

**M. Tech. Applied Electronics – Part Time
Curriculum and Syllabus- 2007**

Semester – I

Subject code	Subject	L	T	P	C
MMA101	*Applied Engineering Mathematics	3	1	---	4
MEC103	*Digital Signal Processing	3	0	---	3
MEC105	*Advanced Digital System Design	3	0	---	3

Total 10

Code	Equivalent of the previous years / Full-Time / Other departments
MMA101	MMA101
MEC103	MEC102 / MEC123
MEC105	MEC105

Semester – II

Subject code	Subject	L	T	P	C
MEC104	*Computer Communication	3	0	---	3
MEC106	*VLSI design	3	0	---	3
MEC108	*Embedded Systems	3	0	---	3

Total 9

Code	Equivalent of the previous years / Full-Time / Other departments
MEC104	MEC104
MEC106	MEC106
MEC108	MEC110

Semester – III

Subject code	Subject	L	T	P	C
MEC201	Neural Networks and its applications	3	0	---	3
MEC203	*Design and Analysis of IC's	3	0	---	3
MECEXX	*Elective – I	3	0	---	3
MEC205	*Electronic Design Laboratory	0	0	3	2

Total 11

Code	Equivalent of the previous years / Full-Time / Other departments
MEC201	MEC202 , MEC225
MEC203	MEC103
MECEXX	-----
MEC205	MEC107, MEC 207

Semester – IV

Subject code	Subject	L	T	P	C
MEC202	*Advanced Digital Signal Processing	3	0	---	3
MEC204	*VLSI Signal Processing	3	0	---	3
MECEXX	*Elective – II	3	0	---	3

Total 9

Code	Equivalent of the previous years / Full-Time / Other departments
MEC202	MEC112, MEC 212
MEC204	MEC121, MEC 224
MECEXX	-----

Semester – V

Subject code	Subject	L	T	P	C
MMG331	Engineering Management	3	0	---	3
MEC301	*Digital Control Engineering	3	0	---	3
MEC303	*Project Phase – I	---	---	24	8
MEC305	*Digital Image Processing	3	0	---	3
MEC307	*Term Paper	---	---	---	2

Total 19

Code	Equivalent of the previous years / Full-Time / Other departments
MMG331	MMG131
MEC301	MEC201
MEC303	MEC203
MEC305	MEC111 , MEC311
MEC307	MEC113 ,MEC 327

Semester – VI

Subject code	Subject	L	T	P	C
MECEXX	*Elective – III	3	0	---	3
MEC302	*Project Work & Viva Voce	---	---	42	14

Total 17

Code	Equivalent of the previous years / Full-Time / Other departments
MECEXX	-----
MEC302	MEC204 , MEC 304

* - core subjects

Total Credits: 75

L: Lecture

T: Tutorial

P: Practical

C: Credit

Electives

Electives for even semester:

- | | |
|-----------|---|
| 1. MECE50 | Modern Digital Communication Techniques |
| 2. MECE52 | Electromagnetic interference & Compatibility |
| 3. MECE54 | Microcontroller based system Design |
| 4. MECE56 | Microwave Devices & Components |
| 5. MECE58 | Soft Computing |
| 6. MECE60 | Computer Architecture and Parallel Processing |

Electives for odd semester:

- | | |
|-----------|--|
| 1. MECE51 | Computer Communication and ISDN |
| 2. MECE53 | Multimedia Compression Techniques |
| 3. MECE55 | Bio-medical Instrumentation |
| 4. MECE57 | Optical communication systems & Networks |
| 5. MECE59 | Digital Signal Processing Practice |

MMA101 APPLIED ENGINEERING MATHEMATICS 3 0 0 3
 This is equivalent to the Full-Time course : MMA101

RANDOM PROCESS 12
 Random Variables – Density & Distribution Functions, Moments, Moment Generating Functions – Two – Dimensional Random Variables – Marginal & Conditional Distribution – Random Process – Stationary & Ergodic Process – Auto Correlation Cross Correlation – Properties – Power Spectral Density.

SPECIAL FUNCTIONS 12
 Series Solutions – Bessel’s Equation – Bessel’s Functions – Legendre’s Equation – Legendre’s Polynomial – Rodrigue’s Formula – recurrence Relations – Generating functions & Orthogonal Property for Bessel’s Function of the First Kind.

CALCULUS OF VARIATIONS 12
 Introduction – Euler’s Equations – Functional Dependent on First and Second Derivatives – Brachistochrone Problem- Functional involving two or more Independent Variables – Isoperimetic Problem – variational Methods of Solving partial Differential Equations Rayleigh – Ritz Methods – Kantorovich Methods

LINEAR INTEGRAL EQUATIONS 12
 Different Types of Integral Equations – Fredholm & Volterra Integral Equations – Relation between Differential and Integral Equations – Green’s Functions – Fredholm’s Equations with Separable kernel – iterative Methods for Solving Equations of Second kind – properties of Symmetric Kernels.

