NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

BACHELOR OF ENGINEERING (B.E.)

(FINAL YEAR)

ELECTRONICS AND COMMUNICATION,

ELECTRONICS AND TELECOMMUNICATION

TERM – I and II

W.E.F 2008 - 2009

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
B.E. (ELECTRONICS and COMMUNICATION / ELECTRONICS and TELECOMMUNICATION)

FIRST TERM

W.E.F. 2008-09

SR.No.	Subject	Teaching Scheme Hours / Week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Radiation and Microwave Technology	4	-	2	3	100	25	25	-
2	* Fiber Optic Communication	4	-	2	3	100	25	-	-
3	* Digital Signal Processing and Processors	4	-	2	3	100	-	25	-
4	* Computer Communication Networks	4	-	-	3	100	25	-	-
5	Elective - I	4	-	2	3	100	25	25	-
6	* Project - I	-	-	2	-	-	25	-	25
7	* Seminar	-	-	2	-	-	25	-	-
	Total	**20**		**12**		**500**	**150**	**75**	**25**
	Grand Total	**32**			**750**				

SECOND TERM

SR. No.	Subject	Teaching Scheme Hours / week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Telematics	4	-	2	3	100	25	-	25
2	Television and Consumer Electronics	4	-	4	3	100	25	25	-
3	Satellite communication	4	-	2	3	100	25	-	-
4	Elective -II	4	-	2	3	100	25	25	-
5	* Industrial Visit / Case Study	-	-	-	-	-	25	-	-
6	* Project - II	-	-	4	-	-	100	-	50
	Total	**16**	**-**	**14**		**400**	**225**	**75**	**50**
	Grand Total	**30**			**750**				

*** Common with B.E. (Electronics Engineering)**

ELECTIVE I	i) Data Communication and Design
	ii) * Biomedical Instrumentation
	iii) System Programming
	iv) * VLSI Design
	v) Broad band Communication

ELECTIVE II	i) * Embedded System
	ii) * Digital Image Processing
	iii) * Neural Network and Fuzzy systems
	iv) Telecomm. Network Management
	v)Nanotechnology

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
RADITATION AND MICROWAVE TECHNIQUES

Teaching scheme:
Lectures: 4 hrs / week
Practicals: 2 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Practical : 25 Marks
Term Work : 25 Marks

UNIT I

Guided waves and Transmission lines : Transmission line parameter, Transmission line equation, Transmission coefficient, reflection coefficient, Impedance matching, quarter wave transmission line, single stub, double stub matching (Analytically and using Smith chart), Solution of quarter wave transformer and single stub by using smith chart only

Electromagnetic Theory: Maxwell's Equation, Uniform waves, free space impedance **Lectures 10, Marks 20**

UNIT II

Wave guide Theory: Comparison between Transmission line and Waveguide, waveguide types rectangular and circular. Wave propagation through rectangular waveguide, Solution of wave equation in rectangular waveguide, Rectangular wave guide modes, Waveguide characteristics for TE and TM modes (for rectangular waveguide), equation for cut off wavelength, guided wavelength, guided velocity, group velocity

Passive Microwave components : Terminator, attenuator, ,traveling detector, Microwave filter, parametric amplifier, resonator, E-plane, H-plane, Magic Tee, Hybrid circuits, Ferrite Components, Microwave bridge Isolator, Circulator, Directional coupler, E-plane Tee, H-plane Tee, magic tees, Directional couplers, Ferrite components, Microwave bridge, Circulator, Isolator, slotted line, Tuners, coupling probes **Lectures 10, Marks 20**

UNIT III

Microwave Tubes: Limitations of conventional Tubes, Klystron tubes, Two cavity Klystron, Multi cavity Klystron, Modes of Reflex klystron, Efficiency of Reflex Klystron, **Slow wave structure: (TWT) :** O type, M type, Magnetron Efficiency, Advantages and disadvantages

Solid state Devices: GUNN diode, PIN diode, IMPATT, BARITT, TRAPATT, Monolithic Microwave strip line devices, Microwave Integrated circuits, Applications of Microwave Integrated Circuits **Lectures 10, Marks 20**

UNIT IV

PMicrowave Antenna

RF antenna and Microwave antenna, Horn antenna, Parabolic reflector with all types of feeding methods, slotted antenna, Lens antenna, Microwave strip line antennas, Equation for antenna gain, Directivity and Beam width of all above antenna types.

Microwave measurements: Frequency, Power, attenuation, VSWR, Impedance measurement. **Lectures 10, Marks 20**

UNIT V

Microwave Applications:

Wireless Microwave communication system: Radio Receiver Architecture, Noise Characterization
Radiometer System: Theory and application, total Power Radiometer, Dicke Radiometer
Microwave heating
Power Transfer
Bio-medical application

RADAR: Principle of Radar System, Pulse radar, Radar range equation, Doppler Effect, Blind Speed, CW Doppler MTI Radar

Lectures 10, Marks 20

References:

1. R. E. Collins - Foundation of microwave engineering, Tata McGraw Hill
2. Pozar - Microwave Engineering , John Wiley
3. Annapurana Das, S. K das - Microwave Engineering, Tata McGraw Hill
4. Samuel Liao – Microwave Devices and circuits, PHI
5. K. C. Gupta – Microwave, New Age
6. Peter A. Rizivi - Microwave Engineering,

List of Practical:

1. Reflex Klystron Characteristics
2. GUNN Diode Characteristics
3. Microwave Junction: Power splitting Characteristics
4. Directional coupler: Isolator, Coupling factor
5. Circulator, Isolator (Y type) Circulator and Isolation Calculation
6. VSWR Measurement (Using V_{max} / V_{min} Method)
7. Antenna Horn (Radiation Pattern and beam width)
8. Antenna parabolic (Radiation Pattern and beam width)
9. Measurement of attenuation (Fixed and variable)

Note: Minimum **EIGHT** practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
FIBER OPTIC COMMUNICATON

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term Work : 25 Marks

UNIT I

Introduction to Optical Fiber Communication System:

Block diagram of OFCS, Advantage and Disadvantage of OFCS over other communication systems. Ray theory of transmission and concept of acceptance angle and Numerical Aperture (Numericals based on this), Meridonial and skew propagate wave theory of optical propagation : cut – off wavelength. Group velocity and Group delay, Types of fibers (According to materials, Refractive index profile, Mode of propagation) Fiber Optic Splices, connectors, couplers, Directional Coupler.

Lectures 10, Marks 20

UNIT II

Light Sources and Detectors:

Sources : Factors or Characteristics for their selection in OFCS, **Types :** Light Emitting diodes, Laser diodes, Surface emitter LEDS, Edge emitter LEDS, Super luminescent LEDS, LED operating Characteristics, **Modulation Bandwidth:** 3-dB electrical bandwidth, 3-dB optical Bandwidth, Radiation patterns of surface and Edge emitters, **Laser diode:** Laser principles, semiconductor laser diode , Hetero junction Laser , strip- gromentry lasers, Distributed feedback lasers, laser diode operating Characteristics, Radiation patterns.

Detectors: Characteristics or factors for their Selection, P-N photo diode, P-I-N Photo diode, Avalanche photodiode, detector parameters: Quantum efficiency, Responsivity, speed of Response (Numericals based on this) **Lectures 10, Marks 20**

UNIT III

Modulation: Noncoherent / Coherent

Intensity Modulation: LED Modulation and Circuits (Analog and digital) Analog modulation formats; AM / IM Sub carrier Modulation, FM / IM Sub carrier Modulation. Digital Modulation formats; PCM: RZ, NEZ, Manchester, Bipolar codes, Other digital formats: PPM, PDM, OOK, FSK and PSK.

