*Faculty of Engineering*
*Scheme of Instruction and Syllabi of*

# BE II- IVth YEAR

OF

FOUR YEAR DEGREE COURSE

IN

# COMPUTER SCIENCE & ENGINEERING

(With effect from the Academic Year 2009-2010)

July 2009
Osmania University
Hyderabad - 500 007.

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WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

# SCHEME OF INSTRUCTION AND EXAMINATION

## B.E. IInd YEAR

## COMPUTER SCIENCE & ENGINEERING

### SEMESTER - I

| Sl. No. | Syllabus Ref. No. | Subject | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per Week | | Duration in Hrs | Maximum Marks | |
| | | | L | D/P | | Univ. Exam | Sessionals |
| | | **THEORY** | | | | | |
| 1. | MT 201 | Mathematics - III | 4 | - | 3 | 75 | 25 |
| 2. | CS 201 | Data Structures | 4 | - | 3 | 75 | 25 |
| 3. | CS 202 | Discrete Structures | 4 | - | 3 | 75 | 25 |
| 4. | CS 203 | Logic and Switching Theory. | 4 | - | 3 | 75 | 25 |
| 5. | CS 204 | Computer Architecture | 4 | - | 3 | 75 | 25 |
| 6. | EC 222 | Basic Electronics | 4 | - | 3 | 75 | 25 |
| | | **PRACTICALS** | | | | | |
| 1. | CS 231 | Data Structures Lab Using C++ | - | 3 | 3 | 50 | 25 |
| 2. | EC 242 | Basic Electronics Lab | - | 3 | 3 | 50 | 25 |
| | | **TOTAL** | **24** | **6** | **-** | **550** | **200** |

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

**MT 201**

## MATHEMATICS-III

(Common to all Branches)

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT –I**

**Partial differential Equations :** Formation of partial differential equations of first order, Lagrange's solution. Standard types. Charpit's & Jacobi's method of solution, Partial differential equations of higher order, Monge's method.

**UNIT-II**

**Fourier Series :** Expansion of a function in Fourier series for a given range, half range sine and cosine expansion, odd and even functions of Fourier series, change of interval, complex form of Fourier Series.

**UNIT – III**

**Partial differential Equations :** Solution of wave equation, heat equation and Laplace's equation by the method of separation of variables, and their use in problems of vibrating string, one and two dimensional wave and heat flow and examples thereon.

**UNIT-IV**

**Z - Transforms :** Introduction. Basic theory of Z-Transforms. Z-transform of some standard sequences. Existence of Z-Transform, Linearity property, Translational Theorem, Scaling property, Initial and Final Value Theorems, Differentiation of Z-Transform, Convolution Theorem, Solution of Difference equations using Z-transforms.

**UNIT-V**

**Numerical Methods :** Solution of linear system of equations. Gauss elimination method Gauss-Seidel iterative method, ill-conditioned equations and refinement of solutions, Interpolation, Lagrange Interpolation, Newton's



divided difference interpolation, Newton's Forward and Backward difference Interpolation Formulas. Numerical differentiation and integration (Trapezoidal and Simpson's formulas) Solution of Differential equations by Runge Kutta Method.

**Suggested Reading**


1. E. Kreyszig. *Advanced Engineering Mathematics*, Wiley Eastern Ltd., 8th Edition, New Delhi, 2006.
2. R. K. Jain and S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2005.
3. B.V. Ramana, *Higher Engineering Mathematics*, Core Engineering Series, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.
4. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 34th Edition, 1998.

CS 201

## DATA STRUCTURES

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

### UNIT-I

**Data Representation of Linear Lists:** Formula-based representation, Linked representation, Indirect representation, Simulating Pointers.

Complexity analysis, Sequential Search, Binary Search, Matrix operations – add, Multiply, transpose. Arrays and Matrices.

### UNIT – II

**Sorting Methods and Complexity Analysis:** Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Closet Pair of Points, Heap sort.

### UNIT – III

**Stacks:** Principle, Formula-based Representation, Linked Representation, Applications, (Recursive calls, Infix to Postfix, postfix Evaluation).
Queue: Principle, Formula-based Representation, Linked Representation, Application Hash Table Representation, An Application – Text Compression.