UNIT – V INTRODUCTION TO FINITE ELEMENT METHOD 12
 Introduction – FEM – functions – Base Functions – Methods – of Approximation – Rayleigh – Ritz Method – Galerkin Method – Application to One – Dimensional & Two Dimensional Problem

Total No. of Hours : 60

Books for Study and Reference:

- Hildebrand, F.B. “Methods of Applied Mathematics”, PHI, New Delhi (1992)
- Elsogt.L., “Differential Equations & Calculus of Variations”, Mir Pub Moscow, (1985).
- Clarke.A.B., Disney, R.L, “Probability and Random Process”, John Wiley, (1970).
- Narayanan.S., et.al, “Advanced Mathematics for Engineering Students”, Madras (1989).
- Zienkienviez, O.C., “Finite Element Methods in Engg. Sciences”, McGraw Hill, London, (1989)
- Papoulis, “Probability, Random Variables & Stochastic Process, McGraw Hill, New York (1991)
- Petrovsky, L.G. “Lectures on Theory of Integral function”, Mit Pub. Moscow (1971)
- Andrews, L.A, “Special Functions for Scientists & Engineers”, McGraw Hill, New York, (1992)

MEC103 DIGITAL SIGNAL PROCESSING 3 0 0 3
 This is equivalent to the Full-Time course : MEC123/MEC102

DISCRETE TIME LINEAR SYSTEMS: 12
 Discrete linear systems - Time invariance - Causality, Stability, Difference Equations, Z-Transform and Inverse Z-Transform. Transfer function of linear discrete systems - Impulse response - Recursive, Non-Recursive filters - Digital filter realization - Direct, Canonic, Cascade, Parallel and Ladder realizations.

DESIGN OF DIGITAL FILTERS: 12
 Review of design techniques for analog low pass filters - Frequency transformation - Properties of IIR filters - IIR filter design - Characteristics of FIR filters with linear phase - Frequency response of linear phase FIR filters - Design of FIR filters using Window functions. Discrete Fourier Transform (DFT) - Definition - Properties - Convolution of sequences - Linear Convolution.

FFT ALGORITHMS: 12
 Introduction to Radix-2 Fast Fourier Transform (FFT) - Properties- Decimation in Time FFT- Data shuffling and bit reversal - Decimation in Frequency FFT- Algorithms of Radix-2 FFT - Computing Inverse DFT by doing a direct DFT.

EFFECTS OF FINITE REGISTER LENGTH: 5
 Effect of number representation on Quantization - Quantization in Sampling Analog signals - Finite Register - Length effects in realization of IIR digital filters - Finite register length effects in realization of FIR digital filters

POWER SPECTRUM ESTIMATION (Brief Ideas): 4
 Basic principles of Estimation Theory - Estimation of Autocovariance - Periodogram method of Power Spectral Estimation.
Total No. of Books : 45

TEXT BOOKS:

1. Oppenheim A.V., and Schaffer R.W., Buck .C, "Discrete-time Signal Processing", Prentice Hall India, 1999
2. Sanjit .K. Mitra, "Digital Signal Processing" - A computer Based Approach" - Tata McGraw Hill, 1997

REFERENCES:

1. Ludemann, L.C., "Fundamentals of Digital signal processing", John Wiley, Inc., 1992
2. Proakis J.B & Monalakis .J., "Digital Signal Processing" -Principles, Algorithm and Application Prentice Hall of India - 1998.

MEC105 ADVANCED DIGITAL SYSTEM DESIGN 3 0 0 3
 This is equivalent to the Full-Time course : MEC105

ADVANCED TOPICS IN BOOLEAN ALGEBRA 9

Shannon's expansion theorem, Consensus theorem, Octal designation, Runmeasure, INHIBIT/INCLUSION / AOI / Driver / Buffer gates, Gate expander, Reed Muller expansion, synthesis of multiple output combinational logic circuits by product map method, Design of static hazard free and dynamic hazard free logic circuits.

THRESHOLD LOGIC 9

Linear separability, Unateness, Physical implementation, Dual comparability, Reduced functions, various theorems in threshold logic, Synthesis of single gate and multigate threshold Network.

SYMMETRIC FUNCTION 9

Elementary symmetric functions, partially symmetric and totally symmetric function, Quin-Mc Cluskey decompositions method, Unity ratio symmetric ratio function, Synthesis of symmetric function by contact networks

SEQUENTIAL LOGIC CIRCUITS 9

Mealy machine, Moore machine, Trivial / Reversible / Isomorphic sequential Machines, State diagrams, State table minimization, incompletely specified sequential machines, State assignments, Design of synchronous and asynchronous sequential logic circuits working in the fundamental mode and pulse mode, Essential hazards, Unger's theorem.