Detection: (Coherent detection / Heterodyne / Homodyne detection):- Optical heterodyne receivers, Optic Frequency Division Multiplexing. **Lectures 10, Marks 20**

UNIT IV

Losses in fibers: Absorption, scattering and bending losses. Signal distortion in optical fiber: Material dispersion, waveguide dispersion, intermodal dispersion. Noise in optical fiber: Thermal Noise, shot noise, S / N Ratio, Noise equivalent power (Numericals based on this)

Fiber Optics System Design: Optical power budgeting, Rise-time budget.

Optical Fiber Measurements: Measurement of Attenuation, dispersion, refractive index. Field Measurements: Optical time domain reflectometry. (OTDR) **Lectures 10, Marks 20**

UNIT V

Advanced Systems and Techniques: -

Wavelength Division Multiplexing, DWDM, optical amplifiers, Optical filters, Integrated optics, Optical Networks: SONET / SDH, Photonic switching, Local Area Networks, Optical Sensors. **Lectures 10, Marks 20**

References:

1. Jonn M. Senior - Optical fiber communication (Principles and Practice), Pearson
2. G. Keiser - Optical fiber communication, MH
3. Joseph Palais - Fiber optic communications, Pearson
4. Wilson Hawkes - Opto electronics, PHI
5. Selvrajan, Srinivas - Optical fiber communication, TMH
6. B.P.Pal - Optical fiber systems and sensors
7. Govind P. Agrawal - Fiber optic communications systems, wiley 3rd Ed.

List of Practical:

1. Electrical characteristics of (Different type LED)
2. Photometric characteristics of LED / LD (Polar Plot, Intensity Measurement)
3. NA Measurement for Single / Multi de, Gi / S1, fiber
4. Attenuation Measurement of optical fiber
5. Spectral characteristics of LED / LD
6. Fiber optic Analog / Digital transmitter / receiver parameter measurement
7. Study of fiber optical connectors
8. Spectral response of optical fiber
9. Parameter measurement of opto isolator
10. Study of OTDR.

Note: Minimum **EIGHT** practicals are to be performed

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B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

DIGITAL SIGNAL PROCESSING AND PROCESSORS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks

UNIT I

Discrete Time Signals and Systems:

Introduction: Basic elements of Digital Signal Processing Systems, Advantage and Limitation of Digital over Analog Signal Processing, Application of Digital Signal Processing: Spectral Analysis, Echo Cancellation, Image Processing, Biomedical Signal Processing, Classification of Signals. Discrete Time Signals: Representation, Standard Discrete Time Signals, Classification of Discrete Time Signals, Simple Manipulations of Discrete Time Signals, Sampling of Analog signals, Aliasing, Sampling Theorem. Discrete Time System: Block diagram representation of Discrete Time Systems, Classification of Discrete Time System, Convolution Sum, Properties of Convolution, Causality and Stability condition in terms of the Impulse Responses. Meaning of IIR, FIR, Recursive, Nonrecursive Systems, and Impulse Response of LTI Recursive System. Cross Correlation and Auto Correlation of two sequences. **Lectures 10, Marks 20**

UNIT II

Z Transform and its application to the analysis of LTI system:

Definition of Z transform, Meaning of ROC, Properties of ROC, Properties of Z transform, Inverse Z transform, Pole Zero plot of the function, Pole location and time domain behavior for causal sequences. Analysis of LTI Systems in Z domain: The System Function of LTI system, Response of LTI system with zero initial condition, Transient and Steady state responses, Causality and Stability of System. Pole zero cancellation. The one sided Z transform, Response of the system with nonzero initial conditions. Solution of difference Equations using Z transform. **Lectures 10, Marks 20**

UNIT III

Frequency Analysis of Discrete Time Signals and Systems:

The Fourier Transform of Discrete time Aperiodic Signals and Energy Density Spectrum, Frequency response of Discrete Time Systems, Magnitude and Phase response. Frequency Domain Sampling: The Discrete Fourier Transform, IDFT, The DFT as Linear Transformation, Twiddle factor, Properties of the DFT, Use of DFT in linear filtering, Frequency analysis of signals using DFT. Magnitude spectrum of signals. FFT Algorithms: Radix2 DIT and DIF algorithms to computer DFT and IDFT. **Lectures 10, Marks 20**

UNIT IV

Design and Realization of Digital Filters:

Basic Network Elements, FIR Filter Structure and Design: Direct form, cascade form, frequency sampling and linear phase structure. Fourier series, Windowing method. Gibbs phenomenon, Frequency sampling method of design. IIR Filter structure and Design: Direct form, Cascade form, Parallel form and Transposed structures. Impulse invariance, Bilinear Transformation method of design. **Lectures 10, Marks 20**

UNIT V

DSP Architecture:

Architectural features of DSP processors: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSP, Multiple access memory, Multiport Memory, Pipelining, Special addressing modes, Onchip Peripherals. Different generation of DSP Processors, Fixed point and floating point numeric representation and Arithmetic, Introducing the TI 6000 platform, Features of TMS320C62X Processors, EDMA, Host Port Interface, Expansion Bus, External Memory Interface (EMIF), Boot Loader, McBSP, Interrupts, Timers, Basic Interfacing Techniques. **Lectures 10, Marks 20**

References:

1. Proakis and Monolakis - Digital Signal Processing-Principles, Algorithms and Applications, Pearson Publication / PHI
2. Mitra S.K. - Digital Signal Processing, TMH Publication
3. B.Venkataramani, M.Bhaskar - Digital Signal Processor, Architecture, Programming and Applications,TMH.
4. Texas Instruments - Technical Reference Manual
5. Teaching Material for TI6000 platform from Texas Instruments
6. Thomas Cavicchi - Digital Signal Processing, Wiley
7. Ingle & Prokis – Digital Signal Processing Using MATLAB, 2nd Ed, Thomson Learning.

List of Practical:

1. Basic operations on sequences of equal and unequal lengths.
2. Sampling of continuous time signal and aliasing effect.
3. Convolution of two sequence\ Impulse response.
4. Spectrum of signals using DFT.
5. Frequency response of LTI Discrete time system.
6. Designing of FIR Filter.
7. Designing of IIR Filter.
8. Sampling audio signal at different sampling rate using DSP kit.
9. Interfacing with DSP Kit.
10. Implementation of digital filter using DSP Kit.
11. Using ADC and DAC for signal acquisition and play back after processing.

Note: Minimum **EIGHT** practicals are to be performed. At least **TWO** on any DSP platform.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
COMPUTER COMMUNICATION NETWORK

Teaching scheme:
Lectures: 4 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term Work : 25 Marks

UNIT I

Introduction to Computer Network: OSI model, TCP / IP and other network models, Different Networks: Novell Netware, Arpanet, NSFNET, Internet. Network Topologies: LAN, WAN, MAN

Physical Layer: Basic for data communication: Fourier analysis, Bandwidth Limited Signal. Transmission media: Twisted pair, Baseband coaxial cable, Broadband coaxial cable, Fiber optics. Wireless Transmission: Radio transmission, Microwave transmission, Infrared and light wave Transmission. Switching. ISDN: Narrowband ISDN: ISDN services, System architecture, Interface. Broadband ISDN: Virtual switching, Circuit switching, ATM Network, Transmission in ATM networks, ATM switches. Cable TV and internet over cable **Lectures 10, Marks 20**

UNIT II

Data link layer: Design issues: Framing, Error detection and correction code, Flow control Data Link Protocols: Unrestricted Simplex Protocol, stop and wait protocol, Simplex Protocol for a Noisy Channel. Sliding Window Protocols: One bit sliding window, Using Go-Back n, Protocol using Selective Repeat. Practical Example of Data Link Protocols: The Data Link layer in HDLC, internet, ATM.

