



**Dr. M.G.R.**  
**EDUCATIONAL AND RESEARCH INSTITUTE**  
**UNIVERSITY**

(Decl. U/S 3 of the UGC Act 1956)

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**M. Tech COMMUNICATION SYSTEMS (Full Time)**  
**Curriculum and Syllabus**  
**2013 Regulation**

<b>I SEMESTER</b>						
<b>S.No</b>	<b>Subject Code</b>	<b>Title of the Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	MMA130006	Applied Mathematics for Electronic Engineers	3	1	0	4
2	MEC13C001	High Performance Networks	3	0	0	3
3	MEC13C002	Mobile Communication	3	0	0	3
4	MEC13C003	Optical Communication Systems and Networks	3	0	0	3
5	MEC13C004	Advanced Engineering Electromagnetic and Radiating System	3	0	0	3
6	MEC13V001	VLSI Architecture and Design Methodologies	3	1	0	4
7	MEC13CL01	Communication Engineering Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>2</b>	<b>3</b>	<b>22</b>

<b>II SEMESTER</b>						
<b>S.No</b>	<b>Subject Code</b>	<b>Title of the Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	MEC13C005	Communication Network Security	3	0	0	3
2	MEC13V005	Embedded System	3	0	0	3
3	MEC13A001	Advanced Digital Signal Processing	3	0	0	3
4	MEC13C006	Spread Spectrum Communication	3	0	0	3
5	MEC13C007	Satellite Communication Systems	3	0	0	3
6	MEC13CEXX	Elective – I	3	0	0	3
7	MEC13AL02	Term Paper	0	3	0	2
8	MEC13CL02	Cadence & Arm Processor Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>3</b>	<b>22</b>

<b>III SEMESTER</b>						
<b>S.No</b>	<b>Subject Code</b>	<b>Title of the Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	MEC13C008	Electro Magnetic Interference & Compatibility in System Design	3	0	0	3
2	MEC13C009	Soft Computing	3	0	0	3
3	MEC13CEXX	Elective – II	3	0	0	3
4	MEC13CEXX	Elective – III	3	0	0	3
5	MEC13CL03	Project Phase – I	0	0	9	4
<b>TOTAL</b>			<b>12</b>	<b>0</b>	<b>9</b>	<b>16</b>

<b>IV SEMESTER</b>						
<b>S.No</b>	<b>Subject Code</b>	<b>Title of the Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	MEC13CL04	Project Work & Viva Voce	-	-	24	15
<b>TOTAL</b>			<b>0</b>	<b>0</b>	<b>24</b>	<b>15</b>

**Total Credits: 75**

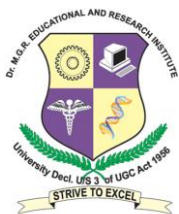


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<b>ELECTIVES</b>						
<b>S.No</b>	<b>Subject Code</b>	<b>Title of the Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	MEC13CE01	MULTIMEDIA COMPRESSION TECHNIQUES	3	0	0	3
2	MEC13A008	NEURAL NETWORKS AND ITS APPLICATIONS	3	0	0	3
3	MEC13CE02	INTERNETWORKING MULTIMEDIA	3	0	0	3
4	MEC13A004	MICROCONTROLLER BASED SYSTEM DESIGN	3	0	0	3
5	MEC13AE04	BIOMEDICAL INSTRUMENTATION	3	0	0	3
6	MEC13AE03	SYNTHESIS AND OPTIMIZATION OF DIGITAL CIRCUITS	3	0	0	3
7	MEC13CE03	SPEECH SIGNAL PROCESSING	3	0	0	3
8	MEC13AE02	MICROWAVE INTEGRATED CIRCUITS	3	0	0	3
9	MEC13A006	COMPUTER ARCHITECTURE AND PARALLEL PROCESSING	3	0	0	3
10	MEC13CE04	SIMULATION OF COMMUNICATION SYSTEMS & NETWORKS.	3	0	0	3
11	MEC13CE11	NETWORK MANAGEMENT	3	0	0	3
12	MEC13CE05	HIGH SPEED SWITCHING ARCHITECTURE	3	0	0	3
13	MEC13CE06	QUANTUM COMPUTING	3	0	0	3



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**MMA130006 APPLIED MATHEMATICS FOR ELECTRONICS ENGINEERS 3 1 0 4**  
**OBJECTIVES**

- To enable the students to learn the basic concepts of random process and special functions

**UNIT – I ADVANCED MATRIX THEORY 12 Hrs**

Generalized Eigen vectors-Jordan canonical form –Matrix Norms-QR algorithm-Pseudo Inverse-Singular value decomposition –Least Square Solutions.

