## Bachelor of Technology (Computer Engineering)
### Scheme of studies / Examination

#### (Semester - 3)

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<th>Sl. No</th>
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<th>Examination Schedule (Marks)</th>
<th>Duration of Exam (Hours)</th>
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<td>1</td>
<td>MATH-201E / HUM-201E</td>
<td>Mathematics-III / Basics of Industrial Sociology, Economics &amp; Management</td>
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<td>2</td>
<td>CSE-201 E</td>
<td>Data Base Management Systems</td>
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<td>3</td>
<td>CSE-203 E</td>
<td>Data Structures</td>
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<td>Internet Fundamentals</td>
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<td>Analog Comm.</td>
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<td>7</td>
<td>IT-253 E</td>
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<td>Data Base Management Systems Lab.</td>
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</table>
Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II

UNIT – III
Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV
Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Note: Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

TEXT BOOKS:
1. “Modern Economic Theory” Dewett, K.K., S. Chand & Co.

REFERENCE BOOKS
2. Business Organization and Management : M.C. Shukla
UNIT – I
Fourier Series: Euler’s Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

UNIT-II
Functions of a Complex Variables: Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.
Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III
Probability Distributions: Probability, Baye’s theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV
Linear Programming: Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

Reference Book
1. Complex variables and Applications: R.V. Churchil; Mc. Graw Hill
3. Operation Research: H.A. Taha
4. Probability and statistics for Engineer: Johnson. PHI.

Note: Examiner will set eight question, taking two from each unit. Students will be required to attempt five questions taking at least one from each unit.
CSE-203 E       DATA STRUCTURES

L    T    P
3    1    –

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit-1: Introduction : Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it.

Arrays: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.


Unit- 4 : Graphs :Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs., Graph traversals and spanning forests, minimum-spanning trees, computer representation of graphs.

Tables : Definition, Hash Functions, Implementation & Applications.

Sorting & Searching : Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

Text Book:


Reference Books:
• Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983, AW
• Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
• Data Structures and Program Design in C By Robert Kruse, PHI,
• Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum’s outline by TMH
• Introduction to Computers Science - An algorithms approach, Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.
单位-1: 集合论

介绍集合论, 集合操作, 集合算术, 组合集合, 双重集合, 有限集合和无限集合, 类集合, 力集合, 二元乘积, 代表关系, 类型的关系, 二元关系, 等价关系和划分, 部分或次序关系和格, 数学归纳, 包括与排除原则, 斐波那契数列。

函数及其类型, 组合函数和关系, 数的基数和反函数关系。函数 & 派克原则。

单位-2: 陈述性逻辑

基本操作: AND（∧）, OR（∨）, NOT（~）, 合成陈述的真值。陈述, 矛盾, 反陈述。

递归和递归关系: 多项式和它们的计算, 序列, 引入到等差, 等比和等几何数列, 部分分数, 线性递归关系与常数系数, 同构解, 特殊解, 总解递归关系使用生成函数。

单位-3: 代数结构

定义, 代数结构的基本性质, 例子, 代数群, 子群, 积群, 环, 模, 同态, 等态, 自反, 等态群, 正则群, 整环, 核, 欧拉公式。

单位-4: 图形和树

图形的引入, 导向和非导向图形, 同构和等同图形, 子图, 切点和桥梁, 多图和加权图, 路径和圈, 加权图的最短路径, 欧拉路径和圈, 哈密顿路径和圈, 平面图。

参考书:

- Concrete Mathematics: A Foundation for Computer Science, Ronald Graham, Donald Knuth and Oren Patashik, 1989, Addison-Wesley.
- Discrete Mathematics by A. Chtewynd and P. Diggle (Modular Mathematics series), 1995, Edward Arnold, London,
- Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.
B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION
(ECE-203E)

L     T   P           THEORY : 100 Marks
3     1   -         SESSIONAL : 50 Marks
TOTAL : 150 Marks
TIME : 3 Hrs.

UNIT – I

NOISE: Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

UNIT-II


UNIT-III

ANGLE MODULATION: frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT-IV

Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

REFERENCE BOOKS:

1. Taub & Schilling, Principles of Communication Systems, TMH.
5. Electronics Communication System: Kennedy; TMH

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.
IT-253 E

Internet Lab.

L   T   P
-   -   3

Sessional : 50 Marks
Exam : 25 Marks
Total : 75 Marks
Duration of Exam: 3 Hrs.


1. To prepare the Your Bio Data using MS Word
2. To prepare the list of marks obtained by students in different subjects and show with the help of chart/graph the average, min and max marks in each subject.
3. Prepare a presentation explaining the facilities/infrastructure available in your college/institute.

HTML Lists:
1. Create a new document that takes the format of a business letter. Combine <P> and <BR> tags to properly separate the different parts of the documents. Such as the address, greeting, content and signature. What works best for each.
2. Create a document that uses multiple <BR> and <P> tags, and put returns between <PRE> tags to add blank lines to your document see if your browser senders them differently.
3. Create a document using the <PRE>tags to work as an invoice or bill of sale, complete with aligned dollar values and a total. Remember not to use the Tab key, and avoid using emphasis tags like <B> or <EM> within your list.
4. Create a seven-item ordered list using Roman numerals. After the fifth item, increase the next list value by 5.
5. Beginning with an ordered list, create a list that nests both an unordered list and a definition list.
6. Use the ALIGN attribute of an <IMG> tags to align another image to the top of the first image. play with this feature, aligning images to TOP, MIDDLE and BOTTOM.
7. Create a ‘table of contents’ style page (using regular and section links) that loads a different document for each chapter or section of the document.

Internet:
1. Instilling internet & external modems, NIC and assign IP address.
2. Study of E-mail system.
3. Create your own mail-id in yahoo and indiatimes.com.
4. Add names (mail-id’s) in your address book, compose and search an element.

Reference Books:
• Complete PC upgrade & maintenance guide, Mark Mines, BPB publ.
• PC Hardware: The complete reference, Craig Zacker & John Rouske, TMH
• Upgrading and Repairing PCs, Scott Mueller, 1999, PHI,
1. Write a program to search an element in a two-dimensional array using linear search.

2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method.

3. Write a program to perform following operations on tables using functions only
   a) Addition  b) Subtraction  c) Multiplication  d) Transpose.

4. Write a program to implement Queue.

5. Write a program to implement Stack.

6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.

7. Write a program for swapping of two numbers using ‘call by value’ and ‘call by reference strategies.

8. Write a program to implement binary search tree.
   (Insertion and Deletion in Binary search Tree)

9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list.

10. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.

11. Create a linked list and perform the following operations on it
   a) add a node  b) Delete a node.

12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.

13. Write a program to simulate the various graph traversing algorithms.

14. Write a program which simulates the various tree traversal algorithms.

15. Write a program to implement various Searching Techniques.

16. Write a program to implement Sorting Techniques.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.
LIST OF EXPERIMENTS:

1. i) To study Double Sideband Amplitude Modulation and determine its modulation factor and power in sidebands.
   ii) To study amplitude demodulation by linear diode detector.
2. i) To study Frequency Modulation and determine its modulation factor.
   ii) To study PLL 565 as frequency demodulator
3. To study Sampling and reconstruction of pulse amplitude modulation system.
4. To study the Sensitivity characteristics of superheterodyne receiver.
5. To study the Selectivity characteristics of superheterodyne receiver.
6. To study the Fidelity characteristics of superheterodyne receiver.
7. i) To study Pulse Amplitude Modulation
   a) Using switching method
   b) By sample and hold circuit.
   ii) To demodulate the obtained PAM signal by IInd order Low pass filter.
8. To study Pulse Width Modulation / Demodulation.
10. To study active filters (Low-pass, High-pass, Band-pass, Notch filter).

NOTE:
At least seven experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining three.
CSE-201 E       Database Management Systems

L    T   P       Sessional:  50    Marks
3   1   -        Exam:  100    Marks
Total: 150   Marks
Duration of Exam: 3 Hrs.


Unit-2: File Organisation: Sequential Files, index sequential files, direct files, Hashing, B-trees Index files, Inverted Lists.

Relational Model, Relational Algebra & various operations (set operations, select, project, join, division), Order, Relational calculus: Domain, Tuple. Well Formed Formula, specifications, quantifiers.

Unit-3: Introduction to Query Languages : QBE, integrity constraints, functional dependencies & Normalization (Normal forms- up to 5th Normal forms).

Unit-4: Introduction to Distributed Data processing, Object Oriented Data Base Management Systems parallel Databases, data mining & data warehousing, Concurrency control : Transaction, Timestamping, Lock-based Protocols, serializability and Recovery Techniques.

Text Books:

Reference Books:
- Data Management & file Structure by Looms, 1989, PHI

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.
CSE-207 E  

Internet Fundamentals

<table>
<thead>
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<th>L</th>
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<td>Duration of Exam: 3 Hrs.</td>
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</table>

Unit-1: The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Internet Congestion, internet culture, business culture on internet. Collaborative computing & the internet. Modes of Connecting to Internet, Internet Service Providers (ISPs), Internet address, standard address, domain name, DNS, IP v6. Modems, Speed and time continuum, communications software; internet tools.


