

**MAHATMA GANDHI
UNIVERSITY**

B.TECH. DEGREE COURSE

8TH SEMESTER

**SCHEME
&
SYLLABUS**

2002

**ELECTRONICS
&
COMMUNICATION
ENGINEERING BRANCH**

ELECTRONICS & COMMUNICATION ENGINEERING

SCHEME

8TH SEMESTER

| Course Code | Course No: | Subject | Teaching periods | | | Uty. Exam duration (hours) | Marks | | | |
|-------------|------------|--------------------------------|------------------|---|--------------|----------------------------|-----------|--------|-----------|-------|
| | | | L | T | Prac./ Proj. | | Sessional | Theory | Practical | Total |
| | | | | | | | | | | |
| A | LA801 | Computer Networks | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| B | L802 | Advanced communication systems | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| C | LA803 | Advanced microprocessors | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| D | L804 | Television Engineering | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| E | L805 | Elective –II | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| F | L806 | Elective – III | 3 | 1 | 0 | 3 | 50 | 100 | - | 150 |
| G | L807 | Systems Lab | 0 | 0 | 3 | 3 | 50 | | 100 | 150 |
| H | L808 | Project design and seminar | 0 | 0 | 3 | - | 100 | | | 100 |
| I | L809 | Viva -voce | 0 | 0 | 0 | - | - | - | 50 | 50 |
| | | Total | 18 | 6 | 6 | | 450 | 600 | 150 | 1200 |

SYLLABUS

COMPUTER NETWORKS

LA 801

3+1+0

Module 1

Network goals -topologies- configurations-concept of internet- ISO-OSI 7 Layer Standard -peer processes-Functions of each layer-TCP/IP reference model - Transmission media -description and characteristics - base band and broad band transmission-synchronous and asynchronous -full duplex, half duplex links- Concepts of WAP technology.

Module 2

MODEMS-serial communication standards - X-21 digital interface- Need for data link layer-stop and wait and sliding window protocol-HDLC-terminal handling-polling-multiplexing- concentration-virtual circuit and data-grams - routing - congestion control.

Module 3

LAN- base band and broad band Lan's - carrier sense networks-CSMA/CD -ring network- shared memory -IEEE802 standards-introduction to X-25. Transport layer- design issues- establishing and releasing connection - flow control - buffering - crash recovery - a simple transport protocol on X-25.

Module 4

Session layer- design issues -data exchange - dialogue management - synchronization- remote procedure call-client server model - Presentation layer-data presentation-compression- network security-privacy- cryptography-presentation layer in ARPANET.

Module 5

Application layer - virtual terminal - file transfer protocol-E-mail-introduction to distributed system - ATM-protocol architecture -ATM logical connections -ATM cells -cell transmission- ATM adaptation layer -AAL protocols -basic principles of SDH and SONET.

References

1. Computer Networks: Andrew S Tannenbaum, Pearson Education.
2. An Engineering Approach to Computer Networking: Keshav, Pearson Education.
3. Computer Networking: A Top Down Approach: Kurose Pearson Education.
4. Computer Network & Internet: Comer, Pearson Education.
5. Data communication: Hausly
6. Computer Networks, protocols standards & interfaces, Uyless Balack
7. Local Area Networks: William Stallings, Pearson Education.

8. Understanding Data Communication and networks- 2nd ed-William A Shay
(Vikas Thomson Learning)

ADVANCED COMMUNICATION SYSTEMS

L802

3+1+0

Module 1

Satellite Communication - Satellite orbits – Geo synchronous orbit –orbital velocity – Round trip time delay - Antenna look angles - Satellite classifications - spacing - frequency allocation- System parameters analysis - link equations- Link Budget - Spacecraft subsystem (block schematic). Tracking and telecommand - Earth stations – Antenna systems – receiver subsystems (block) - functioning LNA – LNB - down converter - channel filters - demodulators- INTELSAT/INMARSAT –Overview of INSAT.

Module 2

Types of satellite communication system-FSS, DSS-Direct broadcasting and community broadcast - Multiple Access Techniques– Introduction- FDM-FM-FDMA, PSK-TDMA, SSMA, CDMA - Switching techniques – circuit – message - packet switching- Packet satellite network-domestic satellite system.