**UNIT – II RANDOM PROCESS 12 Hrs**

Classification of Random Process-Stationary Process-Ergodic Process-Markov Process –Markov Chains-Auto Correlation –Auto Covariance –Cross Correlation-Cross Covariance-Spectral Density.

**UNIT – III SPECIAL FUNCTIONS 12 Hrs**

Bessel's Equation-Bessel Functions-Recurrence relations-Generating function-Orthogonal property-Legendre's equation-Legendre Polynomials- Rodrigue's formula.

**UNIT – IV CALCULUS OF VARIATIONS 12 Hrs**

Variation and its properties-Euler's equations- Functionals dependent on First and Higher Order Derivatives- Functional depend on functions of several independent variables-Problems with moving boundaries-Direct methods-Ritz and Kantorovich methods.

**UNIT – V INTEGRAL EQUATIONS 12 Hrs**

Types of Integral equations-Fredholm Integral equation-Volteera Integral equation-Green's function- Fredholm Integral equations with Separable kernels- Iterative methods solving equations of second kind- Properties of Symmetric kernels.

**Total No. of Hours: 60**

**REFERENCES:**

1. Bronson R., "Theory and problems of Matrix Operations" (Schaum's Outline Series), Mc Graw Hill,(1989)
2. Lewis D.W., "Matrix theory", Allied publishers,(1995)
3. Richard Johnson A., "Miller & Freund's Probability and Statistics for Enginners"(8th ed.) Prentice Hall of India(2009)
4. Veerarajan T., "Probability Statistics and Random Process", Tata McGraw Hill Publishing Co.,(2008)
5. Venkataraman M.K., "Higher Mathematics for Engineering and Science", The National Publishing Co.,(2006)
6. Gupta A.S., "Calculus of variations with applications", Prentice Hall of India,(2004)
7. Raisinghania M.D., "Integral Equations and Boundary Value Problems" (3<sup>rd</sup> ed), S. Chand & Co., (2010)
8. Hildebrand F.B., "Methods of Applied Mathematics", Dover Books, (1992)





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**MEC13C002                      MOBILE COMMUNICATION                      3                      0                      0                      3**

**OBJECTIVES:**

- To enable the students to learn the basic concepts of mobile communication and multiple access schemes.

**UNIT – I INTRODUCTION TO WIRELESS MOBILE COMMUNICATION                      9 Hrs**

History and evolution of mobile radio systems, Types of mobile wireless services / systems – Cellular, WLL, Paging, Satellite systems, Standards, Future trends in personal wireless systems

**UNIT –II CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS                      9 Hrs**

Cellular concept and frequency reuse, Multiple Access Schemes, Channel assignment and handoff, interference and system capacity Trunking and Erlang capacity calculations

**UNIT –III MOBILE RADIO PROPAGATION                      9 Hrs**

Radio wave propagation issues in personal wireless systems, Propagation models, Multipath fading and Baseband impulses respond models, parameters of mobile multipath channels and Antenna systems in mobile radio.

**UNIT –IV MODULATION AND SIGNAL PROCESSING                      9 Hrs**

Analog and digital modulation techniques, performance of various modulation techniques – Spectral efficiency, Error – rate, Power Amplification, Equalizing Rake receiver concepts, Diversity and space – time processing, Speech coding and channel coding

**UNIT –V SYSTEM EXAMPLES AND DESIGN ISSUES                      9 Hrs**

Multiple Access Techniques – FDMA, TDMA and CDMA systems, Operational systems, wireless networking, and design issues in personal wireless systems

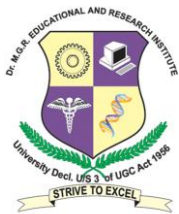
**Total No. of Periods: 45**

**REFERENCES:**

1. Schiller, "*Mobile Communication*", Pearson Education Asia Ltd., 2000
2. W.C.Y.Lee, "*Mobile Communication Engineering: Theory and Application*", Second Edition, McGraw Hill, New York, 1998.
3. T.S. Rappaport, "*Wireless Digital Communication, Principles and Practice*", Prentice Hall, NJ, 1996
4. K. Feher, "*Wireless Digital Communication*", PHI, New Delhi, 1995.