PROGRAMMABLE LOGIC DEVICES 9

Basic concepts, Programming technologies, Programmable logic Element (PLE), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Structure of Standard PLD's, Complex PLD's (CPLD). System Design Using PLD's – Design of combinational and sequential circuits using PLD's, Programming PAL device using PALASM, Design of state machine using Algorithms State Machine (ASM) chart as a design tool.

Total No. of Periods: 45**Reference Books:**

1. William I. Fletcher, "AN Engineering Approach to Digital Design", Prentice Hall of India, 1996.
2. James E. Palmer, David E. Perlman, Introduction to Digital Systems", Tata McGraw Hill, 1996.
3. S.Devadas, A. Ghosh and K. Keutzer, "Logic Synthesis", McGraw Hill, 1994.
4. N.N. Biswas, "Logic Design Theory", Prentice Hall of India, 1993.

MEC104 COMPUTER COMMUNICATION 3 0 0 3
 This is equivalent to the Full-Time course : MEC104

BASICS OF NETWORKS 9

Telephone, Computer, Cable television and Wireless network, Networking principles, Service integration, Network services and layered architecture, traffic characterization and QOS. Networks services: Network elements and network mechanisms.

PACKET SWITCHED NETWORKS 9

OSI and IP models: Ethernet (IEEE 802.3): token ring (IEEE 802.5), FDDI, DQDB, frame relay: SMDS: Internetworking with SMDS, 802.11 Standards & their deployment

INTERNET AND TECP/IP NETOWRKS 9

Overview, Internet protocol: TCP/IP : performance of TCP/IP networks-circuit switched networks: SONET; DWDM, Fibre to home, DSL. Intelligent networks, CATV.

ATM AND WIRELESS NETWORKS 9

Main features – Addressing, signalling and routing: ATM head restructure – Adaption layer, management and control: BISDN; Internetworking with ATM.

OPTICAL NETWORKS AND SWITCHING 9

Optical links – WDM systems, cross – connects, optical LAN's optical paths and networks: TDS and SDS: Modular switch design Packet switching, distributed, shared, input, and output buffers.

Total No. Of Periods: 45.**Reference Books:**

1. Jean warland and Pravin Varaiya, High, Performance communication Networks, 2nd Edition, Harcourt and Morgan Kauffman, London, 2000.
2. Leon Gracia, Widjaja, Communication Networks, Tata McGraw Hill, New Delhi, 2000.
3. Behrouz.a. Forouzan, Data communication and Networking, Tata McGraw Hill, New Delhi, 2000.

MEC108 EMBEDDED SYSTEMS 3 0 0 3
 This is equivalent to the Full-Time course : **MEC110**

UNIT – I 9

Embedded Computer systems: - Applications, software issues, memory mapped architecture, 68HCII Architecture and different addressing modes, study of Intel 8051 microcontroller architecture and Instruction set

UNIT – II 9

Programming of PIC Micro controllers. Architecture of PIC Micro controllers. Instruction set of PIC micro controllers. Simple assembly language and C program for PIC microcontroller