Unit-3: Electronic Mail: Introduction, advantages and disadvantages, User Ids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, MIME types, Newsgroups, mailing lists, chat rooms, secure-mails, SMTP, PICO, Pine, Library cards catalog, online ref. works.

Languages: Basic and advanced HTML, Basics of scripting languages – XML, DHTML, Java Script.

Unit-4: Servers: Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing & using these servers.

Privacy and security topics: Introduction, Software Complexity, Attacks, security and privacy levels, security policy, accessibility and risk analysis, Encryption schemes, Secure Web document, Digital Signatures, Firewalls, Intrusion detection systems

Text Book:
- Internet & World Wide Programming, Deitel,Deitel & Nieto, 2000, Pearson Education

Reference Books:
- Complete idiots guide to java script, Aron Weiss, QUE, 1997
- [www.secinf.com](http://www.secinf.com)
- [www.hackers.com](http://www.hackers.com)
- Alfred Glkossbrenner-Internet 101 Computing MGH, 1996

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.
1. Create a database and write the programs to carry out the following operation:

   1. Add a record in the database
   2. Delete a record in the database
   3. Modify the record in the database
   4. Generate queries
   5. Data operations
   6. List all the records of database in ascending order.

2. Create a view to display details of employees working on more than one project.

3. Create a view to display details of employees not working on any project.

4. Create a view to display employees name and projects name for employees working on projects <P1 and P3> or <P2 and P4>.

5. Using two tables create a view which shall perform EQUIJOIN.

6. Write trigger for before and after insertion. Detection and updation process.

7. Write a procedure to give incentive to employees working on all projects. If no such employee found give app. Message.

8. Write a procedure for computing amount telephone bill on the basic of following conditions.

Usage of S/w:

1. VB, ORACLE and/or DB2
2. VB, MSACCESS
3. ORACLE, D2K
4. VB, MS SQL SERVER 2000
### Bachelor of Technology (Computer Engineering)

#### Scheme of studies / Examination

**Semester- 4**

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<th>Subject</th>
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<th>Examination Schedule (Marks)</th>
<th>Duration of Exam (Hours)</th>
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<td>MATH-201E / HUM-201E</td>
<td>Mathematics III / Basics of Industrial Sociology, Economics &amp; Management</td>
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<td>Computer Architecture and Organization</td>
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<td>Programming Languages</td>
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<td>IT-252 E</td>
<td>Object Oriented Programming using C++</td>
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<td>ECE-204 E</td>
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<td>3</td>
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<td>C++ Programming Lab.</td>
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CSE- 202 E  Computer Architecture & Organization

L  T  P  Sessional:  50  Marks
3  1  –  Exam :  100  Marks
  Total:  150  Marks
Duration of Exam: 3 Hrs.

Unit-1: General System Architecture: Store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Machine Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MASM

Unit-2: Basic non pipelined CPU Architecture: CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining. Hardwired control design method, Micro programmed control unit.

Unit-3: Memory Hierarchy & I/O Techniques: The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations. Allocation & replacement polices, segments, pages & file organization, virtual memory.

Unit-4: Introduction to Parallelism: Goals of parallelism (Exploitation of concurrency, throughput enhancement); Amdahl's law; Instruction level parallelism (pipelining, super scaling –basic features); Processor level parallelism (Multiprocessor systems overview).

Computer Organization [80x86]: Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions, memory reference, register reference. I/O reference, Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, Types of interrupts; Memory Hierarchy. Programmed I/O, DMA & Interrupts.

Text Books:

Reference Books:
- Computer Architecture- Nicholas Carter, 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all at least one from each unit.
• Concrete Mathematics: A Foundation for Computer Science, Ronald Graham, Donald Knuth and Oren Patashik, 1989, Addison-Wesley.
• Applied Discrete Structures for Computer Science, Doerr and Levasseur, (Chicago: 1985,SRA
• Discrete Mathematics by A. Chtewynd and P. Diggle (Modular Mathematics series), 1995, Edward Arnold, London,
• Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
CSE-204 E  Programming Languages

L  T  P  
3  1  -  

Sessional:  50  Marks
Exam:  100  Marks
Total:  150  Marks
Duration of Exam:  3 Hrs.

Unit-1: Introduction: A brief history, Characteristics of a good programming language, Programming language translators compiler & interpreters , Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations ,type checking & type conversions , Assignment & initialization, Numeric data types, enumerations, Booleans & characters.


Unit-2: Structured data objects : Structured data objects & data types , specification & implementation of structured data types, Declaration & type checking of data structure ,vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.

Subprograms and Programmer Defined Data Types: Evolution of data type concept abstraction, encapsulation & information hiding , Subprograms ,type definitions, abstract data types, over loaded subprograms, generic subprograms.

Unit–3: Sequence Control: Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return, recursive subprograms, Exception & exception handlers, co routines, sequence control. Concurrency – subprogram level concurrency, synchronization through semaphores, monitors & message passing

Data Control: Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data: dynamic & static scope. Parameter & parameter transmission schemes.

Unit-4: Storage Management: Major run time elements requiring storage ,programmer and system controlled storage management & phases , Static storage management , Stack based storage management, Heap storage management ,variable & fixed size elements.

Programming Languages: Introduction to procedural, non-procedural ,structured, logical, functional and object oriented programming language, Comparison of C & C++ programming languages.

Text Book:
- Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH

Reference Books:
- Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag).
- Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.,
- Programming Languages – Principles and Pradigms Allen Tucker , Robert Noonan 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.
Unit–1: Introduction to C++, C++ Standard Library, Basics of a Typical C++ Environment, Pre-processors Directives, Illustrative Simple C++ Programs. Header Files and Namespaces, library files. Concept of objects, basic of object modeling, object classes, associations, behaviors, description, Object Oriented Analysis & Object Modeling techniques.

Object Oriented Concepts: Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Other Modifiers, Polymorphism: Overloading, Inheritance, Overriding Methods, Abstract Classes, Reusability, Class’sBehaviors.

Classes and Data Abstraction: Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes : Const(Constatnt) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes And Integrators. Proxy Classes, Function overloading.


Inheritance: Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base- Class Pointers to Derived- Class Pointers, Using Member Functions, Overriding Base –Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived –Class Object To Base- Class Object Conversion, Composition Vs. Inheritance.

Unit–3: Virtual Functions and Polymorphism: Introduction to Virtual Functions, Abstract Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.


Unit-4: Templates & Exception Handling: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members.

Introduction, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Re-throwing an Exception, Exception specifications, Processing Unexpected Exceptions, Stack Unwinding, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

Text Books:
- Programming with C++ By D Ravichandran, 2003, T.M.H

Reference books:
• Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill
• Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
• The Complete Reference in C++ By Herbert Schildt, 2002, TMH.
• C++ Programming Fundamentals by Chuck Easttom, Firewall Media.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five
Unit-1: THE 8085 PROCESSOR: Introduction to microprocessor, 8085 microprocessor: Architecture, instruction set, interrupt structure, and assembly language programming.

MEMORY INTERFACING: Semiconductor memory and its types- Static and dynamic RAM, ROM, EPROM, EEPROM and NOVRAM- Interfacing memory- Interfacing SRAM, DRAM, EPROM etc. Timing of RAM and ROM signals.

Unit-2: THE 8086 MICROPROCESSOR ARCHITECTURE: Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

INSTRUCTION SET OF 8086: Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

Unit-3: INTERFACING DEVICE: The 8255 PPI chip: Architecture, control words, modes and examples. Interfacing D/A and A/D converters.

Unit-4: DMA: Introduction to DMA process, 8237 DMA controller,

INTERRUPT AND TIMER: 8259 Programmable interrupt controller, Programmable interval timer chips.

Text Books:
- Microprocessor Architecture, Programming & Applications with 8085: Ramesh S Gaonkar; Wiley Eastern Ltd.
- The Intel Microprocessors 8086- Pentium processor: Brey; PHI

Reference Books:
- Microprocessors and interfacing: Hall; TMH
- The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications: Triebel & Singh; PHI
- Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design: Yu-Chang Liu & Glenn A Gibson; PHI.
- Advanced Microprocessors and Interfacing: Badri Ram; TMH

Note: Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one from each unit. Each question will carry equal marks.
Q1. Raising a number \( n \) to a power \( p \) is the same as multiplying \( n \) by itself \( p \) times. Write a function called `power()` that takes a double value for \( n \) and an int value for \( p \), and returns the result as double value. Use a default argument of 2 for \( p \), so that if this argument is omitted, the number will be squared. Write a `main()` function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, \((4,5)\) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates. Write a program that uses a structure called `point` to model a point. Define three points, and have the user input values to two of them. Than set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

```
Enter coordinates for P1: 3    4
Enter coordinates for P2: 5    7
Coordinates of P1 + P2 are :   8, 11
```

Q3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.

```
Enter first number, operator, second number: 10/ 3
Answer = 3.333333
Do another (Y/ N)? Y
Enter first number, operator, second number 12 + 100
Answer = 112
Do another (Y/ N) ?  N
```

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure `phone`. Create two structure variables of type `phone`. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

```
Enter your area code, exchange, and number:  415  555   1212
My number is (212) 767-8900
Your number is (415) 555-1212
```

Q5. Create two classes DM (for metres and centimeters) and DB (for feet and inches) which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe a DM object or DB object, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and centimetres depending on the object on display.

