S Y L L A B U S

MASTER OF TECHNOLOGY

TWO YEAR INTERGRATED COURSE

M. Tech. Examination, 2009/2010

Electronics & Communication- (Digital Communication)

JODHPUR NATIONAL UNIVERSITY
JODHPUR

JODHPUR NATIONAL UNIVERSITY

Faculty of Engineering & Technology
M. Tech. Programme

GENERAL INFORMATION FOR STUDENTS

[A] ELIGIBILITY FOR ADMISSION

1. **(a)** Candidates who have passed B.E. in 'Electronics / Electronics & Comm. Engg. / Electronics & Instrumentation Engineering' with at least 55% marks in aggregate from any recognized University or Institute recognized as equivalent may be eligible for admission to "**M.Tech. Programme in Digital Communication**".

   (b) Candidates who have passed B.E. in any of the branches 'Computer Science Engineering / Information Technology' with at least 55% marks in aggregate may be eligible for admission to **"M.Tech. in Computer Science & Engineering."**

   Candidates who have obtained M.Sc. (Computer Science)/MCA degree with at least 60% aggregate marks from any recognized University or Institute recognized as equivalent may be admitted to "M.Tech.in Computer Science & Engineering." Provided the candidates passes the deficiency papers (additional papers offered by the department).

   (c) Candidates who have passed B.E. in 'Civil Engineering/Construction Engineering/Architecture.' with at least 55% marks in aggregate from any recognized University or Institute recognized as equivalent may be eligible for admission to "**M.Tech. Programme in Transportation Engineering / Geotechnical Engineering/Structural Engineering**".

   (d) Candidates who have passed B.E. in 'Mechanical Engineering' with at least 55% marks in aggregate from any recognized University or Institute recognized as equivalent may be eligible for admission to "**M.Tech. Programme in Thermal Engineering**".

   (e) Candidates who have passed B.E. in 'Electrical Engineering' with at least 55% marks in aggregate from any recognized University or Institute recognized as equivalent may be eligible for admission to "**M.Tech. Programme in Electrical Engineering (Power system)**".

   (f) In general, the candidates who have passed B.E. in Computer Science Engineering/Electrical Engineering/ Electronics & Communication Engineering/Information Technology/ Mechanical Engineering/Civil Engineering with at least 55% marks in aggregate from any recognized university or institute recognized as equivalent may be eligible for admission to **M.Tech. Programme in the subject of his B.E./B.Tech.**
2. Candidates who have passed the section 'A' & 'B' examinations of the Institution of Engineers (India) shall be eligible apply for admission to the M.Tech Courses in respective branch of Engineering.
3. On admission, candidate may be required to offer and pass additional courses to make up the deficiency, if any.
4. For the admission to *M.Tech. Programme* candidate shall be screened and/or interviewed by the selection committee constituted under the chairmanship of concerned Head Of the Department.

5. The Faculty reserves the right to admission to any candidate and, the decision of the authorities shall be final in all the cases subject to the approval of Jodhpur National University, Jodhpur.
6. Teachers / Research Scholars / Engineers employed in engineering/scientific organization/self-employed fulfilling the eligibility criteria specified in point 1-4 above may be admitted to the *M.Tech. Programme*.
7. The number of students to be admitted to a particular branch of study shall be decided by the Jodhpur National University in consultation with the Head of the Department concerned.
8. 5% relaxation is provided to candidate belonging to SC/ST category.

[B] DURATION OF THE COURSE

1. The normal duration of *M.Tech. Programme* will be 2 academic years (4 semesters). The maximum period of completion of the programme shall be 5 academic years.
2. In no case a candidate, who has not passed finally after 5 academic years from the date of enrolment, be allowed to continue the course and his/her admission will automatically be cancelled.
    a. Provided that the Vice-Chancellor in consultation with the Head of the Department may waive this limit of 5 years only in the case of candidates who could not complete their M.Tech. programme at one stretch due to genuine reasons. The reasons for granting exemption shall be recorded in writing. Such extension shall not exceed one year.
3. Candidate shall be required to attend regular lecture classes, complete the prescribed course work including the practicals and sessionals.

