PANJAB UNIVERSITY, CHANDIGARH

Scheme of Examination and Syllabi for B.E. 3rd, 4th, 5th, 6th, 7th and 8th semester in INFORMATION TECHNOLOGY
(Academic Session 2013 – 2014)
# Proposed Scheme of Examination and Syllabi for B.E. (Information Technology) 3rd – 8th Semesters for AS 2013-14

## Second Year - Third Semester

<table>
<thead>
<tr>
<th>Sub code</th>
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<th>Scheme of Teaching</th>
<th>Scheme of Examination</th>
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<tr>
<td></td>
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<td>L  T  P  Hrs.  Credits</td>
<td>Theory  Sess  Univ Exam  Marks*  Total</td>
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<td>ASC 301</td>
<td>Engg. Maths-III</td>
<td>3 1 0 4 4</td>
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<tr>
<td>IT322</td>
<td>Analog &amp; Digital Comm.</td>
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<td>IT372</td>
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<tr>
<td>IT323</td>
<td>System Analysis and Design</td>
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<tr>
<td>IT324</td>
<td>Object Oriented Programming</td>
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**Second Year - Fourth Semester**

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<td>ASC 405</td>
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<tr>
<td>IT421</td>
<td>Data Structures and Algorithm</td>
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<td>IT422</td>
<td>Computer Networks</td>
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<td>Microprocessor</td>
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*- Note: Marks refer to mid semester evaluation and end semester evaluation.*
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### Third Year - Sixth Semester

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<td>Wireless Communication</td>
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<td>Software Engineering</td>
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Total 250 250 150 650
*- Note: Marks refer to mid semester evaluation and end semester evaluation

**Fourth Year - Seventh Semester**

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<td>Elective-I*</td>
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<td>IT775</td>
<td>Project-I</td>
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**Elective-I* Choose any one from the following:**
Object Oriented Analysis and Design
Artificial Intelligence
Mobile Computing
Building Enterprise Applications

**Fourth Year - Eighth Semester**

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<td>IT823</td>
<td>Elective-II*</td>
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<td>IT824</td>
<td>Elective-III*</td>
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<td>IT875</td>
<td>Seminar</td>
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<td>IT876</td>
<td>Project II</td>
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**OR OPTION - 2**

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<th>Int. Ass.</th>
<th>Marks Uni. Exam</th>
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Elective II*
*Choose any one from the following:
Software Testing and Quality Assurance
System Simulation and Modeling
Network Administration

Elective III**
Advanced Database Management Systems
Soft Computing
Java Technologies

Student can exercise option 1 or option 2 according to the following:

A student may opt for one semester training in lieu of subjects of 8th Semester. The marks for six months training will be equal to the total marks of 8th Semester study.
A student can opt for six month semester training under following conditions:

a. The student got selected for job in campus placement and the employer is willing to take that student for the training.
b. The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Chairperson/Coordinator of the respective department/branch.
SYLLABUS FOR B.E. (I.T.) THIRD SEMESTER

Paper Title: Engineering Mathematics-III

Paper Code: ASC301  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits : 04  Max. Marks (Int. Exam): 50  Total Lectures: 45

L  T  P   3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To teach computer based Engineering Mathematics to students. After this course, the student will be able to solve complex computer oriented problems.

Part-A

Sequences and Series:  (08)

Linear Algebra:  (07+07)
Concept of linear independence and dependence, Rank of a matrix: Row – Echelon form, System of linear equations: Condition for consistency of system of linear equations, Solution by Gauss elimination method. Inverse of a matrix: Gauss – Jordan elimination method (Scope as in Chapter 6, Sections 6.3 – 6.5, 6.7 of Reference 1). Eigen values, eigen vectors, Cayley – Hamilton theorem (statement only). Similarity of matrices, Basis of eigenvectors, diagonalization (Scope as in Chapter 7, Sections 7.1, 7.5 of Reference 1).

Part-B

Complex Functions:  (08+07+08)
Definition of a Complex Function, Concept of continuity and differentiability of a complex function, Cauchy – Riemann equations, necessary and sufficient conditions for differentiability (Statement only). Study of complex functions: Exponential function, Trigonometric functions, Hyperbolic functions, real and imaginary part of trigonometric and hyperbolic functions, Logarithmic functions of a complex variable, complex exponents (Scope as in Chapter 12, Sections 12.3 – 12.4, 12.6 – 12.8 of Reference 1). Laurent Series of function of complex variable, Singularities and Zeros, Residues at simple poles and Residue at a pole of any order, Residue Theorem (Statement only) and its simple applications (Scope as in Chapter 15, Sections 15.1 – 15.3 of Reference 1). Conformal Mappings, Linear Fractional Transformations (Scope as in Chapter 12, Sections 12.5, 12.9 of Reference 1).

References:

Paper Title: Analog and Digital Communication

Paper Code: IT322
Credits : 04

Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Total Lectures: 45

Time: 3 Hours
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To study about the various modulation techniques and to understand about the modulation techniques used for digital data transmission as well as to have the knowledge about the digital communication, spread spectrum and multiple access techniques.

Part-A

Amplitude Modulation & Demodulation and Systems (08)

Frequency Modulation & Demodulation and Systems (07)
Principles and generation of FM and PM signals, FM Transmitter and FM receiver with various stages

Pulse Modulation & Demodulation (08)
Principles, generation and detection of PAM, PWM, PPM & PCM signals, noise in pulse modulation system, companding, delta modulation, adaptive delta modulation systems.

Part-B

Digital modulation techniques (07)
PSK, FSK, MSK, QAM. Error calculations for PSK, FSK, MSK, QAM, Shannon’s limit, Signal to Noise Ratio

Multiplexing and Multiple Access (07)
Allocation of communication Resources, FDM/FDMA, TDM/TDMA, CDMA, SDMA, Multiple Access Communications and Architecture, Access Algorithms.

Spread Spectrum Techniques (08)
Spread Spectrum Overview, Pseudonoise Sequences, Direct Sequence and Frequency Hopped Systems, Synchronization of DS and FH systems, Jamming Considerations, Commercial Applications
Books Recommended:
7. Electronic Communications by Dennis Roddy and John Coolen (PHI), Edi 4th

Paper Title: Analog and Digital Communication (Practical)

Paper Code: IT 372
MM: 50
Credits: 2

Objective: To have practical knowledge about various circuits for different modulation techniques used for digital data transmission as well as to impart knowledge about the digital communication.

List of experiments:
1. To measure the modulation Index of AM signals using Trapezoidal Method.
2. To study the voltages and waveforms of various stages of an AM Superheterodyne Receiver.
3. To measure the sensitivity and selectivity of a Superheterodyne Radio Receiver.
4. To measure the fidelity of an AM Superhetrodyne radio Receiver.
5. To study DSB/SC AM signal and its demodulation using Product Detector Circuit
   (i) with dedicated wire
   (ii) with antenna
6. To study the Frequency modulation and Demodulation circuits.
7. To study the Pulse Code Modulation (PCM) and de-modulation circuits.
8. To study the Time Division Multiplexing (TDM) and De-multiplexing circuits.
9. To study delta and Sigma Delta modulation, demodulation circuits.

Paper Title: System Analysis and Design

Paper Code: IT323
Max. Marks (Univ. Exam): 50
Time: 3 Hours
Credits: 03
Max. Marks (Int. Exam): 50
Total Lectures: 45

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To manage projects, analyze and document systems, design new systems and implement the plans as well as to have a better understanding of how to logically analyze problems and how an analyst does a preliminary and detailed analysis. Student emphasis should be on analyzing business problems, designing solutions and documenting the results.
PART- A

System definition and concepts: (03)
Characteristics and types of system, Manual and automated systems, Real-life Business sub-systems: Production, Marketing, Personnel, Material, Finance

Systems models: (03)
Systems environment and boundaries, Realtime and distributed systems, Basic principles of successful systems, Role and need of systems analyst

System Development cycle: (03)
Introduction to systems development life cycle (SDLC), various phases of development: Analysis, Design, Development, Implementation, Maintenance

Systems documentation considerations: (03)
Principles of system documentation, Types of documentation and their importance

System Planning: (06)
Data and fact gathering techniques: Interviews, Group communication, Presentations, Site visits; Feasibility study and its importance, Types of feasibility reports, selection plan and proposal, prototyping, tools and techniques of cost-benefit analysis

Systems Design and modeling: (06)
Process modeling, Logical and physical design, Design representation, Systems flowcharts and structured charts, Data flow diagrams, Common diagramming conventions and guidelines using DFD, Data Modeling and systems analysis, Designing the internals: Program and Process design, Designing Distributed Systems

PART - B

Input and Output: Classification of forms: (04)
Input/output forms design, User-interface design, Graphical interfaces

Modular and structured design: (05)
Module specifications, coupling and cohesion, Top-down and bottom-up design

System Implementation and Maintenance: (05)
Planning considerations, Conversion methods, producers and controls, System acceptance criteria, System evaluation and performance, Testing and validation, Maintenance activities and issues.