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**MEC13V001      VLSI ARCHITECTURE AND DESIGN METHODOLOGIES      3 1 0 4**  
**OBJECTIVES**

- To enable the students to absorb the concepts of different PLDs
- To enable the students to equip with the different ASIC and FPGA Techniques

**UNIT- I      CMOS DESIGN      12 Hrs**

Overview of digital VLSI design Methodologies- Logic design with CMOS-transmission gate circuits-Clocked CMOS-dynamic CMOS circuits, Bi-CMOS circuits- Layout diagram,Stick diagram-IC fabrications – Trends in IC technology.

**UNIT- II      PROGRAMABLE LOGIC DEVICES      12 Hrs**

Programming Techniques-Anti fuse-SRAM-EPROM and EEPROM technology –Re-Programmable Devices Architecture- Function blocks, I/O blocks,Interconnects,Xilinx- XC9500,Cool Runner - XC-4000,XC5200, SPARTAN, Virtex - Altera MAX 7000- Flex 10K-Stratix.

**UNIT- III ASIC CONSTRUCTION, FLOOR PLANNING, PLACEMENT AND ROUTING      12 Hrs**

System partition – FPGA partitioning – Partitioning methods- floor planning – Placement physical design flow – Global routing – Detailed routing – Special Routing- Circuit Extraction – Drc.

**UNIT - IV ANALOG VLSI DESIGN      12 Hrs**

Introduction to Analog VLSI- Design of CMOS 2stage-3 stage Op-Amp –High Speed and High Frequency Op-Amps-Super MOS-Analog Primitive Cells-Realization of Neural Networks.

**UNIT- V LOGIC SYNTHESIS AND SIMULATION      12 Hrs**

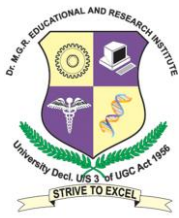
Overview Of Digital Design With Verilog HDL, Hierarchical Modelling Concepts, Modules And Port Definitions, Gate Level Modelling, Data Flow Modelling, Behavioural Modelling, Task & Functions, Verilog And Logic Synthesis-Simulation-Design Examples,Ripple Carry Adders, Carry Look Ahead Adders, Multiplier, Alu, Shift Registers, Multiplexer, Comparator, Test Bench.

**Total No. of Hrs: 45**

**REFERENCES:**

1. M.J.S Smith, “*Application Specific integrated circuits*”, Addison Wesley Longman Inc.1997.
2. Kamran Eshraghian, Douglas A.pucknell and Sholeh Eshraghian, “*Essentials of VLSI circuits and system*”, Prentice Hall India, 2005.
3. Wayne Wolf, “*Modern VLSI Designs*” Prentice Hall India, 2006.
4. Mohamed Ismail, Terri Fiez, “*Analog VLSI Signal and information Processing*”, McGraw Hill International Editions, 1994.
5. Samir Palnitkar, “*Veri Log HDL, A Design guide to Digital and Synthesis*” 2<sup>nd</sup> Ed, Pearson, 2005.



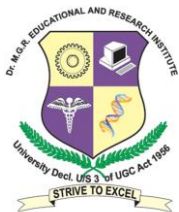


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**MEC13CL01                      COMMUNICATION ENGINEERING LABORATORY                      0 0 3 2**

**OBJECTIVES:**

- To enable the students to learn the basic concepts of filter design and signal processing applications
1. SIMULATION AND TESTING OF CONVOLUTIONAL CODES (VITERBI)
  2. SIMULATION AND TESTING OF SOURCE CODING TECHNIQUES (HUFFMAN, SHANNON – FANO)
  3. DIGITAL FILTERS -DESIGN AND REALIZATION (FIR & IIR)
  4. BASIC SIGNAL PROCESSING APPLICATIONS USING MATLAB
  5. MATLAB IMPLEMENTATION OF DIFFERENT TYPES OF LATTICE FILTERS
  6. FIBER-OPTIC LINK DESIGN
  7. FIBER-OPTIC COMPONENTS CHARACTERISTICS
  8. ANTENNA RADIATION PATTERN MEASUREMENT