Module 3

The cellular concept – Introduction - Frequency reuse –channel assignment – Hand off strategies – prioritizing handoff –practical handoff – Co-channel interface and system capacity – channel planning – adjacent channel interference –Cell splitting – sectoring – repeaters – micro-cell concept- Blue tooth technology- Fundamentals and Applications.

Module 4

Wireless communication system-paging-cordless & cellular system –comparison- Second generation cellular networks-third generation cellular networks - Global System for Mobile – services and features – Architecture – Radio subsystem – channel types – frame structure - Global positioning Systems - basic concepts-system block - positioning – Applications.

Module 5

Spread spectrum Techniques and remote sensing- Pseudo noise sequences –time hopping-frequency Hopping – Robustness – Fast and Slow hopping – Hybrid & Chirp spread spectrum- Synchronization – acquisition – Tracking - Concepts of Jamming -Analysis of DS/SS – Analysis of avoidance-generation of signals-detection –Applications.

References

1. Electronic communication system fundamentals: Wayne Tomasi, Pearson Education.
2. Wireless communication principles and practice: T S Rappaport, Pearson Education.
3. Satellite communication: Gagliardi.
4. Digital Communication Fundamentals and Applications: B Sklar, Pearson Education.
5. Digital communication: Simon Haykin, John Wiley&Sons.
6. Space communication System: Filipowasky, McGrawHill.

ADVANCED MICROPROCESSORS

LA803

3+1+0

Module 1

Intel 8086 Microprocessor - Internal architecture – Block diagram – Minimum and maximum mode operation – Interrupt and Interrupt applications – DMA data transfer – 8087 math coprocessor. 8086 memory organization – even and odd memory banks – segment registers – logical and physical address – advantages and disadvantages of physical memory.

Module 2

Addressing modes used in 80x86 family - Data addressing mode – register addressing, immediate addressing, direct addressing, register indirect addressing, base plus index addressing, register relative addressing, base relative plus index addressing, scaled addressing. Program memory addressing modes - direct program memory addressing, relative program memory addressing. Stack memory addressing mode.

Module 3

Intel 80286 Microprocessor - 80286 Architecture, system connection – Real address mode operation – Protected mode operation

Module 4

Intel 80386 Microprocessor - 80386 Architecture and system connection – Real operating mode – 386 protected mode operation – segmentation and virtual memory – segment privilege levels and protection – call gates – I/O privilege levels – Interrupts and exception handling – task switching – paging mode – 80386 virtual 86 mode operation.

Module 5

Advanced Intel Microprocessors - 80486 – Processor model – Reduced Instruction cycle – five stage instruction pipe line – Integrated coprocessor – On board cache – Burst Bus mode. Pentium – super scalar architecture – u-v pipe line

– branch prediction logic – cache structure – BIST (built in self test) – Introduction to MMX technology.

References

1. The Microprocessors 6th Edition Barry B. Brey Pearson Edu.
2. Microprocessor and Interfacing 2nd Edition Douglas V. Hall TMH
3. The 80x86 family John Uffenbeck

TELEVISION ENGINEERING

L 804

3+1+0

Module 1

Elements of Television system: Basic block schematic of television transmitter and receiver, Analysis of Television pictures, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, maximum video frequency, Colour resolution and bandwidth, Composite video signal, video signal dimensions, vertical and horizontal synchronization signal dimensions, channel bandwidth, vestigial side band transmission, channel bandwidth and allocations for colour transmission.

Module 2

Television camera and transmitters: Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters: Positive and negative modulation and its comparison, high level and low level modulation and its comparison. Colour TV picture tubes: purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

Module 3

Monochrome and colour reception, Monochrome receiver: Detailed block schematic, Yagi antenna, BALUN transformers, RF tuner, electronic tuning, SAW filters, IF conversion, VSB reception and correction, video detector, AGC: delayed AGC and Keyed AGC, video amplifier, cathode and grid modulation, sync separation, horizontal and vertical deflection circuits and wave forms, sound separation. Power supplies: SMPS and block schematic explanation, EHT generation and its wave form description, Typical ICs in different stages.

Module 4

Colour Television: Compatibility consideration, Colour response of human eye, Three colour theory, additive mixing of colours, chromaticity diagram, Luminance and chrominance, colour difference signal and its generation, Polarity of colour difference signal, Frequency interleaving and Colour burst signal, delay

lines, Basic colour television systems: PAL and NTSC, Block schematic explanation.