### UNIT – IV

**Trees:** Definitions and Properties, Representation of binary trees Operations, Binary Tree Traversal.

**Balanced Trees:** AVL Trees, B-Trees

### UNIV – V

**Graphs:** Definitions and Properties, Representation, Graph search methods (dfs and bfs). **Applications of Graphs:** Shortest path algorithm (Dijkstra), Minimum Spanning tree (Prim's and Kruskal's Algorithms).

**Suggested Reading:**

1. S. Sahani. *Data Structures, Algorithms and Applications in C++*. McGraw Hill 1996.
2. T.H. Cormen, C.E. Leiserson, and R.L. Rivest. *Introduction to Algorithms*. Prentice Hall of India. 1996.





CS 202

## DISCRETE STRUCTURES

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

### UNIT – I

**Fundamentals of Logic:** Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems.

**Set Theory:** Sets and Subsets, Set Operations, and the Laws of Set theory, Counting and Venn Diagrams.

**Properties of the Integers:** The well – ordering principle, Recursive definitions, the division algorithms, fundamental theorem of arithmetic.

### UNIT – II

**Relations and Functions:** Cartesian Product, Functions onto Functions, Special Functions, Pigeonhole Principle, Composition and Inverse Functions, Computational Complexity.

**Relations:** Partial Orders, Equivalence Relations and Partitions.

**Principle of Inclusion and Exclusion:** Principles of Inclusion and Exclusion, Generalizations of Principle, Derangements, Rock Polynomials, Arrangements with Forbidden Positions.

### UNIT – III

**Generating Functions:** Introductory examples, definition and examples, Partitions of Integers, exponential generating function, summation operator.

**Recurrence Relations:** First – order linear recurrence relation, second – order linear homogenous recurrence relation with constant coefficients, Non homogenous recurrence relation, divide and conquer algorithms.

**UNIT – IV**

**Algebraic Structures:** Algebraic System – General Properties, semi groups, Monoids, Homomorphism, Groups, Residue arithmetic, group codes and their applications.

**UNIT – V**

**Graph Theory:** Definitions and examples, subgraphs, complements and graph Isomorphism, Vertex degree, planar graphs, Hamiltonian paths and Cycles, Graph Coloring.

**Trees:** Definitions, properties and Examples, Rooted Trees, Spanning Trees and Minimum Spanning Trees.

**Suggested Reading:**


1. Ralph P. Grimaldi, *Discrete and Combinatorial Mathematics*, 4th edition, 2003, Pearson Education.
2. J.P. Tremblay, R. Manohar, *Discrete Mathematical Structure* with Applications to Computer Science, McGraw Hill, 1987.
3. Joe L. Mott, A. Kandel, T.P. Baker, *Discrete Mathematics for Computer Scientists & Mathematicians*, Prentice Hall N.J., 1986.






**CS 203**

## LOGIC AND SWITCHING THEORY

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT-I**

**Digital Computers and Information:** Information representation, Computer Structure.

**Number systems:** Binary Numbers, Octal and Hexadecimal Numbers, Number Ranges.

**Arithmetic Operations:** Conversion from Decimal to other bases. **Decimal Codes:** BCD Addition. **Alphanumeric Codes:** ASCII Character Code, Parity Bit.

**Binary Logic and Gates:** Binary Logic, Logic Gates. **Boolean Algebra:** Basic Identifiers, Algebraic Manipulation, Complement of a function. **Standard Forms:** Minterms and Maxterms, sum of product and products of sums.

**UNIT-II**

**Minimization of Switching Functions:** Introduction, the map method, minimal functions and their properties, the tabulation procedure, the prime implicant chart.

**NAND and NOR Gates:** Nand Circuits, Two-level Implementation, Multilevel NAND Circuits, NOR Circuits. **Exclusive OR Gates:** Odd Function, Parity Generation and Checking.

**UNIT – III**

**Combinational Logic Design:** Combinational Circuits, **Design Topics:** Design Hierarchy, Top-Down design, Computer Aided Design, Hardware Description Languages, Logic Synthesis. **Analysis Procedure:** Derivation of Boolean Functions, Derivation of the Truth Table, Logic Simulation, Design Procedure, Decoders, Encoders, Multiplexers, Binary Adders, Binary subtraction, Binary Multipliers, HDL Representations – VHDL.