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**MEC13C005                      COMMUNICATION NETWORK SECURITY                      3                      0                      0                      3**

**OBJECTIVES**

To study the various cryptographic algorithms, firewall and wireless network security concepts

**UNIT -I INTRODUCTION ON SECURITY**

**9 Hrs**

Security Goals, Types of Attacks: Passive attack, active attack, attacks on confidentiality, attacks on Integrity and availability. Security services and mechanisms, Techniques: Cryptography, Steganography, Substitution Ciphers, Transposition Ciphers, Stream and Block Ciphers.

**UNIT- II SYMMETRIC & ASYMMETRIC KEY ALGORITHM**

**9 Hrs**

Data Encryption Standards (DES), Advanced Encryption Standard (AES), RC4, Principle of asymmetric key algorithms, RSA Cryptosystem, **Case Study**: Cracking RSA public key cryptography, Kitaev's version, Message Integrity, Hash functions : SHA, Digital signatures : Digital signature standards.

**UNIT -III INTEGRITY, AUTHENTICATION AND KEY MANAGEMENT**

**9 Hrs**

Authentication Entity Authentication: Biometrics, Key management Techniques. Introduction to Quantum Cryptography. BB84, B92 protocols. Introduction to security proofs for these protocols

**UNIT- IV NETWORK SECURITY, FIREWALLS AND WEB SECURITY**

**9 Hrs**

Introduction on Firewalls, Types of Firewalls, Firewall Configuration and Limitation of Firewall. IP Security Overview, IP security Architecture, authentication Header, Security payload, security associations, Key Management. Web security requirement, secure sockets layer, transport layer security, secure electronic transaction, dual signature

**UNIT- V WIRELESS NETWORK SECURITY**

**9 Hrs**

Security Attack issues specific to Wireless systems: Worm hole, Tunneling, DoS.WEP for Wi-Fi network, Security for 4G networks: Secure Ad hoc Network, Secure Sensor Network

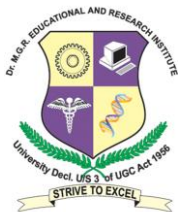
**Total No. of Hrs: 45**

**REFERENCES:**

1. Behrouz A. Fouruzan, "Cryptography and Network security" Tata McGraw- Hill, 2008
2. William Stallings, "Cryptography and Network security: principles and practice", 2nd Edition, Prentice Hall of India, New Delhi, 2002
3. Atul Kahate, "Cryptography and Network security", 2nd Edition, Tata McGraw- Hill, 2008
4. R.K. Nichols and P.C. Lekkass, "Wireless Security", Mc Graw-Hill Professional, New York, NY, USA, 2001
5. H. Yang et al., "Security in Mobile Ad Hoc Networks: Challenges and Solution", IEEE Wireless Communications, Feb. 2004.
6. Securing Ad Hoc Networks, "IEEE Network Magazine", vol. 13, no. 6, pp. 24-30, December 1999.







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**MEC13C006**

**SPREAD SPECTRUM COMMUNICATION**

**3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the concepts of spread spectrum systems and their performance metrics

**UNIT – I INTRODUCTION:**

**9 Hrs**

Communication in the presence of pulse noise jamming - Low probability detection scheme - Director Sequence Spread Spectrum (DSSS) and Frequency Hop Spread Spectrum Systems and examples of Spread Spectrum Systems

**UNIT – II PERFORMANCE CHARACTERIZATION OF DIGITAL DATA TRANSMISSION**

**9 Hrs**

Detection of binary signals in AWGN - Quadrature multiplexed signalling schemes - Signalling through band limited channels - Equalization of digital data transmission system - Realization imperfections – Degradations in performance.

