GOVT. COLLEGE OF ENGINEERING, AMRAVATI

(An Autonomous Institute of Government of Maharashtra)

B.Tech. (Electronics and Telecommunication)

Curriculum for VII and VIII semester

Department of Electronics and Telecommunication
2009-2010

Approved in Academic Board (Senate) meeting held on 22-05-09

Govt. College of Engineering, Amravati

DEPARTMENT OF ELECTRONICS and TELECOMMUNICATION

DEPARTMENT OF ELECTRONICS and TELECOMMUNICATION

SCHEME FOR B.TECH.

Sem III													
Course Code	**Name of the Course**	**Teaching Scheme**				**Evaluation Scheme**							
						Theory				**Practical**		**Total**	**Credits**
		Theory Hrs /week	**Tutorial Hrs/week**	**Practical Hrs/week**	**Total**	**TA**	**CT1**	**CT2**	**ESE**	**Internal**	**External**		
ET301	Engineering. Maths III	4	---	---	4	10	15	15	60	---	---	100	4
ET302	Component Devices andTechnology	4	---	---	4	10	15	15	60	---	---	100	4
ET303	Electrical Engineering.	4	---	---	4	10	15	15	60	---	---	100	4
ET304	Electronics Devices and Circuits	4	1	---	5	10	15	15	60	---	---	100	5
ET305	Instrumentation	4	---	---	4	10	15	15	60	---	---	100	4
ET306	General Proficiency I		---	**2**	2	---	---	---	---	50	---	50	2
ET307	Component Devices andTechnology Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET308	Electrical Engineering. Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET309	Electronics Devices and Circuits Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET310	Instrumentation Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
Total		**20**	**1**	**10**	**31**	**50**	**75**	**75**	**300**	**150**	**100**	**750**	**27**
Sem IV													
ET401	Engineering. Maths IV	4		---	4	10	15	15	60	---	---	100	4
ET402	Fundamentals of communication	4	1	---	5	10	15	15	60	---	---	100	5
ET403	Digital Electronics	4	---	---	4	10	15	15	60	---	---	100	4
ET404	Network analysis	4	---	---	4	10	15	15	60	---	---	100	4
ET405	Humanities and Economics	4	---	---	4	10	15	15	60	---	---	100	4
ET406	General Proficiency II	---	---	2	2	---	---	---	---	50	---	50	2
ET407	Engineering. Maths IV Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET408	Fundamentals of communication Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET409	Digital Electronics Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET410	Network analysis Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
Total		**20**	**1**	**10**	**31**	**50**	**75**	**75**	**300**	**150**	**100**	**750**	**27**

TA :Teacher Assessment **CT: Class Tests** **ESE: End Semester Examination : Duration two hours thirty minutes**

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Sem V													
Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							Credits
						Theory				Practical		Total	
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT 1	CT 2	ESE	Internal	External		
ET501	Electromagnetic fields	4	---	---	4	10	15	15	60	---	---	100	4
ET502	Consumer electronics	4	---	---	4	10	15	15	60	---	---	100	4
ET503	Power Electronics	4	---	---	4	10	15	15	60	---	---	100	4
ET504	Analog Circuits	4	1	---	5	10	15	15	60	---	---	100	5
ET505	Control System Engineering.	4	---	---	4	10	15	15	60	---	---	100	4
ET506	Electromagnetic fields Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET507	Consumer electronics Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET508	Power Electronics Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET509	Analog Circuits Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET510	* Laboratory I	---	---	2	2	---	---	---	---	25	25	50	2
Total		**20**	**1**	**8**	**31**	**50**	**75**	**75**	**300**	**125**	**125**	**750**	**27**
Sem VI													
ET601	Linear Integrated Circuits	4	---	---	4	10	15	15	60	---	---	100	4
ET602	Communication Engineering	4	---	---	4	10	15	15	60	---	---	100	4
ET603	Microprocessor and its Interfacing	4	1	---	5	10	15	15	60	---	---	100	5
ET604	Computer Oriented Operation Research	4	---	---	4	10	15	15	60	---	---	100	4
ET605	Industrial Management and Quality Control	4	---	---	4	10	15	15	60	---	---	100	4
ET606	Linear Integrated Circuits Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET607	Communication Engineering Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET608	Microprocessor and its Interfacing Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET609	Computer Oriented Operation Research Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET610	Minor Project	---	---	2	2	---	---	---	---	25	25	50	2
Total		**20**	**1**	**10**	**31**	**50**	**75**	**75**	**300**	**125**	**125**	**750**	**27**

TA :Teacher Assessment CT: Class Tests ESE: End Semester Examination : Duration two hours thirty minutes

*** Laboratory-I -Experiments will be based on all subjects**

Sem VII				
Course	**Name of the Course**	**Teaching Scheme**	**Evaluation Scheme**	**Credits**

Approved in Academic Board (Senate) meeting held on 22-05-09

Govt. College of Engineering, Amravati

Code						Theory				Practical		Total	
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	Internal	External		
ET701	Digital Communication	4	1	---	5	10	15	15	60	---	---	100	4
ET702	Digital Signal Processing	4	---	---	4	10	15	15	60	---	---	100	4
ET703	Electronics Circuit Design	4	---	---	4	10	15	15	60	---	---	100	4
ET704	Fiber Optics Communication	4	----	---	4	10	15	15	60	---	---	100	4
ET705	Elective I	4	----	---	4	10	15	15	60	---	---	100	4
ET706	Digital Signal Processing Laboratory	----	---	2	2	---	---	---	---	25	25	50	1
ET707	Electronics Circuit Design Laboratory	----	----	2	2	---	---	---	---	25	25	50	1
ET708	Fiber Optics Communication Laboratory	----	----	2	2	---	---	---	---	25	25	50	1
ET709	Project and seminar	---	---	4	4	---	---	---	---	100	--	100	4
Total		20	1	10	31	50	75	75	300	175	75	750	27
Sem VIII													
ET801	Digital System Design	4	---	---	4	10	15	15	60	---	---	100	4
ET802	Microwave Engineering.	4	---	---	4	10	15	15	60	---	---	100	4
ET803	Elective - II	4	---	---	4	10	15	15	60	---	---	100	4
ET804	Elective -III	4	---	---	4	10	15	15	60	---	---	100	4
ET805	Digital System Design Laboratory	----	---	2	2	---	---	---	---	25	25	50	1
ET806	Microwave Engineering. Laboratory	---	---	2	2	---	---	---	---	25	25	50	1
ET807	* * Laboratory II	---	---	2	2	---	---	---	---	25	25	50	1
ET808	Project	---	---	6	6	---	---	---	---	100	100	200	8
Total		16	---	12	28	40	60	60	240	175	175	750	27