Q6. Create a class `rational` which represents a numerical value by two double values- `NUMERATOR` & `DENOMINATOR`. Include the following public member Functions:

- constructor with no arguments (default).
- constructor with two arguments.
• void reduce() that reduces the rational number by eliminating the highest common factor between
  the numerator and denominator.
• Overload + operator to add two rational number.
• Overload >> operator to enable input through cin.
• Overload << operator to enable output through cout.

Write a main() to test all the functions in the class.

Q 7. Consider the following class definition

```cpp
class father {
protected:
    int age;
public:
    father(int x) {age = x;}
    virtual void iam() {
        cout < < “I AM THE FATHER, my age is : ”<< age<< endl;}
};
```

Derive the two classes son and daughter from the above class and for each, define iam() to write
our similar but appropriate messages. You should also define suitable constructors for these
classes.

Now, write a main() that creates objects of the three classes and then calls iam() for them.

Declare pointer to father. Successively, assign addresses of objects of the two derived classes to
this pointer and in each case, call iam() through the pointer to demonstrate polymorphism in
action.

Q 8. Write a program that creates a binary file by reading the data for the students from the terminal.
The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

Q 9. A hospital wants to create a database regarding its indoor patients. The information to store include
   a) Name of the patient
   b) Date of admission
   c) Disease
   d) Date of discharge

Create a structure to store the date (year, month and date as its members). Create a base class to store the above
information. The member function should include functions to enter information and display a list of all
the patients in the database. Create a derived class to store the age of the patients. List the information
about all the to store the age of the patients. List the information about all the pediatric patients (less than
twelve years in age).

Q 10. Make a class Employee with a name and salary. Make a class Manager inherit from Employee. Add an
      instance variable, named department, of type string. Supply a method to toString that prints the manager’s
      name, department and salary. Make a class Executive inherit from Manager. Supply a method toString that
      prints the string “Executive” followed by the information stored in the Manager superclass object. Supply
      a test program that tests these classes and methods.

Q 11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the
total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both
these to 0. A member function called payingCar() increments the car total and adds 0.50 to the cash total.
      Another function, called nopayCar(), increments the car total but adds nothing to the cash total. Finally, a member
      function called displays the two totals. Include a program to test this class. This program should allow the user to
      push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC key should cause the
      program to print out the total cars and total cash and then exit.

Q 12. Write a function called reversit() that reverses a string (an array of char). Use a for loop that swaps the
      first and last characters, then the second and next to last characters and so on. The string should be passed to
      reversit() as an argument.

Write a program to exercise reversit(). The program should get a string from the user, call reversit(), and print
out the result. Use an input method that allows embedded blanks. Test the program with Napoleon’s famous
phrase, “Able was I ere I saw Elba”).
Q13. Create some objects of the string class, and put them in a Deque—some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach() function and a user written display function. Then search the Deque for a particular string, using the firstThat() function and display any strings that match. Finally remove all the items from the Deque using the getLeft() function and display each item. Notice the order in which the items are displayed: Using getLeft(), those inserted on the left (head) of the Deque are removed in “last in first out” order while those put on the right side are removed in “first in first out” order. The opposite would be true if getRight() were used.

Q 14. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

a) Accept deposit from a customer and update the balance.
b) Display the balance.
c) Compute and deposit interest.
d) Permit withdrawal and update the balance.
e) Check for the minimum balance, impose penalty, necessary and update the balance.
f) Do not use any constructors. Use member functions to initialize the class members.

Q 15. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data() to initialize baseclass data members and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

Area of rectangle = x * y
Area of triangle = ½ * x * y
LIST OF EXPERIMENTS

1. Study of 8085 Microprocessor kit.

2. Write a program using 8085 and verify for:
   a. addition of two 8-bit numbers.
   b. addition of two 8-bit numbers (with carry).

3. Write a program using 8085 and verify for:
   a. 8-bit subtraction (display borrow)
   b. 16-bit subtraction (display borrow)

4. Write a program using 8085 for multiplication of two 8-bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.

5. Write a program using 8085 for multiplication of two 8-bit numbers by bit rotation method and verify.

6. Write a program using 8085 for division of two 8-bit numbers by repeated subtraction method and test for typical data.

7. Write a program using 8085 for dividing two 8-bit numbers by bit rotation method and test for typical data.

8. Study of 8086 microprocessor kit

9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double word division and verify.

10. Write a program using 8086 for finding the square root of a given number and verify.

11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.

12. Write a program using 8086 and verify for:
   a. Finding the largest number from an array.
   b. Finding the smallest number from an array.

13. Write a program using 8086 for arranging an array of numbers in descending order and verify.

14. Write a program using 8086 for arranging an array of numbers in ascending order and verify.

15. Write a program for finding square of a number using look-up table and verify.

16. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.

17. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

Note: At least ten experiments have to be performed in the semester out of which seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of ECE-216E.
B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS
(ECE-204E)

L    T    P
3    1    -

Theory : 100 Marks
Sessional : 50 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

UNIT 1 FUNDAMENTALS OF DIGITAL TECHNIQUES:
Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra.

COMBINATIONAL DESIGN USING GATES:
Design using gates. Karnaugh map and Quine Mcluskey methods of simplification.

UNIT 2 COMBINATIONAL DESIGN USING MST DEVICES
Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtracters.
BCD arithmetic Circuits. Encoders. Decoders / Drivers for display devices.

SEQUENTIAL CIRCUITS:
Counters. Asynchronous and Synchronous Ring counters and Johnson Counter, Design of
Synchronous and Asynchronous sequential circuits.

UNIT 3 DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS-devices. Bipolar logic families: RTL,
DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic. Interfacing of CMOS
and TTL families.

UNIT 4 A/D AND D/A CONVERTERS:
Sample and hold circuit, weighted resistor and R-2R ladder D/A Converters, specifications for
D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation,
counting type.
Dual-slope ADC, specifications of ADCs.

PROGRAMMABLE LOGIC DEVICES:
ROM, PLA, PAL, Introduction to FPGA and CPLDs.

TEXT BOOK:

REFERENCE BOOKS:
3. Digital Design: Morris Mano: PHI,

NOTE: Eight questions are to be set in all by the examiner taking two questions from each unit.
Students will be required to attempt five questions taking atleast one question from each unit. Each
question will carry equal marks.
LIST OF EXPERIMENTS

1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R, J-K, T & D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip- flops & drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip- flops & drive a seven-segment display using the same.
10. To design & realize a sequence generator for a given sequence using J-K flip-flops.
11. Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12. Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a Johnson counter.

Note: At least ten experiments are to be performed, at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the Syllabus.
<table>
<thead>
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<th>Sl. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Schedule</th>
<th>Examination Schedule (Marks)</th>
<th>Duration of Exam (Hours)</th>
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### Bachelor of Technology (Computer Engineering)

#### Scheme of Courses/Examination

(6th Semester)

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* Department Elective:
1. CSE-320  Digital Signal Processing
2. CSE-321  Multimedia Technique
3. CSE-322  Graph Theory & Combinations
4. CSE-323  Logical of Programming
5. CSE-324  Advanced Databases System
6. CSE-325  Parallel Computing
CSE-302  Mobile Computing

Theory: - 100
Sectional: - 50

Unit 1.
Introduction: Challenges in mobile computing, coping with uncertainties, resource poorness, bandwidth, etc. Cellular architecture, co-channel interference, frequency reuse, capacity increase by the cell splitting. Evolution of mobile system: CDMA, FDMA, TDMA, GSM.
Mobility Management: Cellular architecture, co-channel interference, Mobility: handoff, types of handoffs: location management, HLR-VLR, hierarchical scheme, predictive location management scheme, Mobile IP, Cellular IP.

Unit -2
Publishing & Accessing Data in Air: Pull and push based data delivery models, data dissemination by broadcast, broadcast disks, directory service in air, energy efficient indexing scheme for push based data disks.
File System Support for Mobility: Distributed file sharing for mobility support, CODA & other storage manager for mobility support.

Unit-3.

Unit-4.

Note: - There will be eight questions in all. Two questions will be set from each unit. Students are required to attempt five questions selecting at least one question for each unit.

Books
3. Yi-Bing Lin & Imrich Chlamtac, “Wireless and Mobile Networks architectures”

CSE-302  Computer Hardware Technologies

Theory: - 100
Sectional: - 25

Unit 1.
Memory
Memory, memory chips & modules, memory types, advance memory technologies, troubleshooting memory.
Power Supply
Power Supply function and operating, power supply quality and specification, power projection and back up, backup power system;UPS; troubleshooting power supply.

Unit 2
Motherboard
PC family tree, motherboard controllers and system resources, input-outputs ports, IRQ, I/O bus system: ISA, MCA, EISA, VESA local bus, PCL, AGP, PCLK; on board I/O devices, ROMBIOS, ROM POST, COOS setup.