System Audit and Security: (03)
Computer system as an expensive resource: Data and strong media procedures and norms for utilization of computer equipment, Audit of computer system usage, Audit trails

Types of threats to computer system and control measures: (04)
Threat to computer system and control measures, Disaster recovery and contingency planning

TEXT BOOK:
1. System analysis and design – Elias M. Awad

REFERENCES:
1. System analysis and design – Perry Edwards
2. Analysis and design of information systems – James A. Senn

Paper Title: Object Oriented Programming

Paper Code: IT324 Max. Marks (Univ. Exam): 50 Time: 3 Hours
Credits: 04 Max. Marks (Int. Exam): 50 Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To provide students in-depth theoretical base and fundamentals of Object Oriented Programming paradigm using C++ as well as to prepare students mind setup to learn new computer languages on their own and to prepare them to design and code various projects using C++.

Part-A

Principles of Objected Oriented Programming (03)
Advantages of OOP, comparison of OOP with Procedural Paradigm

C++ Constructs (03)
Tokens, Expressions and control structures, various data types, and data structures, Variable declarations, Dynamic Initializations, Operators and Scope of Operators, Typecasting, Unformatted and formatted console I/O Operations

Functions (05)
Classes and Objects: Prototyping, Referencing the variables in functions, Inline, static and friend functions. Memory allocation for classes and objects. Arrays of objects, pointers to member functions.

Constructors and Destructors (05)
Characteristics and its various types, Dynamic Constructors, Applications, Order of Invocation, C++ garbage collection, dynamic memory allocation.

Polymorphism (05)
Using function and Operator overloading, overloading using friend Functions, type conversions from basic data types to user defined and vice versa.

Part-B

Inheritance (06)
Derived classes, types of inheritance, various types of classes, Invocation of Constructors and Destructors in Inheritance, aggregation, composition, classification hierarchies, metaclass/abstract classes.

**Pointers**

Constant pointers, Use of this Pointer, Pointer to derived and base classes, virtual functions, Bindings, Pure virtual Functions and polymorphism

**I/O Operations and Files**

Classes for files, Operations on a file, file pointers

**Generic Programming With Templates**

Definition of class template, Function Templates, Overloading Template Functions, Class templates and member functions templates with parameters, Standard C++ classes, persistent objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators and vectors

**Introduction:**

Object Oriented System, Analysis and Design.

**Books Recommended**

1. Object Oriented Programming with C++ by Bala Guruswamy, TMH, Edi 2nd.

**Reference Books**


**Paper Title:** Object Oriented Programming (Practical)

**Paper Code:** IT 374 **MM:** 50 **Credits:** 2

**Objective:** Understanding of object oriented programming concepts and techniques and fundamentals of programming in C++ by designing and implementing object oriented software to solve moderately complex problems with the ability to write a computer program to solve specified problems.

**List of Experiments:**

1. Implementation of Functions, Classes and Objects
2. Constructors and Destructors
3. Operator Overloading and Type Conversion
4. Inheritance and Virtual Functions
5. Files
6. Exception Handling and Generic Programming
Objective: Upon completion of this course on Digital Electronics, the students will be able to design, analyze, evaluate and verify the medium complexity combinational and sequential digital logic circuits using gates and flip flops.

Part-A

Introduction

Number Systems and Codes
Decimal, Binary, Hexadecimal, Octal’s complement, 2’s complement, addition and subtraction, weighted binary codes, Error detecting codes, Error correcting codes, Alphanumeric codes.

Counters & Shift Registers
Ripple Counters, Design of Modulo-N ripple counter, Up-Down counter, design of synchronous counters with and without lockout conditions, design of shift registers with shift-left, shift-right & parallel load facilities, Universal shift Registers.

Part-B

Data Converters
Sample & Hold switch, D/A converters: weighted type, R-2R Ladder type; A/D Converters: Counter-Ramp type, Dual Slope Type, Successive approximation type, flash type; Specifications of ADC & DAC

Digital Logic families
Characteristics of digital circuits: fan in, fan-out, power dissipation, propagation delay, noise margin; Transistor-transistor Logic(TTL), TTL NAND Gate with active pull up, its input and output Characteristics, Types of TTL Gates (Schottky, standard, low power, high speed). Emitter Coupled Logic(ECL), ECL gate, its transfer characteristics, Level translation in ECL & TTL, MOS Gates, MOS Inverter, CMOS Inverter, Rise & Fall time of MOS & CMOS gates, Interfacing TTL & CMOS Circuits, Comparison of Characteristics of TTL, ECL, MOS & CMOS logic circuits, Tristate Logic & its applications.

Semiconductor Memories & Programmable Logic
ROM, PROM, EPROM, EEPROM; RAM: Static RAM, Typical Memory Cell, Memory Organisation, Dynamic RAM cell, Reading, & Writing Operation in RAM, PLA, PAL & FPGA.

Books Recommended:

4. Integrated Electronics by Millman & Halkias, (Tata McGraw-Hill), Edi 1st
5. Digital System Principles & Applications by R J Tocci (PHI), Edi 8th.

Paper Title: Digital Electronics (Practical)

Paper Code: IT 375  MM: 50  Credits: 2

Note: Do any eight experiments.

Objective: The students will be able to verify the truth table of gates; demonstrate the operation of flip flops; develop, test and troubleshoot the combinational and sequential circuits.

List of Experiments:

1. To Study data sheets and truth tables of AND, OR, NOR, NAND, NOT and XOR Gates.
2. To verify the truth tables of RS, D, JK and T Flip Flops
3. To fabricate and test the truth table of half/full adder.
4. To design and implement a Modulo-N Counter
5. To Design and implement a Universal shift register
8. To convert 8 bit Digital data to Analog value using DAC
9. To convert Analog value into 8 bit Digital data using ADC
10. To design and fabricate the given sequential circuits using Flip-flops as memory elements.
SYLLABUS FOR B.E. (I.T.) FOURTH SEMESTER

Paper Title: Cyber Laws & IPR

Paper Code: ASC405  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits : 03  Max. Marks (Int. Exam): 50  Total Lectures: 45

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To introduce the cyber world and cyber law in general and explain about the various facets of cyber crimes, enhancing the understanding of problems arising out of online transactions and provoke them to find solutions as well as to clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard and educate about the regulation of cyber space at national and international level.

Part-A

Basics of Computer & Internet Technology (08)
Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures.

Introduction to Cyber World (02)
Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

E-Commerce (07)
Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

Part-B

Intellectual Property Rights (12)
IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

IT Act, 2000 (12)
Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

Project Work (04)
Candidates will be required to work on a project. At the end of the course students will make a presentation and submit the project report.

Books Recommended

Paper Title: Data Structures and Algorithms

Paper Code: IT421
Credits: 04
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To provide knowledge regarding efficient storage of data for easy access, how to represent the inherent relationship of the data in the real world, and to teach students various data structures and to explain algorithms for performing various operations on these data structures. The objective of the course is to introduce the fundamentals of Data Structures, abstract concepts and how these concepts are useful in problem solving.

Part-A

Introduction: (01)
Introduction to data structures; Introduction to Algorithms Complexity;

Arrays, Stacks & Queues: (08)
Concepts; Basic operations & their algorithms: Transverse, Insert, Delete, Sorting of data in these data structures; Prefix, Infix, Postfix Notations;

Lists: (10)
Concepts of Link List and their representation; Two way lists; Circular link list; Basic operations & their algorithms: Transverse, Insert, Delete, Searching and Sorting of data in List; Storage Allocation & Garbage Collection; Linked stack and queues; Generalized List; sparse matrix representation using generalized list structure;

Part-B

Trees: (08)
Binary Trees and their representation using arrays and linked lists; Trees and their applications; Binary tree transversal; Inserting, deleting and searching in binary trees; Heap & Heap Sort; General Trees; Thread binary tree; Height balance Tree (AVL); B-Tree.

Graphs and their applications: (08)
Graphs; Linked Representation of Graphs; Graph Traversal and spanning forests; Depth first search; Breadth first search.
**Sorting & Searching:**
Insertion sort; Selection sort; Merging; Merge sort; Radix sort; Sequential & Binary Search; Indexed Search; Hashing schemes; Binary search Tree.