**UNIT – III SPREAD SPECTRUM SYSTEMS:**

**9 Hrs**

Direct sequence spread spectrum methods employing BPSK, QPSK and MSK - Frequency Hop spread spectrum methods - Coherent slow frequency Hop technique - Non coherent slow and fast frequency Hop spread spectrum techniques - Hybrid DS/FH spread spectrum - Complex envelope representation of spread spectrum systems.

**UNIT – IV BINARY SHIFT REGISTER SEQUENCES FOR SPREAD SPECTRUM SYSTEMS: 9 Hrs**

Definition - PN sequence generator fundamentals - Maximal length sequences - Properties, Power spectrum and Polynomial tables for maximal length sequences - Gold codes - Rapid Acquisition systems - Non-linear code generators.

**UNIT – V SYNCHRONIZATION OF SPREAD SPECTRUM SYSTEMS:**

**9 Hrs**

Optimal tracking of wideband signals - Early-late tracking loops - Code tracking loops for FHSS - Optimum synchronization techniques - Multiple dwell and sequential detectors - Synchronization using a matched filter - Synchronization by estimating the received spreading code.

**Total No of Periods: 45**

**REFERENCES:**

1. Ziemer, R.E & Peterson, R.L., "*Digital Communication and Spread Spectrum Systems*", Mac millan Publishing Co., 1985.
2. Holms, J.K., "*Coherent Spread Spectrum systems*", Wiley Interscience, 1982.
3. Dixon, R.C., "*Spread Spectrum Systems*", Wiley Interscience, 1976.
4. Charles E Cook.,etal, "*Spread-Spectrum Communications*", IEEE Press, Inc, New York,





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**MEC13CL02                      CADENCE & ARM PROCESSOR LABORATORY                      0 0 3 2**

**OBJECTIVES:**

- To enable the students to learn the basic concepts of Cadence and ARM processor tools

A) Cadence

1. Differential Amplifier.
2. Common Source, Common Drain Amplifier.
3. Operational Amplifier.
4. SAR Based ADC
5. R-2R DAC
6. Combinational Circuits (Full Adder, Mux)

B) ARM Processor

1. 7 –Segment LED
2. 4x4 Keyboard Interface
3. Configure and Blink LED's
4. Serial Port Interface.



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**MEC13C008 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY IN SYSTEM DESIGN**

**3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the concepts of EMI design, measurements and control techniques

**UNIT – I EMI ENVIRONMENT**

**9 Hrs**

Sources of EMI conducted and radiated EMI, Transient EMI, EMI-EMC definitions and units of parameters. EMI Specification / Standards / Limits: Units of specification, Civilian standards Military standards.

**UNIT – II EMI COUPLING PRINCIPLES**

**9 Hrs**

Conducted, Radiated and Transient Coupling, Common impedance Ground Coupling, Radiated Common Mode and Ground Loop coupling, Radiated Differential Mode Coupling, Near Field Cable to cable coupling, Power mains and Power supply Coupling.

**UNIT – III EMI MEASUREMENTS**

**9 Hrs**

EMI Test Instruments Systems., EMI Test, EMI shielded Chamber, Open Area Test Site, TEM Cell Antennas, Conductors Sensors / Injectors / Couplers., Military Test Method and Procedures, Calibration Procedures.

**UNIT – IV EMI CONTROL TECHNIQUES**

**9 Hrs**

Shielding, Filtering, Grounding, Bonding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting.

**UNIT – V EMI DESIGN OF PCBs**

**9 Hrs**

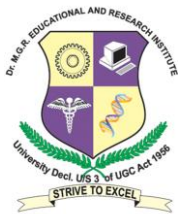
Pcb Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning Motherboard Design and Propagation Delay Performance Models.

**Total No. of Periods: 45**

**References:**

1. P.Kodali, “*Engineering EMC Principles, Measurements and Technologies*”, IEEE Press, 1996.
2. Henry W.Ott, “*Noise Reduction Techniques in Electronic Systems*”, John Wiley and Sons, New York, 1988.
3. Bernhard Keiser. “*Principles of Electromagnetic compatibility*”, Artech House, #rd Ed, 1986.





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**MEC13C009**

**SOFT COMPUTING**

**3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the concepts of fuzzy algorithms and its applications in neural networks and artificial intelligent systems.

