- Stimulated Brillouin and Stimulated Raman Scattering, Propagation in a Non-Linear Medium, Self Phase Modulation and Cross Phase Modulation, Four Wave Mixing, Principle of Solitons.

UNIT –II:
Fiber Optic Components for Communication & Networking: Couplers, Isolators and Circulators, Multiplexers, Bragg Gratings, Fabry-Perot Filters, Mach Zender Interferometers, Arrayed Waveguide Grating, Tunable Filters, High Channel Count Multiplexer Architectures, Optical Amplifiers, Direct and External Modulation Transmitters, Pump Sources for Amplifiers, Optical Switches and Wavelength Converters.

UNIT –III:
Modulation and Demodulation: Signal formats for Modulation, Subcarrier Modulation and Multiplexing, Optical Modulations – Duobinary, Single Side Band and Multilevel Schemes, Ideal and Practical receivers for Demodulation, Bit Error Rates, Timing Recovery and Equalization, Reed-Solomon Codes for Error Detection and Correction.

UNIT -IV:
Transmission System Engineering: System Model, Power Penalty in Transmitter and Receiver, Optical Amplifiers, Crosstalk and Reduction of Crosstalk, Cascaded Filters, Dispersion Limitations and Compensation Techniques.

UNIT –V:
Fiber Non-linearities and System Design Considerations: Limitation in High Speed and WDM Systems due to Non-linearities in Fibers, Wavelength Stabilization against Temperature Variations, Overall System Design considerations – Fiber Dispersion, Modulation, Non-Linear Effects, Wavelengths, All Optical Networks.

TEXT BOOKS:

1. Optical Networks: A Practical Perspective - Rajiv Ramaswami and Kumar N.Sivarajan, 2nd Ed., 2004, Elsevier Morgan Kaufmann Publishers.
2. Optical Fiber Communication – Gerd Keiser, 3rd Ed., 2000, McGraw Hill.

REFERENCE BOOKS:

1. Optical Fiber Communication: Principles and Practice – John.M.Senior, 2nd Ed., 2000, PE.
2. Fiber Optics Communication – Harold Kolimbris, 2nd Ed., 2004, PEI
3. Optical Networks: Third Generation Transport Systems – Uyless Black, 2nd Ed., 2009, PEI.
4. Optical Fiber Communication – Govind Agarwal, 2nd Ed., 2004, TMH.
5. Optical Fiber Communication and Its Applications – S.C.Gupta, 2004, PHI.

COURSE OUTCOMES:

- Explain the basic concept of the Geometrical Optics approach.
- Classify the Fiber Optic Components for communication and networking.
- Distinguish Modulation and Demodulation and Estimate the Reed- Solomon Codes for Error Detection and Correction.
- Understand the basic concept of transmission system model .
- Analyze Fibre Non-linearities and system Design considerations.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM16)WIRELESS MIMO COMMUNICATION
(Program Elective – IV)

M.Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course provides the fading channel and diversity techniques.
- This course serves the Constrained signaling for MIMO Communication.
- This course serves Representation of space-time trellis codes for PSK constellation
- This course provides concatenated codes & iterative decoding
- This course provides space time block codes for frequency selective fading channels

UNIT -I:
FADING CHANNEL AND DIVERSITY TECHNIQUES
Wireless channels – Error/Outage probability over fading channels – Diversity techniques – Channel coding as a means of time diversity – Multiple antennas in wireless Communication.
UNIT -II:
CAPACITY AND INFORMATION RATES OF MIMO CHANNELS
Capacity and Information rates of noisy, AWGN and fading channels – Capacity of MIMO channels – Capacity of non-coherent MIMO channels – Constrained signaling for MIMO Communication.
UNIT -III:
SPACE TIME BLOCK AND TRELLIS CODES:
Transmit diversity with two antennas: The Alamouti scheme – Orthogonal and Quasi-orthogonal space time block codes – Linear dispersion codes – Generic space-time trellis codes – Basic space-time code design principles – Representation of space-time trellis codes for PSK constellation – Performance analysis for space-time trellis codes – Comparison of space-time block and trellis codes.
UNIT -IV:
CONCATENATED CODES & ITERATIVE DECODING
Development of concatenated codes – Concatenated codes for AWGN and MIMO channels – Turbo coded modulation for MIMO channels – Concatenated space-time block coding.
UNIT -V:
SPACE TIME BLOCK CODES FOR FREQUENCY SELECTIVE FADING CHANNELS
MIMO frequency-selective channels – Capacity and Information rates of MIMO FS fading channels – Space - time coding and Channel detection for MIMO FS channels – MIMO OFDM systems.