**Books Recommended:**

**Paper Title: Data Structures and Algorithms (Practical)**

**Paper Code: IT471**

**Objective:** To impart knowledge about developing recursive as well as non-recursive algorithms and to gain the knowledge of different data structures. Students must be able to choose the appropriate data structure and algorithm design method for a specified application and to develop skills to design and analyze simple linear and non linear data structures, to strengthen the ability to identify and apply the suitable data structure for the given real world problem and to gain knowledge in practical applications of data structures.

**List of Programs:**

1. **Implementation of Array Operation:** Traversal, Insertion & Deletion at and from a given location; Sparse Matrices; Multiplication , addition.
2. **Stacks:** Implementation of Push, Pop; Conversion of Infix expression to Postfix, Evaluation of Postfix Expressions.
3. **Queues:** Adding, Deleting Elements; Circular Queue: Adding and Deleting elements.
4. **Implementation of Linked Lists:** Inserting, deleting, inverting a linked list. Implementation of stacks and queues using linked lists; Polynomial addition, Polynomial multiplication.
5. **Trees:** Implementation of Binary & Binary Search Trees, Recursive and Non-Recursive traversal of Tress.
6. **Graphs:** BFS & DFS
7. Implementation of sorting and searching algorithms.
8. **Hash Tables Implementation:** Searching, inserting and deleting, searching & sorting techniques.

**Paper Title: Computer Networks**

**Paper Code: IT422**

**Max. Marks (Univ. Exam): 50**

**Time: 3 Hours**
Credits: 04  Max. Marks (Int. Exam): 50  Total Lectures: 45  L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To provide knowledge about computer network related hardware and software using a layered architecture along with knowledge about various types of networking, networks and network topologies. To impart knowledge to students about basics of Network Management, concepts of OSI reference model and real world protocol suite such as TCP/IP along with outlining the basic network configurations along with security and protection issues.

Part-A

Introduction: (08)
Basic concepts of computer networks, switching; multiplexing; Network Hardware: LAN, MAN, WAN, Wireless networks, Internet; Network Software: Layer, Protocols, interfaces and services; Reference Model: OSI/TCP/IP and their comparison.

Physical Layer: (08)

Data Link Layer: (09)
Framing; Error control; Error correction & Detection; sliding window protocols (one bit, Go back n, selective repeat); Examples of DLL Protocols-HDLC, SLIP; Medium Access Sub layer: Channel Allocation, MAC protocols -ALOHA, CSMA protocols, Collision free protocols, Limited Contention Protocols, Wireless LAN protocols, IEEE 802.3, 802.4, 802.5 standards and their comparison. Bridges: Transparent, source routing, remote.

Part-B

Network Layer: (09)
Design issues, routing algorithms (shortest path, flooding, flow based, distance vector, hierarchical, broadcast, multicast, for mobile hosts), Congestion control algorithms (Leaky bucket, Token bucket, Choke, Packet, Load shedding).

Transport Layer: (06)
Addressing, establishing and releasing connection, flow control & buffering, multiplexing, crash recovery, Internet Transport protocol (TCP and UDP).

Application Layer: (05)
Network Security; Domain Name System; Simple Network Management Protocol; Electronic Mail.

**Books Recommended:**

1. Computer Networks by Andrew S. Tanenbaum (PHI), Edi 4\(^\text{th}\).
2. Data and Computer Communications by William Stallings (PHI), Edi 6\(^{th}\).
3. Internet working with TCP/IP by Douglas E. Coomer,(PHI), Edi 3\(^{rd}\).

**Paper Title: Computer Networks (Practical)**

Paper Code: **IT472**  \hspace{1cm} MM: 50  \hspace{1cm} Credits: 2

**Objective:** To familiarize students with networking components and devices, transmission media, tools along with study of various LAN topologies, configuration of TCP/IP Protocols in Windows and Linux, designing and implementing networks, subnet planning and its implementation and installation of FTP server and client.

**List of Practicals:**

1. To familiarize with the various basic tools (crimping, krone etc.) used in establishing a LAN.
2. To familiarize with switch (manageable & unmanageable), hub, connectors, cables (cabling standards) used in networks.
3. To familiarize with routers & bridges.
4. To use some basic commands like ping, trace-root, ipconfig for trouble shooting network related problems.
5. To use various utilities for logging in to remote computer and to transfer files from / to remote computer.
6. To develop a program to compute the Hamming Distance between any two code words.
7. To develop a program to compute checksum for an ‘m’ bit frame using a generator polynomial.
8. To develop a program for implementing / simulating the sliding window protocol.
9. To develop a program for implementing / simulating a routing algorithm.
10. To study various IEEE standards (802.3, 802.4, 802.5, 802.11)
11. To develop a program for implementing/simulation the ALOHA protocol

Paper Title: Microprocessor (Theory)

Paper Code: IT423  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits : 04  Max. Marks (Int. Exam): 50  Total Lectures: 45

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Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To familiarize students with Microprocessor 8085 and interfacing of 8085 with various peripheral devices; to write programs in assembly language.

Part-A

Microprocessor Architecture and Microcomputer Systems: (06)
Microprocessor Architecture, The 8085 MPU: Block Diagram, Pin Diagram, Address/Data Buses, Concept of demultiplexing of Buses, Control and status signals, Registers, Ports, Flags, Instruction Decoding and Execution, memory Interfacing.

Interfacing I/O Devices (06)
Basic Interfacing Concepts, Interfacing Output Displays, Interfacing Input Devices, Memory- Mapped I/O

Programming the 8085: (07)

Programming Techniques with Additional Instructions: (06)

Part-B

Counters and Time Delays: (06)
Counters and Time Delays, Hexadecimal Counter, Modulo Ten, Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs.

Stack and Subroutines: (04)
Stack, Subroutine, Conditional Call and Return Instructions.
**Interrupts:** The 8085 Interrupt, 8085 Vectored interrupts.  

**General –Purpose Programmable Peripheral Devices:**  
Block Diagram, Working and Control word of: The 8255A Programmable Peripheral Interface, The 8259 A Programmable Interrupt Controller, Programmable communications interface 8251.

**Books Recommended**  
1. Microprocessor Architecture, Programming and Applications with the 8085 by Ramesh S.Gaonkar, PHI, Edi 3rd

**Reference Books:**  
1. Advanced Microprocessors & Interfacing by Badri Ram, Tata Mcгрaw Hill, Edi 1st.  
3. Microprocessors and Interfacing programming and Hardware by Douglas V. Hall, TMH, Edi 2nd

**Paper Title: Microprocessor(Practical)**  
**Paper Code:** IT 473  
**MM:** 50  
**Credits:** 2  

**Objective:** student will be able to develop, key-in, test and troubleshoot the assembly language program and machine level program on 8085 kits.

**List of Experiments:**

- Familiarization of 8085 kits.  
- Verification of arithmetic and logic operations using above kits.(At least 5 programs)  
- Development of interfacing circuits of various control applications based on 8085.  
- Application of assembly language using 8085 instructions set to develop various programs.  
- Applications of data movement instructions to develop relevant programs.

**Paper title: Computer Architecture & Organization**

**Paper Code:** IT424  
**Max. Marks (Univ. Exam):** 50  
**Time:** 3 Hours  
**Credits : 04**  
**Max. Marks (Int. Exam):** 50  
**Total Lectures:** 45  
**L T P 3 1 0**

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the
syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Objective:** Students will be able to understand instruction execution through instruction cycles, basic concept and implementation of interrupts, I/O control and data transfers, functioning of ALU and control unit; instruction set design, pipelining, RISC architecture and superscalar architecture as well as different mechanisms used for read/ write operations in the memory design.

**Part-A**

**Design Methodology**

System design, Design levels- Gate level, Register level, Processor level.

**Basic Computer Organization & Design**

Instruction codes, common bus system, computer instruction, Design of basic computer, Design of accumulator logic.

**Control Design**

Basic concepts, Hardwired control, Micro programmed control, Design of control unit.

**Central Processing Unit**


**Part-B**

**Input-Output Organization**

I/O interface, Modes of transfer, Priority interrupts, DMA, I/O processor.

**Memory Organization**

Memory hierarchy, Main memory, Auxiliary memory, Associative memory. Cache memory, virtual memory, Memory management H/W.

**Parallel Processing**

Introduction, Multiprocessors, Interconnection structure.