## UNIT – IV

**Sequential Circuits:** Sequential circuit definitions, Latches, Flip Flops, sequential circuit analysis, sequential circuit design, design with D Flip-Flops, designing with JK Flip-Flops, HDL representation for sequential circuits – VHDL.

## UNIT – V

**Registers and Counters:** Registers, Shift registers, Synchronous Binary counters, Ripple counter.

**Symmetric Networks:** Properties of symmetric functions, Symmetric relay contact networks, identification of symmetric functions.

**Suggested reading:**


1. M. Moris Mano, Charles R. Kime, *Logic and Computer Design Fundamentals*, 2nd edition, Pearson Education Asia, 2001.
2. Zvi Kohavi, *Switching and Finite Automata Theory*, 2nd edition, Tata McGraw Hill, 1995.
3. H.T. Nagle, *Introduction to Computer Logic*, Prentice Hall, 1975.






CS 204

# COMPUTER ORGANIZATION & ARCHITECTURE

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

## UNIT-I

**Register Transfer and Microoperations:** Register transfer language, Register Transfer, Bus and Memory Transfers, **Arithmetic Microoperations:** Binary Adder, – Subtractor, Binary Incrementer, Arithmetic Circuit. **Logic Microoperations:** List of Logic Microoperations, hardware Implementation. **Arithmetic Logic Shift Unit.**

**Basic Computer Organization and Design:** Instruction Codes: Stored program organization, Indirect Address. **Computer Registers:** Common Bus System. **Computer Instructions:** Instruction Set Completeness. **Timing and Control, Instruction Cycle:** Fetch and Decode, Register Reference Instructions. **Memory Reference Instructions:** Example Instructions, Control Flow Chart. **Input-Output and Interrupt** Configuration, Instructions, Program Interrupt, Interrupt Cycle. **Complete Computer Description. Design of Basic Computer, Basics of Accumulator Logic.**

## UNIT – II

**Microprogrammed Control:** Control Memory, Address Sequencing Control Branching Mapping of Instruction, Subroutines. **Microprogram Example:** Computer Configuration, Microinstruction Format, Symbolic Microinstructions. The Fetch Routine, Symbolic Microprogram, Binary Microprogram. **Design of Control Unit:** Microprogram Sequencer. **Central Processing Unit:** General Register Organization: Control World. **Stack Organization:** Register Stack, Memory Stack, Reverse Polish Notation, Evaluation of Expressions. **Instruction Formats:** Three, Two, One, Zero Address Instructions, RISC Instructions. **Addressing Modes. Data Transfer and Manipulation:** Data Transfer Instructions, Data Manipulation Instruction, Arithmetic Instruction Logical, Shift and Bit Manipulation Instructions. **Program Control :** Status Bit Conditions, Conditional Branch Instructions Subroutine Call and Return, Program Interrupt, Types of Interrupts, **Reduced Instruction Set Computer:** CISC

Characteristics, RISC Characteristics, Overlapped Register Windows.

**UNIT – III**

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, **Vector Processing:** Vector Operations, Matrix Multiplication, Memory Interleaving, Super Computers. **Array Processors:** Attached Array Processor, SIMD Array Processor.

**Computer Arithmetic: Addition and Subtraction:** With Signed Magnitude Data, Implementation and algorithm, Addition and Subtraction with 2's Complement Data. **Multiplication Algorithms** with signed magnitude data, algorithm, Booth's algorithm, Array multiplier. **Division Algorithms** with signed magnitude data, divide overflow, algorithm. **Floating Point Arithmetic Operations, Decimal Arithmetic Unit:** BCD Adder, Subtractor.

**UNIT - IV**

**Input-Output Organization:** Input-Output Interface: I/O Bus and Interface Modules, I/O Versus Memory Bus, Isolated vs Memory Mapped I/O. Asynchronous Data Transfer: Strobe Control, Handshaking, Asynchronous Serial Transfer, Asynchronous Communication Interface. **Modes of Transfer:** Programmed I/O, Interrupt driven I/O. **Priority Interrupt: Daisy Chaining,** Parallel Priority Interrupt, priority Encoder. **Direct Memory Access:** DMA Controller and Transfer. **Input-Output Processor (IOP):** CPU-IOP Communication, IBM 370 I/O Channel, Interl 8089-IOP. **Serial Communication.**

**UNIT-V**

**Memory Organization:** Memory Hierachy, **Main Memory:** RAM and ROM Chips, Address Map, Memory Connection to CPU. **Auxiliary Memory:** Disks and Tapes. **Associative Memory:** Hardware Organization, Match Logic, Read Operation and Write Operation. **Cache Memory:** Associative Mapping, Direct Mapping, Set-Associative Mapping, Writing into Cache Initialization. **Virtual Memory:** Address and Memory Space, Address Mapping, Page Replacement.