**UNIT-I FUZZY SET THEORY**

**9 Hrs**

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

**UNIT-II OPTIMIZATION**

**9 Hrs**

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

**UNIT- III NEURAL NETWORKS**

**9 Hrs**

Supervised Learning Neural Networks – Perceptrons - Adaline – Back propagation Multilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

**UNIT -IV NEURO FUZZY MODELING**

**9 Hrs**

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

**UNIT -V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE**

**9 Hrs**

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

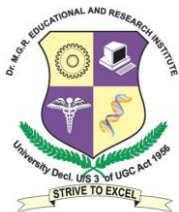
**Total No. of periods: 45**

**Reference books:**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “*Neuro-Fuzzy and Soft Computing*”, PHI, 2004, Pearson Education 2004.
2. Timothy J. Ross, “*Fuzzy Logic with Engineering Applications*”, McGraw-Hill, 1997.
3. Davis E.Goldberg, “*Genetic Algorithms: Search, Optimization and Machine Learning*”, Addison Wesley, N. Y., 1989.
4. S. Rajasekaran and G.A.V. Pai, “*Neural Networks, Fuzzy Logic and Genetic Algorithms*”, PHI, 2003.
5. R.Eberhart, P.Simpson and R.Dobbins, “*Computational Intelligence - PC Tools*”, AP Professional, Boston, 1996.







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**MEC13CE02 INTERNETWORKING MULTIMEDIA**

**3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the concepts of multimedia systems and their real-time applications

**UNIT – I INTRODUCTION**

**9 Hrs**

Digital sound, video and graphics, basic multimedia networking, multimedia characteristics, evolution of Internet services model, network requirements for audio / video transform, multimedia coding and compression for text, image, audio and video.

**UNIT – II SUBNETWORK TECHNOLOGY**

**9 Hrs**

Broadband services, ATM and IP, IPV6, High speed switching, resource reservation, Buffer management, traffic shaping, caching, scheduling and policing, throughput, delay and jitter performance.

**UNIT – III MULTICAST AND TRANSPORT PROTOCOL**

**9 Hrs**

Multicast over shared media network, multicast routing and addressing, scaping multicast and NBMS networks, Reliable transport protocols, TCP adaptation algorithm, RTP, RTCP.

**UNIT – IV MEDIA – ON – DEMAND**

**9 Hrs**

Storage and media serves, voice and video over IP, MPED – 2 over ATM/IP, indexing synchronization of requests, recording and remote control.

**UNIT – V APPLICATION**

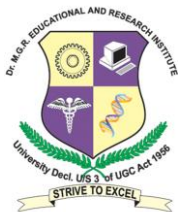
**9 Hrs**

MIME, Peer-to-peer computing, shared application, video conferencing, centralized and distributed virtual reality, lightweight session philosophy.

**Total No. of periods: 45**

**REFERENCES:**

1. Tay Vaughan, "*Multimedia Making*" it to Work, 4ed, Tata McGraw Hill, NewDelhi, 2000.
2. B.O. Szuprowicz, "*Multimedia Networking*" McGraw Hill, Newyork, 1995
3. Jon Crow Croft, Mark Handley Ian Wake Man, "*Internetworking Multimedia*", Harcourt Asia Pvt.Ltd., Singapore



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**MEC13A004 MICROCONTROLLER BASED SYSTEM DESIGN 3 0 0 3**

**OBJECTIVES**

- To enable the students to design microcontroller based embedded systems
- To enable the students to develop real-time peripheral applications

**UNIT – I 8051 MICROCONTROLLER 9 Hrs**

Intel 8051 Architecture – Hardware – I/O ports – External Memory – Counters and Timer – Serial data I/O – Interrupts, Assembly language, Addressing Modes, Instruction Set - Simple Programs, 8051 Interfacing to LCD, ADC, DAC and Stepper Motors.

**UNIT- II 68HC11 MICROCONTROLLER 9 Hrs**

Motorola 68HC11 Architecture – Input / Output Ports – Resets and Self Protection – Interrupt Timing – A/D, D/Converters.

**UNIT – III 8096 MICROCONTROLLER 9 Hrs**

Intel 8096 CPU Structure, I/O Ports – Register File – Assembly Language – Addressing modes – Instruction set – Simple Programs.