**Books Recommended**

2. Computer System Architecture by Morris Mano, Edi 3rd PHI

**Reference Books**

SYLLABUS FOR B.E. (I.T.) FIFTH SEMESTER

Paper title: Data Base Management Systems

Paper Code: IT521  
Credits : 03
Max. Marks (Univ. Exam): 50  
Max. Marks (Int. Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P 3 0 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To expose the student to the basic concepts involved in designing and building a database management system and to make them learn how to use the Structured Query Language (SQL), understand the relational model and relational database management system, detailed knowledge of transaction, concurrency and recovery strategies of DBMS and knowing the importance of normalization for DBMS and different normalization techniques.

Part-A

Data Base Concept:  
Data Base Vs file oriented approach, Basic DBMS terminology, Data independence, General Architecture of a Data Base Management Software, Components of DBMS.

Data Base Design:  
Introduction to Data Models, Entity Relationship Model, Entities, Attributes, E-R Diagrams, Conceptual Design of a relational data base model.

Data Normalization:  
Introduction, Keys, First Normal Form, Second Normal form, Third Normal form, Boyce Codd Normal form, Denormalization, case studies of Data Normalization

Transaction Processing Concepts:  
Schedules and recoverability, serializability, locking techniques, timestamp ordering, granularity, multiversion concurrency control.

Part-B

Structured Query Language (SQL):  
Introduction to SQL, Data types, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Insert statement, Update & Delete statement, Alter & Drop statements, Querying Multiple Tables: Joins, Equi Joins, Inner Joins, Outer Joins, Self Joins; SET Operators: Union, Intersect, Minus; Nested Queries. Functions: Arithmetic, Character, Date and General Functions; Group Functions

Data Manipulation and Control:  

Data Definition Language (DDL), Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) From a Table, Dropping a Column, Introduction to VIEWs, Manipulating the Base table(s) through VIEWs, Rules of DML Statements on Join Views, Dropping a VIEW, Inline Views, Materialized Views. Database Security and Privileges, GRANT Command, REVOKE Command, COMMIT and ROLLBACK.

**PL/SQL:** (06)

**Relational Queries:** (02)
Relational Algebra and Calculus, Preliminaries, Relational Algebra, Relational Calculus, Expressive Power of Algebra and Calculus, Points to review.

**Books Recommended:**

1. An Introduction to Database Systems by C.J. Date, Pearson, Edi 8\textsuperscript{th}.

**Reference books:**

1. Schaum’s Outlines Fundamentals of Relational Databases, by Toledo, Tata Mc Graw Hill, Edi 1\textsuperscript{st}.
2. Database Management Systems by James Martin (PHI), Edi 3\textsuperscript{rd}.
3. Data Base Management Systems by Ullman, Pearson Edi 2\textsuperscript{nd}.
4. Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke, McGraw Hill, Edi 3\textsuperscript{rd}.
5. Introduction to Data Base Systems by Desai, Bipin C. (Galgotia Publications), Edi 3\textsuperscript{rd}.

**Paper title: Data Base Management Systems (Practical)**

**Paper Code: IT 571**
**MM: 50**
**Credits: 2**

**Objective:** Programming assignments will require students to use the Oracle database system with hands on experience on DDL, DML as well as DCL commands and make students able to implement nested queries and various functions based on programming assignments.

**Practical based on Theory.**
Paper Title: Computer Graphics

Paper Code: IT522
Credits : 04
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Total Lectures: 45
L T P 3 1 0

Time: 3 Hours

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To study the introduction of computer graphics and its algorithms, segments, geometric transformations, windowing and clipping, 3D geometry and transformations, hidden Line methods.

Part-A

Introduction to computer graphics (07)
Applications of computer graphics, Picture representation, color table, Video Display Devices- Raster Scan Systems, Random Scan Systems, Input Devices, Output primitives

Raster Scan Graphics: (07)
Scan conversion, Frame buffer, Bresenham's line and circle drawing algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outsise Tests, Boundary-Fill Algorithm, Flood-Fill Algorithm, Antialiasing and Halftoning, Character Generation, Attributes of lines

Segments: (06)
Segments table, creating deleting and renaming segments, visibility, image transformations.

Transformations: (07)
Geometric Transformations: Matrices, Translation, Scaling, Rotation, Homogeneous Coordinates, Composite Transformation Matrix, Coordinate Transformation, Rotation about an arbitrary point, Inverse Transformations, Other transformations.

Part-B

Windowing and clipping: (08)

Three Dimension: (05)
3D geometry, 3D primitives, 3D transformations, rotation about arbitrary axis, parallel projection, perspective projection, viewing parameters, conversion to view plane coordinates
Hidden Line and surface:  (05)
Back face removal algorithms, hidden line methods

Text Book:

Reference Books:

Paper Title: Computer Graphics (Practical)

Paper code: IT 572  MM: 50  Credits: 2

Objective: Understanding how the various elements that underlie computer graphics (algebra, geometry, algorithms and data structures, optics, and photometry) interact in the design of graphics software systems.

Practical based on theory.

Paper title: Operating Systems

Paper Code: IT523  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits : 04  Max. Marks (Int. Exam): 50  Total Lectures: 45
L T P  3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To study and understand main components of operating system, their working, and operations performed by operating system. This subject provides students knowledge on: resource management provided by operating systems, concepts and theories of operating systems, implementation issues of operating systems. Students will be able to understand description of multiprocessor and distributed operating system and different operating system and compare their features.

Part-A

Basic Functions and Concepts of Operating Systems: (05)
Concept of an operating systems, batch system, Multi-programmed, Time sharing, Personal Computer System, Parallel system, Real time system, General system Architecture.

**Features and Objectives of Operating Systems:**
System components, operating system services, System calls, System Programs, System Structure, System design and implementation. Concept of process, process states, process state transition, process control block, operations of processes, concurrent processes, deadlocks, scheduling algorithms, scheduling criteria, Process Synchronization.

**Memory Management:**
Logical and physical address space, storage allocation and management techniques, swapping, concepts of multi programming, paging, segmentation, virtual storage management strategies, Demand Paging, Page Replacement Algorithms, Thrashing.

**Part-B**

**Information Management:**
File concept, Access method, Directory structure, Protection File system structure, Allocation methods, Free space management, Directory implementation, Disk structure, Disk Scheduling, Disk management, Swap space management.

**Distributed-System Structures:**
Network operating system, Distributed operating systems, Remote services, Robustness, Design Issues.

**Distributed file systems and Distributed Coordination:**

**Case Studies:**
Unix O.S. Architecture, Operating system services, user perspective, representation of files in Unix system processes and their structure, Input-output system, Memory management, Unix shell, history and evolution of Unix system.

**Books Recommended:**


**Reference books:**

Paper title: Operating Systems (Practical)

Paper Code: IT 573           MM: 50                     Credits:  
2

Objective: The objective of this lab is to teach students about various operating systems including and UNIX. Students learn about systems configuration and administration. Students learn, explore and practice technologies related to UNIX.

List of Practicals:
1. Installation of the Linux operating system
2. Working with text editor ‘vi’
3. Using basic commands-man,who,more,pipe,finger,cat,redirect,ls,cp,mv,rm.
4. Working with directory and plain files- 
   pwd,cd,mkdir,rmdir,lp,wc,date,cal,sort,diff,uniq and grep commands.
5. Using miscellaneous commands-head,tail,cut,copy,paste,spell,find and bc.
6. Working with shell scripts under Korn Shell and using shell variables, print, 
   chmod and calendar commands.
7. Additional features of Korn shell such as profile, kshrc file, history, read and 
   command line editing commands, aliases and special characters in print command
8. Using quotes, relational operators, command substitution, arithmetic functions, 
   shell control statements such as for-in, if-then-elseif-else, while,case,date and 
   script.
9. Working under the Bourne shell-shell scripts, control statements such as test, for, 
   for in, if-then-else-fi, -if-then-elif-fi, while,until, case, relational operators and 
   expressions.

Paper Title: System Software

Paper Code: IT524           Max. Marks (Univ. Exam): 50          Time: 3 Hours  
Credits : 03                 Max. Marks (Int. Exam): 50          Total Lectures: 45 
                                L T P  3 0 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To introduce the major concepts areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers, linkers, loaders and assemblers. Students will gain knowledge and skills necessary to develop system software covering a broad range of engineering and scientific applications and will learn context free grammars, compiler parsing techniques provided with a thorough coverage of the basic issues in programs interacting directly with operating systems.

Part-A

Introduction: (06)
System software and machine architecture. Simplified Instructional Computer (SIC), Traditional CISC and RISC Machines.