[C] EXAMINATION & RESULT

1. There shall be an examination at the end of each semester.
2. The examination shall be conducted by means of written papers, practicals including sessionals, viva-voce as per scheme of examination specified in the syllabus
3. A candidate who has undergone regular course of study for the first semester shall be eligible to appear at the First Semester Examination for the M. Tech. Programme.
4. A candidate appearing at the First Semester Examination for the M. Tech. Programme shall be required to show competent knowledge of the subjects mentioned in the teaching and examination scheme for the respective branch of study.
5. A candidate appearing at the Second Semester Examination for the M. Tech. Degree shall be required to show competent knowledge of the subjects mentioned in the teaching and examination scheme of respective branch of study.
6. A candidate appearing at the Third Semester Examination for the M. Tech. Degree shall be required to show competent knowledge of the subjects mentioned in the teaching and examination scheme of respective branch of study.
7. A candidate who fails in any elective subject may be permitted by the Head of the Department to change the elective subject. He shall be required to undergo a regular course of study for the new elective subject.

8. For a pass, candidate should obtain 40 % marks in each theory paper, 50 % marks in each course work (Laboratory) and 50 % marks in Seminar. Both the theory & sessional marks will be considered independent of each other. Aggregate pass percentage will be 50% in each subject.
9. On satisfactory completion of the course and after passing the final examination, a candidate shall be awarded M.Tech. Degree in the respective specialization, in respective branch.

10. The division shall be awarded to the M.Tech. students as follows:
    a. The students who obtain in first attempt 75% or more of the aggregate marks in both theory and sessionals and also if the thesis has been adjudged to merit distinction are awarded **Honours.**
    b. The students who obtain 60% or less than 75% of the aggregate marks in all theory papers including thesis and the sessionals are awarded **First Division**.
    c. The students who obtain less than 60% of the aggregate marks in all the theory papers and the sessionals but not less than 40% in each theory paper and 50% in the sessionals will be awarded **Second Division.**
11. Examination fees, Re-appear examination fees, Extension of period etc. shall be charged separately as prescribed by the Jodhpur National University, Jodhpur. Separate examination forms are to be submitted with the Jodhpur National University for all the examinations.

[D] SEMINAR / DISSERTATION:

1. Each candidate shall submit for examination a report embodying literature survey along with a critical review of the latest developments / work carried out in a subject related to M.Tech. programme.
2. Four copies of the seminar/dissertation report printed or type written shall be submitted to the Head of the Department along with a certificate or originality of the work recommendation from his/her supervisor.

[E] SCHEME OF STUDY

1. The Medium of instruction and examination shall be **English**
2. Candidate for the M.Tech course shall be instructed & examined as per the Teaching and Examination scheme and course content of respective semester.

Jodhpur National University

M.Tech. Programme (Digital Communications)

Electronics & Communication

TEACHING/EXAMINATION SCHEME & SYLLABUS

I SEMESTER

Subject Code	Subject	Hrs. / Week				Marks		
		L	T	P	Total	Theory Exam/Viva voce	Internal Assessment	Total
1MEC01	Strategic Management	4	2	-	6	100	50	150
1MEC02	Digital and Data Communication	4	2	-	6	100	50	150
1MEC03	Antenna & Radar Engineering	4	2	-	6	100	50	150
1MEC04.1 1MEC04.2 1MEC04.3	**ELECTIVE-I** Computer Networks-I Digital System Design Satellite Communication	4	-	-	4	100	50	150
1MEC05	Antenna Lab	-	-	6	6	50	50	100
	Total	**16**	**6**	**6**	**28**	**450**	**250**	**700**