**Suggested Reading:**


1. M. Morris Mano, *Computer System Architecture,* 3rd edition, Pearson Education Asia, 2002.
2. William Stallings, *Computer Organization & Architecture,* 6th Edition, Pearson Education Asia, 2003.
3. V. Carl Hamacher, Z.G. Vranesic, S.G. Zaky, *Computer Organization,* McGraw Hill, 2004.






**EC 222**

## BASIC ELECTRONICS

(CSE)

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT - I**

**Semi Conductor Theory:** Energy Levels, Intrinsic and Extrinsic Semiconductor, Mobility, Diffusion and Drift current. Hall Effect, Characteristics of P-N Junction diode, Parameters and Applications.

**Rectifiers:** Half wave and Full wave Rectifiers (Bridge, center tapped) with and without filters, ripple, regulation and efficiency.

**UNIT - II**

**Transistors:** Bipolar and Field effect transistors with their h-parameter equivalent circuits. Basic amplifiers classification and their circuits (Qualitative treatment only).

**Regulators and Inverters:** Zener Diode regulator, Transistorized IC regulators and Simple Inverter Circuits.

**UNIT - III**

**Feedback Concepts** – Properties of Negative Feedback Amplifier, Classification, Parameter Applications.

**Oscillators** – LC Type and RC Type Oscillators and Crystal Oscillators (Qualitative treatment only)

**UNIT - IV**

**Operational Amplifiers** - Basic Principle – Characteristics and Applications (Summer Adder, Integrator, Differentiator, Instrumentation Amplifier).

**Digital Systems:** Basic Logic Gates, half, Full Adder and Subtractors.

UNIT - V

**Data Acquisition systems:** Study of transducer (LVDT, Straingauge, Temperature, Force). **Photo Electric Devices and Industrial Devices:** Photo diode, Photo Transistor, LED, LCD, SCR, TRIAC, DIAC, UJT Construction and Characteristics only.

**Display Systems:** Constructional details of C.R.O and Applications.

**Suggested Reading:**


1. Jacob Milman & C., Halkias, *Electronic Devices* Eighth Edition, Reprinted, McGraw Hill, 1995.
2. Ramakanth A. Gayakwad, *Op-AMPS and Linear Integrated Circuits*, 3rd edition, Prentice Hall of India, 1995.
3. Mooris Mano, *Digital Design*, 3rd edition, Prentice Hall of India, 2002.
4. Chooper, *Electronic Measurements and Instrumentations.*
5. S.Shalivahnan, N. Suresh Kumar, A Vallavea Raj *Electronic Devices and Circuits* Tata McGraw Hill, 2003.




**WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008**

CS 231

## DATA STRUCTURES LAB USING C++

| | | |
|---|---|---|
| Instruction | 3 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 50 | Marks |
| Sessional | 25 | Marks |

**Programming exercise using C++ for the following:**

1. Implementation of Stacks, Queues.
2. Infix to Postfix conversion, evaluation of postfix expression.
3. Polynomial arithmetic using linked list.
4. Implementation of Binary Search and Hashing.
5. Implementation of Selection, Shell, Merge and Quick sorts.
6. Implementation of Tree Traversals on Binary Trees.
7. Implementation of Heap Sort.
8. Implementation of operations on AVL Trees.
9. Implementation of Traversal on Graphs.
10. Implementation of B-Trees.