**Assemblers:**

**Macro Processors:**
Basic Macro processor functions, Machine-Independent Macro processor features, Design options.

**Part-B**

**Loader and Linkers:**

**Compilers:**

**Operating Systems:**
Basic operating system functions, Machine dependent operating system features, Machine independent operating system features, Operating System Design options.

**Text Books:**

**Reference Books:**

**Paper Title:** Multimedia Systems

**Paper Code: IT525**
**Credits : 03**
**Max. Marks (Univ. Exam): 50**
**Max. Marks (Int. Exam): 50**
**Time: 3 Hours**
**Total Lectures: 45**

**L T P**
3 0 0

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Objective:** To understand the basics of multimedia technologies and introduction to various image formats and their features, fundamentals of digital image and video compression techniques and make student understand the basics of Virtual Reality and its
importance along with familiarization with various multimedia applications in various environments.

Part-A

Introduction: 
(05)

Multimedia Technology: 
(06)

Storage Media : 
(05)
Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers.

Audio: 
(05)
Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Nyquist's Sampling Theorem Typical Audio Formats Delivering Audio over a Network, Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System Hardware Aspects of MIDI, MIDI Messages

Part-B

Image, Graphics and Video: 
(06)

Video and Audio Compression: 
(12)

Multimedia Communication: 
(06)
Building Communication network, Application Subsystem, Transport Subsystem, QOS, Resource Management, Distributed Multimedia Systems

Books Recommended:
SYLLABUS FOR B.E. (I.T.) SIXTH SEMESTER

Paper Title: Wireless Communication

Paper Code: IT621
Credits : 04
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To provide basic knowledge about problems and design approaches in wireless communication systems. This includes engineering models in radio propagation and the application of antennas to wireless communication. Students will familiarize with channel impairment, mitigation techniques, and multiple access techniques. Migration to 3G technologies is also covered in the course.

Part-A
Introduction
Evolution of Mobile Communication Systems, Paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems.

System Design Fundamentals
Frequency reuse, Channel assignment strategies, handoff strategies, interference, improving coverage and capacity in cellular systems, mechanism for capacity improvement-cell splitting, cell sectoring and microcell zone concept, modulation techniques.

Wireless Systems
GSM, GSM reference architecture and GSM security architecture, CDMA digital cellular standard, IS-95 system.

Part-B

Channel Impairment Mitigation Techniques
Introduction, Power control, Diversity Techniques: Frequency Diversity, Time Diversity, Space Diversity, Path Diversity, Channel Equalization, Rake receiver, Channel coding and interleaving.
Multiple Access Techniques
Simplex, Duplex, Time Division Duplex, Frequency Division Duplex FDMA, TDMA, CDMA, SDMA, OFDM, Hybrid Multiple Access.

Migration to 3G technologies:
WiFi, WiMax, EDGE, Bluetooth, CDMA-2000.

Books Recommended:

Paper Title: Wireless Communication (Practical)
Paper code: IT 671 MM: 50 Credits: 2
Objective: To familiarize students with the TCP/IP Suite, understand the Wireless Communication Technology (Satellite, Cellular and Bluetooth networking).
Practical based on theory.

Paper title: Software Engineering
Paper Code: IT622 Max. Marks (Univ. Exam): 50 Time: 3 Hours
Credits: 04 Max. Marks (Int. Exam): 50 Total Lectures: 45
L T P 3 1 0
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To help students to develop skills that will enable them to construct software of high quality software that is reliable and that is reasonably easy to understand, modify and maintain.

Part-A

Software Evolution (06)

Project Management Concepts (04)

**S/W Project Planning** (04)
Project estimation, Empirical Estimation Models, COCOMO Model.

**Risk Management** (04)
Reactive Vs Proactive risk strategies, s/w Risks, Risk Identification, Projection, Risk Mitigation, Monitoring and Management.

**S/W Quality Assurance** (06)
S/w quality concept, SQA- S/w quality assurance activities, reviews, SQA plan, ISO 9000 Quality standards, ISO approach to quality assurance systems.

**Part-B**

**S/W Configuration Management** (05)
Baselines, S/w configuration Items, SCM process, Version control, Change control.

**Design** (06)
Design Concepts and principles, Modular Design, Design Methods.

**S/W Testing Methods** (06)
Testing Fundamentals, test case design, White box testing, Black Box testing, Testing Strategies, Verification & validation, Unit, Integration, Validation, System Testing.

**Computer aided S/W Engineering** (04)
CASE, Building blocks For Case, Integrated Case Environment.

**Books Recommended**


**Reference Books**


**Paper title: Web Technologies**

**Paper Code: IT623**
**Max. Marks (Univ. Exam): 50**
**Credits : 03**
**Max. Marks (Int. Exam): 50**

Time: 3 Hours
Total Lectures: 45
L T P 3 0 0

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the
Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Objective:** To enable the students to get familiar with current technologies used in web development and maintenance and to highlight the features of different technologies involved in web technology and various scripting languages

**Part-A**

**Internet Basics:** (07)
Internet; Communication on the Internet; Internet services; types of accounts; Internet Domains; NIC; IP addresses; Web Servers; review of TCP/IP; HTTP; telnet; ftp; WWW concepts; web site creation concepts; web commerce; internet telephony.

**HTML:** (08)
HTML basics; HTML tags; text formatting; text styles; lists: ordered, unordered and definition lists; layouts; adding graphics; tables; linking documents; images as hyperlinks; frames and layers; DHTML, style sheets.

**Java Script:** (06)
Advantages of JavaScript; writing JavaScript into HTML; JavaScript data types, variables, operators and expressions; arrays and functions in JavaScript; condition checking; loops; dialogue boxes.

**Part-B**

**Advanced Java Script:** (08)
JavaScript document object model; JavaScript assisted style sheets; events handling in JavaScript; browser objects; form objects; built-in and user defined objects; cookies.

**ASP:** (16)
Origin of ASP; how ASP works; ASP Objects, Application object; ASP Error object; Request object; Response object; server object; session object; Scripting objects; Active Server Components; ActiveX Data Objects

**Books Recommended:**
1. Web Enabled Commercial Application Development Using HTML, DHTML, Java Script, Perl CGI by Ivan Bayross, BPB, Edi 2nd

**Paper title: Web Technologies (Practical)**
**Paper Code: IT 673**
**MM: 50**
**Credits: 2**

**Objective:** To enable students to understand web page site planning, management and maintenance as well as explain them concepts of developing advanced HTML pages with the help of frames, scripting languages, and evolving technologies & scripting like DHTML, jQuery, AJAXand XML.

**Practical based on theory.**
Paper Title: Network Security and Cryptography

Paper Code: IT624       Max. Marks (Univ. Exam): 50       Time: 3 Hours
Credits : 04             Max. Marks (Int. Exam): 50       Total Lectures: 45
                          L T P   3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To understand the principles of encryption algorithms; conventional and public key cryptography and to have a detailed knowledge about authentication, hash functions and application level security mechanisms.

Part-A

Basic Encryption and Decryption:

(05)

Attackers and Types of threats, challenges for information security, Encryption Techniques, Classical Cryptographic Algorithms: Monoalphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Monoalphabetic ciphers, Polyalphabetic Ciphers such as Vigenere, Vernam Cipher

Stream and Block Ciphers:

(07)


Number theory and basic Algebra:

(04)

Modular Arithmetic, Euclidean algorithm, Random number generation

Key Management Protocols:

(04)

Solving Key Distribution Problem, Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.

Part-B

Public Key Encryption Systems:

(08)


Hash Algorithms:

(05)

Hash concept, description of Hash Algorithms, Message Digest Algorithms such as MD4 and MD5, Secure Hash Algorithms such as SH1 and SHA2

Network Security:

(04)
Web Security: (04)
Web security consideration, secure socket Layer protocol, Transport Layer Security
Secure Electronic Transaction Protocol

Firewalls: (04)
Firewall Design principles, trusted systems, Virtual Private Networks.

Books Recommended:

Reference Books:

Paper Title: Business Intelligence

Paper Code: IT625
Credits : 04
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Objective: To impart knowledge of data warehousing and data mining for Business Processes and to understand the role of Business Intelligence in taking business decisions.

SECTION – A

Introduction to Business Intelligence:
Basics of Data Integration (Extraction Transformation Loading) 8
Concepts of data integration, need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.

Introduction to Multi-Dimensional Data Modeling, 8
Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema

SECTION – B

Basics of Enterprise Reporting 6
Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, and overall architecture.