REFERENCE BOOKS

1. Tolga M. Duman and Ali Ghrayeb, "Coding for MIMO Communication systems", John Wiley & Sons, West Sussex, England, 2007.
2. A.B. Gershman and N.D. Sidiropoulus, "Space-time processing for MIMO Communication", Wiley, Hoboken, NJ, USA, 2005.
3. E.G. Larsson and P. Stoica, "Space-time block coding for Wireless Communication", Cambridge University Press, 2003.
4. M. Janakiraman, "Space-time codes and MIMO systems", Artech House, 2004.
5. H. Jafarkhani, "Space-time coding: Theory & Practice", Cambridge University Press, 2005.

COURSE OUTCOMES:
After the completion of this course, the students should be able to

- Understand the fading channel and diversity techniques.
- Compare the Constrained signaling for MIMO channels.

- Develop Representation of space-time trellis codes for PSK constellation
- Analyze the concatenated codes & iterative decoding
- Develop Representation of space-time block codes

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM17) WIRELESS LANS AND PANS
(Program Elective – IV)

M. Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:

1. This course provides an Introduction from 1G to 4G Wireless systems and The Wireless Spectrum.
2. This course serves an importance of Wireless LANs and comparison of wired and Wireless LANs
3. This course serves Network Architecture using Physical layer and The Medium Access Control Layer and issues.
4. This course provides importance of Wireless PANs and The Bluetooth technology
5. This course provides The IEEE 802.15 working Group for WPANs

UNIT –I:
Wireless System & Random Access Protocols:
Introduction, First and Second Generation Cellular Systems, Cellular Communication from 1G to 3G, Wireless 4G systems, The Wireless Spectrum; Random Access Methods: Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA).

UNIT –II:
Wireless LANs:
Introduction, importance of Wireless LANs, WLAN Topologies, Transmission Techniques: Wired Networks, Wireless Networks, comparison of wired and Wireless LANs; WLAN Technologies: Infrared technology, UHF narrowband technology, Spread Spectrum technology

UNIT –III:
The IEEE 802.11 Standard for Wireless LANs:
Network Architecture, Physical layer, The Medium Access Control Layer; MAC Layer issues: Hidden Terminal Problem, Reliability, Collision avoidance, Congestion avoidance, Congestion control, Security, The IEEE 802.11e MAC protocol

UNIT –IV:
Wireless PANs:
Introduction, importance of Wireless PANs, The Bluetooth technology: history and applications, technical overview, the Bluetooth specifications, piconet synchronization and Bluetooth clocks, Master-Slave Switch; Bluetooth security; Enhancements to Bluetooth: Bluetooth interference issues, Intra and Inter Piconet scheduling, Bridge selection, Traffic Engineering, QoS and Dynamics Slot Assigment, Scatternet formation.

UNIT –V:
The IEEE 802.15 working Group for WPANs:
The IEEE 802.15.3, The IEEE 802.15.4, ZigBee Technology, ZigBee components and network topologies, The IEEE 802.15.4 LR-WPAN Device architecture: Physical Layer, Data Link Layer, The Network Layer, Applications; IEEE 802.15.3a Ultra wideband.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks - Carlos de Morais Cordeiro and Dharma Prakash Agrawal, World Scientific, 2011.
2. Wireless Communication and Networking - Vijay K.Garg, Morgan Kaufmann Publishers, 2009.

REFERENCE BOOKS:

1. Wireless Networks - Kaveh Pahlaram, Prashant Krishnamurthy, PHI, 2002.
2. Wireless Communication- Marks Ciampor, Jeorge Olenewa, Cengage Learning, 2007.

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Recall an Introduction from 1G to 4G Wireless systems and The Wireless Spectrum and understand ALOHA and CSMA/CD ,CSMA/CA.
- Explain the importance of Wireless LANs and Compare wired and Wireless LANs
- Demonstrate Network Architecture using Physical layer and The Medium Access Control Layer.
- Assess the importance of Wireless PANs and The Bluetooth technology
- Understand the concepts of IEEE 802.15 standards.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM18)SOFTWARE DEFINED RADIO
(Program Elective – IV)

M. Tech: II-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course provides design Principles of Software Radio and RF Implementation issues such as RF Front – End and Dynamic Range
- This course serves Profile and Radio Resource Management
- This course serves Radio Resource Management in Heterogeneous Networks
- This course provides Reconfiguration of Base Stations and Mobile Terminals in networks
- This course provides Object – Oriented Representation of Radios and Network Resources and Case Studies in Software Radio Design

UNIT -I:

Introduction: The Need for Software Radios, What is Software Radio, Characteristics and benefits of software radio- Design Principles of Software Radio, RF Implementation issues- The Purpose of RF Front – End, Dynamic Range- The Principal Challenge of Receiver Design – RF Receiver Front-End Topologies- Enhanced Flexibility of the RF Chain with Software Radios- Importance of the Components to Overall Performance- Transmitter Architectures and Their Issues- Noise and Distortion in the RF Chain, ADC and DAC Distortion.

