## II/IV B.TECH (IT) I – SEMESTER

### B.TECH (IT) 2nd YEAR I-SEMESTER SCHEME OF INSTRUCTION AND EXMINATION With effect from 2007-2008 admitted batch

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**TOTAL CREDITS** 28
I. **Semiconductors**:  

II. **PN Junction Diode**:  
PN Junction Diode, VI Characteristics of PN Junction Diode, capacitate effects in PN Junction Diode, Quantitative theory of PN Junction Diode.

III. **Special Devices**:  
Principles, Working of zero diode, Tunnel diode, Varactor diode, Schottky diode, SCR and UJT.

IV. **Transistors**:  
The bipolar junction Transistor – Operation of PNP and NPN Transistors – Transistor Circuit configurations- characteristics of a CE configurations – h parameter, low frequency small signal equivalent circuit of a Transistor.

V. **Transistor Biasing and thermal stabilization**:  
Transistor Biasing, stabilization, Different methods of transistor biasing – Fixed bias, Collector feedback bias – self bias – Bias compensation.

VI. **Field Effect Transistors**:  
Junction Field Effect Transistors (JFET) – JFET characteristics, JFET Parameters, Small equivalent circuit – MOSFETS – Depletion and Enhancement MOSFETS.

VII. **Rectifying circuits**:  
Half wave and full wave rectifiers – Bridge rectifiers – rectifier efficiency, Ripple and regulation – Shunt capacitor filter – Zener regulation.

VIII. **Transistor Amplifiers**:  

**TEXT BOOK:**  
Electronic Device and Circuits by Sanjeev Gupth.

**REFERENCE:**  
Integrated Electronics by Millman & Halkias.
IT2.1.2  ELEMENTS OF ELECTRICAL ENGINEERING  Credits:4
(Common with CSE 2.1.2)

Instruction: 3 Periods & 1 Tut / week  Sessional Marks: 30
Univ. Exam : 3 Hours  Univ-Exam-Marks:70

Magnetic circuits: Definitions of magnetic circuit, Reluctance, Magneto-motive force), magnetic
flux, Simple problems on magnetic circuits, Hysteresis loss.

Electromagnetic Induction: Faraday’s laws of Electromagnetic Induction, Induced E.M.F.,
Dynamically induced E.M.F., Statistically induced EMF, Self Inductance, Mutual Inductance.
D.C. Generators: D.C. Generator principle, construction of D.C. generator, E.M.F equation of
D.C. generator, Types of D.C. generator, Efficiency, Characteristics of D.C. generator, Efficiency,
Applications of D.C. generator
D.C. Motors: D.C. Motor principle, working of D.C. Motors, significance of back E.M.F.,
Torque equation of D.C. Motors, Types of D.C. Motors, Characteristics of D.C. Motors, Speed
control methods of D.C. Motors, Applications of D.C. Motor. Testing of D.C. Machines : Losses
and Efficiency, Direct load test and Swinburne’s test.
A.C. Circuits: Introduction to Steady State Analysis of A.C. Circuits, Single and
Balanced 3 Phase Circuits.
Transformers: Transformer principle, EMF equation of transformer, Transformer on load,
Equivalent circuit of Transformer, Voltage regulation of Transformer, Losses in a Transformer,
Calculation of Efficiency and Regulation by Open circuit and Short circuit Tests.
Phase induction Motor, Principle of operation. Types of 3 phase induction Motor., Torque
Equation of Induction Motor., slip – Torque characteristics., Starting Torque, Torque under
running condition., Maximum Torque Equation., Power stages of Induction Motor., Efficiency
Calculation of Induction Motor by direct loading.
Alternator: Alternator working principle, EMF equation of Alternator, Voltage
Regulation by Sync. Impedance method.
Synchronous Motor: Synchronous Motor principle of Operation, Construction., Methods of starting
of synchronous motor

Text Book:
“Elements of Electrical Engineering and Electronics” by V.K.Mehta, S. Chand & Co