Data Mining Functionalities: 15
Association rules mining, Mining Association rules from single level, multilevel transaction databases, Classification and prediction, Decision tree induction, Bayesian classification, k-nearest neighbor classification

Text Books:

References:
2. Larissa Terpeluk Moss, Shaku Atre : Business Intelligence roadmap by Addison Weseley
3. Cindi Howson : Successful Business Intelligence: Secrets to making Killer BI Applications by Tata McGraw Hill
4. Mike Biere : Business intelligence for the enterprise by Addison Weseley, Augst 2010

Paper title: Business Intelligence and Software Engineering (Practical)

Paper Code: IT 675 MM: 50 Credits: 2

Objective: Students will understand the concepts and be able to apply these concepts in various business contexts and through hands-on exercises with leading software applications for OLAP, OLTP, data warehouses, data marts and relational database and models.
Practical based on theory.
SYLLABUS FOR B.E. (I T) SEVENTH SEMESTER

Paper Title: Digital Signal Processing

Paper Code: IT721  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits: 4  Max. Marks (Int. Exam): 50  Total Lectures: 45
L  T  P   3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To understand how to analyze and manipulate digital signals and have the fundamental MATLAB programming knowledge to do so. The intention is to also provide the student with the necessary background for taking advanced level courses in signal and image processing, and ideally, for reading technical literature in DSP

Part - A

Introduction to Digital Signal Processing  (04)
Applications and advantages of DSP. Sampling theorem, concept of frequency in discrete time signals.

Discrete Time Signals and Systems  (08)
Classification of signals, standard signals and classification of discrete time systems. Linear Time Invariant systems and their representation by difference equations and structures.

Z- Transform  (04)
Definition of direct, inverse z-transform and its properties. System function of a LTI system. Inverse z-transform by power series expansion and partial fraction expansion.

Frequency Analysis  (08)
Fourier series and transform of discrete time signals and properties (DTFT). Discrete Fourier Transform and its properties. Fast Fourier Transform algorithms, decimation in time and decimation in frequency algorithms (radix 2).

Part – B

Realization of FIR & IIR Systems  (04)
Direct forms, cascade and parallel form IIR structures. Direct form, cascade and linear phase FIR structures.

Design of Digital Filters  (12)
Comparison of Analog and Digital filters, Comparison of IIR and FIR filters. FIR Filters and linear phase requirement. FIR filters design using the window technique. IIR Filters and their design using the impulse invariance technique and bilinear transformation. Finite word length effects.

DSP Processors  (05)
Introduction to DSP Processors, architecture of TMS 320CXX and ADSP 21XX

Books Recommended:


Paper Title: Digital Signal Processing (Practical)

Paper code: IT771    MM: 50    Credits: 2

Objective: To develop skills for analyzing and synthesizing algorithms and systems that process discrete time signals, with emphasis on realization and implementation. Computer simulation exercises are intended to familiarize the student with implementation aspects and the application of theoretical knowledge to practical problems.

Practical based on theory.

Paper Title: Visual Programming

Paper Code: IT722    Max. Marks (Univ. Exam): 50    Time: 3 Hours
Credits: 4    Max. Marks (Int. Exam): 50    Total Lectures: 45
           L T P   3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To provide introduction about Win32 environment and be familiar with event driven programming as well as to know about MFC and how to work with App Wizard.

Part – A

Introduction: (08)

Graphical User Interface Concepts - I: (05)
Graphical User Interface Concepts - II: (04)
Menus, Controls: MonthCalendar, DateTimePicker, LinkLabel, ListBox, CheckedListBox, ComboBox, TreeView, ListView, Datagrid, Gridview, TabControl, Multiple Document Interface (MDI) Windows.

Multithreading and Exception Handling: (05)
Thread States, Lifecycle of a Thread, Thread Priorities and Scheduling, Creating and Executing Threads, Thread Synchronization and Class Monitor, Exception Handling.

Part – B

Graphics and Multimedia: (05)

File Processing and Streams: (05)
Data Hierarchy, Files and Streams, Classes File and Directory, Reading and Writing Sequential Access Files, Serialization.

Data Access: (08)
Data Access Techniques, XML, LINQ, SQL, ADO.NET Object Model, LINQ to SQL, ADO.NET and LINQ, LINQ to XML.

Additional Techniques: (05)

Books Recommended:

References:

Paper title: Visual Programming (Practical)
Paper Code: IT 772 MM: 50 Credits: 2

Objective: To make the students to understand the windows programming concepts including Microsoft Foundation Classes. To introduce the concepts of windows programming to introduce GUI programming using Microsoft Foundation Classes To enable the students to develop programs and simple applications using Visual C++

Practical based on theory.
Paper title: Theory Of Computation

Paper Code: IT723  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits: 4  Max. Marks (Int. Exam): 50  Total Lectures: 45
Credit Hours: 3
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To construct and prove the equivalence of languages described by finite state machines and regular expressions, pushdown automata and turing machines.

Part A

Introduction to finite automata: (12)
Strings, alphabet, language operations, finite state machine, finite automation model, acceptance of strings and language, deterministic finite automaton, deterministic finite automaton, equivalence between NFA and DFA, conversion of NFA into DFA, minimization of FSM, equivalence between two FSMs, Moore and Mealy machines.

Regular expressions and regular languages: (11)
Regular sets, regular expressions, identity rules, manipulation rules, manipulation of regular expressions, equivalence between RE and FA, inter conversion, pumping lemma, closure properties of regular sets (proofs not required), regular grammars, right linear and left linear grammars, equivalence between regular linear programming and FA.

Part B

Context free grammar and languages: (8)
Context free grammar, derivation trees, chomsky normal form, greibach normal form, push down automata, acceptance of CFL, equivalence of CFL and PDA, properties of CFL (proofs omitted)

Turing Machines: (7)
Turing machine definition model, design of TM, computable functions, recursive enumerable language, church’s hypothesis, counter machine, types of TM’s (proofs not required), chomsky hierarchy of languages, linear bounded automata and context sensitive language, introduction of DFCL and DPDA, LR(0) grammar

Undecidability: (7)
Undecidability, properties of recursive & non-recursive enumerable languages, universal Turing machine

Text Books:
1. Introduction to automata theory, languages and computation by Hopcroft H.E. & Ullman
2. An introduction to formal languages and automata by Peter linz.

References:
1. Introduction to languages and the theory of automata by John C Martin  
2. Elements of theory of computation by Lewis H.P and papadimition C.H.  
3. Theory of computation by mishra & chandrashekharan.

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**ELECTIVE-I**

**Paper Title:** Object Oriented Analysis And Design  
**Paper Code:** IT724  
**Credits:** 4  
**Max. Marks (Univ. Exam):** 50  
**Max. Marks (Int. Exam):** 50  
**Time:** 3 Hours  
**Total Lectures:** 45  
**L T P** 3 1 0

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Objective:** To provide students in-depth theoretical base and fundamentals of Object Oriented Programming paradigm using C++ as well as to prepare students mind setup to learn new computer languages on their own and to prepare them to design and code various projects using C++.

**Part A**

**Object Oriented Concepts** (02)  
Difference between Procedure-Oriented and Object-Oriented Programming, Basic Concepts of Object Oriented Programming, Abstract data types: Object, Classes, Data Abstraction and Encapsulation, Inheritance, Polymorphism.

**C++ Programming Language and Functions** (05)  
Tokens, Keywords, Identifiers, Basic Data Types, User Defined Data Types, Derived Data Type, Variables, Scope Resolution Operator, Memory Management Operator, Manipulators, Type Cast Operator, Operator Overloading, Operator Precedence, Control Structure, Function Prototype, Call by Reference, Call by Value, Inline functions, Default Argument, Function Overloading

**Classes and Objects** (06)  
Structures and Classes, Class declaration, Creating Objects, Assessing Class Members, Class Function Definition, Member Function Definition, Private and Public Member Function, Nesting of Member Functions, Memory Allocation for objects, Array of objects, Objects as Function Arguments.

**Inheritance: Extending Classes** (05)  
Base and Derived Classes, Visibility Modes, Concept of Protected Member, Types of Inheritance- Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

**Operator overloading** (05)  
Definition, Overloading Unary Operators, Overloading Binary Operators, Type Conversions- Built in to Class Type, Class Type to Built in Type, One Class conversion to another Class.
Part - B

Streams and Templates (05)
C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted I/O Operations, Manipulators, Templates.

File Streams (05)
Classes for File Stream Operation, Opening and Closing a File, Detecting End-of-File, File Pointers and Manipulators, Functions- put() and get(), write() and read().