Medium access sub layer: Channel allocation Problem: Static Channel and dynamic Channel allocation in LANs and MANs. Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access, Collusion Free Protocols, Wireless LAN Protocols. IEEE Standards For LANS and MANS:IEEE Standard 802.3 and Ethernet, (IEEE Standard 802.4) token Bus, (IEEE Standard 802.5) Token Ring, (IEEE Standard 802.6) distributed Queue Dual Bus. (IEEE Standard 802.2) Logical Link Control.

Lectures 10, Marks 20

UNIT III

Network layer : Design Issue: Internal Organization ,Virtual circuit and Datagram subnets, Routing algorithm: Shortest Path Routing, Flooding, Hierarchical Routing, Broad Cast Routing, Routing for mobile host, Multicast routing, Congestion Control Algorithms: Congestion Prevention Policies, Control in virtual Circuits Subnets, choke Packets, Load Shedding.

Lectures 10, Marks 20

UNIT IV

Internetworking: The network layer in the internet: IP Protocol, IP Address, Subnet, Internet control Protocols, Internet multicasting, IPv4: Datagram, Fragmentation, Checksum, Options ,IPv6: Advantages, Packets Formats Extension Headers. Address Resolution Protocol (ARP), RARP, DHCP. The Network Layer in the ATM Networks: Routing and Switching, Traffic Shaping, Congestion Control, ATM LANs.

Lectures 10, Marks 20

UNIT V

Transport layer: The Internet Transport Protocols: TCP: Services, Features, Segments, Connections, Flow control, Error Control, congestion Control, UDP. QOS (Quality of Services) ATM AAL layer protocol.

Application layer: Network security, Domain Name system, SNMP, Electronic Mail; the World Wide Web, Multi media.

Lectures 10, Marks 20

References:

1. Andrew S Tanebaum - Computer Networks, 4th Ed. PHI/ Pearson education.
2. Behrouz A Forouzan - Data Communication and Networks, 3rd Ed. TMH.
3. S. Keshav - An Engineering approact to Computer Networks, 5th Ed. Pearson.
4. W.A. Shay - Understanding communication and Networks, Thomson.
5. Irvine Olifer - Computer Networks: Principles, Technology and Protocols, Wiley India.
6. William Stalling – Data and Computer communications, 7th Ed. PHI

Term Work: It is 50% based on theory and 50% based on minimum FIVE assignments on above syllabus (one assignment for each unit)

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

DATA COMMUNICATION AND DESIGN (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Digital Transmission Fundamentals

Digital signals, Limits of achievable data rate in digital communication, Data communication – components, data representation , Transmission impairment throughput, propagation speed, propagation time, wavelength, Attenuation distortion, delay distortion, Thermal noise , Inter modulation noise , Impulse Noise, Cross talk, channel capacity, source coding, data Rate, and channel capacity. **Lectures 10, Marks 20**

UNIT II

Digital Modulation

Modems, Digital continuous wave modulation techniques for Modem , Baud rate, QAM modern constellation patterns, Telephone modems- Modern stard,, traditional modems, 56M modems, Interface control for typical modem, EIA 232 / V.24 interface, interfacing with computer , Broad b modems. Cable modems. **Lectures 10, Marks 20**

UNIT III

Switching techniques High Speed Digital Access

Different switching techniques, circuit switching telephone , Signaling systems 1H Architecture overview , Packet switching N/w. T1 carrier system / E1 / , T3 / E3 carriers, SONET/ SDB, SDL Technical , ADSL technology, cellular Telephone systems, **Lectures 10, Marks 20**

UNIT IV

Data communication Media

Transmission media guided transmission media (Physical description , application , transmission char.) Twisted pair (unshielded , shielded , twisted pair) , category 3 , 5 , 5E , 6 . UTP, coaxial cable. Wireless transmission unguided media; (Terrestrial microwave satellite microwave) fiber optic communication, satellite communication. , wireless fidelity **Lectures 10, Marks 20**

UNIT V

Ethernet

Traditional Ethernet, fast Ethernet, gigabit Ethernet. Multiple access, rom access, MA, CSMA/ CD , CSMA/CA, control access, FDMA, TDMA, CDMA, . IEEE 802.3, 802.4, 802.5, X.21, X.25, SDLC/HDLC protocol stards. Introduction to N/w connecting devices, bridge , router, gateway, hub, etc. **Lectures 10, Marks 20**

Reference Book:

1) Behrouz A, Forouzan -Data communication, TMH
2) Stallings W. - Data Computer communication , PHI 6th Ed.
3) Shay W - Understanding Data communication and Networks, 3rd Ed., Thomson
4) Godbole A - Data communications, TMH

List of Practical:

1. Implementation of LAN using star topology and connectivity between two computers using crossover UTP5 cable.
2. To establish internet connectivity using dial up modem on windows system.
3. Study of network components such as Preparation of various cables, information attenuator, hubs, switches, bridges, routers, gateways, color codes of AT and T (2 Practicals)
4. Study of MODEM Trainer kit
5. Study of RAM for MODEM
6. Study of CDMA Trainer
7. study of GSM Trainer

Note: Minimum **EIGHT** practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

BIOMEDICAL INSTRUMENTATION (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Modern Imaging System:

Principles of NMR Imaging systems, Image reconstruction technique, Basic NMR components, biological effects of NMR imaging, Advantages, diagnostic ultrasound, physics of ultrasound waves, Medical ultrasound, Basic Pulse Echo Apparatus, A-scan, M- mode, B-scan, Real time Ultrasonic imaging system, Biological effects of ultrasound, Medical thermography, Physics of thermography, Infrared Detector, pyro-electric vidicon camera etc. **Lectures 10, Marks 20**

UNIT II

Cardiac Pacemakers and Defibrillators:

Need for pacemakers, external pacemakers, and Implantable pacemakers, recent developments, pacing system analyzer, need for defibrillators, DC defibrillators, Implantable defibrillators, and Defibrillators analyzers. Blood gas analyzers Acid base balance, Blood pH measurement, measurement of blood PCO_2, Blood PO_2 measurement, intra arterial blood gas monitoring, and complete gas analyzers, types of blood cells, coulter counters, and Auto recognition and differential counting of cells.

Lectures 10, Marks 20

UNIT III

Instruments for Surgery:

Principle of surgical diathermy, surgical diathermy machine, safety aspects, surgical diathermy analyzers, LASER, pulsed RUBY laser, Nd - YAG laser, He-Ne laser, Argon laser, CO_2 laser, laser safety, microwave diathermy, ultrasonic therapy unit,, pain relief through electrical simulation. **Lectures 10, Marks 20**

UNIT IV

Heamo-dialysis Machines and ventilators:

Function of kidneys, Artificial kidney , Dialysers, Membranes for Heamo-dialysis Heamo-dialysis Machine, Portable kidney machine, Mechanics of respiration Artificial ventilation , ventilators Types, ventilator terms, classification of ventilators Modern ventilators, HF ventilators, Humidifiers, Nebulisers and Aspirators. **Lectures 10, Marks 20**

UNIT V

Biomedical Telemetry and telemedicine:

Introduction, physiological parameters adaptable, wireless telemetry, single channel, Multi-channel, multi–patient telemetry, components of Bio-telemetry system, Implantable telemetry, Transmission of Analog and physiological signals over telephone , Telemedicine. Spectro-photometry, colorimeters, Automated Biochemical analysis. Infusion Pumps, Implantable Infusion systems. **Lectures 10, Marks 20**

References:

1. Cromwell - Biomedical Instrumentation, Pearson / PHI
2. Khandpur - Handbook of Biomedical Instrumentation
3. Webster - Biomedical Instrumentation, Wiley

List of Practical:

1. Measurement of echo with ultrasound system.
2. Study of Internal Pacemaker.
3. Study of Pacemaker simulator.
4. Measurement of pacing pubes with the pacemaker system.
5. Study of ON - DEMAND pacemaker system
6. Measurement of blood cell count.
7. Study of Surgical diathermy machine.
8. Study of Heamo dialysis Machine
9. Study of Nebulisers.
10. Measurement of Heart beats by wireless telemetry system.
11. Study of Ultrasonic therapy machine.
12. Study of Spectrophotometer.