UNIT -II:

Profile and Radio Resource Management : Communication Profiles- Introduction, Communication Profiles, Terminal Profile, Service Profile , Network Profile, User Profile, Communication Profile Architecture, Profile Data Structure, XML Structure, Distribution of Profile Data, Access to Profile Data, Management of Communication Profiles, Communication Class marks, Dynamic Class marks for Reconfigurable Terminals, Compression and Coding, Meta Profile Data

UNIT -III:

Radio Resource Management in Heterogeneous Networks

Introduction, Definition of Radio Resource Management, Radio Resource Units over RRM Phases, RRM Challenges and Approaches, RRM Modeling and Investigation Approaches, Investigations of JRRM in Heterogeneous Networks, Measuring Gain in the Upper Bound Due to JRRM, Circuit-Switched System, Packet-Switched System, Functions and Principles of JRRM, General Architecture of JRRM, Detailed RRM Functions in Sub-Networks and Overall Systems

UNIT -IV:

Reconfiguration of the Network Elements : Introduction, Reconfiguration of Base Stations and Mobile Terminals, Abstract Modeling of Reconfigurable Devices, the Role of Local Intelligence in Reconfiguration, Performance Issues, Classification and Rating of Reconfigurable Hardware, Processing Elements, Connection Elements, Global Interconnect Networks, Hierarchical Interconnect Networks, Installing a New Configuration, Applying Reconfiguration Strategies, Reconfiguration Based on Comparison, Resource Recycling, Flexible Workload Management at the Physical Layer, Optimized Reconfiguration, Optimization Parameters and Algorithms, Optimization Algorithms, Specific Reconfiguration Requirements, Reconfiguring Base Stations, Reconfiguring Mobile Terminals

UNIT -V:

Object – Oriented Representation of Radios and Network Resources:
Networks- Object Oriented Programming- Object Brokers- Mobile Application Environments- Joint Tactical Radio System.

Case Studies in Software Radio Design: Introduction and Historical Perspective, SPEAK easy-JTRS, Wireless Information Transfer System, SDR-3000 Digital Transceiver Subsystem, Spectrum Ware, CHARIOT.

TEXT BOOKS:

1. Software Defined Radio Architecture System and Functions- Markus Dillinger, Kambiz Madani, WILEY 2003
2. Software Defined Radio: Enabling Technologies- Walter Tuttle Bee, 2002, Wiley Publications.

REFERENCE BOOKS:

1. Software Radio: A Modern Approach to Radio Engineering - Jeffrey H. Reed, 2002, PEA Publication.
2. Software Defined Radio for 3G - Paul Burns, 2002, Artech House.
3. Software Defined Radio: Architectures, Systems and Functions - Markus Dillinger, Kambiz Madani, Nancy Alonistioti, 2003, Wiley.
4. Software Radio Architecture: Object Oriented Approaches to wireless System Enginering – Joseph Mitola, III, 2000, John Wiley & Sons.

COURSE OUTCOMES:
After the completion of this course, the students should be able to

- Explain basic design principles of software radio and RF implementation issues such as RF Front – End and Dynamic Range.
- Understand the concepts of Profile and Radio Resource Management
- Demonstrate Radio Resource Management in Heterogeneous Networks
- Describe the importance of Base Stations and Mobile Terminals in networks
- Analyze Object – Oriented Representation of Radios and Network Resources

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18AC02)STRESS MANAGEMENT

M. Tech: II-Semester **L T P C**
2 0 0 0

Course Objectives:

- This course provides understanding stress such as work related stress and individual stress
- This course serves time management such as importance of planning the day and developing concentration
- This course serves career plateau such as Identifying Career plateaus and Structural and Content Plateauing and Making a fresh start
- This course provides controlling crisis management
- This course provides self development

UNIT -I:

UNDERSTANDING STRESS

Meaning – Symptoms – Work Related Stress – Individual Stress – Reducing Stress -sources of stress –consequence of stress-burnout-symptoms of Burnout- stress verses Burnout-model of stress-strategies for coping stress (individual and organizational strategies) –case study

UNIT -II:

TIME MANAGEMENT

Techniques – Importance of Planning the day –developing concentration – Prioritizing Beginning at the start – Techniques for conquering procrastination – Sensible delegation – Taking the right breaks – Learning to say "No"

UNIT -III:

CAREER PLATEAU

Career plateau – Identifying Career plateaus – Structural and Content - Plateauing – Making a fresh start – Importance of Sabbaticals – Counseling out – Executive leasing – Sustaining a marketable Career.