II SEMESTER

Subject Code	Subject	Hrs. / Week				Marks		
		L	T	P	Total	Theory Exam/Viva voce	Internal Assessment	Total
2MEC01	Mobile Communication	4	2	-	6	100	50	150
2MEC02	Advanced Optical Comm.	4	2	-	6	100	50	150
2MEC03	Image Processing and Pattern Recognition	4	2	-	6	100	50	150
2MEC04.1 2MEC04.2 2MEC04.3	**ELECTIVE-II** Computer Networks-II Embedded Systems Modern Telephone Switching Systems	4	-	-	4	100	50	150
2MEC05	Image Processing Lab	-	-	6	6	50	50	100
	Total	**16**	**6**	**6**	**28**	**450**	**250**	**700**

III SEMESTER

Subject Code	Subject	Hrs. / Week				Marks		
		L	T	P	Total	Theory Exam/Viva voce	Internal Assessment	Total
3MEC01.1 3MEC01.2	**ELECTIVE-III** Operating Systems Micro-electro-mechanical-systems (MEMS)	4	2	-	6	100	50	150
3MEC02.1 3MEC02.2	**ELECTIVE-IV** Neural Networks And Fuzzy Logic Biomedical Electronics	4	2	-	6	100	50	150
3MEC03	Seminar	-	-	6	6			100
	Total	**08**	**04**	**6**	**18**	**200**	**100**	**400**

IV SEMESTER

Subject Code	Subject	Hrs. / Week				Marks		
		L	T	P	Total	Theory Exam/Viva voce	Internal Assessment	Total
4MEC01	Dessertation / Indusrial Training/ Project work	-	-	-	-	200	-	200
	Total	**0**	**0**	**-**	**-**	**200**	**-**	**200**

Total Marks: 700 + 700 + 400 + 200 = 2000

I SEMESTER

1MEC01 STRATEGIC MANAGEMENT

3L+1T 3 Hours, 100 Marks

Strategic management' could be a useful subjects of 1st semester of M-Tech courses. Strategic management' as detailed below prepares a young budding technocrat to manage assets in more efficient way and lead his/her team more effectively.

This subject would cover the following issues:-

a) **Managing Change:-** Effective change management is the need of the hour. Situations change rather fast these days and has to prepare or mold his / her organization to face such changes and come out winningly.

b) **Crisis Management:-** Every organization or every individual do face crisis many times. A good management or a good leader keeps himself / herself always prepare for such eventualities. Training in this area has often been neglected.

c) **Innovation and Creativity :-** Human brain is very creative. Creative thinking is a must for the fast changing world. Creative things results in innovation and new finds. Creativity could be developed in a positive sense by training.

d) **Entrepreneurship :-** Young budding technocrats need encouragement for creating small/medium size organizations. Sessions on this subject from industry leaders will help in it.

e) **Work Study and Re-engineering:-** Re-engineering is term used these days in place of old terms 'Work Study' Re-engineering is needed not only for the product but also fro the processes as well as for the 'Organization'.

f) **Managing Intangibles :-** An organization have (i) Tangibles assets like machines, material etc. and also(ii) Intangibles assets like staff, line managers etc. Managing 'people' or rather 'Leading' people needs to be taught to young engineers.

g) **Communication Skills: -** We expect our managers to lead their terms. For this communication skills is a must. This could be covered in class room sessions along with practice sessions in groups under the supervision of a teacher.

h) **Quality and Customers Care :-** ISO -9000 has become a hallmark for quality. This can cover pre-requisites for an organization and how to go about for getting IS0-9000 certification.

i) **Safety and Ergonomics:-** Safety is often talked about but not cared for to that extant ergonomics is even less known. Technocrats need to know more about

Note:- This list is not exhaustive and could be enlarged in due course.

1MEC02 DIGITAL AND DATA COMMUNICATION

3L+1T 3 Hours, 100 Marks

Characterization of communication signals, signal space representation, equalisation, matched filtering, binary PSK, QPSK, FSK, QAM & M-Ary modulation techniques and their representation. Coherent & non-coherent detection, carrier & symbol synchronization, bits vs symbol error probability, bandwidth efficiency.
Spread spectrum modulation: Pseudo noise sequences, DS & FH spread spectrum.