Reference Book:
“A First Course in Electrical Engineering” by Kothari.
IT2.1.3  DATA STRUCTURES  Credits: 4

(Common with CSE 2.1.3)

Instruction: 3 Periods & 1 Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ-Exam-Marks: 70

Introduction to Data Structures: Information and Meaning – Representation of Multi-Dimensional Arrays _ Review of C Programming.
The Stack: Primitive operations – As an Abstract Data Type – Implementing the Stack operations in C.
Infix, Postfix and Prefix: Definitions, Evaluation and Conversions using C.
Queues and Lists: The Queue as Abstract Data Type – Sequential Representation _ Types of Queues – Operations – Implementation in C.
Tree Searching: Insertion into a Binary Search Tree – Deleting from a Binary Search Tree – Efficiency of Binary Search Tree operation
Linked Representation of Graphs: Dijkstrak’s Algorithm – Organizing the set of Graph Nodes – Application to Scheduling and its implication. Graph Traversal and Spanning Forests – Undirected Graph and their Traversals, Applications and Efficiency – Minimal Spanning Trees – Prim’s and Kruskal’s Algorithms.

Textbooks:

Note: All Implementation are Using C Language only.
IT2.1.4  DISCRETE MATHEMATICAL STRUCTURES - I  Credits: 4
(Common with CSE 2.1.4)

Instruction: 3 Periods & 1 Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ-Exam-Marks: 70


Recurrence Relations: Generating Functions of Sequences-Calculating their Coefficients-Recurrence relations-Solving recurrence relations-Method of characteristic Roots-Non-homogeneous Recurrence relations and their solutions

Relations and Digraphs: Relations and Directed Graphs-Special Properties of Binary relations-Equivalence Relations-Ordering Relations-Lattices and Enumeration- Operations on relations-Paths and Closures-Directed Graphs and Adjacency matrices- Applications of sorting, searching and topological sorting.

Graphs: Basic concepts-Isomorphism-subgraphs-Planar Graphs-Euler’s formula- Multigraphs and Euler circuits-Hamiltonian graphs-Chromatic numbers-Four color theorem.

Trees: Trees and their properties-Trees as graphs-spanning trees-Directed trees-Binary trees-Their traversals-Arithmetic and Boolean expressions as trees- height balanced trees.

Text Book:

Reference Books:
2) “Discrete mathematics” by Richard Johnsonbaug, Pearson Education, New Delhi
IT2.1.5  PROBABILITY, STATISTICS & QUEUING THEORY  Credits:4
(Common with CSE 2.1.5)

Instruction: 3 Periods & 1 Tut/week  Sessional Marks:  30
Univ. Exam :  3 Hours  Univ-Exam-Marks:70

Probability: Definitions of probability, Addition theorem, Conditional probability,
Multiplication theorem, Bayes theorem of probability and Geometric probability.

Random variables and their properties, Discrete Random variable, Continuous Random variable,
Probability Distribution joint probability distributions their properties, Transformation variables,
Mathematical expectations, probability generating functions.

Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions
and their properties. (Definition, mean, variance, moment generating function., Additive properties,
fitting of the distribution.)

Continuous distributions: Uniform, Normal, exponential distributions and their properties.

Curve fitting using Principle of Least Squares.

Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis,
Multiple Regression, Attributes, coefficient of Association, $\chi^2$ – test for goodness of fit, test for
independence.

Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness,
efficiency, Maximum likelihood estimator, notion & interval estimation.

Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of
significance, power of the test.

Small Sample Tests: Testing equality of means, testing equality of variances, test of correlation
coefficient, test for Regression Coefficient.

Large Sample tests: Tests based on normal distribution

Queuing theory: Queue description, characteristics of a queuing model, study state solutions of
M/M/1: $\alpha$ Model, M/M/1 ; N Model.