TA :Teacher Assessment CT: Class Tests ESE: End Semester Examination : Duration two hours thirty minutes

** Laboratory-II -Experiments will be based on Elective III

Elective I

A. Microprocessor peripherals and Microcontrollers
B. Biomedical Engineering. ,
C. Fuzzy Logic and Neural Network ,
D. Computer Organization and Architecture

Elective - II

A. Wireless Communication
B. Satellite Communication
C. Computer Network and communication
D. Speech processing

Elective - III

A. Digital Image Processing,
B. Very Large Scale Integration Design
C. System Software
D. Bioinformatics

Approved in Academic Board (Senate) meeting held on 22-05-09

ET701 DIGITAL COMMUNICATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Digital communication system: Introduction to digital signal, difference between analog and digital system, advantage of digital system over analog, elements of digital communication system, source encoder, decoder, channel encoder, decoder, modulator, and demodulator.

Information and channel capacity: Measure of information, entropy and Information rate of independent and dependent sequences, source encoding , Shannon's encoding algorithm, Huffman encoding algorithm, discrete communication channel, capacity of discrete communication channel. Shannon's theorem on channel capacity.

Base band transmission: Discrete PAM signals, power spectra of discrete PAM signals, baseband binary data transmission system, inter symbol interference, Nyquist's criteria for distortionless baseband binary transmission, correlative coding, duobinary signaling, modified duobinary technique, equalization, eye diagram, self synchronization for baseband PAM system, scrambler and unscrambler.

Digital modulation techniques : Digital carrier modulation schemes, binary ASK, PSK, FSK coherent scheme, probability of errors, comparison of digital modulation systems, basics of DPSK, QPSK, MSK. Synchronization, carrier synchronization, symbol synchronization.

Error controlling and coding : Introduction to error control coding, methods of controlling errors, type of errors and code, linear block codes, matrix description of linear block code, error detection and error correction capabilities of linear block code, cyclic code.

Modern techniques of communication: Introduction to mobile communication, cellular mobile telephone architecture, frequency assignments, frequency reuse, cell splitting, call initialization, call termination, handover. Multiple access schemes TDMA, FDMA, CDMA, spread spectrum communication, D.S. spread spectrum, frequency hoping spread spectrum, comparison.

Text Books:

1. Digital and Analog Communication Systems, Shanmugam K.S,John 2nd edition, Wiley and Sons, 1996 .
2. Digital Communication, Simon Haykin, 1st edition, John Wiley and Sons, 1996.

Reference Books:

1. Digital Communication, Proakis J. K, 2nd edition , Mc-Graw Hill Book Co., London, 2008.
2. Mobile Cellular Telecommunications Systems, Wcy Lee, 1st edition, Mc-Graw Hill International Editions, 1990 ,
3. Principles of Communication Systems, Taub, Herbert, Schilling D.L, Mc-Graw Hill International Book Co, 1986.
4. Modern Digital and Communication Systems , Lathi B. P., Holt Rinchart and Winston Inc, 1993.

Approved in Academic Board (Senate) meeting held on 22-05-09

ET 702 DIGITAL SIGNAL PROCESSING

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to DSP: Frequency domain definition, description, properties of typical signals and systems, discrete time sequences and systems, definition, representation and properties of discrete time signals and linear time invariant systems, convolution and correlation, stability criteria of discrete time systems, linearity unit sample response, solution of linear difference equations.
Z- Transform: Direct Z transform and inverse Z transform, properties, complex Z-plane, ROC determination of filter coefficients, analysis of LTI systems in Z- domain, relationship between Fourier transform and Z-transform.
Fourier analysis: Introduction to Fourier transform of discrete time signal, properties and application of F.T., inverse Fourier transform, sampling and reconstruction of continuous time signal from sequences, Fast Fourier Transform
(FFT), algorithms, decimation in time and frequency, circular convolution and linear convolution from DFT.
Design of Filters: Filter categories, direct form I, direct form II, cascade and parallel structure for IIR and FIR filter, analog filter types, butter worth, elliptic filter, specification and formulae to decide filter order, methods to convert analog filter into IIR digital.
Digital Filters: Steps in filter design, FIR design by frequency sampling method, design by pole zero placements, FIR filter design by windowing method, rectangular, triangular and Blackman window, IIR approximation of derivatives, impulse invariant, bilinear, matched Z transformation.
Multi rate DSP: Introductory concept of multi rate signal processing, decimators and interpolator, filter banks, applications, design of practical sampler, rate converters, multistage implementation for sampling rate conversion, introduction to DSP processors.

Text Books:

1. Digital Signal Processing, Proakis and Monolakis, 3rd edition PHI, 1996 .
2. Digital Signal Processing, Mitra S.K., 3rd edition TMH, 1998.

Reference Books:

1. Discrete Time processing , Oppenhavm and Scheffer, PHI, 2002.
2. DSP and Multi rate Systems , P.P. Vaidyanathan, PHI, 2004.
3. Digital Signal Processing, Ifeachorand Jervis, 2rd edition, PHI, 2002.
4. Digital Signal Processors , B.Venkatramani and M. Bhaskar, TMH.

ET703 ELECTRONIC CIRCUIT DESIGN

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Regulated power supply : Design of regulated power supply using transistor as a regulated power supply, op-amp regulator, three-terminal regulator, switching power supplies, heat sinks

Op-amp circuits : Design of DC amplifier, comparator, window detectors, scaling and summing amplifier using IC741 / IC 3245 or equivalent.
Waveform generators and Filters : Design of waveform generator using IC 741, IC 8038, IC 566, design of sweep generator, voltage controlled oscillator, design of IC 555 based circuits, design of first and second order filters, design of notch filter.
Instrumentation amplifier: Design of instrumentation amplifier, temperature controller /indicator using thermocouple, resistance thermal detector and thermister.
Circuit design using MULTI-SIM : Design and simulation of analog /digital circuits, study of import of VHDL/Verilog models, import/export of SPICE models, and export to standard PCB design packages.
Introduction to VHDL : Basic language elements, behavioral modeling, sequential processing, data types, attributes, configurations, synthesis and synthesis issues, RTL simulation, place and route, introduction to VERILOG.
Design using HDLs : Design of combinational blocks such as adders, MUX, DEMUX , encoders, decoders, ALU, design of sequential circuits, asynchronous and synchronous design, issues, state machine modeling (moore and mealy machines).