Books :

1. R.D.Gitlin and others, "Data Communication Principles", McGraw Hill.
2. R.L.Peterson and others, "Introduction to Spread Spectrum Communication", Prentice HallInternational Edition 1995.
3. Digital Communication (2nd Edition). McGraw Hill. Marvin K.Simon & others, "Digital Communication Techniques: Signal Design & Detection", Prentice Hall International 1995.

1MEC03 ANTENNA & RADAR ENGINEERING

3L+1T 3 Hours, 100 Marks

Antenna: Fundamental parameters of antennas, radiation integrals, potential functions, linear wire antennas, loop antennas. Arrays: linear, planner & circular. Matching techniques. Broad band antennas, Planner antennas, Aperture antennas & Horn antennas, Antenna measurement. Preliminary on antenna synthesis.
Radar Fundamentals, Radar System: Functions and Parameters, Radar Equation, Target and interfacing signals. Target Echo and information extraction, different types of radars, radar antennas, receivers and displays.
Radar signal processing : Introduction, Signal integration, spectrum analysis, windows and resolutions, MT fundamentals, DC-Staggering and processing, high, resolution radar, Special radar topics

Books:

1. Antenna theory, analysis and design by CA balanis.
2. Antennas by JD Kraus.
3. Introduction to radar by MI Skolnik
4. Radar (Principles, Technology and Applications) by Byron Edde
5. Antennas & Radio Propagation by RE Collin
6. Travelling wave antenna by CH Walter
7. Antenna & wave propagation by KD Prasad
8. Microstrip Antennas by PS Hall
9. Radar Hand book by MI Skolnik
10. Hand book of radar measurement by DK Barton and HR Ward
11. Radar system design and analysis by Hovanession.

1MEC04.1 COMPUTER NETWORK – I

3L+1T Hours, 100 Marks

Introduction: Basic elements of a computer network. Computing Models. Network topologies and their features. Characteristics of Peer-to-peer, Server-based, Broadcast, and Point-to-point networks. Characteristic features of LAN, MAN, and WAN.

Network Architecture: Layered network architecture. The OSI reference model. Concepts of layer entities, layer interfaces, service access points, connection oriented/connectionless services, reliable/unreliable services, and service primitives. TCP/IP reference model. ATM reference model.

Physical Layer: Overview of data, signals and channel characteristics. Characteristics and application of various transmission media: Coaxial cable, Twisted pair, Optical fiber and wireless.

Data Link Layer: Design issues for data link layer. Framing, character and bit stuffing. Polynomial code (CRC) for error Detection. Flow-control protocols: Stop-and-wait and Sliding-window. Link protocols: HDLC and SLIP and PPP protocols.

Local Area Networks: Medium Access Control protocols: ALOHA, CSMA. ,. Features of IEEE LAN standards: 802.2 (Logical Link Control), 802.3 (CSMA/CO), 802.5 (Token Ring), FDDI. 802.12 (100VG-ANYLAN), 802.11(Wireless LAN), ATM LAN, and Fiber channel. Structure and operation of Hubs, Bridges, Switches, Routers and Gateways.

Operating System: Functions and types of operating systems. Services provided. Structure of an OS. Concepts of Scheduling, and Memory management. Features of network and distributed operating systems. Remote login, Remote file transfer, Data migration, Computation migration, Process migration, Remote services.

Books:

1. Tanenbaum, A.S. Computer Networks, 3rd Ed, PHI
2. Stallings, William Data and Compter Communications, 5th ED, PHI
3. Forouzan Data Communication and Networks, 2nd Ed, Tata Mcgraws Hill
4. Sheldon, Tom Encyclopedia of Networking, TMH
5. Silberschatz and Galvin Operating System Concepts, 5th Ed, Addision-Wesley

1MEC04.2 DIGITAL SYSTEM DESIGN

3L+1T 3 Hours, 100 Marks

INTRODUCTION: Fundamental & history of various hardware description language, Design flow of ASICs and standard logic circuits using software

COMBINATIONAL CIRCUIT BUILDING BLOCKS: Multiplexer, Decoders, encoders, Code Converters, VHDL Code for Combinational Circuits.