Unit 3
Interfaces and I/O Ports
Floppy disk interface, IDE interface: ATA standards, master-slave configuration, data transfer mode; SCSI interface; SCSL bus standards; which is better SCSI or IDE; Serial ports, parallel ports, USB, Video adapters, troubleshooting video adapters.

Unit-4  Devices and Peripherals
Floppy disk drive, hard disk drive, CD ROM drive, DVD ROM drive, recordable drives, keyboard, mice, printers and monitors, trouble-shooting drives and peripheres.

Note: - There will be eight questions in all. Two questions will be set from each unit. Students are required to attempt five questions selecting at least one question for each unit.

Books
CSE-302   Network Management and Security

L      T      P          Theory: - 100
4      1      -          Sectional: - 50

**Unit 1.**
Introduction: Need and basic goals for computer, security, security threats etc. Cryptographic building blocks: symmetric and asymmetric key cryptography, cryptographic hash functions, digital signature schemes etc., with representative application for each.

**Unit-2**
Operating system security: low-level protection mechanisms, access control: models for access control, some confidentiality, integrity and hybrid models of access control such as Bell-La Padula, Biba, Chinese Wall etc., Discretionary v/s mandatory access control.
Case Studies: Java access control policy specification, SELinux security model and implementation. Program flaws; bugs which have security implications such as buffer overflow, race condition etc.

**Unit-3**
Medication Code: Viruses, worms, Trojan horses; how they and how to defend against them.
Network Security: Problem in network security; Kind of attacks, PKL, Key exchange protocols, example protocol such as PGP, Kerberos, IPSEC/VPN, SSL, S/MIME etc.

**Unit-4**
Protocol vulnerabilities: example of protocol vulnerabilities such as in TCP/IP, denial of service attacks, etc.
Tools for network security such as firewall and intrusion detection systems.

**Note:** There will be eight questions in all. Two questions will be set from each unit. Students are required to attempt five questions selecting at least one question for each unit.

**Books**
4. Jeff Crume ” Inside Internet Security” Addison Wesley.
Unit-1.
Software and software engineering- Software characteristics, software crisis, software engineering paradigms.
Planning a software project-software cost estimation, project scheduling, personal planning, term structure.

Unit 2.
Software configuration management, quality assurance, project monitoring, risk management.
Software requirement analysis- Structure analysis, object oriented analysis and data modeling, software requirement specification, validation.

Unit-3.
Design and implementation of software – Software design fundamentals, design methodology (structured design and object oriented design), design verification, monitoring and control coding.
Software Reliabilities: Metric and specification, fault avoidance and tolerance, exception handling, defensive programming.

Unit-4.
Testing – Testing fundamentals, while box and black box software testing
Software Testing Strategies: Unit testing, integration testing, validation testing, system testing, debugging.
Software Maintenance – Maintenance characteristics, maintainability, maintenance task, maintenance side effect.

CASE tools.

Note: - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Book:
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1. To solder and de-solder various components.
2. To check and measure various supply voltage of PC.
3. To make comparative study of motherboard; 386, 486, PI, PII, PIII.
4. To observe and study various cables, connection and parts used in computer communication.
5. To study various cards use in system viz. Display cards, LAN card etc.
6. To remove, study and replace floppy disk drive.
7. To remove, study and replace hard disk.
8. To remove, study and replace CD ROM drive.
9. To study monitor, its circuitry and various preset and some elementary fault detection.
10. To study printer assembly and elementary fault detection of DMP and laser printer.
11. To observe various cables and connectors used in networking.
12. To study parts of keyboard and mouse.
13. To assemble a PC.
14. Troubleshooting exercise related to a various components of computer like monitor, drives, memory and printers etc.

Books:
2. Craig Zacker & John Rouske, PC Hardware: The complete reference, TMH.
1. Design a prototype that implements the Cache management for a mobile computing environment?

2. Design a system: The challenges of developing high performance, high reliability and high quality software system are too much for ad-hoc and informal engineering techniques that might have worked in the past on less demanding system. New techniques for managing these growing complexities are required to meet today’s time-market, productivity and quality demand.

3. Peer-to-peer communication system: As computer become more pervasive and homes become better connected, a new generation of application will be developed over the internet. In this model, Peer-to-peer application become very attracting because they improve scalability and enhance performance by enabling direct and real-time communication among the peers. We need to propose a decentralized management system that manages the Peer-to-peer applications and the system resources in an integrated way; monitors the behavior of the Peer-to-peer applications transparently and obtains accurate resource projections, manages the connections between the peers and distributes the objects in response to the user requests and changing processing and networking conditions.

4. Write a program that implement the few sorting algorithms (Bubble, selection etc.) n data. It stops the operation when the counter for sorting index is at 100, 1000, 10000 and so on, stores the contents of the registers, program counter and partially sorted list of data, etc. It resumes the operation after 30 sec. from the point of the termination.

5. Write a program the implement the bubble sort for n data. It stops the operation when the counter for sorting index is at 100,1000,10000 and so on, stores the contents of the registers, program counter and partially sorted list of data, etc. It transfers the code and data across the network on the new destination and resumes the operation from the point of termination on the previous node. Finally the result from the last node in the itinerary is send back to the process-initiating node.

6. Develop a protocol that performs parallel computation of the same task on different nodes. Finally process initiator (master node) receives the result and computation time required to complete the task on an each node and displays to the user. Compare the computing power of different nodes.

Book:

7. Java Servlets: Application Development; Karl Moss, TMH, Delhi.
1. (i) Implement Receipt Acknowledgement and updating of Inventory (RAUP)
   a) Find Unadjusted Functional points (UFP)
   b) Calculate FPC by Mark II Method
(ii) To estimate effort and schedule
   Calculate the compression factor and the manpower based on given information of software.
2. Suggest an action plan for the following risks without compromising the project, process or product parameters
   a) Language skills inadequate in two people in a term of five.
   b) Specially ordered hardware and software likely to be delivered three months later.
   c) Customer and the end user not convinced to the new technology implementation as a correct choice.
   d) Software required interface with other technologies on which the project team has no experience.
3. Implementation a testing strategy for the following software development cases:
   a) Rule based deterministic closed large but simple payroll system for a company.
   b) Development of a customer relation management system for a retail distribution chain. The retail organization is not sure about the scope and the failure feature.
   c) Modification to exiting order processing system for a multi-location multi-product company.
4. Build a work breakdown structure for the following
   a) Delivery of the software, initiation to development covering lifecycle.
   b) Development of protocol.
   c) Development of a process for a function.
5. In a hospital management system develop the following diagram for a Ward services management system (SMW).
   a) Work Flow.
   b) System Flow.
   c) DFD.
   Develop on effective modular design of SMW using these diagrams.
6. Draw three level DFD’s for CLPS. Modularize the CLPS and the structure them top-down as functional model.
7. Conduct a task analysis for the following users:
   a) Officer at railway ticket reservation window
   b) Officer at insurance claim settlement desk
   c) Clerk at call center, answering queries of customer who have purchased cars form the company.
8. Based on the business model of DFD develop a modular structure for a business system model. Draw a complete system flowchart.

Books
a. W.S Jawadekar, Software Engineering Principal and Approaches, TMH, 2004
Unit 1.
**Introduction**
Signal, system and signal processing, classification of signals, concept of frequency in continuous time and discrete. Time signals. Analog to digital and digital to analog conversion, Discrete time signals, discrete time system, LTI systems, difference equations, and implementation of discrete time system.

Unit 2
**Z-transform and Its Applications.**
Z-transform, properties of Z-transform, inversion of Z-transform, applications of Z-transform. Discrete Fourier Transform(DFT), properties of DFT, Linear filtering methods based on the DFT, frequency analysis of signals using the DFT.

Unit 3
**Fast Fourier Transform and Its Applications**
FFT algorithms(Radix 2 FFT) algorithm, implementation of Distrete time System, structure of FIR system, Direct from structure, cascade form structure, parallel form, structure for IIR system, cascade, direct form and parallel from structure.

Unit 4
**Design of Digital Filter**
Design of IIR filters, Bilinear transformation and impulse invariance method, Matched Z transformation design of FIR filter with different methods.

Note: - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Book:**
1. John G.Proakis and Dimitris G. Manolakis, Digital Signal Processing, PHI
2. Oppenheim & Schaffer, Digital Signal Processing, PHI
4. S.K.Mitra, Digital Signal Processing,TMH.
5. S.Salivayhan, A Vallavraj, C. Gnanapriya, Digital Signal Processing,TMH.
Unit 1.
Basic of Multimedia Technology
Computers, communication and entertainment, multimedia- an introduction; framework for multimedia system; multimedia devices, CD Audio, CD ROM, CD-1; representation devices and the user interface; multimedia representation and authoring; professional development tools; LANs and multimedia, internet, WWW and multimedia; distribution network- ATM and ADSL; multimedia servers and data bases; vector graphics; 3D graphics programs; animation techniques; shading; anti aliasing, morphing, video on demand

Unit -2
Image Compression And Standards
Making still images, editing and capturing images, scanning images, computer colour models, color palettes, vector drawing, 3 D drawing and rendering, JPEG- objectives and architectures, JPEG- DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding, JPEG performance, overview of other image file format as GIF, TIFF, BMP, ONG etc.