Module 5

Television applications: CCTV and its functional block schematic, Cable television: converters, cable connections, Satellite television: Dish antenna, LNB, Down converters, Video discs: VCD and DVD, Digital recording, LASER source, High definition television.

References

1. Monochrome and colour television: R R Gulati, Wiley Eastern.
2. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill.
3. Television engineering: A M Dhake, Tata Mc Graw Hill
4. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

ADVANCED MATHEMATICS (ELECTIVE - II)

CMELRT 805-1

3+1+0

Module 1 Green's Function

Heavisides, unit step function – Derivative of unit step function – Dirac delta function – properties of delta function – Derivatives of delta function – testing functions – symbolic function – symbolic derivatives – inverse of differential operator – Green's function – initial value problems – boundary value problems – simple cases only

Module 2 Integral Equations

Definition of Volterra and Fredholm Integral equations – conversion of a linear differential equation into an integral equation – conversion of boundary value problem into an integral equation using Green's function – solution of Fredholm integral equation with separable Kernels – Integral equations of convolution type – Neumann series solution.

Module 3 Gamma, Beta functions

Gamma function, Beta function – Relation between them – their transformations – use of them in the evaluation certain integrals – Dirichlet's integral – Liouville's extension of Dirichlet's theorem – Elliptic integral – Error function.

Module 4 Power Series solution of differential equation

The power series method – Legendre's Equation – Legendre's polynomial – Rodrigues formula – generating function – Bessel's equation – Bessel's function of the first kind – Orthogonality of Legendre's Polynomials and Bessel's functions.

Module 5 Numerical solution of partial differential equations.

Classification of second order equations- Finite difference approximations to partial derivatives – solution of Laplace and Poisson’s equations by finite difference method – solution of one dimensional heat equation by Crank – Nicolson method – solution one dimensional wave equation.

References

1. Linear Integral Equation: Ram P.Kanwal, Academic Press, New York
2. A Course on Integral Equations: Allen C.Pipkin, Springer, Verlag
3. Advanced Engg. Mathematics: H.K.Dass, S.Chand
4. Advanced Engg. Mathematics: Michael D.Greenberge, Pearson Edn. Asia
5. Numerical methods in Engg.&science: B.S.Grewal, Khanna Publishers
6. Generalized functions: R.F. Hoskins, John Wiley and Sons.
7. Principles and Techniques of: Bernard Friedman, John Wiley and sons Applied Mathematics
8. Principles of Applied Mathematics: James P.Keener, Addison Wesley.
9. Numerical methods: P.Kandasamy,K.Thilagavathy,K.Gunavathy, S.Chand & co

VHDL (ELECTIVE - II)

LA805-2

3+1+0

Module 1

Introduction: Hardware Abstraction- Basic Terminology- Entity Declaration- Architecture Body- Configuration Declaration- Package Declaration- Package Body- Model Analysis- Simulation- Basic Language Elements –Identifiers- Data Objects- Data Types- Operators.

Module 2

Behavioural Modelling: Entity Declaration- Architecture Body-Process Statement- Variable Assignment Statement- Signal Assignment Statement- Wait Statement- If Statement - Case Statement- Null Statement- Loop Statement- Exit Statement- Next Statement- Assertion Statement- Report Statement- Other Sequential Statements- Multiple Processes- Postponed Processes - Dataflow Modelling: Concurrent Signal Assignment Statement- Concurrent versus Sequential Signal Assignment- Delta Delay Revisited- Multiple Drivers- Conditional Signal Assignment Statement- Selected Signal Assignment Statement- the UNAFFECTED Value- Block Statement- Concurrent Assertion Statement- Value of a Signal

Module 3

Structural Modelling: Component Declaration- Component Instantiation- Resolving Signal Values - Generics and Configurations: Generics-

Configurations- Configuration Specification- Configuration Declaration- Default Rules - Conversion Functions - Direct Instantiation- Incremental Binding.

Module 4

Subprograms and Overloading: Subprograms- Subprogram Overloading- Operator Overloading- Signatures- Default Values for Parameters - Packages and Libraries: Package Declaration- Package Body-Design File- Design Libraries- Order of Analysis- Implicit Visibility- Explicit Visibility.