SEQUENCIAL CIRCUITS: VHDL code for Flip-Flops, shift registers, counters.

SYNCHRONOUS/ ASYNCHRONOUS SEQUENCIAL CIRCUITS :Mealy & Moore tye FSMs, VHDL Code for Mealy & Moore Machines, VHDL Codes for Serial Adder, Vending Machine**.**

DIGITAL SYSTEM DESIGN: Building Block circuits, Memory organization, SRAM, Design examples of divider, Multiplier, Shifting & Sorting Operations, Clock Synchronization, CPU organization and design concepts.

Books**:**

1. *Brown, Vranesic*, Digital Logic Design with VHDL Programming, TMH
2. *J.Bhaskar,* A VHDL Primer, PHI
3. *Doglous Pery,* VHDL Programming by example, TMH

1MEC04.3 SATELLITE COMMUNICATION

3L+1T 3 Hours, 100 Marks

Introduction: Origin of satellite communication current state of satellite communication orbital aspects of satellite communication system performance.

Earth Station Technology: Earth station design using antenna, tracking, small earth station antenna equipment for earth station, video receive only station and frequency co-ordination.

Satellite Link Design Basic Transmission Theory: System noise temp and G/T ratio, design of down links, domestic satellite system using small earth station, uplink design, design of satellite link for specified (C/N)

Multiple Access Techniques: FDMA, Time Division Multiple Access (TDMA) : Frame structure burst structure frame efficiency, super frame, frame acquisition, and synchronization, burst time plan.

Demand Assignment Multiple Access Techniques: Erlang call congestion formula, demand assignment control, DA-FDMA (spade) system, demand assignment TDMA, random access techniques, and miscellaneous access techniques frequency hopping satellite switched TDMA.

Role and Application of Satellite : Satellite application different areas, satellite television, telephone service via satellite, data communication, services, satellite for earth observation, satellite for weather forecast, satellite for scientific studies, satellite for military application.

Propagation on Satellite: Earth Path and its influence on the Design and Advanced Topics, Quantizing attenuation depolarization, interference effect, rain and ice effect, monitoring propagation effects. VSAT technology and mobile satellite Networks

Books:

1. Satellite Comm. By Timothy Pratt (1986), pratt publishers
2. Satellite Comm. By Dr. DC Aggarwal (Khanna Publishers)

II SEMESTER

2MEC01 MOBILE COMMUNICATION

3L+1T 3 Hours, 100 Marks

An overview of wireless communication systems. First generation analog cellular systems, second generation digital cellular systems, third generation systems standards for wireless communications systems. GSM, IMT-2000, UMTS. Mobile Satellite Communication – GEO, LEO, MEO, Terrestrial mobile system.

Cellular communication fundamentals. Cellular systems. Geometry of a Hexagonal Cell. Cochannel interference ratio. Cellular system design in worst case with an omnidirectional antenna, cochannel interference reduction with use of directional antenna. Cell splitting. Frequency and spectrum management and handoffs Access Techniques.

GSM architecture and interfaces. GSM frequency bands, GSM PLMN, GSM PLMN Services, GSM interfaces. The Radio interface MS to BTS. Abis interface (BTS to MSC). Interface BSC to MSC.

Radio Propagation and cellular engineering concept. Propagation characteristics. Multipath faded radio signals. Radio link design. Receiver sensitivity and link budget.

Data services in GSM. GSM GPRS. Privacy and security in GSM

Basics of CDMA. Properties and generation of PN sequences. Applications of CDMA to cellular communication systems. Second and third generation CDMA systems/ standards. Multicarrier CDMA. Synchronization and demodulation. Diversity techniques and rake receiver. General study of 4-G mobile communication system.