**UNIT – IV REAL TIME CONTROL PROGRAMMING 9 Hrs**

Interrupt Structure – Programmable Timers – Real Time Clock Latency – Interrupt Density and Interval Consideration, Shared Resources and Critical Regions.

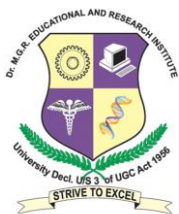
**UNIT – V SOFTWARE AND EXPANSION METHODS 9 Hrs**

Queues – Table and Strings – Program Organization – State Machines – Key Switch Parsing – Timing Consideration – UART Ports – I/P O/P Serial Ports Programmable Controllers.

**Total Number of Hours: 45**

**References:**

1. Kenneth J.Ayala, “*The 8051 Microcontroller Architecture, Programming & Applications*” – Penram International publishing (India), Second Edition, 1996.
2. Muhammed Ali Mazidi, Janice Gillies Pie Mazidi, “*The 8051 Microcontroller and Embedded Systems*”– Pearson EducationAsia.
3. PEATMAN J.B, “*Design with Microcontrollers*” – McGraw Hill Book International Ltd, Singapore, 1989.
4. Intel Manual on 16 – bit “*Embedded controllers*”, Santa Clara, 1991.



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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**MEC13AE04                      BIOMEDICAL INSTRUMENTATION                      3                      0                      0                      3**

**OBJECTIVES**

- To enable the students to learn the concepts of biomedical instruments and their applications.

**UNIT – I FUNDAMENTALS OF MEDICAL INSTRUMENTATION**

**9 Hrs**

Anatomy and physiology-Physiological system of the body-Sources of biomedical signals-  
Basic medical instrumentation system-Performance requirements of medical instrumentation system-Intelligent medical instrumentation system

**UNIT – II BIOMEDICAL RECORDERS**

**9 Hrs**

ECG-VCG-PCG-EEG-EMG-Other biomedical recorders-Biofeedback instrumentation

**UNIT – III PHYSIOTHERAPY AND ELECTROTHERAPY EQUIPMENT**

**9 Hrs**

High frequency heat therapy-Short wave diathermy-Microwave Diathermy-Ultrasonic therapy unit-  
Pain relief through electrical stimulation-Diaphragm pacing by radiofrequency.

**UNIT – IV VENTILATORS**

**9 Hrs**

Mechanics of respiration-Artificial ventilation-Ventilators and its types –Ventilator terms –Classification of ventilators-  
Humidifiers-Nebulizers-Aspirators.

**UNIT – V PATIENT SAFETY**

**9 Hrs**

Electric shock hazards-Leakage currents-Safety codes for Electro medical equipment-Electrical safety analyzer-Testing of biomedical Equipment.

**Total No. of Hours: 45**

**References:**

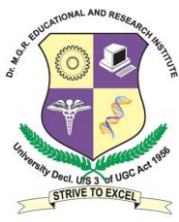
- 1 KHANDPUR, “*Handbook on Bio-medical Instrumentation*”-Tata McGraw Hill Co Ltd., 1989
- 2 LESIS CROMWELL FRED, J.WERBELL and ERICH A.PFRAFFER, “*Bio-medical Instrumentation and measurements*”- Prentice Hall of India, 1990.











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**MEC13A006      COMPUTER ARCHITECTURE AND PARALLEL PROCESSING    3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the concepts of parallel processing and their performances

**UNIT –I THEORY OF PARALLELISM**

**9 Hrs**

Parallel Computer models – the state of computing, Multiprocessors and Multicomputers and Multivectors and SIMD computers, PRAM and VLSI models, Architectural development tracks, Program and network properties – Conditions of parallelism.

**UNIT – II PARTITIONING AND SCHEDULING**

**9 Hrs**

Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures, Principles of scalable performance – performance matrices and measures, Parallel processing applications, speedup performance laws, scalability analysis and approaches.

**UNIT –III HARDWARE TECHNOLOGIES**

**9 Hrs**

Processor and memory hierarchy advanced processor technology, superscalar and vector processors, memory hierarchy technology, virtual memory technology, bus cache and shared memory – backplane bus systems, cache memory organizations, shared memory organizations, sequential and weak consistency models.