Unit-3
Audio And Video
Digital representation of sound, time domain sampled representation, method of encoding the analog signals, sub-band coding, Fourier method, transmission of digital sound, digital audio signal processing, stereophonic and quadraphonic processing and rendering, sampled sound, MPEG audio compression and decompression, brief survey of speech recognition and generation, audio synthesis, musical instrument digital interface(MIDI), digital video and image compression, MPEG, motion video compression standard,DVI technology, time- based media representation and delivery

Unit – 4
Virtual Reality
Application of multimedia, intelligent multimedia system, desktop virtual reality( VR), VR operating system, virtual environment displays and orientation tracking, visually coupled system requirements, intelligent VR software systems.
Application of environment of various fields viz. entertainment, manufacturing, business, education etc.

Note: - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Book:
1. Villamil & Molina multimedia: an introduction, PHI
2. Lozano, Multimedia: sound and video PHI
3. Villamil & Molina multimedia: Production, planning and delivery PHI
4. Sinclair, Multimedia on the PC, BPB
5. Tay Vaughan, multimedia: making it works, TMH
CSE-320   Graph theory and combinatorics  
(Departmental Elective I) 

L  T  P        Theory:  100  
3  2  -        Sessional:  50  

**Unit 1.**  
Introduction  
Basic concepts, subgraphs, vertex, degrees, walks, paths, circuits, cycles, trees, spanning trees, cut vertices and cut edges, connectivity, Euler tours and Hamiltonian cycles, matching perfect matching, connectivity and separability, network flows, 1-isomorphism and 2- isomorphism  

**Unit 2**  
Advanced Features  
Vertex coloring, chromatic polynomial, edge coloring, planar and non- planar graphs, Euler’s formula Kwiatkowski’s theorems, test for planarity, directed graphs, tournaments, networks, max flow, min cut theorems, graphs enumerations, Polya’s counting theorem  

**Unit 3**  
Graph algorithms  
Computer representation of graphs, shortest path algorithms, minimal spanning tree, fundamental circuit, depth first search, planarity testing, directed circuits, isomorphism, and performance of graph theoretic algorithms  

**Unit 4**  
Combinatorics  
Basic combination numbers, recurrence relations, generating functions, multinomial, counting principals, Polya’s theorem, inclusion and exclusion principle, block design and error correcting codes, Hadamard matrices, finite geometry.  

**Note:** - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.  

**Book:**  
1. Deo N: Graph theory and applications, Prentice Hall  
3. S.A. Choudum: A First course in Graph Theory, MacMillan [India]  
4. V. Krishnamurthy:Combinatorics—Theory and application, Affiliated East and West  
### Unit 1: Fundamentals

Propositions, tautologies, precedence rule, system definition, reasoning using Transformation, Formal system, Axioms, Interference rules, Predicates, Quantification, Free and bound Identifiers, Data values & Types, Generators, Semantic definitions of functions, Generator induction, defined ness condition.

### Unit 2: Semantics

Predicate Transformations, Various command, alternative and Interactive commands, Procedure call, The semantic characterization of programming language, two Theorems, Design of properly terminating constructs, Euclid’s Algorithms, Interrupts, spin lock.

### Unit 3: Communicating Sequential Process (CSP)

Parallel commands, Co routines, Subroutines and data representation, monitor and scheduling, Integer semaphore, Dining Philosophers problem.

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**Note:** There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books:**

2. E.W. Dijkstra, A Discipline of Programming PHI.
3. Hoare and Jones, Essays in Computer Science, TMH
Unit 1.
Parallel & Distributed Data bases
Architecture for parallel database, parallel query evolution, parallelizing individual operations, parallel query optimization, introduction to distributed databases, distributed DBMS architectures, sorting data in a distributed database DBMS, Distributed catalog management, Distributed query processing, updating distributed data, introduction to distributed transactions, Distributed concurrency control, recovery.

Unit 2
Data Mining
Introduction, counting co-occurrences, mining for rules, tree structured rules, clustering, similarity search over sequences

Unit 3
Object database systems
User defined ADT, structured types, objects and reference types, inheritance, design for an ORDBMS, challenges in implementing an ORDBMS, OODBMS, comparison of RDBMS with OODBMS and ORDBMS

Unit 4
Advanced topics
Advanced transactions processing, integrated access to multiply data source, mobile data bases main memory databases, multi media data bases, GIS, Temporal and sequenced databases.

Note: - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books
CSE-325       Parallel Computing
(Departmental Elective I)

L   T   P       Theory: 100
3   2   -       Sessional: 50

Unit 1.
Introduction: Paradigms of parallel computing: Synchronous – Vector/Array, SIMD, systolic;
Asynchronous- MIMD, reduction paradigm.
Hardware Taxonomy: Flynn’s classification, handler’s classification.
Software taxonomy: Kung’s taxonomy, SPMD.

Unit 2
Abstract parallel computational models: combinational circuits, sorting network, PRAM models,
Interconnections RAMs. Parallelism approaches- data parallelism, control parallelism.
Performance matrices: Laws governing performance measurements. Matrices- speedups, efficiency,
utilization, communication overheads, single/ multiple program performances, bench marks.

Unit 3
Parallel processors: taxonomy and topology: shared memory multi processor, distributed memory
networks, processor organization, static and dynamic interconnections. Embeddings and simulations.
Parallel programming: shared memory programming, distributed memory programming, object oriented
programming, data parallel programming, functional and data flow programming.

Unit 4
Scheduling and parallelization: Scheduling parallel programs, loop scheduling. Parallelization of sequential
programs. Parallel programming support programs

Note: - There will be 8 questions in all. Two questions will set from each unit. Students are required to attempt
five questions selecting at least one question from each unit.

Books
2. T.G.Lewis and El-Rewini, Introduction to Parallel computing, Prentice Hall, New Jersey, 1992
3. T.G.Lewis, Parallel Programming: A machine Independent approach, IEEE Computer Society Press,
Los Alamitos, 1994
### Bachelor of Technology (Computer Engineering)

**Schemes of Studies / Examination**

**(Semester- 7TH)**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Schedule</th>
<th>Examination Schedule</th>
<th>Duration Of Exam (Hours)</th>
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<tr>
<td>1</td>
<td>*</td>
<td>Departmental Elective-II</td>
<td>3</td>
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<td>Departmental Elective-III</td>
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<td>3</td>
<td>CSE-401</td>
<td>Compiler Design</td>
<td>4</td>
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<tr>
<td>4</td>
<td>CSE-403</td>
<td>Web Engineering</td>
<td>3</td>
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<tr>
<td>5</td>
<td>CSE-405</td>
<td>Statistical Models for Computer science</td>
<td>4</td>
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<td>6</td>
<td>CSE-407</td>
<td>Unix &amp; Linux Programming (Pr)</td>
<td>-</td>
<td>-</td>
<td>*1+2</td>
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<tr>
<td>7</td>
<td>CSE-409</td>
<td>Web Engineering (Pr)</td>
<td>-</td>
<td>-</td>
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<td>8</td>
<td>CSE-411</td>
<td>Minor Project</td>
<td>-</td>
<td>-</td>
<td>6</td>
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<td>9</td>
<td>CSE-413</td>
<td>Seminar</td>
<td>-</td>
<td>2</td>
<td>-</td>
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<tr>
<td>10</td>
<td>CSE-415</td>
<td>Training Viva</td>
<td>-</td>
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**Departmental Elective-II**

1. CSE-441 Software Project Management
2. CSE-443 Embedded System Design
3. CSE-445 Artificial Intelligence
4. CSE-447 Image Processing

**Departmental Elective-III**

1. CSE-471 - Unix & Linux Programming
2. CSE-473 - Security & Cryptography
## Bachelor of Technology (Computer Engineering)
### Schemes of Studies / Examination
#### (Semester- 8TH)

<table>
<thead>
<tr>
<th>Sl. No.</th>
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<th>Examination Schedule</th>
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<td>3</td>
<td>CSE-402</td>
<td>Neural Networks &amp; Fuzzy Logic</td>
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<td>CSE-404</td>
<td>Interactive Computer Graphics</td>
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<td>CSE-406</td>
<td>Neural Networks (Pr.)</td>
<td>-</td>
<td>-</td>
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<td>CSE-408</td>
<td>Major Project</td>
<td>-</td>
<td>-</td>
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<td>CSE-410</td>
<td>Seminar</td>
<td>-</td>
<td>2</td>
<td>-</td>
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<td>8</td>
<td>CSE-412</td>
<td>Comprehensive Viva-Voce</td>
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<td>8</td>
<td>CSE-414</td>
<td>General Fitness &amp; Professional Aptitude</td>
<td>-</td>
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**TOTAL** | 14 | 6 | 15 | 35 | 1000 |

### Departmental Elective-IV

1. CSE-440 Distributed Operating Systems  
2. CSE-442 Software Quality Models and Testing  
3. CSE-444 Bioinformatics  
4. CSE-446 Expert Systems  
5. CSE-448 Real Time Systems and Softwares  
6. CSE-450 Software Verification, Validation and Testing

### Departmental Elective- V

1. CSE-472 Object Oriented Software Engineering  
2. CSE-474 Simulation and Modeling  
3. CSE-476 Data warehousing and Data Mining
Assemblers, linkers, loaders, compilers and translators, the structure of a compiler, different states in the construction of a compiler, Design of lexical analyzer, Basic Parsing Techniques, Parsers, shift-reduce parsing, operator- precedence parsing, top-down parsing predictive parsers, L.R. Parsers, the canonical collection of L R (O) items, construction of SLR parsing tables, construction canonical L.R. Parsing tables, Constructing LALR parsing tables implementation of L R Parsing tables.