Books :

1. G. Stuber *Principles of Mobile Communication Systems*, Kluwer Academic Publishers, 1996.
2. K. Pahlavan and A. Levesque, *Wireless Information Networks*, John Wiley & Sons, Inc, 1995.
3. Principles & applications of GSM – Vijay K. Garg, and J.E. Wilkes 1999 – Prentice hall PTR.
4. Principal of Mobile Communications by Rappapart

2MEC02 ADVANCED OPTICAL COMMUNICATION

3L+1T 3 Hours, 100 Marks

Optical fibers: Review of fundamentals, signal distortion and attenuation, intermodal and intramodal dispersion, dispersion flattened and dispersion compensated fibers, profile dispersion, study of PMD.
Laser diode and photodiode. Photodetector, noise analysis.

Optical Amplification and integrated optics: Optical amplifiers, semiconductor laser amplifiers, theory, performance characteristics, fiber amplifiers, rare earth doped fiber amplifiers, raman and brillouin fiber amplifier, integrated optics, planar waveguides, some integrated optical devices, beam splitters, directional couplers and switches, modulators.

Optical couplers: passive optical couplers, Mach-Zehnder
interferometer multiplexer, optical add/drop multiplexers, isolators, circulators, optical filters, tunable sources and tunable filters, arrayed waveguide grating, diffraction grating

Optical networks: Network concepts, network topologies, SONET & SDH, high-speed lightwave links, optical add/drop multiplexing, optical switching, WDM network, DWDM examples, mitigation of transmission impairments.

Performance measurement and monitoring: Measurement standards, basic test equipment, optical power measurements, optical timedomain reflectometer OTDR, Optical switching, WDM networks, optical performance monitoring.

Classification of optical sensors: Intensity modulated, phase modulated and spectrally modulated sensors.

Books:
1. Optical Fiber communication by Senior JM
2. Optical Fiber communication by Gerd Keiser
3. Introduction to Optical Fiber by Allien H. Chairin
4. Optical communication by RM Gagliardi & S. Karp

2MEC03 IMAGE PROCESSING AND PATTERN RECOGNITION

3L+1T 3 Hours, 100 Marks

INTRODUCTION: Imaging in ultraviolet and visible band. Fundamental steps in image processing. Components in image processing. Image perception in eye, light and electromagnetic spectrum, Image sensing and acquisition using sensor array.

DIGITAL IMAGE FUNDAMENTALS: Image sampling and quantization, Representing digital images, Basic Relationship Between Pixels, Zooming and Shrinking digital images,

INTENSITY TRANSFORMATION : Basic Intensity transformation functions, Histogram processing, Fundamental of Spatial Filtering. Smoothning, Sharpening Spetial filters.

IMAGE RESTORATION: Image restoration model, Noise Models, Spatial and frequency properties of noise, noise probability density functions, Restoration in presence of noise - only spatial filter, Mean filter, order Statistic filter and Adaptive filter, Frequency domain filters - Band reject filter, Band pass filter and Notch filter.

IMAGE COMPRESSION: Compression Fundamentals - Coding Redundancy, Interpixel redundancy, Psycho visual redundancy and Fidelity criteria. Image Compression models, Source encoder and decoder, Channel encoder and decoder, Lossy compression and compression standards.

IMAGE SEGMENTATION: Fundamentals, point , edge and line detection., THresholding, Region based segmentation., Region based segmentation, Region Growing & Splitting & merging.

EXPERT SYSTEM AND PATTERN RECOGNITION: Use of computers in problem solving, information representation, searching, theorem proving, and pattern matching with substitution. Methods for knowledge representation, searching, spatial, temporal and common sense reasoning, and logic and probabilistic inference. Applications in expert systems and robotics.

Books:

1. Digital Image Processing : Gonzalez & Wood, Addison-Wisley Publisher Comp. 1993.
2. Digital Image Processing : A.K Jain, PHI, Edition 1995.