Note: Minimum **EIGHT** practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
SYSTEM PROGRAMMING (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction to system software: Types of Software and Application Software Spectrum of system Software, Need of system Software, Assembler, Loader, Compiler. Symbolic Debuggers, Interpreter, Macro, Operating system and its types. Assembler- Structure of Assembler, Basic Functions, Assembler directives, Types of Assembler, General design specification of an Assembler, Purposes of Passes, Databases for Passes, Literals, Design of Pass I and Pass II Assembler.

Lectures 10, Marks 20

UNIT II

Data Structure -Stack Array, Queue, Link list, Data Structure, Sorting Technique, Linear and binary search. Macro and Macroprocessor- Macro definition and call, Features of macro, Macro expansion, Nested Macros, Design of Macroprocessor single pass and two pass macroprocessor. **Lectures 10, Marks 20**

UNIT III

Loader and Linkage editor- Basic functions of Loader, Relocation and Linking concepts, and different Loader schemes, other Loader schemes, binders, Linking Loaders, overlay Dynamic Binders, Design issue of Direct Linking Loaders. Compiler- Concept, Phases of compiler, Types of complier, Parser, Parsing technique, Top-down and Bottom-up parsing, Shift reduce and recursive descent parser, Operator precedence parser, Predictive parser, L-R parser. **Lectures 10, Marks 20**

UNIT IV

Operating System Concepts- Need of OS, Types of OS, like Batch, Time sharing, Multiprogramming, Multitasking real time and personal OS.

Process Concepts and Management: - Process concepts, process state, process state Transition, PCB, operation on process, OS Services for Process Management.

Deadlocks - Principals, Detections, Preventions Recovery and Avoidance Algorithm. Scheduling - Process scheduling long term, middle term and short term scheduling CPU burst, scheduling algorithm and performance evolution.

Lectures 10, Marks 20

UNIT V

Memory Management -Concept of Memory management, Contiguous Memory allocation, paging and segmentation concepts, , virtual memory concept. File Management- File concepts, Access Methods, Directory Structure, single, two, three level structure, Protection, file sharing allocation methods. Dynamic Linking In Windows- (Introduction and concepts only) clipboard, OLE terminology and Technology, Dynamic Data Exchange Dynamic Linking Libraries (DLL) **Lectures 10, Marks 20**

References:

1. Jhon J. Donovan - System Programming, TMH.
2. Dhamdhere - System Programming and Operating System, TMH, 2nd Ed.
3. L Beck - System Software, Pearson, 3rd Ed.
4. Aho Ulman - Complier Construction, Pearson LPE.
5. Silberschatz, Galvin, Gagne.- Operating System Principles , John Wiley and Sons, 7th Ed.
6. Tanenbaum - Modern Operating System, Pearson, 2nd Ed.
7. J.P. Bennett - Compiling Technique, TMH

List of Practical:

1. Language Programming for 8085 / 8051.
2. Implementation of sorting method (Any two) in C / C++.
3. Implementation of searching methods (Linear and Binary Search) in C / C++.
4. Implementation of stack/queue using linked list data structure in C / C++.
5. Develop an application to simulate first pass of two pass assembler for 8085 Microprocesser.
6. Design of simple Loader.
7. Design of Parser for a subset of C by using C / C++.
8. Design of Line and Screen Editor in C / C++.
9. Design of Microprocessor (Nested Macro Calls within definition) in C / C++.
10. Implementation of CPU Scheduling algorithm,
11. Implementation of memory management algorithm.
12. Implementation of interprocess Communication.

Note: Minimum **EIGHT** practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
VLSI DESIGN (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction:

History of HDL: Brief history of VHDL, brief history of Verilog. Structure of VHDL and Verilog module: Structure of Entity / Module, Port. Operators in VHDL and Verilog: Logical, Relational, Arithmetic Shift and Rotate Operators. Data types of VHDL and Verilog. Types of Architecture use in VHDL and Verilog: Behavioral Description, Structural Description, Switch level Description, Data-flow Description, Mixed-type Description. Simulation and Synthesis and comparison between them.

Lectures 10, Marks 20

UNIT II

Data-flow Description (VHDL / Verilog): Structure of Data-flow Description: Signal declaration and Signal assignment statements, Concurrent Signal assignment statements, Constant declaration and assignment statements, Assigning a delay to the signal assignment statements, VHDL / Verilog Programming using Data-flow description and Common errors occurs during programming.

Behavioral Description (VHDL / Verilog): Structure of Behavioral Description for both VHDL/Verilog. VHDL variable assignment statement. Sequential statements for VHDL / Verilog: IF statement, Signal and variable (only for VHDL) assignment, Case statement, Loop statement. VHDL/ Verilog Programming using Behavioral description and Common errors occur during programming. **Lectures 10, Marks 20**

UNIT III

i) Structural Description (VHDL / Verilog): Organization of structural design, Binding, State machines, Generic (VHDL), Parameter (Verilog), VHDL / Verilog Programming using Structural description and Common errors occurs during programming.

ii) Switch Level Description (VHDL / Verilog): Single NMOS and PMOS switches: NMOS and PMOS switch description for VHDL / Verilog, Serial and parallel combinations of switches. Switch level description of: Primitive gates, Combinational logics, Sequential circuits. CMOS switch. Bidirectional switches.

iii) Procedures (VHDL), Task (Verilog) and Functions (VHDL / Verilog) **Lectures 10, Marks 20**

UNIT IV

Mixed type Description (VHDL / Verilog): User defined data types in VHDL, VHDL Packages, Implementation of Arrays, and Mixed-type Description Programming.

Advanced HDL Description (VHDL / Verilog): File processing in VHDL / Verilog. VHDL record types. Programming of File processing for VHDL / Verilog.

Architecture of Xilinx 9500 series CPLD. **Lectures 10, Marks 20**

UNIT V

Xilinx Spartan 4000 series FPGA.

Testing of Logic Circuits:

Fault model, path sensitizing, random test. Design of testability, BIST (Built in self test), Boundary scan test.

Introduction to various Debugging Tools .Introduction to Simulation Tools.

Introduction to Digital Pattern Generator and Logic Analyser. Advantage of Logic Analyzer with built in Digital Pattern Generator over Simulator. **Lectures 10, Marks 20**

References:

1. John F. Wakerly - Digital Design, Principles and Practices, Pentice Hall Publication.
2. Nazeib M. Botros - HDL programming Fundamentals VHDL and Verilog , Thomson.
3. Stephen Brown and Zvonko Vranesic - Fundamentals of Digital Logic with VHDL design, McGraw Hill
4. Douglas Perry - VHDL , Tata MC-Graw Hill
5. Xilinx data manual - The Programmable Logic data Book
6. Sudhakar Yalamanchil - An Introduction to VHDL from Synthesis to Simulation
7. Bhaskar – A VHDL Primer, Pearson
8. Zwolinski – Digital System Design with VHDL, Pearson

List of Practical:

Minimum **EIGHT** Practical on VHDL / Verilog coding, simulation and synthesis with implementation on CPLD / FPGA devices. and test performance using 32 channel pattern generator integrated with logic analyzer apart from verification by simulation with tools . Use the pattern generator to generate input signal and truth tables. (PC Based instruments may also be used)