UNIT -IV:

CRISIS MANAGEMENT

Implications – People issues – Structure issues – Environmental issues – Learning to keep calm - Preventing interruptions – Controlling crisis – Pushing new ideas – Empowerment – Work place Humour, Developing a sense of Humour – Learning to laugh – role of group cohesion and team spirit.

UNIT -V:

SELF DEVELOPMENT

Improving personality – Leading with Integrity – Enhancing Creativity – Effective decision making – Sensible Communication – The Listening Game – Managing Self – Mediation for peace – Yoga for Life

TEXT BOOKS

1. Bhatia R.L., The Executive Track: An Action Plan for Self Development Wheeler Publishing, New Delhi
2. Charavathy.S.K, "Human Values for Manager", McGraw Hill/Henely Management Series

REFERENCES

1. Jeffr Davison, Managing Stress, Prentice Hall of India, New Delhi
2. Jerrold S Greenberg, Comprehensive Stress Management, Jain Books, 2009

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Enhance the Physical strength and flexibility.
- Learn to relax and focus.
- Relieve physical and mental tension
- Improve work performance/ efficiency.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM19)FORMATTING AND ANALYSIS LABORATORY

M. Tech: II-Semester **L T P C**
0 0 4 2

Course Objectives:

- To use LaTeX and its related components and various templates acquired from the course to format documents, presentations and reports.
- To use and Use various methods to either create or import graphics into a LaTeX document.
- To develop hands on working experience with mathtype equation editor in order to be able to type mathematical expressions fast and correctly.
- To provide sufficient familiarity with gnuplot to plot simple 2D/3D graphs of data generated by other programs.

Note: Minimum of 10 Experiments have to be conducted

A. Latex (Formatting Tool)

1. To study the List structures in Latex
2. To study the Special lists and Customizing lists
3. To study Easy list package

B. Sage (Writing Mathematical Equations and expressions)

4. To study and explore Sage 50 software for writing equations
5. To learn how to enter information and global options
6. To create company and System date & period
7. To create equations and typical mathematical expressions
8. To create general journal and reporting

C. Gnu plot (Plotting tools)

9. To study and explore features and distribution terms in gnu plotting
10. To study GUIs and create programs that use gnuplot
11. To study programming and application interfaces

COURSE OUTCOMES:
After the completion of this course, the students should be able to

- Explain basic concepts of LaTeX and its related components
- Classify various templates acquired from the course to format documents, presentations and reports.
- Compose hands on working experience with math type equation
- Demonstrate understanding of sufficient familiarity with gnu plot to plot simple 2D/3D graphs of data generated by other programs.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM20)SIMULATION LABORATORY

M. Tech: II-Semester **L T P C**
0 0 4 2

Course Objectives:

- To apply the knowledge of Communication and networking areas to innovatively solve the problems of changing world using modern engineering tools.
- To familiarize with the syntax, semantics, data-types and library functions of numerical computing languages such as SCILAB.
- To study the applications of such language for implementation/simulation.
- To visualize basic mathematical functions relevant to electronics applications.

Note: Minimum of 10 Experiments have to be conducted using SCILAB

1. Introduction to SCILAB, overview of SCILAB, how to install SCILAB, study of advantages of SCILAB over MATLAB.
2. To study building blocks of SCILAB: The console, The editor, Docking, Using exec, Batch processing.
3. To study basic elements of the language, creating real variables, variable names
4. To study elementary mathematical functions, pre-defined mathematical variables
5. To design a program to compare parallel realization values of IIR digital filter.
6. To design a program to compare direct realization values of IIR digital filter.
7. To design FIR filters using windows technique
8. DSP program for the design of chebyshev high pass filter
9. To design digital filters (low pass, high pass, band pass, band stop)
10. DSP Program for the design of butterworth band pass analog filter
11. To design analog filters (low pass, high pass, band pass, band stop)
12. To understand sampling theorem

COURSE OUTCOMES:
After the completion of this course, the students should be able to

- Demonstrate the understanding of SCILAB
- Explain communications and networking to innovatively solve the problems of changing world using modern engineering tools.
- Build syntax, semantics, data-types and library functions of numerical computing languages such as SCILAB
- Visualize basic mathematical functions relevant to electronics applications

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM21)MINI PROJECT

M. Tech: III-Semester **L T P C**
0 0 4 2

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Use fundamental knowledge and skills in engineering and apply it effectively on a project.
- Understand the Product Development Process including budgeting through Mini Project.
- Plan for various activities of the mini project.
- Inculcate electronic hardware and software implementation skills .
- Manage any disputes and conflicts within and outside individually.
- Prepare a technical report based on the Mini project.
- Deliver technical seminar based on the Mini Project work carried out.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM22)4G & 5G TECHNOLOGIES
(Program Elective - V**)**