2MEC04.1 COMPUTER NETWORKS II

3L+1T 3 Hours, 100 Marks

Network Layer: Design issues for the network layer. Packet switching. Data-gram and Virtual-circuit networks. Routing algorithm properties and types. Dijkstra's shortest path routing, Flooding. Distance-vector routing. Link-state routing. Hierarchical routing. Broadcast routing and Multicast routing. Principles of Congestion control.
Internetworking: Principles of internetworking. Tunneling. Fragmentation. Naming and addressing concepts. Hierarchical naming. Domain name system. Name resolution process. IP address classes and concept of subnetting. Classless Inter-domain routing (CIDR) and DHCP concepts. The internet protocols: IP, ICMP, ARP, RARP, RIP, OSPF, EGP and BGP.
End-to-end Data Transfer: The design issues for the transport layer. Transport layer protocol issues: addressing, establishing connection, flow control and multiplexing. The internet protocols: TCP and UDP.
TCP/IP Application: Overview of TELNET, SMTP, POP, FTP and HTTP.
Computer Networks: Features and working of X.25, frame-relay, and ATM networks
Data Translation and Security: Principles of data encryption. Overview of secret-key and public-key algorithms. Need for data compression. Overview of data compression techniques. JPEG and MPEG standard overview.
Network Security and Management: Network security consideration. Overview of Authentication protocols and Digital signatures. Network management concepts. SNMP protocol. Planning a computer network.

Books:

1. Tanenbaum, A.S. Computer Networks, 3rd Ed. PHI
2. Stallings, William Data and computer communications, 5th ED, PHI
3. Forouzan Data communications and networks, 2nd Ed, Tata McGraw Hill
4. Sheldon, Tom Encyclopedia of Networking, TMH
5. Stevens, R.W. TCP/IP Illustated, Vol. 1: The Protocols, Addison-Vesley.

2MEC04.2 EMBEDED SYSTEMS

3L +1T 3 Hours, 100 Marks

THE 8051 MICROCONTROLLER: Introduction, The 8051 microcontroller hardware, I/O pins, Port, External memory, Counters and Timers, Serial data. Interrupts.
8051 ASSEMBLY LANGUAGE PROGRAMMING: Addressing modes, External data moves, push and pop opcodes, Logical operations, Byte level and bit level logical operations. Arithmetic operations, Jump and call instructions, Interrupts & returns.
REAL TIME CONTROL: Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051,Timers,Free running counter & Real Time control .
SYSTEM DESIGN: Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing.
INTRODUCTION TO EMBEDED SYSTEM: Application of Microcontrollers in interfacing,
Robotics, MCU based measuring instruments. Real Time Operating System for System Design,
Multitasking System, Task Definition in a Multitasking System, Round Robin Scheduling, Full Pre-emptive Scheduling, Basic study and Features of Commercial RTOS : WINCE and Embedded Linux.

2MEC04. 3 MODERN TELEPHONE SWITCHING SYSTEMS

3L+1T 3 Hours, 100 Marks

Electronic space Division switching :- Stored program control (SPC), switching matrices, multistage switching, enhance services photonic switching.

Time Division switching: - Time division space, and time switching, multiplexed switching, combination switching, T-S, T-S-T, switching n-stage combination switching, PBX switching, PBX networking, digital PBX.

Traffic Engg. : - Traffic load , Grade of service, Erlang's formulas, blocking modeling switching systems, Blocking model.

Subscriber Loop, Dialing Systems :- Switching hierarchy & routing, Transmission plan, numbering plan, charging plan, signaling technique.

Local Access Techniques :- Digital subscriber lines, DSL, ADSL etc, WLL, FIL, wireless for local telephone services.

Integrated services digital network: the concept of ISDN, ISDN interfaces and End-user applications, ISDN architecture.