UNIT – III					9
Software Development: - Quality programming, memory allocation, self-documenting code, Abstraction, Modular Software development Device drivers, Threads Recursion					
UNIT – IV					9
Interfacing method.					
Blind cycle counting synchronization, Gadfly Synchronization, Printer Interfacing					
Interrupt Synchronization:					
Reentrant programming, FIFO Queue, 6811 Interrupts Polled versus vectored interrupts					
Timing Generation and Measurements					
MC8811 Input capture, Period measurements, Output compare, square wave generation Frequency measurements.					
UNIT – V					9
Serial I/O devices:					
RS232 Specifications, Communication protocols, MC6811 SCI ad SPI.					
Parallel port Interfaces					
Input switches and keyboard, out put LED, Stepper motor					
Memory Interfacing					
Address switching, Memory Interface, examples for MC6H16, Introduction to High speed I/O interfacing.					
					Total No. of Periods: 45
Text Books					
1. Jonathan.W.Valvano, “Embedded Microcomputer system”, Brooks/COLE Thomson learning series					
2. John B Peatman “Design with PIC Microcontroller” Latest Edition.					
Reference Books:					
1. “Programming and customizing the Microcontroller”, Myke Predko TMH.					
MEC106	VLSI DESIGN		3	0	0
					3
	This is equivalent to the Full-Time course : MEC106				
MOS Technology and Circuits					9
Mos Technology and VLSI, Process parameters and considerations for BJT, MOS and CMOS, Electrical properties of MOS circuits and Device modeling-MOS Circuit Design Process - MOS Layers, Stick diagram Layout diagram Propagation delays, Examples of combinational logic design, Sealing of MOS circuits, Capacitance Calculations					
Digital Circuits and Systems					9
Programmable Logic Array (PLA) and Finite State Machines, Design of ALUs, Memories and Registers.					
Analog VLSI and High Speed VLSI					9
Introduction to Analog VLSI, Realisation of Neural Networks and Switched capacitor filters, sub-micron technology and GaAs VLSI technology.					
Hardware Description Languages					9
VHDL background and basic concepts, Structural specifications of hardware design organisation and parameterisation.					
VLSI Design					9
VLSI applied to communication circuits, Filter design, VLSI for RF circuits, VLSI architectures for reduced critical path & low power design					
					Total No. of Periods = 45
References					
1. Wayne Wolf, Modern VLSI Design, 2 nd Edition, Prentice Hall, 1998.					
2. Douglas A. Pucknell and Kamran Eshraghian, Basic VLSI Design Systems and circuits, Prentice Hall of India Pvt Ltd., 1993.					
3. Randall .L.Geiger and P.E.Allen, VLSI Design Techniques for Analog and Digital Circuits, McGraw Hill International Company, 1990.					
4. Amar Mukherjee, Introduction to NMOS and CMOS VLSI System Design, Prentice Hall, 1983.					
MEC201	NEURAL NETWORKS AND ITS APPLICATIONS		3	0	0
					3
	This is equivalent to the Full-Time course : MEC225/MEC202				
INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS					9
Neuro – physiology – General Processing Element – ADALINE – LMS learning rule – MADALINE – perception Networks					
BPN AND BAM					9
Back Propagation Network – Updating of output and hidden layer weights – Application of BPN – Associative memory – Bi-directional Associative Memory - Hop field memory – Traveling sales man problem					
SIMULATED ANNEALING AND CPN					9
Annealing, Boltzmann machine – Learning – Application – Counter Propagation network – Architecture – Training – Application.					
SOM AND ART					9
Self-organizing map – Learning algorithm – Feature map classifier – Applications – Architecture of Adaptive Resonance theory – Pattern matching in ART network. Neocognitron: Architecture of Neocognitron – Data processing and performance of architecture of Spacio – Temporal networks for speech recognition					
CASE STUDY:					9
1. Implementation of BPN algorithm in a computer language					
2. Application of Neural Networks for Pattern recognition, data comparison					
3. Hop field networks for an nbit A/D converter					
					Total No. of Periods : 45
Reference Books:					
1. J.A. Freeman and B.M. Skapura, “Neural Networks, Algorithms Applications and Programming Techniques”, Addison-Wesley, 1990.					
2. Laurence Fausett, “Fundamentals of Neural Networks: Architecture, Algorithms and Applications”, Prentice Hall, 1994.					

UNFOLDING: 7
Introduction - An algorithm for unfolding - Properties of unfolding - Critical path, unfolding and retiming - Application of unfolding.

FOLDING: 7
Introduction - folding Transformation - Register Minimization Techniques - Register Minimization in folded Architectures - Folding of multirate systems.

SYSTOLIC ARCHITECTURE DESIGN: 9
Introduction - systolic Array Design Methodology - FIR systolic Arrays - Selection of scheduling vector - Matrix Multiplication and 2D systolic array Design - Systolic design for space representations containing Delays .

FAST CONVOLUTION: 8
Introduction - Cook - Toom algorithm - Winogard algorithm - Iterated convolution - cyclic Convolution - Design of Fast convolution Algorithm by Inspection.

Total No. of Periods : 45

REFERENCES:

1. Keshab.K. Parhi, "VLSI Digital signal processing systems -Design and Implementations" wiley - Inter science, 1999.
2. Mohammed Ismail, Terri, Fiez, 'Analog VLSI signal and Information Processing, 1994 McGraw Hill.
3. Keshab K.Parhi, VLSI Digital signal processing systems Design and Implementation Wiley - Inter science, 1999.
4. Kung .S.Y, H.J. While house, T.Kailath, "VLSI and Modern signal processing, Prentice hall, 1985
5. Jose E. France, Yannis Tsividis "Design of Analog - Digital VLSI circuits for Telecommunications and signal processing" - Prentice Hall, 1994.

MMG331 ENGINEERING MANAGEMENT 3 0 0 3
This is equivalent to the Full-Time course : MMG331/MMG131

Operations Management: 9
Operations Management - Definition and concepts - Quality circles - Suggestion scheme for Quality improvement - Total Quality Management Concept - ISO Quality Certifications and types - Quality assurance.-Quality Audit - Hr, Six Sigma Concept, Quality function deployment.