**UNIT – IV PIPELINING AND SUPERSCALAR TECHNOLOGIES**

**9 Hrs**

Parallel and scalable architectures, Multiprocessor and Multicomputers, Multivector and SIMD computers, Scalable, Multithreaded and data flow architectures.

**UNIT – V SOFTWARE AND PARALLEL PROCESSING**

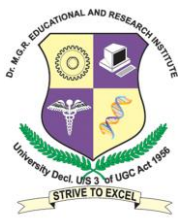
**9 Hrs**

Parallel models, Languages and compilers, Parallel program development and environments, UNIX, MACH and OSF/1 for parallel computers.

**REFERENCES:**

**Total No of Hrs: 45**

1. Kai Hwang “*Advanced Computer Architecture*”. McGraw Hill International 2001.
2. Dezsó Sima, Terence Fountain, Peter Kacsuk, “*Advanced computer Architecture – A design Space Approach*”. Pearson Education, 2003.
3. Carl Homaner, Zvonko Vranesic, Sefwat Zaky, “*Computer Organisation*”, 5<sup>th</sup> Edition, TMH, 2002.
4. David E. Culler, Jaswinder Pal Singh with Anoop Gupta “*Parallel Computer Architecture*”, Elsevier, 2004.
5. John P. Shen. “*Modern processor design Fundamentals of super scalar processors*”, Tata McGraw Hill 2003.
6. Sajjan G. Shiva “*Advanced Computer Architecture*”, Taylor & Francis, 2008.
7. V.Rajaraman, C.Siva Ram Murthy, “*Parallel Computers- Architecture and Programming*”, Prentice Hall India, 2008.
8. John L. Hennessy, David A. Petterson, “*Computer Architecture: A Quantitative Approach*”, 4<sup>th</sup> Edition, Elsevier, 2007.
9. Harry F. Jordan Gita Alaghaband, “*Fundamentals of Parallel Processing*”. Pearson Education, 2003.
10. Richard Y. Kain, “*Advanced computer architecture – A system Design Approach*”, PHI, 2003.



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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**MEC13CE04      SIMULATION OF COMMUNICATION SYSTEMS AND NETWORKS      3 0 0 3**

**OBJECTIVES**

- To enable the students to learn the basics of simulation methods of random process and queues.

**UNIT – I MODELLING OF COMMUNICAITON      9 Hrs**

Model of speech and picture signals, Pseudo noise sequences, Non-Linear sequences, Analog Channel model, Noise and fading, Digital channel model-Gilbert model of bustry channels, HF, Troposcatter and satellite channels, Switched telephone channels, Analog and Digital communication systems models, Light wave system models.

**UNIT – II SIMULATION OF RANDOM VARIABLES AND RANDOM PROCESS      9 Hrs**

Univariate and multivariate models, Transformation of random variables, Bounds and approximation, Random process models-Markov AND -ARMA Sequences, Sampling rate for simulation, Computer generation and testing of random numbers

**UNIT – III ESTIMATION OF PERFORMACNE MEASURES      9 Hrs**

Quality of an estimator, estimator of SNR, Probability density functions of analog communication system, BER of digital communication systems, Montre Carlo method and Importance sampling method, estimation of power spectral density of a process

**UNIT – IV COMMUNICATION NETWORKS      9 Hrs**

Queuing models, M/M/I and M/M/I/N queues, Little formula, Burke's theorem, M/G/I queue, Embedded Markov chain analysis fo TDM Systems, Polling, Random access systems

**UNIT – V NETWORK OF QUEUES      9 Hrs**

Queues in tandem, store and forward communication networks, capacity allocation, congestion and flow chart, Routing model, Network layout and Reliability

**Total No. of Periods: 45**

**REFERENCES:**

1. M.C. Jeuchim, Philip Balaban and K. David Kelton, “*Simulation Modeling and Analysis*”, McGraw Hill Inc., New York, 1991
2. A.M.Law and W.David Kelton, “*Simulation Modeling and Analysis*”, McGraw Hill Inc., New York, 1991
3. J.F.Hayes, “*Modelling and Analysis of Computer Communication Networks*”, Plenum Press, New York, 1984.