Books :

1. Telecomm. Switching systems & networks- Thaigrajan PHI
2. Comm. System – Taub & Schilling, Mc Graw Hill
3. Telecomm. & the Computers - James Martin – PHI
4. The Issential Guide to Telecomm – Pearson Educah- Annabelz Dodd.

III SEMESTER

3MEC01.1 OPERATING SYSTEMS

3L+1T 3 Hours, 100 Marks

Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices organization, I/0 devices organization, I/0 devices organization, I/0 buffering.

Process concept, process scheduling, operations on processes, threads, inter-process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation.

Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system.

Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study.

3MEC01.2 MICRO-ELECTRO-MECHANICAL-SYSTEMS (MEMS)

3L+1T 3 Hours, 100 Marks

Micro electro mechanical system (MEMS) origins. MEMS impetus/ motivation. Material for MEMS. The toolbox: processes for micro machining. MEMS fabrication technologies. Fundamentals MEMS device physics: Actuation. Fundamental MEMS devices: The cantilever beam.

Microwave MEMS applications: MEM switch design considerations. The micro-machined transmission line. MEMS-based microwave circuit and system.

3MEC02.1 NEURAL NETWORKS AND FUZZY LOGIC

3L+1T 3 Hours, 100 Marks

Neural Networks Characteristics. Characteristics of neural networks, Historical development of neural networks principles, Artificial neural networks Terminology, Models of neuron, Topology, Basic learning laws.

Learning Rules: The Perceptron, Linear seperability, Hebbs rule, delta rule, widrow & Hoff LMS rule, Correlation learning rule, instar and outstar learning rules. Unsupervised learning, competitive learning, K-means clustering algorithm, Kohenen's feature maps

Different Neural Network: Basic Learning law in RBF nets, Back propagation method, feed forward network, ART network.

Application of Neural Nets: Pattern recognition, application of BPN, optimization, associative memories, vector quantization, applications in speech & decision making

Fuzzy Logic: Basic concept, fuzzy v/s crisp logic set, variables, membership function, operation's inference, techniques, defuzzification, basic inference algorithm. Application of Fuzzy Logic, Fuzzy system design & implementation.

Books:

1. Philip D. Wasserman, Neural Computing Theory and Practice. ANZA research, Inc.
2. Mohamad H. Hassun, Fundamentals of Artificial Neural Networks, PHI
3. Zurada - Artificial Neural Networks

Reference

1. Fuzzy systems design principles, building Fuzzy IF-THEN rule bases by riza C. Berkin & trubatch. JeeeBcss
2. Vegna Naryanan – Artificial neural networks
3. Bart Kosko- Neural networks & Fuzzy Logic
4. Simon Kaykin – Neural Network pearosn Lpe
5. Neural Network – Satish Kumar
6. Fundamental of Neural Network – Laurent Forself

3MEC02.2 BIOMEDICAL ELECTRONICS

3L+1T 3 Hours, 100 Marks

Brief introduction to human physiology. Biomedical transducers: displacement, velocity, force, acceleration, flow, temperature, potential, dissolved ions and gases. Bioelectrodes and biopotential amplifiers for ECG, EMG, EEG, etc. Measurement of blood temperature, pressure and flow. Impedance plethysmography. Ultrsonic and nuclear imaging.

Prostheses and aids: pacemakers, defibrillators, heart-lung machine, artificial kidney, aids for the handicapped. Safety aspects. Telemetry – Transmission of the original through wire & wireless. Imaging techniques – Ultrasound, CAT, X-Rays, PET, NMR, Nuclear. Physiological effect of electric current, safety.

Cardiological Signal Processing: Basic Electrocardiography, ECG data acquisition, ECG lead system, ECG parameters & their estimation, the use of multi scale analysis for parameters estimation of ECG waveforms, Arrhythmia analysis, monitoring, long form continuous ECG recording. ECG data reduction technique, Direct data compression techniques, Direct ECG data compression techniques. Transformation compression techniques. Other data compression techniques. Data compression techniques, comparison.