M. Tech: III-Semester **L T P C**
3 0 0 3

Course Objectives:
- This course provides generation of cellular systems and standards various networks and their architectures.
- This course provides LTE networks and cognitive radio
- This course serves WIMAX networks spectrum and flexibility and power level requirements

UNIT I
INTRODUCTION
Introduction: History of mobile cellular systems, First Generation, Second Generation, Generation 2.5, Overview of 3G & 4G, 3GPP and 3GPP2 standards

UNIT II
3G NETWORKS
3G Networks: Evolution from GSM, 3G Services & Applications, UMTS network structure, Core network, UMTS Radio access, HSPA – HSUPA, HSDPA, CDMA 1X , EVDO Rev -0, Rev-A, Rev-B, Rev-C Architecture, protocol stack.

UNIT III
4G LTE NETWORKS
4G Vision, 4G features and challenges, Applications of 4G, 4G Technologies – Multi carrier modulation, Smart Antenna Techniques, OFDM-MIMO Systems, Adaptive Modulation and Coding with Time-Slot Scheduler, Bell Labs Layered Space Time (BLAST) System, Software-Defined Radio, Cognitive Radio**.**

UNIT IV
WiMAX NETWORKS
WiMax: Introduction – IEEE 802.16, OFDM, MIMO, IEEE 802.20

UNIT V
SPECTRUM & PERFORMANCE
Spectrum for LTE-Flexibility-Carrier Aggregation-Multi standard Radio base stations-RF requirements for LTE-Power level requirements-Emission requirements-Sensitivity and Dynamic range-Receiver susceptibility. Performance Assessment-Performance Evaluation

REFERENCES:

1. Introduction to 3G Mobile Communication, Juha Korhonen, Artech House, (www.artechhouse.com), Jan 2003, ISBN-10: 1580535070
2. 4G LTE/LTE – Advanced for Mobile Broadband, Erik Dahlman, Stefan Parkvall, Johan Skold, Academic Press 2011.
3. 3G Evolution HSPA and LTE for Mobile Broadband, Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, Academic Press, Oct 2008, ISBN-10: 0123745381
4. UMTS Mobile Communication for the Future, Flavio Muratore, John Wiley & Sons Ltd, Jan 2001, ISBN-10: 0471498297
5. HSDPA/HSUPA for UMTS, Harri Holma and Antti Toskala, Johan Wiley & Sons Ltd, May 2006, ISBN-10: 0470018844
6. Savo G.Glisic, "Advanced Wireless Networks- 4GTechnologies", Wiley, 2006
7. Magnus Olsson, Catherine Mulligan, "EPC and 4G packet network", Elsevier 2012

COURSE OUTCOMES:

- Identify the generation wise development in the mobile cellular systems
- Analyze the Architecture and protocol of 3G networks for HSPA
- Understand the designing challenges and Multi carrier modulation in 4G LTE systems.
- Develop primary concept of WiMAX networks
- Evaluate the importance of cognitive radio for spectrum management.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM23)MOBILE COMPUTING TECHNOLOGIES
(Program Elective - V**)**

M. Tech: III-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves designing, architecture and application of mobile computing, architecture of GSM and its routing, interfaces and network aspects.
- This course provides IEEE 802.11 standards and their architectures, intelligence in networks and interfaces
- This course provides architectures of JAVA, J2ME & programming for CLDC, GUI in MIDP, SIP real time protocols and security issues in mobile computing

UNIT –I:

Introduction to Mobile Computing Architecture: Mobile Computing – Dialog Control – Networks – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Security in Mobile Computing – Architecture for Mobile Computing – Three Tier Architecture – Design considerations for Mobile Computing – Mobile Computing through Internet – Making existing Applications Mobile Enabled.

UNIT –II:

Cellular Technologies: GSM, GPS, GPRS, CDMA and 3G: Bluetooth – Radio Frequency Identification – Wireless Broadband – Mobile IP – Internet Protocol Version 6 (IPv6) – Java Card – GSM Architecture – GSM Entities – Call Routing in GSM – PLMN Interfaces – GSM addresses and Identifiers – Network aspects in GSM – Authentication and Security – Mobile computing over SMS – GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS – Spread Spectrum technology – Is-95 – CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G

UNIT –III:

Wireless Application Protocol (WAP) and Wireless LAN: WAP – MMS – Wireless LAN Advantages – IEEE 802.11 Standards – Wireless LAN Architecture – Mobility in wireless LAN
Intelligent Networks and Interworking : Introduction – Fundamentals of Call processing – Intelligence in the Networks – SS#7 Signaling – IN Conceptual Model (INCM) – soft switch – Programmable Networks – Technologies and Interfaces for IN