**Note:** For each of the problems PSP (Personal Software Process) Principles should be applied.

**EC 242**

## BASIC ELECTRONICS LAB

(For Mech., Prod. & CSE)

| | | |
|---|---|---|
| Instruction | 3 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 50 | Marks |
| Sessional | 25 | Marks |

**List of Experiments:**

1. Characteristics of Semiconductor and Zener diodes
2. CRO Applications
3. Fullwave rectifier with and without filter
4. Zener Voltage Regulator
5. Characteristics of BJT transistor (CB, CE, CC)
6. Characteristics of field effect transistor.
7. Feedback amplifier with and without feedback
8. h-parameters of transistors
9. Phase shift oscillator
10. Hartley oscillator & Colpitts Oscillator.
11. Operational Amplifier and its applications
12. Logic gates and flip flops-verifications
13. Realization of Half and Full adder
14. Comparators

**Suggested Reading :**

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. Paul B. Zbar, *Industrial Electronics*, A Text – Lab Manual, 3rd Edition, TMH, 1983.



## SCHEME OF INSTRUCTION AND EXAMINATION

### B.E. IInd YEAR

## COMPUTER SCIENCE & ENGINEERING

**SEMESTER - II**

| Sl. No. | Syllabus Ref. No. | Subject | Scheme of Instruction: Periods per Week L | Scheme of Instruction: Periods per Week D/P | Scheme of Examination: Duration in Hrs | Scheme of Examination: Maximum Marks: Univ. Exam | Scheme of Examination: Maximum Marks: Sessionals |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | | |
| 1. | MT 251 | Mathematics - IV | 4 | - | 3 | 75 | 25 |
| 2. | CS 251 | Object Oriented Programming using Java | 4 | - | 3 | 75 | 25 |
| 3. | CS 252 | Operating Systems | 4 | - | 3 | 75 | 25 |
| 4. | CS 253 | Data Communications | 4 | - | 3 | 75 | 25 |
| 5. | EE 221 | Electrical Circuits and Machines. | 4 | - | 3 | 75 | 25 |
| 6. | CE 222 | Environmental Studies | 4 | - | 3 | 75 | 25 |
| | | PRACTICALS | | | | | |
| 1. | CS 281 | Java Lab | - | 3 | 3 | 50 | 25 |
| 2. | CS 282 | Operating Systems Lab | - | 3 | 3 | 50 | 25 |
| | | **TOTAL** | **24** | **6** | **-** | **550** | **200** |

MT 251

## MATHEMATICS-IV

(Common to all Branches)

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT–I: Functions of Complex variables**

Limit and Continuity of function-Analytic function-Cauchy- Reimann equations – complex integration, Cauchy's theorem-Derivative of Analytic functions-Cauchy's integral formula and it's applications.

**UNIT-II: Taylor's and Laurent's Series Expansions**

Zeroes and Singularities – Residues-Residue theorem-Evaluation of real Integrals using Residue theorem-Conformal Mapping-Bilinear transformation.

**UNIT-III: Statistics**

Random Variables, distributions, density functions-conditional distributions-Baye's theorem – mathematical expectation, expected values-moments and Moment generating functions.

**UNIT-IV: Distributions**

Poisson, Normal, Gamma and Chi - Square distribution-fitting curves to the data.

**UNIT-V: Curve fitting by method of least squares**

Correlation and Regression-lines of regression - Tests of Significance, Chi-Square, F and T-Tests

**Suggested Reading:**


1. R.V. Churchill & J.W. Brown, *Complex Variables and Applications*, Fifth Edition, McGraw –Hill International Edition, 1990.
2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, S. Chand & Co., New Delhi, 1997
3. R.K. Jain & S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2002.
4. B.V. Raman, *Higher Engineering Mathematics, Core Engineering Series* Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2007.






CS 251

## OBJECT ORIENTED PROGRAMMING USING JAVA

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT – I**

**Object Oriented System Development:** Understanding Object Oriented Development, Understanding Object Oriented Concepts, Benefits of Object Oriented Development.

**Java Programming Fundamentals:** Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Classes, Methods, Inheritance, Packages and Interfaces..

**UNIT – II**

Exception Handling, Multithreaded Programming, I/O basics, Reading console input and output, Reading and Writing Files, PrintWriter Class, String Handling.

**UNIT – III**

Exploring JAVA language, Collections Overview, Collections Interfaces, Collection Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and Interfaces, String tokenizer, BitSet, Date, Calendar, Timer.

**UNIT – IV**

Java I/O classes and Interfaces: Files, Stream and Byte classes, Character Streams, Serialization.