Text Books :
1. Op-amp and linear integrated circuits, R.A. Gayakwad, 4th editionPrentice-Hall Inc, 2000.
2. VHDL Primer, J.Bhasker, 3rd edition, Pearson Education,2001.

Reference Books:
1. A Monogram of Electronic circuit design , Goyal-Khetan
2. VHDL , Douglas L. Perry, 3 rd edition, Mc- Graw Hill publication.
3. Applications and design with analog integrated circuits, J. Michael Jacob, 2nd edition, , Pearson Education, 2007.

ET704 FIBER OPTIC COMMUNICATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to fiber optic: Basic optic principles, snell's law, manufacturing of fiber, different manufacturing techniques, different splicing techniques and connectors.

Optical fiber properties: Theory of circular wave guide, modes in optical fibers, Single mode fiber, multimode fiber, numerical aperture (N.A), power flow. attenuation, absorption losses, bending losses, scattering losses, dispersion, intra modal - intermodal dispersion, and bandwidth parameters. nonlinear effect in single-mode fiber.

Optical sources and detectors: Optical emission from semiconductors, LED, power efficiency, double heterojunction LED, Basic concept of Lasers, semiconductor injection lasers, optical detection principle, absorption, quantum efficiency, responsivity, PIN photo diode, detector noise characteristics, avalanche photo diode(APD) and noise in photodiode, metal semiconductor metal(MSM) photo detectors.

Principles of fiber optic communication: Analog and digital transmission, digital coding , electrical and optical bandwidth, dispersion effects, bandwidth and data rate, dynamic range, noise and bit error rate.

Optical transmitters, receivers, fiber optics test and measurement: Optical transmitter, receiver, digital system planning consideration, power budgeting coherent and non

coherent system, modulation and demodulation scheme, wavelength multiplexing, optical switches, measure fiber output power, perform decibel and dBm power measurement, use of optical time domain

reflectometer (OTDR).

Optical amplifiers and networks: Erbium doped fiber amplifer (EDFA), photonic switching, optical– SONET/SDH, optical interfaces, ring topology, star architecture

Text Books :

1. Optical Fiber Communication and Application, Senior J.M., 3rd edition, PHI, 1998.
2. Optical Fiber Communication, Gerd Keiser, 4th edition, TMH, 2008.

Reference Books:

1. Optical Communication System , Gowar, 3rd edition, Prentice Hall India. , 2000.
2. Fiber optic communication technology, D.F Mynbacv and L. Scheiner, 3rd edition, Pearson Education, 2001.

ET705 ELECTIVE I
(A)MICROPROCESSOR PERIPHERALS AND MICROCONTROLLERS

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Interfacing Devices with 8085: Architecture and programming of programmable DMA controller 8237, programmable internal timer/counter 8253, architecture and functioning of floppy disk controller 8272.
Computer peripherals of interfacing: CRT controller 8275, architecture and function of programmable DOT matrix printer controller 8295, USART 8251.
Analog to Digital and Digital to Analog conversion techniques: Case study of ADC 0809, ADC 1210, DAC0808, DAC 1008 and their interfacing with microprocessor, use of ADC in applications like measurement of temperature, flow, speed and pressure.
Microcontroller 8051: Architecture of 8051, signal description, register set, timer structure and their modes, input/output port structure, interrupts and serial port modes, Instruction set of 8051, addressing modes, memory and I/O addressing , programming using 8051.
PIC microcontroller: Introduction to PIC microcontroller, PIC 16C6X/7X, file selection register (FSR), memory organization, instruction set, addressing modes, I/O ports, interrupts, PIC 16C61/71 timers, PIC 16C71 analog to digital converter(ADC), introduction to ARM processor.

Text Books:

1. Microprocessor Interfacing Programming and Hardware, D.B.Hall and V.Douglas, 2nd edition, TMH Book Co. New York, 1991.
2. The 8051 microcontroller, Kenneth Ayala, 3rd edition, Delmar Cengage Learning, 2005.

Reference Books:

1. Advanced microprocessors and Peripherals, A.K.Ray and K.M.Bhurchandi, 2nd edition, Tata McGraw Hill, 2008.
2. Design with PIC microcontrollers, John B. Peatman, 1st edition, PHI, 1998.
3. Fundamentals of microprocessors and microcomputers, B.Ram, 4th edition, Dhanpat Rai publication, 2004.
4. 8051 Microcontroller and Embedded System, Muhammad Ali Mazidi, 2nd edition, Prentice Hall, 2000.

ET705 ELECTIVE I
(B) BIOMEDICAL ENGINEERING.

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Anatomy and Physiology : Elementary ideas of cell structure, heart and circulatory system, control nervous system, musclo-skeletal system, respiratory system, body temperature and reproduction system.

Biomedical Equipment ,Signals and Their recording: Diagnostic, therapeutic and clinical laboratory equipment, bioelectric signals (ECG, EMG, EOG and ERG) and their characteristics, bio-electrodes, electrodes tissue interface, contact impedance, types of electrodes, electrodes for ECG, EEG and EMG.

Transducers for Biomedical Application: Resistive transducers - muscle force and stress (strain gauge), spirometry (potentiont) ,humidity(gamstrers), respiration (thermistor)**,** inductive transducers- flow measurements, muscle movement (LVDT) capacitive transducers - heart sound measurement, pulse pick up photoelectric transducers - pulse transducers, blood pressure, oxygen analyses, piezoelectric transducers - pulse pickup, ultrasonic blood flow meter, chemical transducer- Ag-alfalfas (electrodes, PH electrode).

Signal recording machines and Patient Monitoring system: Physiological pre-amplifier and specialized amplifiers, ECG lead systems details, ECG, EMG, and EEG machines, heart rate measurement pulse rate measurement, respiration, rate measurement, blood pressure measurement, microprocessor applications in patient monitoring.

X- Ray Machine and **Safety Aspect for Medical :** Basic X-ray components and circuits, types of X-ray machines e.g. general purpose, dental image intensifier system, table shooting and maintenance of X- ray machine, gross current, micro current shock, safety standards rays and considerations, safety, testing instruments, biological effects of X-rays and precautions ,operation and function of all the controls of dental X-ray machine, Computerized Axial Tomography (CAT), computerized aided ECG analysis, computerized catheterization.