Unit – 2

Syntax-Directed Translation: Syntax-directed translation schemes, implementation of syntax directed translators, intermediate code, postfix notation, parse trees and syntax trees, three address code, quadruples, and triples, translation of assignment statements. Boolean expressions, control statements.
Symbol labels
The contents of a symbol table data structures for symbol tables representing scope information.

Unit-3

Run Time Storage Administration: Implementation of a simple stack allocation scheme, implementation of block structured languages, storage allocation in block structured languages.
Error Detection And Recovery: Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

Unit -4

Code Optimization: The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis.
Code Generation: Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

BOOKS

2. Donovan, J, System Programming , TMH
3. D.M. Dhamdhere: Compiler construction- Principles and Practice Mc Milan India
4. David Grics: Compiler Construction for digital computer
Web Engineering

CSE-403
L T P Theory: 75
3 1 - Sessional: 25

Unit-1

**Information Architecture:** The role of Information Architect, Collaboration and communication, Organizing information, organizational challenges, Organizing web sites and Intranets, Creating cohesive organization systems, designing navigation systems, types of navigation systems, Integrated navigation elements, designing elegant navigation systems, Searching systems, Searching your web site, designing the search interface, Indexing the right stuff, To search or not to search grouping content, conceptual design, High level Architecture Blueprint. Architectural Page Mockups, Design Sketches.

Unit-2

**Dynamic HTML and Web Designing:** HTML Basic concepts, Good web design, process of web publishing phases of web site development, STRUCTURE OF HTML documents, HTML elements- Core attributes, Language attributes, Core events, Block level events, Text level events, Linking basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image maps, Semantic linking meta information, image preliminaries, Image download issues, Images and buttons, introduction to layout: Backgrounds, color and text, fonts, layout with tables. Advanced layout: Frames and layers, HTML and other media types. Audio support in browsers, video support, other binary formats. Style sheets, positioning with style sheets. Basic Interactivity and HTML: FORMS, form control, new and emerging form elements.

Unit-3

**CGI Using PERL:** Introduction to CGI, Alternative technologies, The Hypertext Transport protocol, URLs, HTTP, Browser requests, Server Responses, Proxies, Content Negotiation, The common Gateway Interface, The CGI Environment, Environment variables, CGI Output, forms and CGI, Sending Data to the server, form Tags, Decoding from input, Architectural Guidelines, Coding Guidelines, Efficiency and optimization.

Unit-4 **Java Server Pages:** Basics, Integrating Scripts in JSPs, JSP Objects and Components, configuring and troubleshooting, JSP: request and response objects, retrieving the contents of an HTML format, retrieving a query string, Working with Beans, Cookies, creating and Reading Cookies. Using Application Objects and Events.

**XML:** Relationship between HTML, SGML and XML, Basic XML, Valid documents, ways to use XML, XML for data files, embedding XML into HTML documents. Converting XML to
HTML for Display, Displaying XML using CSS and XSL, rewriting HTML as XML, the future of XML.

**Note:** - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**BOOKS**

2. SCSEt Guelich, Shishir Gundavaram, Gunther Birzneik; CGI Programming with PERL 2/e, O’Reilly.
3. Doug Tidwell, James Snell, Pavel Kulchenko; Programming web services with SOAP, O’Reilly
5. Yong, XML step by step, PHI
6. Aaron, Weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk reference, Techmedia publications
Statistical Models for Computer Science

CSE-405

L T P Theory: 100 Sessional: 25
1 - 4

Unit-1

Probability Models, Sample Space, Events, their algebra, graphical methods of representing events, Probability Axioms and their applications, Condition probability, Independence of Events, Bayes' Rule and Bernoulli Trials.

Unit-2

Random variables, and their event spaces, Probability mass function, Distribution functions, some discrete distributions (Bernoulli, Binomial, Geometric, Negative Binomial, poisson, Hyper geometric and Uniform), Probability Generating Function, Discrete random vectors, Continuous random variables: some continuous distributions (Exponential, Hyperexponential, Erlang, Gamma, Normal), Functions of random variables, jointly distributed random variables. Expectation, Expectation of functions of more than one random variable, Brief introduction to Conditional pmf: pdf and expectation, Moments and transforms of some distributions (Uniform, Bernoulli, Binomial, Geometric, Poisson. Exponential, Gamma, Normal), Computation of mean time to failure.

Unit-3

Stochastic Processes, Classification of stochastic processes, the Bernoulli process, The Poisson process, renewal process, renewal model of program behavior.

Unit-4

Markov Chains, Computation of n-step transition probabilities, State classification and limiting distributions, Distribution of times between state changes, Irreducible finite chains with aperiodic states, M/G/1 queuing system, Discrete parameter Birth-Death processes, Analysis of program execution time. Continuous parameter Markov Chains, Birth-Death process with special cases, Non-Birth-Death Processes.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

BOOKS

1. Familiarize with Unix/Linux logging/logout and simple commands.
2. Familiarize with vi editor.
3. Using Bash shell develop simple shell programs.
4. Develop advanced shell programs using grep, fgrep & egrep.
5. Compile and debug various C programs using different options.
6. Learning of installation and upgradation of Linux operating system.
7. Install, Linux on a PC having some other previously installed operating system. All OSs should be usable.
8. As supervisor create and maintain user accounts, learn package installation, taking backups, creation of scripts for file and user management, creation of startup and shutdown scripts using at, cron etc.

Note: Atleast 5 to 10 more exercises are to be given by the teacher concerned.

- Teachers are supposed to devote 1 period for giving instructions to clear the concepts UNIX & Linux and 2 periods for the lab work.
Web Engineering (Pr.)

CSE-409

L T P Practical: 25
- - 2 Sessional: 25

1. Chalk out the storyboard and design of Diary Food Limited. As the name reflects your site diary products and aims at opening an online store. Your storyboard should cover all the features that you plan to have on the site.

2. Create your own page with your favorite hobbies.

3. Create a Menu or a table of content web page. Each menu item or section of the table of content should load a different web page. For example, if the user clicks on menu one or section I then the link should take him to respective menu html or section and so on.

4. Create a web site for your college.

5. Create a frameset that is divided into three sections. The frameset should have three zones.
   - The Topmost section of the frameset should take up about just 15% of the browser window. Name this frame title.
   - The middle section should be 70% of the browser window. Name this frame title.
   - The lower section should be 15% of the browser window. Name this frame menu.
   Create pages for each section. For the lowermost section, create page that loads the content into the middle section. The topmost section should contain a page describing the web page itself.

6. Create a web page, which displays the map of your country Link, each city /state on the image map, such that the respective HTML page of the city/state is displayed when the user selects an area.

7. Add the tickertape applet to your page by customizing it for the following settings:
   - Increase the count by one.
   - Accordingly update the message count.
   - Change the text color to (237,192,171)
   - Experiment with changing the scrolling speed.
   - Customize the message text as per your page requirement.

8. Incorporate a quest book into the Diary Food Webpage and use Java Script to build validations into the form.

9. Use Style sheet to modify the following:
   - Change background to modify the following.
   - Change font type, face and color.
   - Align Text.
   - Remove underlines from hyperlinks.

10. Use Microsoft’s Personal Web Server to set up your Website.
Software Project Management

CSE-441

(Departmental Elective II)

L  T  P      Theory:  75
3  1  -      Practical:  50

Unit-1


Unit-2


Unit-3


NOTE: There will be 8 questions in all. At least two questions will be set from each unit.

Books

2. Project management 2/e, Maylor.
Embedded System Design

CSE-443

(Departmental Elective II)

L T P Theory: Practical:
3 1 - 75 50

Unit-1

**Introduction to an embedded systems and its design:** Introduction to ES & its applications, Design parameters of an ES and its significance (with respect to all parameter), Present trends in ES, Embedded system design life cycle, Product specifications and hardware, software partitioning, Co-design

**RTOS & its overview:**
Spell of OS 2 Difference between OS 2 RTOS, Role of RTOS in ES 2 its process models (Process transition diagram), Course structure, Overview Window, CE, Unix, Mino Kernel, UCOs & RT linux, Interrupt rotation in RTOS &^ Inblow response cycle, Different IPC machines in RTOS, Scheduling construm in RTOS (hand 2 soft), Memory sowing and its protechan, Encapsulation of Semephores and Queues, Timon in RTOS (Watch dog timer)

Unit-2

**Processor Selection:** Role of processor selection in ES (Mp V/s Uc), Mino control – 8051, 16232 bit mino controller 2 its processor, More about micro controller applications with respect to embedded system design, DSP’s in ES, New trends in processing and DSP’s.