UNIT –IV:

Client Programming, Palm OS, Symbian OS, Win CE Architecture: Introduction – Moving beyond the Desktop – A Peek under the Hood: Hardware Overview – Mobile phones – PDA – Design Constraints in Applications for Handheld Devices – Palm OS architecture – Application Development – Multimedia – Symbian OS Architecture – Applications for Symbian, Different flavors of Windows CE -Windows CE Architecture **J2ME:** JAVA in the Handset – The Three-prong approach to JAVA Everywhere – JAVA 2 Micro Edition (J2ME) technology – Programming for CLDC – GUI in MIDP – UI Design Issues – Multimedia – Record Management System – Communication in MIDP – Security considerations in MIDP – Optional Packages

UNIT –V:

Voice Over Internet Protocol and Convergence: Voice over IP- H.323 Framework for Voice over IP – Session Initiation Protocol – Comparison between H.323 and SIP – Real Time protocols – Convergence Technologies – Call Routing – Voice over IP Applications – IP multimedia subsystem (IMS) – Mobile VoIP

Security Issues in Mobile Computing: Introduction – Information Security – Security Techniques and Algorithms – Security Protocols – Public Key Infrastructure – Trust – Security Models – Security frameworks for Mobile Environment

TEXT BOOKS:

1. Mobile Computing – Technology, Applications and Service Creation – Asoke K Talukder, Roopa R Yavagal, 2009, TATA McGraw Hill
2. Mobile Communication – Jochen Schiller – 2nd Edition – Pearson Education

REFERENCE BOOKS:

1. The CDMA 2000 System for Mobile Communication – Vieri Vaughi, Alexander Damn Jaonvic – Pearson
2. Adalestein : Fundamentals of Mobile & Parvasive Computing, 2008, TMH

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Analyze the basic function of Mobile Computing Architecture .
- Illustrate and compare the operation of various cellular technologies
- Understand the Wireless LAN Architecture and Wireless Application Protocol
- Explain the overview of the hardware structure for Client Programming .
- Analyze the challenges of designing an Internet Protocol for voice communication

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM24)ADHOC AND WIRELESS SENSOR NETWORKS
(Program Elective - V**)**

M. Tech: III-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course provides traffic profiles & challenges of mobile networks, optimized web over wireless, classification of MAC protocols, routing and transport layer solutions.
- This course provides challenges in quality of services and need for energy managements, architectures of sensor networks and evolving standards.

UNIT-I:

Ad hoc Wireless Networks – What is an Ad Hoc Network? Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communication – Types of Mobile Host Movements – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet . Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols.

Wireless Internet:

Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web Over Wireless.

UNIT-II:

AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.

MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention – Based Protocols, Contention – Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT –III:

Routing Protocols: Introduction, 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.

Transport Layer and Security Protocols: Introduction, 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 Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT –IV:

Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT –V:

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols – C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press

REFERENCE BOOKS:

1. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.
2. K.Akkaya and M.Younis, " A Survey of routing protocols in wireless sensor networks", Elsevier Adhoc Network Journal, Vol.3, no.3,pp. 325-349, 2005

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Explain the concepts of network architectures and applications of Ad Hoc wireless sensor networks
- Understand the application of different types of MAC and Ad Hoc
- Explain the challenges of routing protocols
- Evaluate the QoS related performance measurements of Ad hoc and sensor networks
- Analyze the protocol design issues of wireless sensor networks

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18CS05)SCRIPTING LANGUAGES
(Open Elective)

M. Tech: III-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course provides Working with arrays, Lists and hashes, Scripts with arguments, Using Pack and Unpack, Security issues. TCL phenomena, Control flow
- This course provides applications 'Internet-aware', 'Nuts-and-bolts' internet programming
- This course provides to understand Perl-Java Script, concepts of python.
- This course serves qualitative concepts of objects, classes and data hierarchy .

UNIT -I:
Introduction to Scripts and Scripting:
Characteristics and uses of scripting languages, Introduction to PERL, Names and values, Variables and assignment, Scalar expressions, Control structures, Built-in functions, Collections of Data, Working with arrays, Lists and hashes, Simple input and output, Strings, Patterns and regular expressions, Subroutines, Scripts with arguments.

UNIT -II:
Advanced PERL:
Finer points of Looping, Subroutines, Using Pack and Unpack, Working with files, Navigating the file system, Type globs, Eval, References, Data structures, Packages, Libraries and modules, Objects, Objects and modules in action, Tied variables, Interfacing to the operating systems, Security issues.