**UNIT – V**

GUI and Event Driven Programming: Applet Class, Event Handling, Delegation event model, event classes, event listener Interfaces.
Customizing Frame Windows, GUI Programming Basics, Text Related GUI Components, Layout Managers, Effective use of Nested panels, Other GUI components, Menus and Handling Mouse Events.

**Suggested Reading:**


1) Herbert Schildt *"The Complete Reference Java "*, 7th Edition, Tata McGraw Hill, 2005.
2) James M Slack *"Programming and Problem Solving with JAVA"* Thomson Learning , 2000.
3) C Thomas Wu *"An Introduction to Object Oriented Programming with Java"* Tata McGraw Hill, 2005.






CS 252

## OPERATING SYSTEMS

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT-I**

**Introduction to operating systems:** OS structure and strategies, Process concept, Interprocess communication, Threads, Multithreaded Programming.

Process Scheduling: Scheduling Criteria, Scheduling Algorithms, Multi Processor scheduling, Thread Scheduling

**UNIT-II**

Memory Management, swapping, contiguous allocation, paging, Static and dynamic partition, demand paging, page replacement Algorithms, thrashing, segmentation, segmentation with Paging.

**File System Interface**: File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

**File System Implementation**: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, and Free Space management, Efficiency and Performance, Recovery.

**UNIT –III**

Process synchronization: Critical Section problem, Semaphores, monitors.

**Deadlocks**: Necessary conditions, resource allocation graph, methods for handling deadlocks, preventions, avoidance, detection and recovery Protection_ Goal, domain of protection, access matrix.

**UNIT -IV**

**Device Management**: Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management, RAID structure, Stable storage Implementation.

**I/O System**: I/O hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O request to hardware operation, STREAMS.

**UNIT-V**

Case studies

**Linux System**: Design Principles, Kernel Modules, Process Management, Scheduling Memory Management, File Systems, Input and Output, Inter-process Communication, Network Structure, Security

**Windows XP**- Design Principles, Architecture, Environmental Subsystem, File system, Networking, Programming interface.

**Suggested Reading:**


1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, Wiley India, 2006.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition, Pearson Education, Asia-2001.
3. Robet Love: *Linux Kernel Development*, Pearson Education, 2004.






**CS 253**

## DATA COMMUNICATIONS

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**UNIT-I**

**Introduction**: Communication model, Data Communication networking, Protocols and Architecture, Standards.

**Data Transmission**: Concepts and terminology, Analog and Digital Transmission, Transmission Impairments, Transmission media.

**Data Encoding**: Digital Data-Digital Signals, Digital Data-Analog Signals, Analog Data-Digital Signals, Analog Data-Analog Signals.

**UNIT-II**

**Data Communication Interface**: Asynchronous and Synchronous Transmission, Line Configuration, Interfacing.

**Data Link Controls**: Flow Control, Error Detection, Error Control, HDLC, other Data link Control protocols, performance issues.

**UNIT -III**

**Multiplexing**: Frequency Division Multiplexing, Synchronous time-Division Multiplexing, Statistical Time-Division Multiplexing. Asymmetric Digital Subscriber line, xDSL. Circuit Switching, Packet Switching & Frame Relay.

ATM Architecture, Logical Connection, ATM Cells, Transmission of ATM cells.

**UNIT –IV**

**Traditional Ethernet**: Topologies and Transmission Media, LAN protocol architecture, MAC sub layer, CSMA/CD, Physical Layer, Implementation, Bridged, switched and full duplex Ethernets, Layer 2 and Layer 3 Switches.

**Fast Ethernet**: MAC sublayer, Physical Layer, Implementation

**Gigabit Ethernet**: MAC sublayer, Physical Layer, Implementation.

**UNIT –V**

**Cellular Wireless Networks**: Principles of Cellular Networks, First Generation Analog Second Generation CDMA, Third Generation Systems. **Wireless LANs**: Overview, Wireless LAN Technology, IEEE 802.11 Architecture and services, IEEE 802.11 Medium Access Control, IEEE 802.11 Physical Layer

**Bluetooth**: Architecture, Layers.

**Suggested Readings:**


1. William Stallings, *Data and Computer Communication*, 7th edition. Pearson Education, Asia-2004.
2. Behrouz A. Forouzan, *Data Communications and Networking*, 4th Edition, Tata McGraw Hill, 2006.
3. Fred Halsall, *Data Communications, Computer Networks and Open Systems*, 4th Edition, Pearson Education, 2000.