**Cost Compiler and cross assembly for embedded systems**
Why we need cross compiler / Assemble, Embedded software development take chain and software development tool chain, Compiler linker, locators, cross assembles, GCC compiler.

Unit-3

**Basic Concepts of Device Driving:**
Device drives introduction & how device driver are different from the normal ports, Sevical communication enterface device drivers.

**System Synthesis and Debugging Techniques:**
Introduction to system synthesis & Hardware and Software, Biomultation & methods to improve to speed of simulations, Emulators (ICE) and its type, How emulators an difference for simulations, Introduction JTAG and OCP (on chich and debugging)

Unit-4

**Communication Protocols with reference to ES:**
Introduction to protocol, why we need in ES, Overview TCP (IP), UDD< wings protocols, IrDA, Blue Box, IEEE 8811
Other design issues and current trends on its application of ES
Memory optimization, Poorer optimization, Co-simulation of its system on chip and SOS (System on Slices), Revision of Cost

**Note**: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books**

1. John Catsoulis, “Designing Embedded Hardware”, O’reilly
2. An Embedded Software Primer”, David E. Simon, Pearson Education
5. Michael Barr, “Programming Embedded Systems”, O’reilly
Artificial Intelligence
CSE-445
(Departmental Elective II)

L T P Theory: 75
3 1 - Sessional: 50

Unit-1


Production System: Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, specify alternative approach for conflict resolution by Meta rules, Architecture of production system.

Unit-2


Predicate Logic: Alphabet of first order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, Unification of predicates, unification algorithm, resolution Robinson’s interface rule, Scene interpretation using predicate logic.

Unit-3

Default and Non monotonic Logic: Axiomatic theory, Monotonicity, non-atomic reasoning using McDermott’s NML-I, problems with NML-I, reasoning with NML-II, Case study of Truth Maintenance system(TMS), neural network fundamentals.


Unit-4

Intelligent Search Techniques: Heuristic function, AND-OR graph, OR Graph, Heuristic search, A* algorithm and examples.

Logic Programming with Prolog: Logic program, Horn clause, program for scene interpretation, unification of goals, SLD resolution, SLD tree, flow of satisfaction, controlling back tracking using CUT, command use of CUT, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replacing cut-fail by not.
Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books
2. E. Charniak and D. McDermott: Introduction to Artificial Intelligence, Addison Wesley Longman.
**Image Processing**

CSE - 447

**(Departmental Elective II)**

L   T   P        Theory:75
3    1    -        Scssional:50

**Unit-1**


**Unit-2**

**Image Transforms:** Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional And Two Dimensional DFT Cosine and Sine Transforms Iiadmard, slant ,IIARR and KI, Transforms and their properties, Approximation to KI Transforms. Image representation by stochastic model, One Dimensional Causal Models, AR and ARMA models, Non Causal Representation Spectral factorization, Image Decomposition.

**Unit-3**


**Unit-4**

**Image Analysis and Image Compression:** Spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representations structures, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Techniques, Transform Coding Theory, Coding of Image, Coding of two-tone image.

**Note:** - There will be 8 questions in all. Two Questions will be set from each unit. Students are
required to attempt five questions selecting at least one question from each unit.

**BOOKS**

1. Anil Jain: Digital Image Processing
2. Gonzalez Woods: Image Processing
Departmental Elective-III

UNIX & Linux Programming

CSE-471

L  T  P
3  1  -

Theory: 75
Sessional: 25

Unit-1
Linux Startup: User accounts, accessing Linux - starting and shutting processes, Logging in and Logging out, Command line, simple commands
Shell Programming: Unix file system: Linux/Unix files, i-nodes and structure and file system related commands, Shell as command processor, shell variables, creating command substitution, scripts, functions, conditionals, loops, customizing environment

Unit-2
Regular Expressions and Filters: Introducing regular expressions patterns, syntax, character classes, quantifiers, introduction to egrep, sed, programming with awk and perl.

Unit-3
The C Environment: The C compiler, vi editor, compiler options, managing projects, memory management, use of makefiles, dependency calculations, memory management - dynamic and static memory, building and using static and dynamic libraries, using ldd, soname, dynamic loader, debugging with gdb

Unit-4
Processes in Linux: Processes, starting and stopping processes, initialization processes, rc and init files, job control - at, batch, cron, time, network files, security, privileges, authentication, password administration, archiving, Signals and signal handlers, Linux I/O system.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books

Security and Cryptography

CSE -473

L T P Theory: 75
3 1 - Sessional: 50

Unit-1

**Traditional Cryptography:** Crypto analysis, substitution and transposition ciphers, cryptographic principles, secret – key algorithms: DES, DES chaining, Breaking DES, IDEA, Differential and Linear crypto analysis Public –key algorithms : RSA, Knapsack.

Unit-2

**Authentication protocols:** KDC protocols, shared secret key, Diffle-Hellman Key exchange, Needham –n Schroeder protocol, Using Kerbros, interlock protocol, digital signatures- Secret key and public key signatures, DSS, message digest, MD5 and Secure Hash algorithms

Unit-3

**Computer security Mechanisms:** Role of different security Mechanisms, passwords-technology and administration, principles of database system security , epidemic of viruses: types of viruses , study of different virus codes, means of spread, prevention from virus, life cycle of a virus, immunization, Trojan horse and bombs with examples, writing antivirus / Trojan codes.

Unit-4

**Network security:** Basics, Security Functions, preventing loss and damage, securing local area network- authorization, security plan and policy, Securing enterprise network- setting priorities, security plans, securing network components, hardware security, levels of access control and authorization.

**Note:** - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books**

### Bachelor of Technology (Computer Engineering)
#### Schemes of Studies / Examination
#### (Semester- 8TH)

<table>
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**TOTAL** 14 6 15 35 1000

### Departmental Elective-IV

1. CSE-440 Distributed Operating Systems
2. CSE-442 Software Quality Models and Testing
3. CSE-444 Bioinformatics
4. CSE-446 Expert Systems
5. CSE-448 Real Time Systems and Softwares
6. CSE-450 Software Verification, Validation and Testing

### Departmental Elective- V

1. CSE-472 Object Oriented Software Engineering
2. CSE-474 Simulation and Modeling
3. CSE-476 Data warehousing and Data Mining

---

**Neural Networks & Fuzzy Logic**
UNIT 1.


Fundamentals of Neural Networks: The biological prototype, Neuron concept, Single layer Neural Networks, Multi-Layer Neural Networks, terminology, Notation and representation of Neural Networks, Training of Artificial Neural Networks.

Representation of perceptron and issues, perceptron learning and training, Classification, linear Separability

UNIT 2

Hopfield nets: Structure, training, and applications, Stability


Counter Propagation Networks: Kohonan Network, Grossberg Layer & Training, applications of counter propagation, Image classification.

UNIT 3

Bi-directional Associative Memories: Structure, retrieving a stored association, encoding associations, memory capacity.

ART: ART architecture, ART classification operation, ART implementation, and characteristics of ART.

Image Compression Using ART

UNIT 4


The Cognitrons and Neocognitrons: Their structure and training.


Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books

1. Li Min Fu," Neural Networks in Computer Intelligence", McGraw-Hill, Inc.
4. M. H. Hassun, “Fundamentals of Artificial Neural Networks”, PHI.
Interactive Computer Graphics

CSE-404

L  T  P          Theory:  100
4  1  -          Sessional:  25

UNIT- 1


UNIT- 2

Display Description: Screen co-ordinates, user co-ordinates, Graphical data structures (compressed incremental list, vector list, use of homogeneous coordinates); Display code generation Graphical functions: the view algorithm. Two-dimensional transformation, Line drawing. Circle drawing algorithms.

UNIT- 3


UNIT-4

3-D Graphics: Wire-frame, perspective display, Perspective depth, projective transformations, Hidden line and surface elimination. Transparent solids, shading, Two dimensional Transformations. 3-dimesional Transformations. Interactive Graphical Techniques GUI.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books

5. Kelley Bootle, Mastering Turbo C
Neural Networks (Pr.)

CSE-406

**L**  **T**  **P**  
-  -  3  

Practical: 50  
Sessional: 50

**Design and train**

1. NN for AND, OR gate using perceptron.
2. Perceptron to classify odd and even numbers.
3. NN for alphabet recognition using backpropagation.
4. Hopfield network for recognizing patterns such as ‘+’ and ‘-‘.
5. NN for EXOR classification using Back propagation.
6. CPN for image classification.
7. Name and Telephone number recognition system

Note: Atleast 5 to 10 more exercises are to be given by the teacher concerned.
Departmental Elective-IV
Distributed Operating Systems
CSE-440

(Departmental Elective IV)

L T P Theory: 75
3 1 - Sessional: 50

Unit-1

Architecture of distributed operating system: Introduction, motivation, system architecture type, issues in distributed operating system, Communication primitive.

Unit-2


Unit-3

Distributed dead lock detection: Introduction, dead lock handling, strategies, issues in deadlock detection & resolution, Control organization, centralized, distributed & hierarchical detection algorithm.