Text Books :

1. Hand book of Medical instruments R.S. Khandpur , 6th edition, 2004,TMH
2. Biomedical Instrumentation and Measurement, Carr and Brown, 3rd edition, Pearson Education,1996.

Reference Books :

1. Principles of Applied Biomedical Instrumentation ,Goddes and Baker, 4th edition, John Wiley, 1986.
2. Medical Instrumentation, John. G. Webster , 2nd edition, John Wiley, 2006.
3. Medical Electronics and Instrumentation, Sanjay Guha , 5th edition

University Publication, 2006.

ET705 ELECTIVE I
(C) FUZZY LOGIC AND NEURAL NETWORKS

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction of Neurons: Biological neurons and their artificial models, introduction to neural computing, components of neuron, input and output weight, threshold, weight factors, transfer functions.
Supervised Learning : Introduction, single layer network, perceptron, linear separability, training algorithm and limitations ;multilayer network: architecture of feed forward network, learning rule, generalized delta rule, learning function;back propagation algorithm.
Unsupervised Learning: Introduction, counter propagation networks, Kohonen's self organizing maps, Hopfield networks.
Fuzzy Sets: Introduction , uncertainty in information, basic concepts of fuzzy sets, operations on fuzzy sets, properties; fuzzy relations, operations, properties, value assignments.
Membership functions : Features, fuzzification, membership value assignments, fuzzy rule based systems, graphical technique of inference, defuzzification :lambda-cuts for fuzzy sets and fuzzy relations, defuzzification methods.
Applications: Fuzzy pattern recognition, feature analysis, partitioning of feature space, single sample identification multi feature pattern recognition, simple fuzzy logic controller: control system design stages, assumptions in a fuzzy control system design, general fuzzy logic controllers, simple examples.

Text Books

1. Introduction to Artificial Neural Systems, J.M. Zurada , 1st edition, Jaico Publishing House, 2004.
2. Fuzzy Logic with Engineering Applications, Timothy Ross, 2nd edition, Wiley, 2004.

Reference Books

1. Neural Networks in Computer Intelligence, Limin Fu, 1st edition, McGraw Hill, 2003.
2. Neuro-Fuzzy and Soft Computing, Jang, Sun, 1st edition, Mizutani, Pearson Education, 2004.
3. Neural Networks and Fuzzy systems, Kosko Bart , 1st edition, PHI, 1992.

ET705 ELECTIVE I
(D) COMPUTER ARCHITECTURE AND ORGANIZATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Computer performance considerations, performance measures, speed up techniques.
Processor Basics: CPU organization , fundamentals, additional features, data representation , basic formats, fixed-point numbers, floating-point numbers, instruction sets, instruction formats, instruction types, programming considerations.

Datapath Design: Fixed-point arithmetic, addition and subtraction, multiplication and division, arithmetic-logic units, combinational ALUs, sequential ALUs, advanced topics, floating-point arithmetic and pipeline processing.
Control design: Basic concepts, hardwired control, design examples, microprogrammed control, basic concepts, multiplier control unit, CPU control unit, pipeline control, instruction pipelines, pipeline performance, superscalar processing.
Memory Organization: Memory systems, multilevel memories, address translation, memory allocation, cache memories, main features, address mapping
Introduction to Parallel Processing: Processor-level parallelism, multiprocessors, fault tolerance.

Text Book:

1. Computer Architecture and Organization, John P.Hayes , 3rd edition McGraw Hill,1998.
2. Computer system Architecture, Mano Morris, 3rd edition ,Prentice Hall of India ,New Delhi, 1993

Reference Books:

1. Structure Computer Organization, Tanenbaum A.S, 5th edition,Prentice Hall of India, New Delhi, 2006.
2. Computer Organization and Architecture, William Stallings, 6th edition, Prentice Hall of India

ET706 DIGITAL SIGNAL PROCESSING LABORATORY

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed
List

1. To perform folding, shifting, time scaling operation on discrete time signal
2. To perform scalar addition and multiplication
3. Perform autocorrelation and cross correlation on signal
4. Write MATLAB code to evaluate impulse response of given difference equation
5. Write MATLAB code to find poles and zeros and express H[Z] in factored form
6. Compute FFT of different signals and sequence
7. Study of design of Butterworth and Chebyshev analog / digital filter
8. FIR filter design using window technique (rectangular window)
9. Write MATLAB code to transform an analog into digital IIR filter using impulse invariance method

ET707 ELECTRONICS CIRCUIT DESIGN LABORATORY

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. To design and realize a transistorized series pass low voltage regulator
2. To realize a astable multivibrator using IC 555 Timer.
3. To realize a monostable multivibrator using IC 555 Timer.
4. To design a First order high pass filter using op-amp IC 741.
5. To design a second order low pass filter using op-amp IC 741.
6. To design a triangular wave generator using op-amp IC 741.
7. To design Voltage controlled oscillator using IC 566.
8. To design Window detector using op-amp IC 741.
9. To realize and simulate an electronic circuit and to carry out I-V analysis using MultiSIM-9.
10. To realize and simulate an electronic circuit and to carry out frequency analysis using MultiSIM-9.
11. To realize and simulate an electronic circuit with an import/export to various other packages using MultiSIM-9.

ET708 FIBER OPTICS COMMUNICATION LABORATORY

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. Optical fiber cable as a light guide
2. Fiber optic cable transmission
3. Characteristics of connectors and splices
4. Index-matching procedures
5. Fiber optic transmitter
6. Receiver design
7. Fiber termination techniques
8. Investigate reflection, refraction and critical angle.
9. Measure wavelengths of light using the techniques of Young, Michelson and Lloyd.
10. Test a lens for defects, collimate light and evaluate a person's visual perception skills.
11. Capture light in optical fiber and investigate fiber optics phenomena.
12. View a hologram, observe interference rings and measure diffraction patterns with a ruler.

13. Determine the index of refraction of a liquid or transparent solid by measuring bending in the intense laser beam as it enters or leaves the material.
14. Study characteristics of light: wavelength, interference, diffraction and polarization.