Marketing: 9
Basic concepts of Marketing - marketing mix - new product development (Concepts & cases). Relationship marketing ,supply chain management. Product life cycle - concepts of service marketing, global marketing concepts.

Finance: 9
Basic concepts of finance - Project finance - Long term finance - short term finance working capital management - International finance - GDR - Financial forecasting - Leverage (Operating, Financial & Combined Leverages)

Managerial Effectiveness & Leadership: 9
Measuring Managerial Effectiveness. - Organizational Climate - Leadership Styles Group Influences - Team building - Organizational and Managerial Efforts - Self Development - Negotiation Skills - Development of the Competitive Spirit - Knowledge Management - Fostering Creativity. (Case Study)

Entrepreneurship Development 9
Entrepreneurship concept - Entrepreneurship as a Career- Entrepreneur - Personality Characteristics of Successful. Entrepreneur- Knowledge and Skills Required for an Entrepreneur. Business Environment - Central and State Government Industrial Policies and Regulations Business Plan Preparation: Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation. (Case Study)

Total No. of Periods : 45

Reference Books:

1. R. Panneerselvam, "Production and Operation Management", Prentice Hall of India, 2002.
2. Reddin W.J. Effective Management, Tata McGraw Hill Company, New Delhi, 1995.
3. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, 2001.
4. Gaither, "Production and Operations Management (with two CDs)", Thomson Asia (P) Ltd.,Bombay, Ninth Edition, 2002.
5. Chase, Aquilano & Jacobs "Production and Operations Management ",Tata McGraw Hill, Sm
6. Edition, 1999. 6. Principles ofMarketing : Philip Kotler, Tata McGraw ~ 8m Edition, 2004.
7. Chakraborty, Managerial effectiveness and Quality of Work life: Indian Insights, Tata McGraw Hill,2 000.
8. S. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi,2001.

MEC305 DIGITAL IMAGE PROCESSING 3 0 0 3
This is equivalent to the Full-Time course : MEC311/MEC111

CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS 9
Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Processing Problems and Applications, Vision Camera, Digital Processing System, 2-D sampling Theory, Aliasing, Image Quantization, Lloyd Max Quantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, Z-Transform, Matrix theory Results, Block Matrices and Kronecker Products.

IMAGE TRANSFORMS 9
2-D orthogonal and Unitary transforms, 1-D and 2-d DFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, singular value Decomposition transforms.

IMAGE ENHANCEMENT 9
Point operations – Contrast stretching, clipping and thresholding density slicing, Histogram equalization, modification and specification, spatial operations – Spatial averaging, low pass, high pass, band pass filtering, direction smoothing, medium filtering, generalized cepstrum and homomorphic filtering, edge enhancement using 2-D IIR and FIR filters, color image enhancement

IMAGE RESTORATION 9
Image observation models, sources of degradation, inverse and Wiener filtering, geometric mean filter, non-linear filters. Smoothing splines and interpolation, constrained least squares restoration.

IMAGEDATA COMPRESSION AND IMAE RECONSTRUCTION FROM PROJECTION 9
Image data rates, pixels coding, predictive techniques transform coding and vector DPCM, Block truncation coding, wavelet transform coding of images, color image coding. Random transform.

Reference Books :

1. Anil K. Jain, "Fundamentals of Digital Image Processing", PHI 1995.
2. M.A.Sid Ahmed, "Image Processing", McGraw Hill, Inc, 1995.
3. R.Gonzalazand P.Wintz, "Digital Image Processing", Addition Wesley 2nd Ed, 1987.
4. William. K.Pratt, "Digital Image Processing ",Wiley Interscience, 2nd Ed, 1991.

MEC301 DIGITAL CONTROL ENGINEERING 3 0 0 3
 This is equivalent to the Full-Time course : MEC301/MEC201

PRINCIPLES OF CONTROLLERS 9
 Review of frequency and time response analysis and specifications of control systems, need for controllers, continues time compensations, continues time PI, PD, PID controllers, digital PID controllers.

SIGNAL PROCESSING IN DIGITAL CONTROL 9
 Sampling, time and frequency domain description, aliasing, hold operation, mathematical model of sample and hold, zero and first order hold, factors limiting the choice of sampling rate, reconstruction.

MODELLING AND ANALYSIS OF SAMPLED DATA CONTROL LANGUAGE 9
 Difference equation description, Z-transform method of description, pulse transfer function, time and frequency response of discrete time control systems, stability of digital control systems, Jury's stability test, state variable concepts, first companion, second companion, Jordan canonical models, discrete state variable models, elementary principles.