Unit-4

Distributed file system: Introduction, architecture mechanism for building, design issues, log structured file system.
Distributed Scheduling: Introduction, motivation, issues in load distribution, component of load algorithm, stabilizing load distribution algorithm, performance comparison, selection of a suitable load sharing algorithm, requirement for load distribution, task migration, issues in task migration.

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

BOOKS

2. A.S Tanenbaum : Modern Operating Systems, PHI.

Software Quality Models and Testing
CSE-442

(Departmental Elective IV)

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**Theory**: 75  
**Sessional**: 50

**Unit-1**

**Software Quality**: Meaning and scope, software quality factors, software quality metrics, relationship b/w quality factors and quality metrics, quality management system, software reviews, formal technical reviews, correctness proof, statistical quality assurance, clear room, software engineering, standards of software quality assurance.

**Unit-2**

**Software Reliability**: meaning and its relation with software quality, reliability modeling- exponential failure time models (viz., Jelinski Moranda model, Schneidiwind’s model, Musa’s basic execution time model, hyperexponential model), Weibull and gamma failure time model (viz. Weibull model, S-shaped reliability growth model), and infinite failure category models (viz. Duane’s model, geometric model, Muse-Okumto model). Types of failure, bath-tub Curve, Exponential law of reliability.

**Unit-3**

**Software Testing**: Meaning. Scope and its relationship with software quality, software testing techniques: white box testing, basis path testing, control structure testing and black box testing, etc.  
Software testing strategies: unit testing, integration testing, validation testing and system testing, etc.

**Unit-4**

Concept of repair and maintenance, concept of availability and its relation with reliability and maintainability, preventive maintenance, Software maintenance, the management of reliable software, Automatic error detection and error correction.

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books**

5. Concepts of Reliability by L SriNath
6. Software Reliability By K.K. Aggarwal
7. Software Reliability by H Koptez.
Unit-1
**Introduction to Bioinformatics:** Introduction, outline of proteins, primary structure: the 20 amino acids – chemical structure & properties; chirality, different types of side chain: relevance to mutation, size, aliphatic/aromatic, polarity, charge, hydrophobicity; disulphide bonds, molecular models, polypeptide geometry: the folding chain, nomenclature, molecular graphics, Structure evolution and mutation genetic information - the triplet code; DNA structure Synthesis of proteins: cell biology background; transcription; RNA polymerase, introns, exons, splicing translation: ribosomes, strat/stop codons, post-translational processing

Unit-2
**Computing evolution:** Phylogenetic Analysis Sequence- based taxonomy: overview and assumptions, from Multiple Alignment to phylogeny Neighbor, Joining Maximum Likelyhood Vs. Parsimony, The molecular Clock, Computer Tools for patterns, mapping and phylogenetic analysis, Mathematical tools of proteins and nucleic acids, sequence- Function Relationships Sequence Homology and Conserved Regions, Conserved DNA Sequences.

Unit-3
**Bioinformatics tools:** Networks- WWW, CERN EMBnet; EMBL Database, SEQNET, Gen Bank, NLM, etc., Sequence Databases and Sequence Analysis: Genomic, CDNA EMBL database, GenBank Protein sequence, Pattern recognition tools Similarity searching, secondary sources, genome databases, Molecular graphics software and other packages, To find sequences based on keywords & phrases, to grab individual sequences or whole groups of Sequences from a database

Unit-4
**Genomics:** Introduction, genome scale sequencing, comparative and evolutionary genomics, microarrays, proteomics, pharmacogenomics, Development using computer tools for sequencing projects, PCR and restriction mapping practical and theoretical problems in sequencing. The challenges of whole genome sequencing, web based tools for restriction mapping, new technologies and new bioinformatics tools.

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.
Books
Expert Systems

CSE-446

(Departmental Elective IV)

L      T      P
3      1      -

Theory: 75
Sessional: 50

Unit-1

Features of expert system, Representation and organization of knowledge, Basics characteristics, types of problems handled by expert systems, Case study of PROSPECTOR.

Unit-2


Unit-3

Building an Expert System: Expert system development, Selection of tool, Acquiring Knowledge, Building process.

Unit-4

Problems with Expert Systems: Difficulties, common pitfalls in planning, dealing with domain expert, difficulties during development.

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books

Real Time Systems and Software

CSE-448

(Departmental Elective IV)

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Unit-1

Process and State-based Systems model, Periodic and Sporadic Process, Cyclic Executives, CE definitions and Properties, Foreground-Background Organizations, Standard OS and Concurrency – Architectures, Systems Objects and Object-Oriented Structures, Abstract Data Types, General Object Classes

Unit-2
Declarative Specifications: Regular Expressions and Extensions, Traditional Logics-Propositional Logic, Predicates, Temporal logic, Real time Logic

Unit-3
Deterministic Scheduling: Assumptions and Candidate Algorithms, Basic RM and EDF Results, Process Interactions-Prority Inversion and Inheritance


Unit-4
Timer Application, Properties of Real and ideal clocks, Clock Servers – Lamport’s Logical clocks, Monotonic Clock service, A software Clock server, Clock Synchronization- Centralized Synchronization, Distributed Synchronization

Programming Languages: Real Time Language Features, Ada-Core Language, Annex Mechanism for Real Time Programming, Ada and Software Fault Tolerance, Java and Real-time Externsions, CSP and Occam

Operating Systems: Real Time Functions and Sevices, OS Architectures-Real Time UNIX and POSIX, Issues in Task management- Processes and Threads, Scheduling, Synchronization and communication
Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books
1. Real – Time Systems and software by Alan C. Shaw ; John Wiley & Sons Inc
Software Verification, Validation & Testing

CSE-450

(Departmental Elective IV)

L T P Theory: 75 Practical: 50
3 1 -

Unit-1
**Introduction:** What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory & Discrete Mathematics.

**Functional Testing:** Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Unit-2
**Structural Testing:** Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

**Reducing the number of test cases:**
Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing

Unit-3

**Object Oriented Testing:** Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Unit-4

**Note:** - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books**
Departmental Elective-V
Object Oriented Software Engineering

CSE-472

L T P
3 1 -

Theory : 75
Sessional: 50

Unit-1

Design Objects, Class Hierarchy, inheritance, polymorphism, object relationships and associations, aggregations and object containment, object persistence, meta-classes, Object-oriented systems development life cycle, Software development process object oriented systems development: a use-case driven approach.

Unit-2

Object modeling techniques as software engineering methodology, Rumbaugh methodology, Jacobson methodology, Booch methodology, patterns, frameworks, the unified modeling language (UML).

Unit-3

Analysis Process, Use-Case Driven Object Oriented Analysis, Use-Case Model, Object Classification, Theory, Different Approaches for identifying classes, classes, responsibilities and Collaborators, identifying Object Relationships, attributes and Methods, super-sub Class Relationships, Apart of Relationships-Aggregation , Class Responsibilities , Object Responsibilities.

Unit-4

Object Oriented design process, corollaries, design axioms, design patterns, object oriented design philosophy, UML Object Constraint Language, Designing Classes : The Process, Class Visibility, Refining Attributes, Designing Methods and Protocols, Packages and Managing classes, Designing interface objects, View layer interface design, Macro and Micro level interface design process.

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

BOOKS

1. Ali Bahrami, Object Oriented Systems Development ;McGraw Hill, 1999
2. Rumbaugh et.al.,Object Oriented Modeling and Design, PHI, 1997
4. William Stallings: Data and Computer Communications 5/e, PHI.
Simulation and Modeling CSE-474  
(Departmental Elective- V)

L   T   P
3   1   -    

Theory : 75
Sessional: 50

Unit-1
Introduction: System Concepts, system boundaries and environment, continuous and discrete systems, system modeling, types of Models, Modeling methodology, Model validation, Principles & Nature of Computer modeling and simulation.

Unit-2
Continuous and Discrete: Analog vs. Digital Simulation, Continuous simulation vs. Numerical Integration, Concepts of simulation of continuous and discrete system with the help of live example, generation of random numbers, generation of non-uniformly distributed random numbers, generation of Poisson and Erlang variates.

Unit -3
Simulators for the Live systems: Simulation of a water reservoir system, Simulation of a hypothetical Computer, Simulation of queuing Systems, basic concepts of queuing theory, simulation of single server, two server and general queuing theory, simulation in inventory control systems, elements of Inventory theory, inventory models, simulators for complex inventory systems.

Unit-4

Note: There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books

# Data Warehousing and Data Mining

**CSE-476**  
(Departmental Elective-V)

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## Unit-1
Data Warehousing: Definition, Scope, Practical Implications, Structures and functions.

Data Mining: Process, Technologies & Rules, platform tools & tool characteristics, operational vs. information systems.

## Unit-2
Types of Data Warehouses: Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

## Unit-3
Data warehouses architecture: Metadata, operational data & operational data bases. Data warehouse architecture model, 2-tier, 3-tier & 4-tier data warehouses.

OLAP & DSS support in data warehouses.

## Unit-4
Data Mining: Knowledge discovery through statistical techniques, Knowledge discovery through neural networks, Fuzzy tech. & genetic algorithms.

**Note:** There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

## Books

5. “Data Mining”, A. K. Pujari; Longman Publisher