Object Oriented Analysis and Object Oriented Design (08)
Object Oriented Notations and Graphs, Steps in Object Oriented Analysis, Steps in Object Oriented Design, System analysis, System Design, Object Design

Object Oriented Methodologies (04)
OMT methodology, Object Model, Dynamic Model, Function Model, Relationship among models, Jacksons Model, Booch’s OOA and OOD approach.

Recommended Books:


Paper Title: Artificial Intelligence

Paper Code: IT724
Credits: 4
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: This subject aims to introduce the main concepts, ideas and techniques of artificial intelligence (AI) to the students so that they could know the various aspects of AI, understand some essential principles and are able to implement some basic AI techniques in their projects or other related work.
Part – A

Introduction:  
(06)  
Artificial Intelligence and its applications, Artificial Intelligence Techniques, criteria of success, Intelligent Agents, Nature and structure of Agents, Learning Agents

Problem solving techniques:  
(09)  
State space search, control strategies, heuristic search, problem characteristics, production system characteristics, Generate and test, Hill climbing, best first search, A* search, Constraint satisfaction problem, Mean-end analysis, Min-Max Search, Alpha-Beta Pruning, Additional refinements, Iterative Deepening

Knowledge representation:  
(08)  
Mapping between facts and representations, Approaches to knowledge representation, procedural vs declarative knowledge, Forward vs. Backward reasoning, Matching, conflict resolution, Non-monotonic reasoning, Default reasoning, statistical reasoning, fuzzy logic Weak and Strong filler structures, semantic nets, frame, conceptual dependency, scripts.

Part – B

Planning:  
(06)  
The Planning problem, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Analysis of planning approaches, Hierarchical planning, conditional planning, Continuous and Multi Agent planning

Learning:  
(10)  
Forms of Learning, inductive learning, Decision trees, Computational learning theory, Logical formulation, knowledge in learning, Explanation based and relevance based learning, statistical learning, Learning with complete data and hidden variables, instance based learning, Neural Networks

Introduction to Natural Language processing and Expert system:  
(06)  

Books Recommended:  

References:  

Paper Title: MOBILE COMPUTING
Objective: To provide basics for various techniques in Mobile Communications and Mobile Content services. The students will understand the fundamentals of mobile computing with ubiquity of wireless communication technologies and the proliferation of portable computing devices and to build skills in working with Wireless application Protocols to develop mobile content applications.

SECTION – A

Mobility: (6)
Issues, challenges, and benefits; Review of mobile and cellular communication technology; Review of distributed/network operating systems, ubiquitous computing.

Global System for Mobile Communication (GSM) System Overview: (5)
GSM Architecture, Mobility Management, Network Signaling, GPRS

Mobile IP Networks: (5)
Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing.

Mobile Transport Layer: (5)
Transport layer issues in wireless, Indirect TCP, Snoop TCP, Mobile TCP

SECTION – B

Wireless LANs: (6)
Introduction to IEEE 802.11, Bluetooth technologies and standards.

Mobile Adhoc Networks: (6)
Hidden and exposed terminal problems; Routing protocols: DSDV, DSR, AODV.

Mobile Devices and OS: (6)

Application Development: (6)
WWW programming model, Development Environment for Mobile Devices.

Text Books:
1. Jochen Schiller : Mobile Communication, Pearson
References:

Paper Title: Building Enterprise Applications

Paper Code: IT724 Max. Marks (Final Exam): 50 Time: 3 Hours
Credits: 4 Max. Marks (Sessional Exam): 50 Total Lectures: 45
L T P: 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, at least two from each section.

Objectives: To expose the students to the essentials of building enterprise applications. The core modules of this elective include designing and developing high quality enterprise applications and other tasks related to it.

SECTION – A

Introduction to Enterprise application 8
Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications

Incepting enterprise application and business process modeling 8
Inception of enterprise applications, enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

Enterprise Architecture and designing enterprise application 8
Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture - design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

SECTION – B

Constructing enterprise application 11
Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage.
Testing and rolling out enterprise application

Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application

Text Books:

References:
SYLLABUS FOR B.E. (IT) EIGHTH SEMESTER

Paper Title: DIGITAL IMAGE PROCESSING

Paper Code: IT821

Max. Marks (Univ. Exam): 50
Time: 3 Hours
Max. Marks (Int. Exam): 50
Total Lectures: 45

L T P   3 1 0

Note: Examiner shall set eight questions, four from Part -A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To understand how to analyze and manipulate digital signals and have the fundamental MATLAB programming knowledge to do so; to provide the student with the necessary background for taking advanced level courses in signal and image processing.

SECTION – A

Introduction to Image Processing: 5
Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation, color models.

Image Transformation & spatial Filtering: 8
Intensity transform functions, histogram processing, Spatial filtering, fourier transforms and its properties, Walsh transform, Hotelling transforms, Haar and slant transforms, Hadamard transforms, frequency domain filters, Homomorphic Filtering, Pseudo coloring, color transforms

Image Restoration: 5
Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering

SECTION – B

Image Compression: 8
Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression

Image Segmentation & Representation: 13
Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors, Regional Descriptors

Object Recognition: 6
Patterns and Patterns classes, Recognition based on Decision Theoretic methods

Text Books:

2. Boyle and Thomas : Computer Vision - A First Gurse 2nd
References:


Paper Title: DIGITAL IMAGE PROCESSING (Practical)

Paper Code: IT 871       MM: 50       Credits: 2

Note: Students are required to complete any 8 practicals by implementing them in any of the programming language such as Java, C/C++, C#, MATLAB

Objective: To develop skills for analyzing and synthesizing algorithms and systems that process discrete time signals, digital and analog filters with emphasis on realization and simulation in MATLAB.

List of Practicals:

1. Reading and displaying images in different formats using different color models.
2. Converting color images into monochrome images.
3. Understanding brightness, contrast and intensity concept of images
4. Images enhancements using grey level transformations
5. Image enhancements using spatial filters
6. Image enhancements in frequency domain
7. Homomorphic Filtering
8. Image Noise removal and inverse filtering of images
9. Image color enhancements using pseudo coloring techniques
10. Point, Line, Edge and Boundary Detections in images
11. Histogram Matching and specification on images
12. Boundary Linking techniques on images
13. Thresholding of Images
14. Magnification of Images
15. Image representation and Description techniques

Paper title: EMBEDDED SYSTEM DESIGN

Paper Code: IT822     Max. Marks (Univ. Exam): 50     Time: 3 Hours
credits: 4            Max. Marks (Int. Exam): 50     Total Lectures: 45

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To introduce students to the embedded systems, its hardware (microcontrollers) and software, devices and buses used for embedded networking and explain real time operating systems, inter-task communication and an exemplary case of RTOS.

Part - A

Introduction to Microcontrollers (02)
Comparison of Microprocessors and Microcontrollers. Embedded and external memory devices, CISC and RISC processors, Harvard and Von Neumann Architectures.

Overview of 8 bit Microcontrollers (18)
Overview of 8051, Architecture, addressing modes and instructions. Interrupts, Timer/ Counters, Serial Communication and applications. Interfacing Overview of Atmel 89C51 microcontroller.

Part - B

PIC Microcontrollers (15)
Introduction and features, PIC 16C6X/7X: Architecture, Registers, Reset actions, Memory Organization, Instructions, Addressing Modes, I/O Ports, Interrupts, Timers, ADC. Input Capture, Output Compare, Frequency Measurement, Serial I/O Device
Software Development & Tools


Real Time Operating Systems

RTOS Architecture, Task and Task States, Tasks and Data, Semaphores and shared data, Operating System Services: message queues, timer function, events, memory management, interrupt Routines in an RTOS environment, Basic Design Using RTOS

Books Recommended:

3. Microcontrollers ( Theory and Applications ) by Ajay Deshmukh, TMH Publishers

Paper title: EMBEDDED SYSTEM DESIGN (Practical)

Paper Code: IT 872  MM: 50  Credits: 2

Objective: Practical introduction to the design, implementation, testing and documentation of microprocessor-based systems.

Practical based on theory.

ELECTIVE II

Paper Title: SOFTWARE TESTING AND QUALITY ASSURANCE

Paper Code: IT823  Max. Marks (Univ. Exam): 50  Time: 3 Hours
Credits: 4  Max. Marks (Int. Exam): 50  Total Lectures: 45

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To make students aware about the importance of the software testing during software development. The course covered to be in line with the development
tools and languages taught in this level. The course will prepare the student for software testing and debugging. It will further laid the foundation for advanced courses in Software quality assurances.