DESIGN OF DIGITAL CONTROL ALGORITHMS 9
 Review of principle of compensator design Z-plane specification, digital compensator design using frequency response plots, discrete integrator, discrete differentiator, development of digital PID controller, transfer function, design in the Z – Plane

PRACTICAL ASPECTS OF DIGITAL CONTROL ALGORITHMS 9
 Algorithm development of PID control algorithms, software implementation, implementation using microprocessors and microcontrollers, finite word length effects, choice of data acquisition systems, microcontroller based temperature control systems, microcontroller based motor speed control systems.

Total No. Of Periods: 45

Text Book:

1. M.Gopal, "Digital control and static variable Methods", Tata McGraw Hill, New Delhi, 1997.

Reference Books:

1. John J.D'Azzo, "Constantine Houplos, Linear Control System Analysis nad Design", McGraw Hill, 1995.
2. Kenneth J. Ayala, "The 8051 Microcontroller – Architecture, Programming and Application", Penram International, 2nd Edition, 1996.

MECE50 MODERN DIGITAL COMMUNICATION TECHNIQUES 3 0 0 3
 This is equivalent to the Full-Time course: MECE50

Functional architecture coded and encoded digital communication system architecture 9

Digital Modulation 9
 PSD, Data pulse stream, M-ary Markov source, convolutionally coded modulation, continous phase

Coherent and Non-coherent communication waveform 9
 Optical receiver in WGN, MF receiver, Matrix generation, colored GN, Whitening approach, inphase and Quadrature phase modern.

Band Limited Channels 9
 Optimum pulse shape design, Optimum demodulations of digital signals in the presence of ISI

Coded Digital Communication 9
 Architecture, interfacing, detailing, Synchronization, block coded digital communication system, performance, type of binary block codes, Shannon channel coding theorem, linear block codes.

Total No of periods : 45

Reference Books :

1. Simon Haykin, Digital Communications, John Wiley and sons, 1998.
2. Wayne Tomasi, Advanced Electronic communication system, 4th Edition, Pearson Education Asia, 1998
3. B.P.Lathi, modern Digital and analog communication systems, 3rd Edition, Oxford University Press, 1998.
4. M.K.Simon, S.M.Hindedi and W.C.Lindsey, Digital Communicaiton techniques : signalling and detection, Prentice Hall India, New Delhi. 1995.

MECE51 COMPUTER COMMUNICATION AND ISDN 3 0 0 3
 This is equivalent to the Full-Time course : MECE51

COMPUTER COMMUNICATION 9
 Evolution of data Networks, Network architecture, ISO Reference model example of networks, Application of networks.

MEDIUM ACCESS SYBLAYER & DATA LINK LAYER 9
 Local area networks, conventional channel allocation methods, pure – ALOHA, S-ALOHA, finite population ALOHA , Controlled ALOHA, Reservation ALOHA, Design issues for packet radio networks- IEEE standards for LAN – Ethernet.

NETWORK AND TRANSPORT LAYER 9
 Network layer design issues – Routing algorithms- Congestion control algorithms – Internet working. Transport layer design issues – connection management

QUEING THEORY AND CAPACITY ASSIGNMENT 9
 M/M/I Queues, M/G/I – Priority queuing capacity assignment for terminal network and distributed networks – concentration and buffering for finite and infinite buffers