Simulation, Synthesis, and Implementation and observe Real-time validation using pattern generator and Integrated logic Analyzer:

Group A. Combinational Logic: (At least THREE of the following must be covered)

1. Write VHDL code to realize all the logic gates

2. Write a VHDL program for the following combinational designs
   a. 2 to 4 decoder
   b. 8 to 3 (encoder without priority & with priority)
   c. 8 to 1 multiplexer
   d. 4 bit binary to gray converter
   e. Multiplexer, demultiplexer, comparator

3. Write a VHDL code to describe the functions of a Full Adder Using following modeling styles.
4. Write VHDL code to display messages on the given seven segment display and LCD and accepting Hex key pad input data

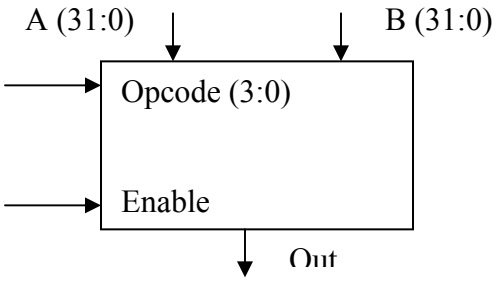
Group B. Sequential logic: (At least THREE of the following must be covered)

1. Develop the VHDL codes for the following flip-flops,
   SR, D, JK, T.

2. Design 4 bit binary, BCD counters (Synchronous reset and Asynchronous reset) and “any sequence” counters.
3. Implementation of 8 – Bit Left / Right Shift Register.

Group C. Implement 32 bit ALU for any (Arithmetic / Logical) Function.
(At least ONE of the following must be covered)

Write a model for 32 bit ALU using the schematic diagram shown below.(example only)



- ALU should use combinational logic to calculate an output based on the four bit op-code input
- ALU should pass the result to the out bus when enable line in high, and tri-state the out bus when the enable line is low.
- ALU should decode the 4 bit op-code according to the given in example below

OPCODE	ALU OPERATION
1.	A + B
2.	A - B
3.	A Complement
4.	A * B
5.	A AND B
6.	A OR B
7.	A NAND B
8.	A XOR B

Group D. INTERFACING (At least Two of the following must be covered)

1. Write VHDL code to control speed, direction of DC and Stepper motor
2. Write VHDL code to accept 8 channel Analog signals, Temperature sensors and display the data on LCD panel or seven segment displays.
3. Write VHDL code to generate different waveforms (Sine, Square, Triangle, Ramp etc.,) using DAC change the frequency and amplitude.
4. Write VHDL code to simulate Elevator operations
5. Write VHDL code to control external lights using relays.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I

BROADBAND COMMUNICATION (ELECTIVE I)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Switching Techniques:

Introduction, circuit switching, Routing for circuit switching networks, control signaling. Common channel signaling, Packet switching, Packet size, X.25 protocol, packet level, sequence of events. Comparison of circuit and packet switching.

Lectures 10, Marks 20

UNIT II

Frame Relay:

Introduction, Frame relay protocols, architecture, comparison with X.25 protocol, frame mode call control, call control protocol. Frame relay congestion control, Congestion, Approaches, traffic rate management, explicit congestion avoidance, implicit congestion control. **Lectures 10, Marks 20**

UNIT III

ISDN:

Introduction to ISDN, IDN, Principles of ISDN, Evolution of ISDN, ISDN Standards, Architecture, Transmission structure, User network interface configuration, ISDN protocol architecture, ISDN Connection, Addressing. Inter Networking ISDN – ISDN, ISDN – PSTN, ISDN – CSPDN. **Lectures 10, Marks 20**

UNIT IV

ATM:

Overview, Virtual channels, Virtual paths, VP and VC switching, ATM cells, Header format, Generic flow control, Header error control, Transmission of ATM cells, Adaptation layer, AAL services and protocols. ATM switching building blocks, ATM cell processing in a switch, Matrix type switch, Input, Output buffering, central buffering, Performance aspects of buffering switching networks. **Lectures 10, Marks 20**

UNIT V

Broadband standards:

Broadband ISDN Standards, Broadband Services, Broadband Architecture, User network interface. Broad band ISDN protocol, architecture, physical layers, SONET / SDH. **Lectures 10, Marks 20**

References:

1) Williams stallings - ISDN and Broadband ISDN with frame Relay and ATM , PHI , 4TH Ed
1) Mischa Schwartz - Broadband Internet Network, PHI
2) Bernand Forozen. - Data Communication. and Networking, TMH
3) Balaji kumar - Broadband Communication, MGH

List of Practical:

- Simulation of any one of the PSTN switch Configuration (T / S / T Switch)
- Implementation of congestion control algorithm
- Implementation of routing algorithm (Shortest path)
- Case Study – ISDN – ISDN and ISDN - PSTN

Note: Minimum **EIGHT** practicals are to be performed, based on the syllabus.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
PROJECT I

Teaching scheme:
Practicals: 2 hrs / week

Examination scheme:
Oral : 25 Marks
Term Work : 25 Marks

1. Every student individually or in a group (group size is of 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work.) shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester. .

3. Project title should be precise and clear. Selection and approval of topic:

   Topic should be related to real life application in the field of Electronics and Telecommunication

   OR

   Investigation of the latest development in a specific field of Electronics or Communication or Signal Processing

   OR

   The investigation of practical problem in manufacture and / or testing of electronics or communication equipments

   OR

   The Microprocessor / Microcontroller based applications project is preferable.

   OR

   Software development project related to VHDL, Communication, Instrumentation, Signal Processing and Agriculture Engineering with the justification for techniques used / implemented is accepted.

   OR

   Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.

5. The group is expected to complete details system design, layout etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

6. One guide will be assigned at the most three project groups.

7. The guides should regularly monitor the progress of the project work.

8. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Documentation	Attendence	Total	Evaluation (10%)	Presntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).

10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.

11 .The evaluations at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - I
SEMINAR

Teaching scheme:
Practical: 2 hrs / week

Examination scheme:
Term Work : 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory 1) Implementation 2) Methodology
        3) Application 4) Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.

5 ASSESSMENT OF SEMINAR for TERM WORK
Title of seminar: _____
Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection	Literature Survey	Report Writing	Depth of understanding	Presentation	
			5	5	5	5	5	25

6 . Assessment of Literature survey will be based on
    a. Collection of material regarding history of the topic.
    b. Implementation.
    c. Recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)

9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
TELEMATICS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Oral : 25 Marks
Term work : 25 Marks

UNIT I

Telephone switching and Traffic Engineering:

Evolution of telecommunication, simple telephone communication, basics of switching systems Dialing mechanism, electronics switching, digital switching system, SPC configuration , Architecture features, centralized and distributed SPC, enhanced services.