ET709 PROJECT AND SEMINAR

Teaching Scheme: 04P Total: 04 Credit: 04
Evaluation Scheme: 100 Internal Total Marks: 100

100 marks divided in two parts, 50 marks for Seminar and 50 marks for project work

A. Seminar :

1. Student shall select a topic for seminar which is not covered in curriculum. Student shall complete the conceptual study of the selected topic and expected to know functional and technical details of selected topic
2. Before end of semester students shall deliver a seminar and submit seminar report in proper format consisting of
    - Literature survey
    - Concept
    - Functional and Technical detail
    - Present status
    - Future scope
    - Application
    - Comparison with similar technique
    - References
3. Student shall deliver a seminar on report submitted which shall be assessed by two examiner (one should be guide) appointed by HOD

B. Project :

1. Students have to complete project work in VIIth and VIIIth semester. In general a group of 4 -5 student should be allowed to complete one project
2. In VIIth semester student shall complete literature survey and finalized the topic for project. They shall submit synopsis on the selected topic to HOD. On approval of project topic , they shall complete the design work and procure the required components.
3. Before the end of the semester student shall submit one copy of progress report in proper format covering the total work completed by the group
4. There shall be oral exam based on report submitted by student. The oral examination shall be conducted by two examiner (one should be guide) appointed by HOD

ET801 DIGITAL SYSTEM DESIGN

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to digital logic : Review of switching algebra, boolean algebraic theorems, function of binary variables, standard form of logical functions, minimization methods of

boolean functions, K-map up to five variables, Quine Mcclusky method, don't care conditions and it's effects.

Combinational logic :Analysis and synthesis of AND – OR, universal gates, combinational logic design using 74/54 series MSI chips concerning to binary parallel adders, Look-ahead carry adder construction , multiplexers, demultiplexer, decoders, encoders, comparators, code converters, priority encoders, parity generator/ checker and BCD-to-seven segment decoder.

Programmable logic devices : Combinational logic design using PLDs like ROM array, PLA, PAL, preliminary design concepts using CPLDs and FPGAs.

Synchronous Sequential circuits : Design of counter and sequential networks, analysis of clocked sequential networks, general models of sequential machines, mealy and moore machine, equivalence and minimization networks, derivation of state graph and tables, reduction of state assignments.

Asynchronous Sequential circuits: Analysis of asynchronous sequential networks, derivation and reduction of primitive flow tables, state assignments and realization of flow tables, hazards, asynchronous sequential network design.

Fault detection and location : Fault detection and location in combinational circuits, path sensitizing method, Equivalent - Normal-Form (ENF) method,
Two-level fault detection, fault detection and location in sequential circuits using circuit test approach.

Text Books :

1. Fundamental of Logic Design, Charles H. Roth Jr., 4th edition, Jaico , 2003. Publication.
2. Digital Circuit and Logic Design S.C. Lee, 3rd edition, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Modern Digital Electronics R.P.Jain, 3rd edition, TMH Publication, 2003.
2. Digital Electronic Circuits and Systems, N.M. Morris, 2nd edition , Mac millan Press.
3. Fault Tolerant and Fault Testable Hardware Design , Parag K. Lala, B.S.

ET802 MICROWAVE ENGINEERING

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Microwave communication: Introduction, Microwave Spectrum and Bands, Applications of Microwaves.

Rectangular waveguides: TE/TM mode analysis, expressions for fields, characteristic equation and cut-off frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross-section, mode characteristics – phase and group velocities, wavelengths and impedance relations power transmission and power losses in rectangular guide, related problems, introduction to circular wave guide.

Microstrip lines: Introduction, Zo relations, effective dielectric constant, losses, Q factor.

Microwave tubes: Limitations and losses of conventional tubes at microwave frequencies, microwave tubes – O type and M type classifications. O-type tubes, two cavity klystrons structure, velocity modulation process and applegate diagram, bunching process and small signal theory, expressions for o/p power and efficiency. reflex klystrons structure, applegate diagram and principle of working, mathematical theory of bunching, power output,

efficiency, electronic admittance, oscillating modes and o/p characteristics, electronic and mechanical tuning, related problems, significance, types and characteristics of slow wave structures; structure of TWT and amplification process (qualitative treatment), suppression of oscillations, nature of the four propagation constants, gain considerations.

M-type tubes: Introduction, cross-field effects, magnetrons – different types, eight cavity cylindrical travelling wave magnetron, Hull Cut-off and Hartree Conditions, modes of resonance and PI mode operation, separation of PI mode, o/p characteristics.

Microwave solid state devices: Introduction, classification, applications. varactor diode, step recovery diode, parametric amplifiers, tunnel diode, gunn diode, negative resistance amplifier, PIN diode, IMPATT and TRAPATT diodes, MASAER'S.

Wave guiding system (passive components): Microwave passive components, terminator, attenuator, phase changer, directional coupler, hybrid junction, microwave propagation in ferrites, devices employing, Faraday rotation scattering matrix formulation for N port junction

Microwave resonators and filters: Basic resonant circuits RLC, transmission line resonators, Fabry Perot resonator, rectangular and circular cavities and their Q, transmission line filter, quarter wave and direct coupled cavity filter.

VHF, UHF And microwave antennas: Arrays with parasitic elements, Yagi - Uda arrays, folded dipoles and their characteristics, reflector antennas, flat sheet and corner reflectors, paraboloidal reflectors, geometry, characteristics, types of feeds, F/D ratio, spill over, back lobes, aperture blocking, off-set feeds, cassegrainian Feeds. horn Antennas, types, optimum Horns, design, characteristics of pyramidal horns, lens antennas, geometry, features, dielectric Lenses and Zoning, applications.

Text Books:

1. Microwave Devices and Circuits, , Samuel Y. Liao, 3rd edition, PHI, 1994.
2. Antennas for All Applications, , John D. Kraus and Ronald J. Marhefka, 3rd edition, Tata McGraw- Hill, 2003.

Reference Books

1. Microwave Engineering Passive Circuits, Peter A. Rizzi, 1st edition, PHI,1999.
2. Electronic and Radio Engineering, F.E. Terman,4th edition, McGraw-Hill,1955.
3. Foundations for Microwave Engineering, R.E. Collin, 2nd edition, IEEE Press, John Wiley, 2002.
4. Electromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2nd edition, PHI, 2000.

ET803 ELECTIVE II

(A) WIRELESS COMMUNICATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to wireless communication system: Evolution of cellular mobile systems(1st, 2nd, 3rd generation), A basic cellular system, cell shape, concept of frequency reuse, hand off strategies, power control operation of cellular systems, example of cellular calls.