UNIT -III:
TCL:
The TCL phenomena, Philosophy, Structure, Syntax, Parser, Variables and data in TCL, Control flow, Data structures, Simple input/output, Procedures, Working with Strings, Patterns, Files and Pipes, Example code.

UNIT -IV:
Advanced TCL:
The eval, source, exec and up-level commands, Libraries and packages, Namespaces, Trapping errors, Event-driven programs, Making applications 'Internet-aware', 'Nuts-and-bolts' internet programming, Security issues, running untrusted code, The C interface.

UNIT -V:
TK and JavaScript:
Visual tool kits, Fundamental concepts of TK, TK by example, Events and bindings, Geometry managers, PERL-TK. JavaScript – Object models, Design Philosophy, Versions of JavaScript, The Java Script core language, Basic concepts of Python.
Object Oriented Programming Concepts (Qualitative Concepts Only): Objects, Classes, Encapsulation, Data Hierarchy.

TEXT BOOKS:

1. The World of Scripting Languages- David Barron, Wiley Student Edition, 2010.
2. Practical Programming in Tcl and Tk - Brent Welch, Ken Jones and Jeff Hobbs., Fourth edition.
3. Java the Complete Reference - Herbert Schildt, 7th Edition, TMH.

REFERENCE BOOKS:

1. Tcl/Tk: A Developer's Guide- Clif Flynt, 2003, Morgan Kaufmann SerieS.
2. Tcl and the Tk Toolkit- John Ousterhout, 2nd Edition, 2009, Kindel Edition.
3. Tcl 8.5 Network Programming book- Wojciech Kocjan and Piotr Beltowski, Packt Publishing.
4. Tcl/Tk 8.5 Programming Cookbook- Bert Wheeler

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Understanding of scripting and the contributions of scripting languages.
- Understanding of Perl especially evaluate the object oriented concepts.
- PhP basics and be exposed to create advanced applications on web applications.
- Analyze the basics of TCL and apply the logic on TCL concepts.
- Be exposed to basic applications python, create its modules and Web applications

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
(M18MA01) ADVANCED OPTIMIZATION TECHNIQUES
(Open Elective)

M. Tech: III-Semester **L T P C**
3 0 0 3

Course Objectives:

- This course serves single and multi variable optimization techniques like Fibonacci, golden section interpolation ,quadratic & cubic interpolation methods. Powell's Hook Jeeves, Rosenbrock methods.
- This course serves Geometric and Dynamic ,Linear, Integer and Stochastic Programming

UNIT- I

SINGLE VARIABLE NON-LINEAR UNCONSTRAINED OPTIMIZATION: One dimensional Optimization methods, Uni-modal function, elimination method, Fibonacci method, golden section method, interpolation methods- quadratic & cubic interpolation methods.

UNIT - II

MULTI VARIABLE NON-LINEAR UNCONSTRAINED OPTIMIZATION: Direct search method – Univariant Method – pattern search methods – Powell's – Hook – Jeeves, Rosenbrock search methods – gradient methods, gradient of function, steepest decent method, Fletcher reeves method. Variable metric method.

UNIT - III

GEOMETRIC PROGRAMMING: Polynomials – arithmetic – geometric inequality – unconstrained G.P – constrained G.P

DYNAMIC PROGRAMMING: Multistage decision process, principles of optimality, examples, conversion of final problem to an initial value problem, application of dynamic programming, production inventory. Allocation, scheduling replacement.

UNIT- IV

LINEAR PROGRAMMING: Formulation – Sensitivity analysis. Change in the constraints, cost coefficients, coefficients of the constraints, addition and deletion of variable, constraints. Simulation: Introduction – Types – Steps – application – inventory – queuing – thermal system.

UNIT- V

INTEGER PROGRAMMING: Introduction – formulation – Geometry cutting plane algorithm – Zero or one algorithm, branch and bound method.

STOCHASTIC PROGRAMMING: Basic concepts of probability theory, random variables – distributions – mean, variance, Correlation, co variance, joint probability distribution – stochastic linear, dynamic programming.

REFERENCES:

1. Optimization theory & Applications/ S.S Rao/ New Age International
2. Introductory to operation research/Kasan & Kumar/Springar
3. Optimization Techniques theory and practice / M.C Joshi, K.M Moudgalya/ Narosa Publications.
4. Operation Research/H.A. Taha/TMH
5. Optimization in operations research/R.L Rardin
6. Optimization Techniques/Benugundu & Chandraputla/Person Asia
7. Optimization Techniques /Benugundu & Chandraputla / Pearson Asia

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Apply different types of optimization techniques for different purposes.