Traffic Engineering, Introduction, Traffic usages, traffic measurement unit, traffic distribution, Grade of service Blocking probability, Numericals on above topics. **Lectures 10, Marks 20**

UNIT II

Switching networks

Single stage and multistage switching N/W, blocking probability, Lee's model to evaluate blocking probability of three stage network , concept of time division time switching, time multiplexed time and space switching, combination switch ST, TS, STS, TST stages, Brief description of combination switching. **Lectures 10, Marks 20**

UNIT III

Mobile cellular Telephony:

Limitations of conventional mobile Telephone system, Frequency band allocation, Basic cellular system components, operations of a cellular. Calculation of maximum number of calls per hour per cell, frequency channels per cell, concept of frequency reuse, cell splitting: Hand off mechanism, Delayed hand off, Forced hand off. Mobile assisted hand off. Cell site hand off, Inter system hand off, co-channel Interference reduction factor, fading. Multi-user communication . TDMA, FDMA and CDMA. **Lectures 10, Marks 20**

UNIT IV

Digital cellular systems:

GSM, radio aspects, features of GSM. Architecture details channel structure, security aspects, Authentication and ciphering key. Different call flow sequences in GSM, North American CDMA cellular standard , radio aspect, forward link and Reverse link structure, key features of standard. **Lectures 10, Marks 20**

UNIT V

IP telephony

Introduction to VOIP, low level protocols, - RTP / RTCP / UDP, voice activity detection and discontinuous transmissions. IP telephony protocols: - H.323 standard, session Initiation protocol (SIP), Gateway location protocol, QOS requirements, RSVP Architecture, message format , reservation merging. **Lectures 10, Marks 20**

References :

1. Vishwanathan - Telecommunication switching systems , PHI
2. William C.Y. LEE - Wireless and cellular Telecommunications, MGH , 3rd Ed.
3. Raj Pandya - Mobile and personal communication systems , PHI
4. Rappaport - Wireless communication , PHI
5. Alberto Leon Garcia - Communication network, TMH
6. Andreas F. Molisch - Wireless communication, Wiley

List of Practical:

1. Study of Electronic Telephone exchange (C-Dot OR E-10B)
2. Traffic Measurement calculations
3. Mobile Transmitter and Receiver (Trainer Kit)
4. To study GSM architecture
5. To Study cordless Telephone system
6. To study CDMA
7. To study VOIP
8. To study RSVP Architecture.
9. Study of DTMF signaling including DTMF decoder
10. Study of GSM AT commands.

Note: Minimum **EIGHT** practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

TELEVISION AND CONSUMER ELECTRONICS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Basic concept of Television: TV broadcasting, Scanning methods, Synchronization, Aspect ratio, Kell factor, Horizontal and Vertical resolution, video bandwidth, positive and negative modulation. Composite video signal. **Camera Tubes:** Image Orthicon, Vidicon, Plumbicon, Saticon, Silicon diode array, **Television transmission:** VSB transmission, TV channels, TV standards, TV Channels bands, block diagram of monochrome TV receiver. **Lectures 10, Marks 20**

UNIT II

Colour Television receivers: Colour fundamentals, compatibility, frequency interleaving, colour mixing. Colour camera tube, picture tubes – static and dynamic convergence, colour purity. PAL, SECAM, NTSC system concept, encoder and decoder and their comparison. Colour TV transmitter and receiver block diagram. **Lectures 10, Marks 20**

UNIT III

Advanced TV system and techniques: Introduction to digital compression technique : GPEG, MPEG.,Block diagram of digital TV:- transmitter and receiver, HDTV- transmitter and receiver, DTH system, Video on demand. Introduction of Plasma and LCD TV. Cable TV. Introduction of 3D DTV system. CCTV, digital terrestrial TV (DTT). **Lectures 10, Marks 20**

UNIT IV

Methods of sound, video recording and reproduction: Disc recording, magnetic recording, optical recording- CD and DVD. Monophony, stereophony, Hi-Fi system. **PA system:** Block diagram, requirement, characteristics, its planning for various uses. Introduction to satellite radio reception (word space) **Lectures 10, Marks 20**

UNIT V

Modern Home Appliances : Block Diagram and working of FAX Machine, Washing Machine, Microwave Oven, Video Games, CD and DVD players, Digital diary. **Internet Applications:** E-mail, FTP, WWW. Solar Cells and Panels. Introduction to Palm Top, Pen Drive. **Lectures 10, Marks 20**

References:

1. A. M. Dhake - TV and Video Engineering , TMH
2. R. G. Gupta - TV Engineering and Video system , TMH
3. Kelth Jack - Video Demisified , Penram International
4. S. P. Bali - Colour TV Theory and Practice , TMH
5. Bernard Grobb, Charles E - Basic TV and Video system , TMH (6^{Th} Ed.)
6. R. R. Gulati - Monochrome and colour TV , New Age
7. Philips Handbooks on Audio, Video and Consumer Electronics application notes
8. Olson - High Quality Sound recording and reproduction

List of Practical:

1. Study of colour TV Receiver
2. Voltage and Waveform analysis for colour TV.
3. Alignment and fault finding of colour TV using wobbuloscope and pattern generator (02 Expts.)
4. Study of DTH and Set Top Box.
5. Study of CD / DVD player.
6. Practical Visit to TV transmitter / Studio.
7. Study of PA system with cordless microphone.
8. Study of Audio System, MP3 player, Satellite radio.
9. Study of HDTV.
10. Study of Digital TV.
11. Web page designing.
12. Study of Tape recorder

Note: Minimum **EIGHT** practicals are to be performed

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
SATELLITE COMMUNICATIONS

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Term work : 25 Marks

UNIT I

Introduction: General background, frequency allocations for satellite services, basic satellite system, system design considerations, applications. **Satellite Orbits:** Introduction, laws governing satellite motion, orbital parameters, orbital perturbations, Doppler effects, geostationary orbit, antenna look angles, antenna mount, limits of visibility, Earth eclipse of satellite, sun transit outage, inclined orbits, sun-synchronous orbit, launching of geostationary satellites.

Lectures 10, Marks 20

UNIT II

Wave Propagation and Polarization: Introduction, atmospheric losses, ionospheric effects, rain attenuation, other impairments, antenna polarization, polarization of satellite signals, cross polarization discrimination, ionospheric depolarization, rain depolarization, ice depolarization. **Satellite Antenna:** Antenna basics, aperture antennas, parabolic reflectors, offset feed, double reflector antenna shaped reflector systems. **Lectures 10, Marks 20**

UNIT III

Link Design: Introduction, transmission losses, link power budget equation, system noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, intermodulation noise. **Multiple Access Techniques:** Introduction, FDMA, TDMA, FDMA / DMA, operation in a multiple beam environment, CDMA, multiple access examples .

Lectures 10, Marks 20

UNITT IV

Satellite Transponder: Transponder Model, Satellite front end, RF filtering of digital carrier, Satellite signal processing Transponder limiting. **Communication Satellites:** Introduction, design considerations, lifetime and reliability, spacecraft sub systems, spacecraft mass and power estimations, space segment cost estimates. **Earth Stations:** Introduction, design considerations, general configuration and characteristics. **Lectures 10, Marks 20**

UNIT V

Non Geostationary Orbit Satellite Systems: Introduction, reasons, design considerations, case study, example of systems. **Satellite Applications**: INTELSAT Series, INSAT, VSAT, DBS Television and Radio, Remote sensing, Mobile satellite services: GSM and GPS, Satellite navigation system, DTH, Internet Connectivity, Video Conferencing.

Lectures 10, Marks 20

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References:

1. M. Richharia - Satellite Communications systems, Mc Millan publication ,2nd Ed.
2. Dennis Roddy - Satellite Communications, Mc-Graw Hill publication , 3rd Ed.
3. Timothy Pratt, Charles Bostian, Jeremy Allnut - Satellite communications , John Wiley & Sons , 2nd Ed.
4. J. Martin - Communication Satellite Systems, PHI Publication.
5. Robert M. Gagliardi - Satellite Communication , CBS Publishers and Distributors , 2nd Ed.

Term Work: It is 50% based on theory and 50% based on minimum FIVE assignments on above syllabus (one assignment for each unit)

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
EMBEDDED SYSTEM (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Embedded system Introduction:

Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Lectures 10, Marks 20

UNIT II

System Architecture:

Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I / O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc. **Lectures 10, Marks 20**

UNIT III

Interfacing and Programming:

Basic embedded C programs for on-chip peripherals studied in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc. **Lectures 10, Marks 20**

UNIT III

Real Time Operating System Concept:

Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to Ucos II RTOS, study of kernel structure of Ucos II, synchronization in Ucos II, Inter-task communication in Ucos II, memory management in Ucos II, porting of RTOS.