Module 5

Advanced Features: Entity Statements- Generate Statements- Aliases- Qualified Expressions- Type Conversions- Guarded Signals- Attributes- Aggregate Targets- Shared Variables- Groups - Model Simulation: Simulation- Writing a Test Bench- Converting Real and Integer to Time- Dumping Results into a Text File- Reading Vectors from a Text File- A Test Bench Example- Initialising a Memory- Variable File Names- Hardware Modelling Examples: Modelling Entity interfaces- Modelling Simple Elements- - Different Styles of Modelling- Modelling Regular Structures- Modelling Delays- Modelling Conditional Operations- Modelling Synchronous Logic- State Machine Modelling- Interacting State Machines- Modelling a Moore FSM- Modelling a Mealy FSM- A Generic Priority Encoder- A Simplified Blackjack Program- A Clock Divider- A Generic Binary Multiplier- A Pulse Counter- A Barrel Shifter- Hierarchy in Design.

Text Book

VHDL Primer Third editions: J. Bhasker, Pearson Education Asia.

References

1. Introducing VHDL from simulation to synthesis: Sudhakar Yalamanchilli, Pearson Education Asia

MEDICAL ELECTRONICS (ELECTIVE - II)

L 805-3

3+1+0

Module 1

Bioelectric potentials Human cell – action potential – ECG waveform – relation with heart action- bio-potentials from brain- excitation and inhibition potentials- Electroencephalogram- muscle action- EMG- muscular servo mechanism. Bio-potential electrodes: Half cell potential- equivalent circuit between electrodes and skin – electrodes types- stimulating electrodes- biomedical transducers- classification- selection.

Module 2

Biomedical amplifiers – op amps- differential amplifiers- OPA 111: FET input op amp- data sheet- high impedance 50 Hz reject filter with gain- instrumentation amplifier – INA 101- pH probe amplifiers- pH probe electrometer- Bridge amplifiers- input protection- isolation amplifiers- basic design- carrier type isolation amplifier- synchronous demodulator- opto isolators- optical coupling- Transformer coupled isolation amplifiers- ISO212- Fiber optic isolation amplifier- chopper stabilized amplifier- differential chopper amplifier- input guarding- shield driver.

Module 3

ECG wave form- The standard lead system- Einthoven triangle- ECG preamplifier- Right leg drive circuit- shield drive- Typical ECG amplifier circuit- QRS complex detection- ECG digitization- improvement in resolution- ECG machine- mechanism- patient cables- ECG machine maintenance. Blood pressure measurements- Pressure transducers- Amplifiers- dc amplifiers- isolated dc amplifier- pulsed excitation amplifier- ac carrier amplifier- systolic, diastolic and mean detector circuit plethysmography- blood flow measurements- electromagnetic flow meter.

Module 4

EEG- Instrumentation requirements- Neuron membrane potential- EEG electrodes- Frequency bands- multi-channel EEG recording systems- preamplifiers- circuits- EEG telemetry systems. ICU monitoring system- intensive care equipments- cardio tachometers- lead fault indicator- central monitoring consoles- telemetry system.

Module 5

Medical Imaging: Computed tomography- basic principle - data accumulation- scanning motions – x ray tubes- collimators- detectors- image reconstruction- algorithms- display – resolution. Nuclear Magnetic Resonance- nuclear structure and angular momentum- magnetic dipole moment- alignment- Larmor frequency- RF magnetic field- Free Induction decay- Instrumentation- Imaging system.

References

1. Introduction to Biomedical equipment technology: J J Carr, Pearson Education.
2. Biomedical Instrumentation: John G Webster, Mifflin Houghton Co.
3. Medical Electronics: C Raja Rao, University Press.
4. Biomedical Instrumentation: R S Khandpur, TMH

ADVANCED MICRO-CONTROLLERS (ELECTIVE - II)

LA805-4

3+1+0

Module 1

Low pin count controllers – Atmel AVR family – ATtiny15L controller - architecture – pin descriptions – features – addressing modes – I/O space – reset and interrupt handling – reset sources - Tunable internal oscillator.

Module 2

Timers – Watch dog timer – EEPROM – preventing data corruption – Analog comparator – A/D converter – conversion timing – ADC noise reduction – PortB – alternate functions – memory programming – fuse bits – high voltage serial programming – algorithm.