Cellular concept - system design fundamentals: Frequency assignments, channel assignment strategies, co-channel and non-co-channel interference, cellular system capacity, performance criteria, trunking and grade of service, improving coverage and capacity in cellular system.
Multiple access technique for wireless communication: FDMA, TDMA, FHMA, SDMA, Packet radio. Mobile Radio propagation and Antennas, radio propagation mechanism, path loss modeling and signal coverage, multipath propagation, fading, doppler shift, fast and slow fading, control of fading in mobile systems, Antennas at cell site, mobile antenna, diversity.
Wireless systems and standards: GSM system architecture, radio subsystem, channel types, frame structure, signal processing in GSM, CDMA (IS-95), frequency and channel specifications, forwardand reverse CDMA channel.
Cordless systems and WLL: Introduction to cordless systems, CT2 and DECT standards, DECT architecture, DECT frame format and radio link, DECT operation, IEEE802.16 ,role of WLL, propagation considerations for WLL, LMDS and MMDS.
Wireless LAN: Overview of wireless LAN, wireless LAN technologies, infrared, spread-spectrum, narrow band microwave LAN, mobile data networks, CDPD, GPRS, WAP.
Bluetooth: Overview, radio specification, base band specification, link manager specifications.

Text Books:

1. Mobile Cellular Telecommunications, William CY Lee., 2nd edition, 1995, MGH
2. Wireless Communications Principles and Practice , Theodore S. Rappaport, 2nd edition, Pearson Education, 2002.

Reference Books :

1. Wireless Communications and Networks, William Stallings, 3rd edition, Pearson Education, 2003.
2. Principles of Wireless Networks , K. Pahlavan and P. Krishnamurthy, 2nd edition, Pearson Education , 2002.
3. Mobile Communications, Jochen Schiller, 2nd edition, Pearson Education, 2002.
4. The Essential Guide to Wireless Communication Applications , Andy Dornam, 3rd edition, Pearson Education, 2003.

ET803 ELECTIVE II
(B) SATELLITE COMMUNICATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Overview of satellite systems: Introduction to satellite frequency bands, satellite types – LEO,MEO, GEO and HEO, communication satellite system, orbit, modulation, transmission and multiplexing, India's advancement in satellite program a brief history.
Orbits and launching methods: Kepler's law, orbital aspects of satellite communication, orbital period and velocity, effects of orbital inclination, azimuth and elevation, converge angle and slant range, orbit determination, orbit perturbations orbital effects in communication, system performance, launch vehicles and propulsion.

Satellite channel: Radio wave propagation, polarization, antennas, atmospheric losses, receiver noise, carrier to noise ratio, satellite link analysis, frequency reuse and depolarization.

Satellite Transponder: The transponder model, satellite front end, RF filtering of digital carriers, satellite signal processing, transponder limiting, nonlinear satellite amplifier, RF link.

Multiple access: Principles of frequency multiple access system, FDMA channelization, principles of TDMA system, satellite effects on TDMA performance, code division multiple access, synchronized, non-synchronized CDMA,DAMA, antijam advantages of spectral spreading, comparison of Multiple access techniques.

Application of satellite communication: Earth station technology and satellite services, earth station design, tracking, equipment for earth station, domestic satellite systems using small earth stations, VSAT, Global positioning system, satellite navigation, direct broadcast satellite television and radio, satellite services and the internet.

Text Books :

1. Satellite Communication, Robert M.Gagliardi, 1st edition, CBS publications and Distributors, 1987.
2. Satellite Communication, Pratt Timothy, Bostian W.Charles and Jeremy Allnutt, 2nd edition, Willey International Publication, 2003.

References:

1. Satellite Communication, Dennis Roddy, 3rd edition, 2001,Mc-Graw Hill
2. Satellite Communication systems engineering, Wilbur L, Henri, Robert, 2nd edition, Pearson Education, 2003.
3. www.isro.org

ET803 ELECTIVE II
(C) COMPUTER NETWORK AND COMMUNICATION

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction: Communication network, data communication, components of data communication, data representation, and data flow.

Types of communication networks: LAN, MAN, WAN, LAN topologies, bus, ring, star, network models, OSI model, layered architecture, various layers in OSI model in detail, introduction to circuit switching, packet switching, message switching.

Data Link control Protocols: ARQ retransmission strategy, stop and wait ARQ, go-back-N ARQ, selective repeat ARQ, piggybacking, sliding window protocol, framing, HDLC, SDLC, LAPD, queuing models.

Multiple Access Protocol: Channel allocation, random access methods - ALOHA, slotted ALOHA, CSMA, CSMA/CD, control access methods - polling, token passing by token ring, token bus.

TCP/IP Protocols : Overview of TCP/IP, UDP, IP address type, IP addressing and related issues, IP address resolution techniques, IP datagram and datagram forwarding.

Networking devices and routing techniques: Hubs, repeaters, bridges, routers, gateways, switches, routing switches, routing algorithms; fixed routing, random routing, flooding

routing, and adaptive routing.
Introduction to Ethernet: Frame relay, FDDI, introduction to SONET/SDH, ISDN and Broadband ISDN, introduction to BLUETOOTH technology architecture, layers and frame format in BLUETOOTH, introduction to electronic mail architecture, user agent, message transfer agent-SMTP, introduction to ATM technology, its architecture and layers.

Text Books :

1. Computer Networks , Andrew S. Tanenbaum, 4th edition, Prentice Hall Publications, 2002.
2. Data Communications and Networking, Behrouz Forouzan, 4th edition, Tata McGraw Hill Publications, 2006.

Reference Books

1. Computer Networks and Internets, Douglas E. Comer, 4th edition Prentice Hall Publications, 2003 .
2. Data and Computer Communications, William Stallings, 8th edition, Prentice Hall Publications, 2007.
3. Local Area Networks , Gerd Keiser, 2nd edition, Tata McGraw Hill Publications, 1989 .

ET803 ELECTIVE II
(D) SPEECH PROCESSING

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Nature of speech signal : Speech production mechanism, classification of speech, sounds, nature of speech signal, models of speech production ; speech signal processing: purpose of speech processing, digital models for speech signal ; digital processing of speech signals, significance, short time analysis.
Time domain methods for speech processing : Time domain parameters of speech, methods for extracting the parameters, zero crossings, auto correlation function, pitch estimation.
Frequency domain methods for speech processing : Short time fourier analysis, filter bank analysis, spectrographic analysis, format extraction, pitch extraction ; analysis synthesis systems.
Linear predictive coding of speech : Formulation of linear prediction problem in time domain, solution of normal equations, interpretation of linear prediction in auto correlation and spectral domains.
Homomorphic speech analysis : Central analysis of speech, format and pitch estimation.
Applications of sppech processing: Introduction of application based on speech recognition and speech synthesis.