Lectures 10, Marks 20

UNIT V

Embedded Linux:

Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, Network. Some debug techniques- Syslog and strace, GDB, TCP / IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using pThreads - Threads verses Processes and pThreads, Linux and Real-Time Standard kernel problems and patches. **Lectures 10, Marks 20**

References:

1. Rajkamal - Embedded Systems, TMH.
2. David Simon - Embedded systems software primer, Pearson
3. Steve Furber - ARM System-on-Chip Architecture, Pearson
4. Jean J Labrose - MicroC / OS-II, Indian Low Price Edition
5. DR.K.V.K.K. Prasad - Embedded / real time system, Dreamtech
6. Iyer, Gupta - Embedded real systems Programming , TMH
7. Steve Heath - Embedded System Design , Neuwans

LAB EXERCISE

- Integrated Development Environment Overview (Project creation, down load and debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR / STR, SMT / LDM)

List of Practical:

GROUP - A

1) Writing basic C-programs for I / O operations
2) C-Program to explore timers / counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

GROUP - B

5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

GROUP - C

7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD
9) Program to interface stepper motor

GROUP - D

10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.

uCOS II / Embedded Linux RTOS Examples

GROUP - E

14) Interfacing 4 x 4 matrix keyboards and 16 x 2 characters LCD displays to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
15) Writing a scheduler / working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

GROUP - F

16) Implement a semaphore for any given task switching using RTOS on microcontroller board.
17) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

GROUP – G

18) RTOS based interrupt handling using Embedded Real Time Linux.
19) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

GROUP – H

20) Program for exploring Message Queues using Embedded Real Time Linux.
21) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note: 1) At least **ONE** practical should be performed from **EACH GROUP**.
2) **TWO** practical should be performed using the **JTAG debugger / on-board Debugger- emulator.**

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
DIGITAL IMAGE PROCESSING (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Digital Image Processing:

Introduction, Examples of Fields that use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of Image Processing Systems, Image Sensing and Acquisition, Image Sampling and Quantization, Representing Digital Images, Spatial and Gray level Resolution, Basic pixel relationship, Distance Measures, Statistical Properties: Histogram, Mean, Standard Deviation, Introduction to DCT, Walsh, Hadamard, and Wavelet Transform.

Lectures 10, Marks 20

UNIT II

Image Enhancement:

Enhancement in Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancements using arithmetic and logical operations, Basics of Spatial Filtering, Smoothening and Sharpening Spatial filters, Enhancement in Frequency Domain: Smoothening and Sharpening frequency Domain Filters. **Lectures 10, Marks 20**

UNIT III

Image Coding and Compression:

Image Coding Fundamentals, Image Compression Model, Error Free Compression, VLC, Huffman, Arithmetic, RLC, Lossless Predictive Coding; Lossy-Compression, Lossy Predictive Coding, Transform Coding, Discrete Cosine Transform, Image Compression Standards, JPEG Baseline Coder Decoder. **Lectures 10, Marks 20**

UNIT IV

Image Restoration and Color Image Processing:

Image Degradation Model, Noise Models, and Restoration in Presence of Noise in spatial Domain, Linear Filtering, Inverse Filter, Wiener Filter, Constrained Least Square Restoration, Geometric Transformation, Spatial Transformation, and Grey Level Transformation. Color Image Processing, Color Image Fundamentals, Color models, RGB to HIS and vice versa, Color Transforms, Smoothing and Sharpening **Lectures 10, Marks 20**

UNIT V

Image Segmentation:

Image Segmentation: Point, line, Edge detection, Canny Edge Detection, Second Order Derivative, Hough Transform, Thresholding, Region Based Segmentation, Region Growing, Region Splitting and Merging, Image Representation, Chain Codes, Signature, Texture, Use of Principal Component for Description. **Lectures 10, Marks 20**

References:

1. Gonzalez and Woods - Digital Image Processing, Pearson Education/ PHI.
2. Arthur Weeks Jr - Fundamentals of Digital Image Processing, PHI.
3. A. K. Jain - Digital Image Processing, PHI
4. Pratt - Digital Image Processing, Wiley
5. Castleman - Digital Image Processing, Pearson

List of Practical:

1. Study of different file formats e.g. BMP, TIFF and extraction of attributes of BMP.
2. Study of statistical properties- mean, standard deviation, profile, variance and Histogram plotting.
3. Histogram equalization and modification of the image.
4. Gray level transformations such as contrast stretching, negative, power law transformation etc.
5. Spatial Domain filtering- smoothing and sharpening filters.
6. DCT / IDCT of given image.
7. Edge detection using Sobel, Prewitt and Roberts operators.
8. Capturing image through grabber card from camera and Process it.
9. Pseudo coloring.
10. Converting color image to B / W image and vice versa
11. Creating noisy image and filtering using MATLAB

Note: Minimum **EIGHT** practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

NEURAL NETWORK AND FUZZY SYSTEM (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction:

Biological neurons and their artificial model. Models of neuron: McCulloch-pitts Model, Perceptron, Adaline ,Topology: Basic structures of artificial neural network , Basic learning laws: Hebb's law, Perceptron learning law, Widrow and Hoff LMS learning law, Correlation learning law, Instar and Outstar learning law, Learning Methods: Hebbains learning , Competitive learning, Differential competitive learning , Error correction learning, Reinforcement learning, Stochastic learning.

Lectures 10, Marks 20

UNIT II

Perceptron Layer Network:

Perceptron learning Rule. Perceptron architecture: Single neuron Perceptron, Multiple-Neuron perceptron. Training Multiple neuron Perceptron. Limitations of Perceptron.

Supervised Hebbian Learning:

Linear association, Hebbs rule, Performance analysis, Variation of Hebians rule. Performance Surfaces and Optimum points: Taylor's series, Directional derivatives, Necessary condition for Optimality. **Lectures 10, Marks 20**

UNIT III

Widrow - Hoff Learning:

ADALINE Network, Single ADALINE, Mean square error, LMS algorithm, Analysis of convergence, Adaptive Filtering: Adaptive noise cancellation, Echo cancellation.

Backpropogation Network:

Multilayer Perceptron: Pattern classification, Function approximation. Back propagation algorithm: Performance index, Chain rule, Back propagation the sensitivity. **Lectures 10, Marks 20**

UNIT IV

Fuzzy Mathematics:

Classical sets, fuzzy sets, Fuzzy set operations, Procedure of Fuzzy Sets, Crisp Relations, Fuzzy Relations, Operation of Fuzzy Relations , Fuzzy Tolerance and Equivalence Relations membership functions, Defuzzyfication Methods. Manipulation of Linguistic Variables. **Lectures 10, Marks 20**

UNIT V

Application of Neuro - fuzzy System : Introduction to Neuro **-** Fuzzy System. Types of Neuro – Fuzzy nets, Neuro – Fuzzy Systems Design and implementation.

Fuzzy classification by equivalence relations: C-means clustering, hardening relations from clustering, Fuzzy pattern recognitions. Control applications: Control system design stages, Control Surface, System Identification Problem, Simple Neuro - Fuzzy Logic Controller, Industrial applications. **Lectures 10, Marks 20**

Reference Books:

1 Fausett - Fundamentals of Neural networks : Architectures, Algorithnors Applications , Pearson
2 B. Yegnanarayana - Artificial Neural Networks, Prentice Hall of India, New Delhi
3 Martin T. Hagan - Neural Network Design , PWS Publishing company (A devision of International Thomson Publishing Inc.)
4 J.M. Zurada - Introduction to Artificial Neural Network, Jaico Publishing House
5 Meherotra Kishan ,Mohan C.K, Ranka Sanjay - Elements Of Artificial Neural networks, Penram Int Pub Mumbai.
6 D.E Goldberg , Addision - Genetic Algorithm in Search Optimization and Machine Learning, Wesley Publication
7 Kalyanmoy Deb - Optimization for Engineering Design Algorithms and Examples, Prentice Hall of India New Delhi
8 George J. Klir / Bo Yuan - Fuzzy Sets And Fuzzy Logic, Prentice Hall of India New Delhi / Pearson
9 T. J. Ross - Fuzzy Logic With Engineering Application , McGraw hill Inc. 1995.