PRESENTATION LAYER & APPLICATION LAYER		9			
Design issues – Abstract syntax notation – Data compression techniques – Cryptography – Remote procedure call. Design issues – file transfer access and managements.					
					Total No. of Periods : 45
Reference Books:					
1. Andrew S.Tanenbaum, Computer Networks – Prentice Hall of India 1990.					
2. D.Bertsekas and R.Gallagherv, Data Networks – Prentice hall of India, 1989.					
3. Fred Halsall, Data Communication, Computer Networks and open system – Addition Welsey 2000.					
4. Gerd E.Keiser, Load Area Networks – McGraw ill Publication, 1989.					
MECE52	ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY IN SYSTEM DESIGN	3	0	0	3
This is equivalent to the Full-Time course: MECE52					
EMI ENVIRONMENT					9
Sources of EMI, conducted and radiated EMI, Transient EMI, EMI-EMC definitions and units of parameters.Emi Coupling Principles 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.					
EMI SPECIFICATION / STANDARDS / LIMITS					9
Units of specification, Civilian standards Military standards.					
EMI MEASUREMENTS					9
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.					
EMICONTROL TECHINQUES					9
Shielding, Filtering, Grounding, Bonding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting.					
EMI DESIGN OF PCBs					9
PCB Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning Motherboard Design and Propagation Delay Performance Models.					
					Total Number of Periods : 45.
Reference Books:					
1. Bernhard Keiser.” Principles of Electromagnetic compatibility”, Artech House, 3rd Ed, 1986.					
2. Henry W.Ott, “Noise Reduction Techniques in Electronic Systems”, John Wiley and Sons, New York, 1988.					
3. V.P.Kodali, “Engineering EMC Principles, Measurements and Technologies”, IEEE Press, 1996.					
MECE53	MULTIMEDIA COMPRESSION TECHNIQUES	3	0	0	3
This is equivalent to the Full-Time course : MECE53					
Brief history of data compression applications, Overview of information theory					9
Text Compression					9
Compact techniques- Huffman coding – arithmetic coding – Shannon Fano Coding and dictionary techniques – LZW family algorithms. Entropy measures of performance – Quality measures.					
Audio Compression					9
Audio Compression techniques- frequency domain filtering- basic sub band coding – application to speech coding					
Image Compression					9
Predictive techniques-PCM, DPCM,DM.					
Video Compression					9
Video Signal representation, Video Compression techniques-MPEG,Motion estimation techniques.					
					Total No of periods : 45
References					
1. Mark Nelson, Data Compression book, BPB Publishers, New Delhi, 1998.					
2. Sayood Khaleed, Introduction to Data Compression, Morgan Kauffman, London, 1995.					
3. Warkinson, J.Compression in video and audio, Facol press, London. 1995					
4. jan Vozer, Video compression for multimedia, AP profes, Newyork, 1995					
MECE54	Microcontroller Based System Design	3	0	0	3
This is equivalent to the Full-Time course : MECE54					
UNIT – I					9
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					9
Motorola 68HC11 Architecture – Input / Output ports – Resets and self protection – Interrupt Timing – A/D D/A converters.					
UNIT – III					9
Intel 8096 CPU Structure – Register file – Assembly Language – Addressing modes – Instruction set – simple programs.					
UNIT – IV					9
Interrupt structure – Programmable timers – Real time clock latency – Interrupt density and Interval consideration, shared resources and critical regions.					

UNIT – V

Queues – Table and Strings – Program organisation – State machines – Key switch parsing – Timing consideration – UART ports – I/P O/P Serial ports programmable controllers.

9**Total Number of Hours : 45****Reference Books:**

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.

MECE55 BIOMEDICAL INSTRUMENTATION **3 0 0 3**
This is equivalent to the Full-Time course : MECE55

UNIT – I

Basic physiology-study of cells & their structures-Nervous system

9**UNIT – II**

Basic Transducer principles & Electrodes – Bio-Chemical transducers

9**UNIT – III**

Cardiovascular system- ECG- blood pressure measurement

9**UNIT – IV**

X-ray & Radioisotope Instrumentation – Fluoroscopy-Image intensifiers

9**UNIT – V**

Bio-telemetry – Anatomy of Nervous system – EEG-EMG

9**Total No. of periods : 45****Reference Books:**

1. M.ARUMUGAM, Bio-medical Instruemntation-Anuradha Agencies Publishers, 1992.
2. LESIS CROMWELL FRED, J.WERBELL and ERICH A.PFRAFFER, Bio-medical Instruemntation and measurements- Prentice Hall of India, 1990.
3. KHANDPUR, Handbook on Bio-medical Instrumentation-Tata McGraw Hill Co Ltd., 1989.

MECE56 MICROWAVE DEVICES & COMPONENTS **3 0 0 3**
This is equivalent to the Full-Time course : MECE56

Microstrips Lines, Design, Analysis

Introduction, Types of MICs and their technology, propagating models, Analysis of MIC by conformal transformation

9**Coupled Microstrip, Directional couplers and lumped**

Introduction to coupled Microstrip, Even and odd mode analysis, Directional couplers, branch couplers.

9**Non-Reciprocal Components and Active Devices for MICS**

Ferromagnetic substrates and inserts, Micro strip circulators, Phase shifters, Microwave transistors.

9**Microstrip circuit design and applications**

Introduction, Impedance transformers, Filters, High power circuits, Low power circuits.

9**MMIC Technology**

Fabrication process of MMIC, hybrid MICS, configuration, Dielectric substances, thick and thin film technology, Testing methods, Encapsulation and mounting of Devices.

9**Total No of Periods: 45****Reference**

1. Hoffman R.K “Handbook of microwave intergrated circuits”, Artech House, Bostonm, 1987.
2. Gupta. K.C and Amarjit Singh, “Microwave Intergrated circuits” John Wiley, New York, 1975.