Module 3

National semiconductor COP8 family - COP8CBR9 processor – features – electrical characteristics – pin descriptions – memory organization –EEPROM - security – brownout reset – in system programming – boot ROM. Idle timer – Timer1, Timer2, Timer3 -operating modes – PWM mode – event capture mode

Module 4

Power saving modes – Dual clock operation – Multi input wake up – USART – framing formats – baud rate generation – A/D conversion – operating modes – prescaler – Interrupts – interrupt vector table – Watch dog – service window – Micro-wire interface – waveforms.

Module 5

Microchip PIC16 family – PIC16F873 processor – features – architecture – memory organization - register file map – I/O ports – PORTA - PORTB – PORTC – Data EEPROM and flash program memory – Asynchronous serial port – SPI mode – I2C mode.

References

1. Design with PIC micro-controllers: John B Peatman, Pearson Education.
2. DS101374: National Semiconductor reference manual.
3. National semiconductor web site – www.national.com
4. 1187D: Atmel semiconductor reference manual.
5. Atmel semiconductor web site – www.atmel.com
6. DS30292B: Microchip reference manual.
7. Microchip semiconductor web site – www.microchip.com

E-COMMERCE (ELECTIVE - II)

LA805-5

3+1+0

Module 1

Introduction to Electronic Commerce - E-Commerce Framework- Anatomy of E-Commerce Applications - E-Commerce Consumer & Organization Applications- E- Commerce and World Wide Web - Internet Service Providers - Architectural Framework for Electronic Commerce - WWW as the Architecture- Hypertext publishing.

Module 2

Network Security - Client-Server Network Security - CS Security Threats – Firewalls - Data & Message Security - Encrypted Documents - Security on the Web.

Module 3

Electronic Payment Systems - Types of Electronic Payment Systems - Digital Token Based Electronic Payment System - Smart Cards - Credit Cards - Risk in Electronic Payment Systems - Designing Electronic Payment Systems.

Module 4

Electronic Data Interchange - EDI Application in Business- EDI-Legal - Security and Privacy Issues - EDI standardization - EDI Envelope for Message Transport - Internet based EDI - Internal Information System- Work-flow Automation and Coordination- Supply Chain Management- Document Library- Types of Digital Documents- Corporate Data Warehouses.

Module 5

Recent Trends in E-Commerce - Multimedia in E-Commerce- Video Conferencing with Digital Videos- Broad Band Telecommunication- Frame & Cell Relays- Switched Multimegabit Data Service (SMDS)- Asynchronous Transfer Mode- Mobile Computing and Wireless Computing.

Text Book

Frontiers of Electronic Commerce: Ravi Kalakota & Andrew B Whinston, Pearson Education.

References

1. Global Electronic Commerce: J Christopher Westland & Theodore H K Clark.
2. E- Commerce The cutting edge of Business: Kamlesh K Bajaj & Debjani Nag.
3. E-Commerce: Strategy Technologies and Applications, TMH.

ADVANCED DIGITAL SIGNAL PROCESSING (ELECTIVE - III)

LA806-1

3+1+0

Module 1

Introduction to Multi-rate Digital Signal Processing – Sample rate reduction - decimation by integer factors- sampling rate increase – interpolation by integer factor - Design of practical sampling rate converters: Filter Specification- filter requirement for individual stages - Determining the number of stages and decimation factors - Sampling rate conversion using poly-phase filter structure – poly-phase implementation of interpolators.

Module 2

Adaptive Signal Processing – Adaptive filters – Concepts- Adaptive filter as a Noise Canceller - Other configurations of the adaptive filter - Main components of the adaptive filter – Basic Wiener filter theory – The basic LMS adaptive algorithm – Practical limitations of the basic LMS algorithm - Recursive Least Square Algorithm – Limitations - Factorization Algorithm.

Module 3

Introduction to two dimensional signal and systems - 2D – DFT Transforms - Properties and applications - Discrete Hilbert Transform and Discrete Cosine Transform – Properties and Applications - Short term Fourier Transform - Gabor Transform - Properties and Applications.

Module 4

Wavelets – Wavelet Analysis – The Continuous Wavelet Transform - scaling - shifting - scale and frequency - The Discrete Wavelet Transform - One Stage filtering - Approximation and Details - Filter bank analysis – Multilevel Decomposition – Number of levels – Wavelet reconstruction – Reconstruction filter- Reconstructing Approximations and details- Multilevel Reconstruction - Wavelet packet synthesis- Typical Applications.