**EE 221**

## ELECTRICAL CIRCUITS AND MACHINES

(Common to CSE, ME and PE)

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessionals | 25 | Marks |

**Unit I**

DC & AC Circuits: Analysis of circuits using loop current method, Thevenin's and Norton's theorems, Sinusoidal sources, Phasor representation of sinusoidal quantities, Average and rms values, Active power, Reactive power, Energy stored in inductance and capacitance, Mutual inductance, Dot convention, analysis of simple coupled circuits.

**Unit II**

Production of 3-Phase Voltages: Analysis of 3-phase balanced circuits, 3-phase power measurement by two-wattmeter method. Transformers: Principle of transformation of voltages and currents, Equivalent circuit of transformer on no load and load, Efficiency and regulation of transformer, OC and SC tests, Auto-transformer.

**Unit III**

DC Machines: Construction and working principle of a DC machine, Production of emf in a generator, Types of excitation, Characteristics of series, shunt and compound motors, Speed control and application of DC motors, Losses and efficiency.

**Unit IV**

Induction Motors: Production of rotating magnetic field, Construction and principle of induction motors, Methods of starting and Speed control of 3-phase induction motors, Speed-torque characteristics.

**Unit IV**

Single-Phase & Special Motors: Various types of single phase motors, Split phase, Capacitor start and Capacitor run, Basic features of Stepper motor and Brushless DC motor

**Suggested Reading:**


1. V.K.Mehta, *Principles of Electrical Engineering*, S.Chand & Co., 1995
2. Kothari and Nagrath, *Basic Electrical Engineering*, Tata McGraw Hill, 2nd Edition, 2002.

CE 222

## ENVIRONMENTAL STUDIES
(Common to all Branches)

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessionals | 25 | Marks |

### UNIT –I

**Environmental studies :** Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

### UNIT – II

**Ecosystems :** Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

### UNIT – III

**Biodiversity :** Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

### UNIT - IV

**Environmental Pollution :** Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

**Environment Protection Act:** Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.



### UNIT – V

**Social Aspects and the Environment :** Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid, rain, ozone layer depletion. Environmental protection act, population explosion.

**Disaster management :** Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

### Suggested Reading


1. A. K. De, *Environmental Chemistry*, New Age Publications, 2002.
2. E. P. Odum, *Fundamentals of Ecology*, W.B. Sunders Co., USA.
3. G.L. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

**CS 281**

## JAVA LAB

| | | |
|---|---|---|
| Instruction | 3 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 50 | Marks |
| Sessionals | 25 | Marks |

1. A program to illustrate the concept of class with constructors, methods and overloading.
2. A program to illustrate the concept of inheritance and dynamic polymorphism
3. A program to illustrate the usage of abstract class.
4. A program to illustrate multithreading.
5. A program to illustrate thread synchronization.
6. A program using StringTokenizer
7. A program using Linked list class
8. A program using TreeSet class
9. A program using HashSet and Iterator classes.
10. A program using Map classes.
11. A program using Enumeration and Comparator interfaces.
12. A program to illustrate the usage of Filter and Buffered I/O streams
13. A program to illustrate the usage of Serialization
14. An application involving GUI with different controls, menus and event handling.
15. A program to implement an applet.





**CS 282**

## OPERATING SYSTEMS LAB

| | | |
|---|---|---|
| Instruction | 3 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 50 | Marks |
| Sessionals | 25 | Marks |

1. Printing file flags for specified descriptor.
2. Print type of file for each command line arguments.
3. Recursively descend a directory hierarchy counting file types.
4. Program using process related system calls.
5. Programs create threads.
6. Program using Signals.
7. Echo server-using pipes
8. Echo server-using messages.
9. Producer & Consumer Problem using Semaphores and Shared memory
10. Producer & Consumer problem using message passing.
11. Readers and Writers problem using message passing.
12. Dining philosopher's problem using semaphores
13. Program using File Locking
14. Understanding and submitting an assignment on RC scripts.
15. Programs using Linux shell script.