MECE57 OPTICAL COMMUNICATION SYSTEMS AND NETWORKS **3 0 0 3**
This is equivalent to the Full-Time course : MECE57

FIBRE OPTIC GUIDES

Light wave generation systems, systems components, optical fibers, SI, GI fibre, modes, Dispersion in fibers, Limitations due to dispersions, fibre loss, non liner effects

9**OPTICAL TRANSMITTERS AND FIBRES**

Basic concepts, LED structures spectral distribution, semiconductor lasers, gain coefficients, modes, SLM and STM operation, Transmitter design, Receiver PIN and APD diodes design, noise sensitivity degradation,

9**LIGHT WAVE SYSTEM**

Coherent, homodyne and Hetro dyne keying formats, BER in synchronous and Asynchronous.

9**AMPLIFIERS**

Basic concepts, Semiconductor laser amplifiers Raman-and Brillouin-fibre amplifiers, Erbium doped-fibre and amplifiers, pumping phenomenon

9**DISPERSION COMPENSATION**

Limitations, post-and pre-compensation techniques, equalizing filters

9**Total No. of periods : 45**

Reference Books:

1. Franze & Jain, Optical communication, systems and components, Narosa Publication, new Delhi, 2000
2. G.Keiser, Optical fibre communication, system, McGraw Hill, Newyork, 2000
3. G.P Agarwal, Fibre optic communication system. 2nd Edition, John Wiley & Sons, New York, 1997.
4. Franz and Jain, Optical communication system, Narosa Publications, New Delhi, 1995

MECE58	SOFT COMPUTING	3	0	0	3
	This is equivalent to the Full-Time course : MECE58				
ARTIFICIAL NEURALS					9
Basic-concepts- single layer perception- Multi layer perception – Supervised and un supervised learning back propagation networks, Application					
FUZZY SYSTEMS					9
Fuzzy sets and Fuzzy reasoning – Fuzzy matrices – Fuzzy functions-decompositions					
NEURO-FUZZY MODELLING					9
Adaptive networks based Fuzzy interfaces – Classification and Representation trees- Date dustemp algorithm					
GENETIC ALGORITHM					9
Survival of the fittest- Pictures computations-cross over mutation-reproduction-rank method-rank space method, application					
SOFT COMPUTING AND CONVENTIONAL AI					9
AI Search algorithm-Predicate calculus rules of interface- Semantic networks- frames- objects- Hybrid models-applications					
					Total No. of periods : 45

Reference Books:

1. Jang J.S.R., Sun C.T and Mizutami E-Neuro Fuzzy and Soft computing Prentice Hall New Jersey, 1998.
2. Nih.J.Ndsen Artificial intelligence, Harcourt Asia Ltd., Singapore, 1998.
3. Timothy J.Ross : Fuzzy Logic Engineering Applications McGraw Hill, NewYork, 1997
4. Laurance Fauseett : Fundamentals of Neural networks, prentice Hall India, New Hersey, 1995.

MECE59 DIGITAL SIGNAL PROCESSING PRACTICE
This is equivalent to the Full-Time course: MECE59

1. Study of TMS320C3X Processors
2. Implementation of Linear Convolution
3. Implementation of circular convolution
4. Implementation of DFT & IDFT
5. Compression of Analog Signal
6. Interfacing with I/O deices through CODEC chip, etc.

MECE60 COMPUTER ARCHITECTURE AND PARALLEL PROCESSING **3** **0** **0** **3**
This is equivalent to the Full-Time course: MECE60

THEORY OF PARALLELISM **15**
Parallel computer models – The state of computing, multiprocessors and multicomputers and Multivectors and SIMD computer, PRAM and VLSI models, and Architectural development tracks. Program and networks properties, Conditions of parallelism, Program partitioning architecture. Principles of scalable performance – Performance matrices and measures, parallel processing applications, speedup performance laws, scalability analysis and approaches.

HARDWARE TECHNOLOGIES **10**
Processor and memory hierarchy advanced processor technology, super scalar and vector processor, memory hierarchy technology, virtual memory technology, bus cache and shared memory – back plane bus systems, cache memory organisations, shared memory organisations, sequential and weak consistency models.

PIPELINING AND SUPERSCLAR TECHNOLOGIES **10**
Parallel and scalable architectures, Multiprocessor and Mutlicomputers, Multivector and SIMD computer, scalable, Multithreaded and data flow architectures.

SOFTWARE AND PARALLEL PROGRAMMING **10**
Parallel models, Languages and compilers, Parallel program development and environments, UNIX, MACH and OSF / 1 for parallel computer.

Total No. of Periods: 45

Reference Books:

1. M.J.Quinn, “Designing Efficient Algorithms for Parallel Computers”, McGraw Hill International, 1994.
2. Kai Hwang, “Advanced Computer Architecture”, McGraw Hill International, 1993.
3. William Stallings, “Computer Organization and Architecture”, Macmillan Publishing company, 1990.