Module 5

General and special purpose DSP Processors - Computer Architecture for signal processing – Harvard Architecture - Pipelining - Hardware Multiply and Accumulate – Special Instructions - Replication - On-chip Memory Cache - Extended Parallelism - SIMD – VLIW and static super-scalar Processing - Brief study of TMS320C4X and ADSP 2106 processors.

References

1. Digital Signal Processing: Emmanuel C Ifeachor, Barrie W Jrevis, Pearson Education.
2. Theory and Applications of DSP: L.R Rabiner and B gold
3. Electronic filter Desig Hand Book: A .B Williams and FT Taylor, McGraw Hill
4. Wavelets and Subband Coding: Valterli & Kovaceric, PHI.

5. Analog Devices & Texas Instruments Users Manual of TMS320C4X and ADSP 2106x.

MULTIMEDIA SYSTEMS (ELECTIVE - III)

LA806-2

3+1+0

Module 1

INTRODUCTION: Definition of multimedia, multimedia, hardware, software applications and software environments - Media Types - Analog and digital video, digital audio, music and animation - Analog & Digital video - Memory storage - Basic tools - Authoring tools.

Module 2

BUILDING BLOCKS: Text - Hyper text - Sound - Sound cards - Standards - Image - Image types - Image compression, RLE, JPEG, MPEG - Fractal and Wavelet Compressions - Image file types - Animation - Capture and Playback techniques. (basic ideas only)

Module 3

MULTIMEDIA ENVIRONMENTS: The Compact Disc family, CD-interactive, Digital Video Interactive, QuickTime, Multimedia PC and Microsoft Multimedia Extensions.

Module 4

MULTIMEDIA PROGRAMMING: Framework: Overview, Media classes, Transform classes, Format classes and Component classes - Problems related to programming - Composition, Synchronisation, Interaction, Database integration.

Module 5

ADVANCED MULTIMEDIA: Moving pictures - Techniques realistic image synthesis, Virtual Reality - Full motion digital video - Video capture techniques - multimedia networks - Desktop video conferencing - Future multimedia.

References

1. Multimedia Programming Objects, Environments & Framework - Simon J. Gibbs, Dionysios C. Tsischritiz (Addison-Wesley Publishing Co.)
2. Multimedia- Making it work - Tay Van Ghan – Osborne Tata Mcgraw Hill
3. Authoring Interactive multimedia - Arch C Luther
4. Optimizing your Multimedia PC - L.J. Skibbe, Susan Lafe Meister - Comdex
5. Multimedia Bible - Winn L. Rosch, Sams
6. Multimedia Producers Bible- Ron Goldberg, Comdex
7. Multimedia Power Tools - Peter Jellam, Random house Electronic Pub.
8. Multimedia Computing - Mathew E. Hodger & Russel M. Sasnett, Addison wesley
9. Integrated Multimedia Systems - Palikom, The communication Wall Overview

SYSTEM SOFTWARE (ELECTIVE - III)

LA806-3

3+1+0

Module1

Introduction: Concept of system software, classification of system s/w. Assemblers: over view of assembly process, elementary ideas of macros & macro processors. Compilers: Overview of compilation process, Parsing- top down & bottom-up parsing, storage allocation. Interpreters: basic ideas only.

Module2

Operating Systems: types of OS, batch processing, multiprogramming, timesharing, real time OS. OS services UNIX OS –shells, Bourne Shell, C shell-visual editor.

Module3

Information Management: File system- directory structure, basic file system calls, file protection, allocation methods disk blocks and inodes in UNIX. Device management.

Module4

Processor Management: CPU scheduling - scheduling algorithms, Multiprocessor scheduling, Process management in UNIX, concurrent process-critical section, semaphores, synchronization, concurrent languages.

Module5

Memory Management: swapping, partitions,, paging, segmentation, virtual memory concepts, page replacement, dynamic linking, caching of secondary storage, memory management in UNIX, Deadlocks: cause, detection, prevention, avoidance, recovery, combined approach to deadlock handling.

References

1. System programming and Operating Systems – D M Dhamdhare
2. System Software – an introduction to system Programming – Leland L Beck, 3ed.
3. Operating System – Peterson & Silberschatz, Addison Wesley
4. Operating Systems – Dietal H M
5. Design of UNIX Operating System – Maurice J Bach
6. UNIX System Programming – Stevens.