- Formulate and solve the problems by using one dimensional unconstrained minimization methods.
- Formulate and solve the problems (industrial/research) by using the geometric programming.
- Formulate and solve the constrained minimization methods.
- Understand the importance of integer programming and solve stochastic programming

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18SE27)WASTE MANAGEMENT
(Open Elective)

M. Tech: III-Semester 1. **L T P C**
3 0 0 3

Course Objectives:

- This course provides knowledge of environment, quantity assessment of solid wastes, collection and transfer station.
- This course provides techniques to recover the resources and necessary equipments.
- This course serves the necessary equipments for disposal of solid wastes.

UNIT-I: Introduction to Environment:
Ecosystem –meaning- Types -Components- Structure – Functions, Levels of organization in nature- Food chain and Tropic structure, Biogeochemical Cycles, Energy flow.

UNIT-II: Municipal solid waste:
Definition Sources and types of solid waste- composition and its determinants of Solid waste-factors influencing generation-quantity assessment of solid wastes-methods of sampling and characterization.

UNIT – III: Collection and Transfer Collection:
Collection of Solid waste – collection services – collection system, equipments – time and frequency of collection – labour requirement – factors affecting collection – analysis of collection system – collection routes – preparation of master schedules. Transfer and Transport: Need for transfer operation – transfer stations – types – transport means and methods – location of transport stations - Manpower requirement – collection routes: Transfer stations – selection of location, types & design requirements, operation & maintenance.

UNIT-IV: Processing Techniques and Recovery of Energy:
Processing techniques – purposes mechanical volume reduction – necessary equipments – chemical volume reduction – incinerators – mechanical size reduction selection of equipments – components separation – methods – drying and dewatering. 7 Recovery of Resources, conversion products and energy recovery – recoverable materials – processing and recovery systems – incineration with heat recovery.

UNIT-V: Disposal of Solid Wastes:
Refuse disposal – various methods – incinerations – principle features of an incinerator – site selection and plant layout of an incinerator - sanitary landfill- methods of operation – advantages and disadvantages of sanitary land fill - site selection – reactions accruing in completed landfills – gas and leachate movement and control – equipments necessary.

REFERENCES:

1. George Techobanoglous et al,"Integrated Solid Waste Management" McGraw - Hill, 1993.
2. Techobanoglous Thiesen Ellasen; Solid Waste Engineering Principles and Management, McGraw - Hill 1997.

3. R.E.Landrefh and P.A.Rebers," Municipal Solid Wastes-Problems & Solutions" ,Lewis, 1997.
4. Manual on Municipal 1 Solid waste Management, CPHEEO, Ministry of Urban Development, Govt. Of. India, New Delhi, 2000. 5) Blide A.D.& Sundaresan, B.B,"Solid Waste Management in Developing Countries", INSDOC, 1993.
5. Ecology Science and Practice; Claude Fourie, Christian Ferra, Paul Medori, Tean Devaux, Oxford and IBH Publishing Co (Pvt) LTD, special Indian edition.
6. Principles of Ecology- P.S.Verma, V.K.Agarwal.S.Chand & Company (Pvt) LTD 1989.

COURSE OUTCOMES:

1. On completion of the project work students will be in a position to take up any challenging practical problem and find better solutions.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM25)DISSERTATION PHASE - I

M. Tech: III-Semester 1. **L T P C**
0 0 20 10

COURSE OUTCOMES:

- In Master's Project Phase-I, the students should select a recent topic from a reputed International Journal, preferably IEEE, ACM, Springer in the field that has direct or indirect relation to the area of specialization.
- After conducting a detailed literature survey, they should compare and analyze research work done and review recent developments in the area and prepare an initial design of the work to be carried out as Master's Project.
- It is mandatory that the students should refer National and International Journals and conference proceedings while selecting a topic for their Project.
- Emphasis should be given for introduction to the topic, literature survey, and scope of the proposed work along with some preliminary work carried out on the Project topic.

Students should submit a copy of Phase-I Project report covering the content discussed above and highlighting the features of work to be carried out in Phase-II of the Project.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(M18WM26)DISSERTATION PHASE - II

M. Tech: IV-Semester 1. **L T P C**
0 0 32 16

COURSE OUTCOMES:

After the completion of this course, the students should be able to

- Use Specialized knowledge and skills in engineering and apply it effectively on a project.
- Apply knowledge of the 'real world' situations that a professional engineer can encounter.
- Apply critical and creative thinking in the design of wireless and mobile communications projects.
- Demonstrate a sound technical knowledge of selected project topic.
- Demonstrate the skills and attitude of a professional engineer.
- Summarize an appropriate list of literature review, analyse previous work and relate them to current project.
- Deliver technical seminar based on the Project work carried out.
- Publish the conducted research work in a National / International Conference or Journal preferably IEEE, ACM, Springer and Scopus indexed/SC Indexed/ESCI.

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