Practical: All the Practicals are based on Any Concerns Software .

1. Design and implementation of artificial neural network to compute XOR for two inputs using feedback artificial neural network.
2. Design a perceptron network to solve Classification problem with different classes of input vectors.(Take two or more classes of input vectors)
3. Design the Perceptron model for pattern recognition. (Take prototype pattern as example)
4. Simulate Adaline algorithm.
5. Implement Back-propagation simulator.
6. Find out the Fuzzy Relation of the given Fuzzy Sets.
7. Verify any one Defuzzification method.
8. Fuzzy pattern recognition.
9. Design any control system using fuzzy logic in simulink

Note: Minimum **EIGHT** practicals are to be performed.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II

TELECOMMUNICATION NETWORK MANAGEMENT (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Foundations and TMN architecture:

Network management standards, network management model, organization model, information model, abstract syntax notation 1 (ASN. 1), encoding structure, macros, functional model. Terminology, functional TMN architecture, Information architecture, physical architecture, TNN tube, TMN and OSI **Lectures10, Marks 20**

UNIT II

Network management application functional requirements:

Configuration management, fault management, performance management, error correlation technology, security management, accounting management, service level management, management service, community definitions, capturing the requirements, simple and formal approaches, semi formal and formal notations **Lectures10, Marks 20**

UNIT III

Information service element and modeling for TMN:

CMISE model, service definitions, errors, scooping and filtering features, synchronization, functional units, association services, common management information protocol specification. Rationale for information modeling, management information model, object oriented modeling paradigm, structure of management information, managed object class definition, management information base (MIB) **Lectures10, Marks 20**

UNIT IV

Simple Network Management Protocol:

SNMPv1: managed networks, SNMP models, organization model, information model, **SNMPv2:** communication model, functional model, major changes in SNMPv2, structure of management information (SMI), MIB, SNMPv2 protocol compatibility with SNMPv1, **SNMPv3:** architecture, applications, MIB security, remote monitoring SM and MIB, RMON1 and RMON2.

Lectures10, Marks 20

UNIT V

Network management examples and tools:

ATM integrated local management interface, ATM, MIB M1, M 2, M 3, M 4 interfaces, ATM digital exchange interface management, digital subscriber loop (DSL) and asymmetric DSL technologies, ADSL configuration management, performance management, network statistics management, network management system, management platform case studies: OPENVIEW, ALMAP **Lectures10, Marks 20**

References:

1. Mani Subramanium - Network management principles and practice , Pearson Education
2. Lakshmi Raman - Fundamentals of Telecommunication Network Management, PHI
3. Airdarous Salah - Telecommunication Network Management Technologies and implementations, PHI

List of Practical:

1. Connectivity of LAN computer to internet using dial up modem / leased line modem (installing and configuration)
2. Installation and configuration of network application like telnet.
3. Users creation, rights assignment, mappling drives, sharing files, printers etc using SNMP. Study and analysis of network
4. Design and implementation of network based on number of nodes and traffic.
5. Implementation of routing algorithms (software based) any TWO practicals, (shortest path)
6. Implementation of encryption and decryption (software based)
7. Campus networking – case study

Note: Minimum **EIGHT** practicals are to be performed, based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
NANO –TECHNOLOGY (ELECTIVE II)

Teaching scheme:
Lectures: 4 hrs / week
Practical: 2 hrs / week

Examination scheme:
Theory Paper: 100 Marks (3 Hours)
Practical : 25 Marks
Term work : 25 Marks

UNIT I

Introduction to physics of solid state, Structure of Energy Bands-Insulators, Semiconductors, conductors, Effective masses, Fermi surfaces, localized Particles-Donors, Acceptors, Deep traps.

Nano, size of matter, different kind of small, Nano Challenges, Fundamental science behind Nanotechnology, Electrons, Atoms, Ions, Molecules, Metals, Other material, Biosystems, Molecular Recognition, Electrical conduction and ohm's law, Quantum Mechanics, Quantum ideas **Lectures 10, Marks 20**

UNIT II

Investing and manipulating materials in Nano scale, Electron Microscopies, Scanning probes Microscopies, optical Microcopies for nanoscience and technology
Tools for Measuring Nanostructures, Scanning Probe Instrument, Nanoscale Lithography
Tools for measuring Nanostructures, Scanning probe Instrument, Nanoscale Lithograpthy, Dip. Pen. Lithography, E beam Lithogaphfy, Nanosphere Lithographty, Polarizmatization, nanobricks and building Blocks. **Lectures 10, Marks 20**

UNIT III

Carbon Nano tubes –Synthesis and purification, Filling of Nano tubes, Mechanism of Growth, Electronic Structure, Transport Properties, Mechanical properties, Physical properties, Applications of Nano Tubes such as Field emission and shielding , Computer, Fuel Cell, chemical sensors
Properties of Nanotubes- strength and elasticity, Uses of Nano tubes
Smart Materials, Sensors, nanoscale Bio structure, Energy capture, Transformation and storage, Optics, Electronics, Natural nano scale Sensor, Electromagnetic sensors, Electronics Nose. **Lectures 10, Marks 20**

UNIT IV

Building blocks digital better, Linking brains with computer, FET to SET fabricating new chips, Quantum wells, wires, Dots - preparation of quantum Nanostructures
Synthesis of Quantum Dots - General strategies, Synthesis in Confined Media, Uses of Nano particles.
Semiconductor Quantum Dots, Synthesis of Quantum dots, Electronic Structure of Nanocrystals **Lectures 10, Marks 20**

UNIT V

Nanoelectronics – Introduction, The tools of manufacturing of Micro and nanofabrication optical Lithography, Electron Beam lithography, atomic lithography, Quantum Information and quantum computer , How is quantum computer works and difference between the classical computer.
Application in Medical, Understanding how pharmaceutical, Companies develop drug, Delivering new drug Technology, Oil and Water won't help, Mincells, special delivery cancer with Nanoshell. **Lectures 10, Marks 20**

References:

1. Mark Ratnakar, Daniel Ratnakar – Nanotechnology : A gentle Introduction to Next Big Idea, Prentice hall of India
2. Richard Booker, Eart Boy sen - Nanotechnology Fun and easy way, Wiley
3. Charles P. Poole J.V. Frank J. Owens - Introduction to Nanotechnology , Wiley India ISBN
4. T. Pradeep - Nano: The essentials, understanding Nanoscience and Nanotechnology , TMH
5. Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Ragase - NANOTECHNOLOGY basic science and emerging technologies - Overseas press ISBN81 -88689 - 20-3

Note: Minimum **EIGHT** practicals are to be performed, based on above syllabus

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
INDUSTRIAL VISIT / CASE STUDY

Teaching scheme: **Examination scheme:**
NIL **Term Work : 25 Marks**

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
   (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Electronics or in Electronics and telecommunication Engineering branch.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (ELECTRONICS, ELECTRONICS AND COMMUNICATION, ELECTRONICS AND TELECOMMUNICATION)

W.E.F : 2008- 09

TERM - II
PROJECT II

Teaching scheme:
Practicals: 4 hrs / week

Examination scheme:
Oral : 50 Marks
Term Work : 100 Marks

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.)
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.

9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

10. The Project work should be kept in department for one academic year after University Examination .