Textbooks

1. Digital processing of speech signals, L.R. Rabiner and R.E Schafer, 1st edition, Prentice Hall, 1978.
2. Fundamentals of speech recognition, Signal Processing, Rabiner L. Juang B.H, 1st edition, Prentice Hall,1993.

Reference Books

1. Speech Analysis Synthesis and Perception, J.L Flanagan , 2nd edition, Sprenger Vertag,1972.
2. Principles of Computer Speech, I.H.Witten , 1st edition, Academic press ,1983.

ET804 ELECTIVE III
(A) DIGITAL IMAGE PROCESSING

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to digital image processing : Digital image fundamental, component of image processing system, elements of visual perception, simple image model, sampling and quantization, basic relationships between pixel, imaging geometry, Gray scale image representation.
Image Transforms: Introduction to the Fourier Transform, DFT, properties of two dimensional Fourier Transform, FFT, Hadamard, Harr DCT, slant transform.
Image enhancement, basic techniques, enhancement by point processing, spatial filtering, enhancement in frequency domain, histogram based processing, homomorphic filtering.
Image Restoration: Degradation model, diagonalisation concept, algebraic approach to restoration. inverse filtering, Weiner (CNS) filtering restoration in spatial domain, Basic morphological concept, morphological principles, binary morphology, Basic concepts of erosion and dilation.
Image Compression: Fundamentals, image compression models, elements of information theory, lossy and predictive methods, vector quantization, run length coding, Hauff coding, and lossless compression, compression standards.
Image Segmentation: Detection of discontinuities, edge linking and boundary detection, thresholding, region oriented Segmentation.

Text Books:

1. Digital Image Processing, Gonzalez and Woods, 2nd edition, Prentice Hall, 2005.
2. Digital Image Processing, A.K.Jain, 2nd edition, PHI, 2004.

Reference Books:

1. Digital Image Processing, William K. Pratt, 3rd edition, John Wiley, 2005.
2. Digital Image Processing and Computer Vision, Schalkoff R. J. , John Wiley and Son, 1988.

ET804 ELECTIVE III
(B)VERY LARGE SCALE INTEGRATION DESIGN

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to VLSI Circuits: MOS transistor switch, CMOS circuits and Logic design, realization of universal gates, compound gates, tristates, multiplexers, latches using MOS transistors, CMOS fabrication and layout **,**CMOS inverter, fabrication process, layout design rules, design flow, design entry, function simulation, planning, placement and routing.
MOS Transistor theory and modeling : Ideal I-V characteristics, C-V characteristics, MOS capacitance models, non-ideal I-V effects, analysis using CAD tools.

CMOS Processing technology : Wafer formation, well and channel formation, contacts and metallization, design rules, interconnects, circuit elements, Design Rule checking(DRC), manufacturing issues.
Circuit characterization and performance estimation : Resistance, capacitance and inductance estimation, delay estimation, delay models, transistor sizing, static and dynamic power dissipation, low power design, reliability issues.
CMOS logic design : Basic physical design of simple logic gates, design of CMOS NAND gate, adder cell, comparator circuit, RS latch, clock divider, shift registers, analog cells using CMOS layout design tool.
Analog integrated circuit design using CMOS : Single stage amplifier, differential amplifier, voltage regulator, Analog IC design, operational amplifier, Digital to Analog and Analog to Digital converters.

Text Books :

1. CMOS VLSI Design A circuits and systems perspective, Neil Weste, David Harris, Ayan Banerjee, 3rd edition, Pearson Education, 2006.
2. Basics of CMOS cell design, Etienne Sicard, Sonia Bendhia, 1st edition TMH Publications, 2005.

Reference Books:

1. CMOS Analog Circuit Design, Phillip E. Allen and Douglas R., 2nd edition, Holberg Oxford University Press Publication,2004.
2. "VLSI Digital signal processing systems Design and Implementation " K. K. Parhi; John Wiley and Sons

ET 804 ELECTIVE III
(C) SYSTEM SOFTWARE

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to system software: Assemblers, linkers, microprocessors, compilers, interpreters, loaders, compiler drivers, static linking, object files, reloadable object files, symbols and symbol tables, symbol resolution, relocation, executable object files, loading executable object files, dynamic linking with shared libraries, loading and linking shared libraries from applications, position independent code, tools for manipulating object files
Computer system overview : CPU registers, interrupts, memory hierarchy, cache memory, I/O communication techniques
Operating system overview : objectives and functions, evolution of operating systems, characteristics of modern operating systems like windows, Unix, Linux
Processes : process states, description, control, Unix SVR4 process management, processes and threads, symmetric multiprocessing, microkernels, windows thread, SMP management, Solaris thread, Linux process and thread management
Language processors: Introduction, language processing activities, fundamentals of language processing and language specification, language processor development tools.
Data structures for language processing: Search Data structures, allocation data structures.
Assemblers: Elements of assembly language programming, a simple assembly scheme, pass structure of assemblers, design of a two pass assembler, a single pass assembler for IBM PC.

Macros and macro processors: Macro definition and call, macro expansion, nested macro calls, advanced macro facilities, design of a macro pre-processor, linkers, relocation and linking concepts, design of a linker, self relocating programs, a linker for MS-DOS, linking for overlays, loaders.
Software tools: Software tools for program development, editors, debug monitors, programming environments, and user interfaces.
Statement of problem: Recognizing basic elements, recognizing syntactic units and interpreting meaning, intermediate form, arithmetic statements, non arithmetic statements, non executable statements, storage allocation, code generation, optimisation (machine independent), optimisation (machine dependent), assembly phase, general model of the compiler.
Phases of the compiler: Lexical phase, syntax phase, interpretation phase, optimisation, storage assignment, code generation, assembly phase, passes of the compiler.
Data structures: Introduction, implementation, recursion, call and return statements, storage classes, static, automatic, external control and based storage implementation, block structure, non-local go to's, interrupts, pointers.
Interpreters: Use and overview, pure and impure interpreters

Text books

1. Systems Programming and OS, Harshawardhan P.Bal, 2nd edition, TMH, 2004
2. Systems Programming , John Donovan, TMH,2000.

Reference books

1. Compilers principles, technique and tools, Alfred V Aho, Ravi Sethi, Jeffrey D Ulman, Addison Wesley Publication, 1986.
2. Modern compiler implementation in C 2nd edition, Andrew Appel, Cambridge, 1998.