**Part– A**

**Introduction:**

(07)

**Software Quality Assurance Concepts and Standards :**

(08)

**Risk Management and Change Management:**

(07)

**Part– B**

**Software Testing:**

(07)

**Testing Techniques:**

(08)

**Testing Process:**

(08)

**Books Recommended:**

References:

Paper Title: SYSTEM SIMULATION AND MODELING

Paper Code: IT823
Credits: 4
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Objective: The main objective of this subject is to gain knowledge about system and its behavior so that students can transform the physical behavior of a system into a mathematical model that can in turn transform into an efficient algorithm for simulation purpose.

PART A

Introduction: What is modeling and simulation, application areas, definition and types of system, model and simulation, introduction to discrete-event and continuous simulation.

Simulation Methods: Discrete-event Simulation, Time advance Mechanisms, Components and organization of Discrete-event simulation, Flowchart of next-event time advance approach, Continuous Simulation.

Queueing Models: Single server queueing system, introduction to arrival and departure time, flowcharts for arrival and departure routine. Event graphs of queueing model. Determining the events and variables, Event graphs for inventory model.

PART B


Distribution Functions: Stochastic activities, Discrete probability functions, Cumulative distribution function, Continuous probability functions. Generation of
random numbers following binomial distribution, poisson distribution, continuous distribution, normal distribution, exponential distribution, uniform distribution.

**Simulation Languages:** Basic Introduction to Special Simulation Languages:-GPSS/ MATLAB/ Network Simulators.

**Text Books:**

**References:**
2. Rudra Pratap: “Getting Started with MATLAB 7”, Oxford University Press.

**Paper Title: NETWORK ADMINISTRATION**

**Paper Code: IT823**

Max. Marks (Univ. Exam): 50

Max. Marks (Int. Exam): 50

Time: 3 Hours

Credits: 4

Total Lectures: 45

L T P 3 1 0

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

**Objective:** To expose students to a variety of fundamental skills utilized in entry-level computer network systems administration. Students will be exposed to various aspects of network hardware and software maintenance and monitoring, configuring and supporting a local area network (LAN) and a wide area network (WAN), Internet systems and segments of network systems.

**Part - A**

**Introduction to Unix System Administration** (04)
Daily Tasks of a System Administrator, Startup and Shutdown, Periodic Processes, Managing File Systems, Responsibilities to the users, Hardware responsibilities, Types of SunOS Systems.

**Disks and Devices in Unix** (03)
Disk Structure and Partitions, Disk Partitions; Devices- Logical Names, Disk Label and Bootblock, Tapes.
Unix File System Management


Operating Systems Installation

Installing Solaris 10.0, Post Install Actions, Solaris Patch List, IRIX 5.X; Startup and Shutdown- Booting, Run Levels etc/inittab, Solaris PROM, Diskless Workstations, Shutdown, Crashes.

System Configuration

Kernel configuration; Adding Hardware Special Files in Solaris 10.0, IRIX 5.X, Digital UNIX and Ultrix, Systems Directories,/ -root/ etc- systems. Creating networks and subnets, configuring network interfaces, obtaining network statistics, routing , /user- system programs, libraries, etc; User accounts-admittance, login procedure, Password Aging.

Part – B

Daily Systems Administration

User and Group Administration, Communicating with systems users, Running programs automatically, corn & at, Admintool, Solstice Adminsuite, Services Managed, The Distributed Systems Administration Daemon.

Backup Procedures

Backup Procedures, Backup Strategies, Backup and Restore Commands.

Network Services

Overview of Services Access, Service Access Facility, Service Access Controller, Port Monitors, Setting Up a Terminal, Network Port Monitors, Terminal Control, Network Administration, Network Initialization, Host Names and addresses, Services, Network Programs.

Security


Books Recommended:

2. Essential UNIX System Administration, Aeleen Frisch, Edi 3rd.
ELECTIVE III

Paper title: ADVANCED DATABASE MANAGEMENT SYSTEMS

Paper Code: IT824            Max. Marks (Univ. Exam): 50            Time: 3 Hours
Credits: 4                Max. Marks (Int. Exam): 50            Total Lectures: 45

L T P  3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: To introduce students with the basic concepts of Relational Database design, implementation, query processing, security and authorization. In addition, students will be familiarized with various types of databases.

Part - A

Review of basic DBMS concepts:
ER model, Normalization, Query Languages (01)

Transaction Management: (03)
Transaction concept, state, serializability, Recoverability, Implementation of Isolation, Testing for serializability.

Concurrency Control: (03)
Lock based protocols, time stamp based protocol, validation based protocols, locking.

Crash Recovery: (03)
Failure classification, storage hierarchy, recovery and atomicity, log-based, shadow paging, recovery, buffer management.

Security & Integrity: (03)
Security & integrity violation, authorization & views, security systems in SQL, encryption.

The Extended Entity Relationship Model and Object Model: (04)
The ER model revisited, Motivation for complex data types, User defined abstract data types," and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.

Object-Oriented Databases: (04)
Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects;

Part – B
Object Relational and Extended Relational Databases: (05)
Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; Systems comparison of RDBMS, OODBMS, ORDBMS.

Parallel Databases: (04)
Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins;

Distributed Database: (04)
Concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases.

Enhanced Data Models for Advanced Applications: (04)
Active database concepts. Generalized model, design and implementation issues, potential applications. Temporal database concepts: Time representation, calendars and time dimensions, tuple versioning, attribute versioning.

Spatial Databases: (03)
Types of spatial data and queries, application involving spatial data, spatial indexes, indexing based on space filling curves.

Deductive Databases and Query Processing: (04)
Introduction to recursive queries, least model semantics, recursive queries with negation, efficient query evaluation.

Books Recommended:

Reference Books:
3. An Introduction to database systems, Sixth Edition C. J. Date Addison Wesley
Paper title: SOFT COMPUTING

Paper Code: IT824   Max. Marks (Univ. Exam): 50   Time: 3 Hours
Credits: 4   Max. Marks (Int. Exam): 50   Total Lectures: 45

L T P  3 1 0

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objective: Introduce students to soft computing concepts and techniques and foster their abilities in designing and implementing soft computing based solutions for real-world problems.

Part - A

Neural Networks: (05)

Fuzzy Logic: (04)

Operations on Fuzzy Sets: (05)
Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: (06)

Part – B

Fuzzy Logic: (05)

Uncertainty based Information: (05)
Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

Introduction of Neuro-Fuzzy Systems: (05)
Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic: (04)
Medicine, Economics etc.
Genetic Algorithm: (06)
An Overview, GA in problem solving, Implementation of GA

Books Recommended:

Reference:

Paper Title: Java Technologies

Paper Code: IT824
Credits: 4
Max. Marks (Univ. Exam): 50
Max. Marks (Int. Exam): 50
Total Lectures: 45
L T P 3 1 0

Time: 3 Hours

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Objectives: This subject will provide students with the principles of object orientation from the perspective of Java implementation and UML. Students are expected to learn the concepts of and practical approaches to object-oriented analysis, design and programming using UML and Java.

Part – A

Java Methods, Classes and Inheritance: (8)
Introduction; classes; methods; constructors; overloading methods; arrays; recursion; passing arrays and objects to methods; Inheritance; method overriding; abstract classes; using final; packages; interfaces.

I/O, Applets and Graphics: (8)
I/O basics; stream classes; byte and character streams; reading and writing files; Applet fundamentals; Applet class; Applet initialization and termination; event handling; keyboard and mouse events; AWT class; Layout managers; panels; canvases; Frame windows; drawing lines, rectangles, ellipses.

Exceptional Handling and Multithreaded Programming: (8)
Exception handling fundamentals; exception types; uncaught exceptions; try and catch; creating exception classes; throwing exceptions; Java thread model; thread priorities; creating a thread; interthread communication; thread synchronization; suspending, resuming and stopping threads;

Part – B
Overview of J2EE and working with JDBC: (7)
What is J2EE, component based architecture of J2EE: Web, Business and Application component, commonly used classes and interfaces of java.sql package, connecting java application to a database, prepared statements.

Servlets and JSP: (7)
Java Servlets, compilation, deployment, and testing a servlet, session management, request dispatching, Java Server Pages, deploying and testing a JSP, using java beans in JSP.

Enterprise Java Beans(EJB): (7)
Architecture of EJB, creating a stateless-session EJB, statefull-session bean, Life Cycle of session beans, Entity beans, life cycle of entity beans.

Text Book:
2. Herbert Schildt : The Complete Reference Java2, TMH