EMBEDDED SYSTEMS (ELECTIVE - III)

LA806-4

3+1+0

Module 1

Overview of Embedded System: -Embedded System, Categories of Embedded System, Requirements of Embedded Systems, Challenges and Issues in Embedded Software Development, Applications of Embedded Systems in Consumer Electronics, Control System, Biomedical Systems, Handheld computers, Communication devices.

Module 2

Embedded Hardware & Software Development Environment: - Hardware Architecture, Micro-Controller Architecture, Communication Interface Standards, Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems.

Module 3

Embedded Communication System: Serial Communication, PC-to-PC Communication, Serial Communication with the 8051 Family of Micro-controllers, Protocol Converter, Voice-over-IP, Embedded Applications over Mobile Network example MP3 Sound Player.

Module 4

Real Time & Database Applications: - Real-Time Embedded Software Development, Sending a Message over a Serial Link, Simulation of a Process Control System, Controlling an Appliance from the RTLinux System, Embedded Database Applications using examples like Salary Survey, Energy Meter Readings.

Module 5

Java Applications & Future Trends in Embedded Systems: Networked Java-Enabled Information Appliances, Embedded Process Control System, Mobile Java Applications, Appliance Control using Jini, System on a Chip (SOC), Smart Cards and the Cashless Society, Security in Embedded Systems.

Text Book

Programming for Embedded Systems- Dreamtech Software Team, Wiley Dreamtech

Reference

1. Fundamentals of Embedded Software where C and Assembly Meet – Daniel W Lewis.

DIGITAL IMAGE PROCESSING (ELECTIVE - III)

LA806-5

3+1+0

Module 1

Image representation and modeling - Characteristics of a digital image - Elements of digital image processing systems - Image digitizers & scanners - Elements of visual perception - Brightness & contrast - Image sampling & Quantisation - Two dimensional Sampling theorem - Reconstruction of image from its samples - Aliasing.

Module 2

Image Transforms - Two dimensional orthogonal & unitary transforms - Properties of unitary transforms - Two dimensional DFT & its properties - Cosine – Hadamard – Haar – Sine - KL Transforms & their properties.

Module 3

Image Enhancement - Point processing - Histogram modeling & Equalization - Spatial Filtering - Filtering in the frequency domain - color Image processing.

Module 4

Image Restoration - Degradation model - Inverse filtering - Wiener Filter - Interactive restoration - Image analysis & vision -basic principles only.

Module 5

Image Coding & Compression- basic principles - run length coding - variable length coding - bit plane coding - loss-less predictive coding - lossy predictive coding - Transform coding - Image compression standards.

References

1. Digital image Processing: I.Gonzalez Rafael C, Pearson Education.
2. Fundamentals of digital image processing: Jain Anil K, PHI.
3. Digital Image Processing: Pratt William K, John Wiley.

SYSTEMS LAB

L807

0+0+3

1. Experiments based on Matlab.
 - a. To test linearity, causality & stability of LTI system.
 - b. To find DFT of a given sequence using DIT & DIF FFT algorithms.
 - c. To find IFFT of a given sequence using DIT & DIF FFT algorithms.
 - d. Program to design IIR filter using Bilinear transformation impulse invariant methods.
 - e. Control system simulation experiments.
 - f. Programs to design filters using window techniques.

2. Digital signal processing based on DSP processors.
3. Familiarization of PAL assembler.
4. Realization of combinational and sequential circuits using PAL.
5. Realization of simple digital circuits using VHDL.
6. Familiarization of FPGA trainer kits.
7. Realization of digital circuits using FPGA.

Note

Any other experiments may be added in accordance with the electives offered.

L 709 / 808

PROJECT DESIGN AND SEMINAR

0+0+2

Each student is required to present a technical paper on a subject approved by the dept. The paper should in general reflect the state of the art. He / she shall submit a report on the paper presented to the department. In addition to the seminar he / she shall undertake a project work (as a team or individually) in the 7th semester itself in consultation with the guide (s), panel of staff members, and submit a report of the project work done to the department.

VIVA – VOCE

L809

A comprehensive Viva - voce examination will be conducted to assess the student's overall knowledge in the specified field of engineering. At the time of viva - voce, certified reports of seminar and project work are to be presented for evaluation.