ET 804 ELECTIVE III
(D) BIOINFORMATICS

Teaching Scheme : 04L Total: 04 Credit : 04
Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE Total Marks: 100
ESE duration : 2 hrs 30 min.

Introduction to bioinformatics: Introduction to LINUX, changing password, ending the session, lock facility, window basics, controlling windows and scroll bars, GUI in Red Hat LinuxVersion9.0,accessories, internet, programming, system tools, preferences and miscellaneous.
PERL and JAVA: Overview of PERL, installation of PERL and tools for its programming, Examples in bioperl reverse compliment program. Overview of JAVA, tools for its programming, examples, brief analysis of swing program.
Sequence database and sequence analysis : Entrez, pubmed, medline and pubmed central, analysis of gene bank flat file with example, tools within NCBI, KEGG, fly base, miRNA registry, eukaryotic promoter database, database searches, algorithms, substitution matrices, gap penalty.
BLAST and FLASTA: Karlin altshul statistics, analysis of blat results an overview of different blat like programs, gapped-blast, PSI-blat and PHI-blast, blast andinformation theory, UCSC browser and BLAT, fasta, analysis of fasta results.

Genome sequencing and Maps: Sanger method, shot gun approach, human genome, genome annotation, gene ontology, physical maps, genetic maps, cytogenetic maps, Marshfield map, radiation hybrid maps, Stanford map, SNP and HAP map.
Analysis Tools: Bioinformatics programming tool kit, proteome analysis through LC-MS, NMR, x-ray crystallographic analysis, microscopic image analysis and automated gel analysis, network pathway analysis and metabolomics software, facilities in bioconductor.

Text books

1. Bioinformatics-A modern approach, Vittal R. Srinivas, 1st edition, PHI publisher, 2005.
2. Bioinformatics concepts Skills and application C.Rastogi, Namita Mendirata and Parag Rastogi , 3rd editionCBS publisher, 2003.

Reference books

1. Bioinformatics a practical guide to analysis the genes and proteins 2nd edition, Andreas D. Baxevanisand B.F. Francis Quellette, John Wiley, 2002.
2. Bioinformatics-Principles and Application 3rd edition, Harshawardhan P.Bal, TMH ,2005.
3. Introduction to Bioinformatics 2nd edition, Arthur M. Lesk, Oxford University, 2002.

ET805 DIGITAL SYSTEM DESIGN LABORATORY

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. To design and realize a 4-bit binary subtractor using IC 7483.
2. To design and realize a one-digit BCD Adder using IC 7483.
3. To design a combinational logic circuit which detects a 4-bit binary number divisible by 03.
4. To realize a full adder using 4:1 multiplexers.
5. To implement a 4-bit Binary to Gray code converter using logic gates.
6. To design and realize a 5-bit comparator using IC 7485.
7. To design and realize a 4-bit even parity checker using EX-OR gates.
8. To design and realize a new flip-flop: E-T flip-flop.
9. To convert a J-K flip-flop to D-flip-flop and T-flipflop.
10. To realize a BCD to seven segments decoder based one-digit display.
11. To realize a 3-bit asynchronous counter.
12. To realize a 3-bit asynchronous counter with seven segment display.

ET806 MICROWAVE ENGINEERING LABORATORY

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. Study of the characteristics of the Klystron Tube.
2. Frequency and wavelength measurement.
3. Determination of standing wave ratio and reflection coefficient coefficient.
4. Impedance measurement.
5. Study of Magic Tee, Directional Coupler, Isolator, circulator and Attenuator.
6. Study of I – V characteristics oh Gunn Diode.
7. Measurement of the gain and polar pattern of various microwave antennas.
8. Study of various feature of Doppler RADAR

ET807 LABORATORY II
(A) DIGITAL IMAGE PROCESSING

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1) To study Image processing toolbox.
2) Image Arithmetic.
3) Determining the value of Individual pixels
4) Adjusting contrast and brightness of image.
5) Linear filtering using convolution and correlation
6) Study of Dilation and Erosion
7) Image Analysis: a)Edge detection b)Boundary tracing c)Line detection
8) Region based processing: Specifying a region of interest and filtering region
   Study of Image compression

ET807 LABORATORY II
(C)VERY LARGE SCALE INTEGRATION DESIGN

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. To write VHDL program for 1 : 4 decoder and implement on FPGA
2. To write VHDL program for a combinational logic circuit and its implementation on FPGA
3. To write VHDL program for a flip-flop (S-R, J-K, D, T Flip-flop) and implement on FPGA

4. To write VHDL program for a Finite State Machine (FSM), and implement on FPGA
5. To write VHDL program for a (asynchronous/ synchronous) counter and implement on FPGA
6. To design a basic CMOS inverter using a CMOS layout design tool.
7. To design a basic logic gate using a CMOS layout design tool.
8. To design an universal logic gate using a CMOS layout design tool.
9. To design a combinational logic using a CMOS layout design tool.

ET807 LABORATORY II
(C) SYSTEM SOFTWARE

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

List

1. Implementing a queue using linked list
2. Creating an expression tree and tree traversals.
3. Creating a mnemonic table using Hashing.
4. Implementing pass I of an assembler.
5. Implementing pass II of an assembler. (Synthesizing target code for the assembler using the output of Pass I).
6. Implementing of a macro-processor.
7. Implementing a lexical analyzer

ET807 LABORATORY II
(D)BIOINFORMATICS

Teaching Scheme: 02P Total: 02 Credit: 01
Evaluation Scheme: 25 Internal + 25 External Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum 08 experiments should be performed

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List

1. Installing Linux on computer
2. Implementing different Linux keyword and commands
3. Creating accounts and assigning different rights.
4. Creating and changing attributes of the files.
5. Understanding of various Unix command
6. Understanding concept of JAVA language
7. Creating applets in JAVA
8. Study of various Bioinformatics tools

ET808 PROJECT

Teaching Scheme: 06P Total: 06 Credit: 08
Evaluation Scheme: 100 Internal + 100 External Total Marks: 50

1. In continuation with the work completed in VII th semester, student shall complete the implementation of ideas given in synopsis, so that working model of project shall be complete before the end of semester.
2. Students shall submit final project report in proper format which shall include the work completed in VII th semester also.
3. HOD shall design an evaluation system to evaluate the progress of project work.
4. Final examination of project shall include demonstration of working model, presentation by student and oral examination based on total project work. Project work shall be accessed by guide and one external examiner.