Reference Book: Probability & Statistics with Reliability, Queuing and Computer Applications
by Kishor S. Trivedi, Prentice Hall of India,1999

2. Combinational Logic Design, Gate-Level Minimization.
   Combinational Logic

3. Sequential Logic Design, Synchronous Sequential Logic
   Registers and Counters
   Fundamentals of Asynchronous Sequential Logic

4. Memory and Programmable Logic


   2. Fundamentals of Digital Circuits, A. Aganda Kumar, PHI, 2002
IT 2.1.7  ELECTRONICS LAB  Credits:2

Lab: 3 Periods /week  Sessional Marks: 50
Univ.-Exam : 3 Hours  Univ-Exam-Marks:50

1.  P-N Junction Diode Characteristics
2.  Zener diode Characteristics
3.  Transistor as Switch
4.  CE characteristics
5.  CE Amplifier
6.  FET Characteristics
7.  Half-Wave Rectifier
8.  Full-Wave Rectifier
1. Write a program to implement the operations on stacks.
2. Write a program to implement the operations on circular queues.
3. Write a program for sorting a list using Bubble sort and then apply binary search.
4. Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion.
5. Write a program for finding the Depth First Search of a graph, and Breadth First Search of a graph.
6. Write a program for converting a given infix expression to postfix form.
7. Write a program for evaluating a given postfix expression.
8. Write a program for implementing the operations of a dequeue.
9. Write a program for the representation of polynomials using circular linked list and for the addition of two such polynomials.
10. Write a program for quick sort.
11. Write a program for Heap sort.
12. Write a program for Merge sort.
13. a) Write a program for finding the transitive closure of a digraph.
    b) Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra’s algorithm.
## II/IV  B.TECH (IT) II – SEMESTER

### B.TECH (IT) 2nd YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION With effect from 2007-2008 admitted batch

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IT2.2.1 SYSTEMS PROGRAMMING Credits 4

Instruction: 3 Periods & 1 Tut/week

Univ-Exam: 3 Hours

Sessional Marks: 30

Univ-Exam Marks: 70

Introduction to Systems Programming, Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register.

Introduction to Assembler, databases used in assembler design, Design of Assembler - Single Pass & Double Pass.


Introduction to Loaders, functions of a loader, types of Loaders, databases used in Loaders, Design of Loaders - Absolute & DLL.

Introduction to Software Tools, Text editors, Interpreters, Program Generators, Debug Monitors.

TextBook: Systems Programming by Donovan
Tata Mc Graw Hill

Reference: System Programming by Dhamdhere
Tata Mc Graw Hill, IInd Revised Edition
IT2.2.2 DISCRETE MATHEMATICAL STRUCTURES - II Credits: 4

(Common with CSE 2.2.2)

Instruction: 3 Periods & 1 Tut /week  Sessional Marks: 30
Univ-Exam : 3 Hours  Univ-Exam Marks: 70

Introduction: Relations-Types of relations-Matrix representation of relations-Representation of relations as graphs-Ordering-Partial Ordering-Functions-Composition of Functions-Binary and n-ary Operations-Characteristic Functions of a set-Hashing functions-Recursion-Primitive recursive functions-Recursive functions.

Algebraic Structures: Algebraic Systems-Semi groups and Monoids-Grammars and Languages-Polish expression and their compilation-Groups-The application of residue arithmetic to Computers- Group Codes

Lattices: Lattices as Partially Ordered Sets-Properties of Lattices- Sublattices-Direct Product and Homomorphisms-Isomorphisms-Modular Lattices-Distributive lattices- Complemented lattices –Their Properties

Boolean Algebra: Definition- Subalgebra-Direct Product-Homomorphisms-Isomorphisms-Boolean Functions-Representation of Boolean Functions-Minimization of Boolean Functions-Design examples of Boolean Algebra

Computability: Introduction-Finite State Machines-Introductory Sequential Circuits- Equivalence of Finite State Machines-Finite State Acceptors and Regular Grammars- Turing Machines and Partial Recursive Functions.

Text Book:

Reference Books:
1) Discrete and combinatorial mathematics by Ralph. G. Grimaldi Pearson Education, New Delhi
IT2.2.3 Microprocessors (Common with CSE 2.2.3)

Instruction: 3 Periods & 1 Tut/week
Univ-Exam: 3 Hours

Credits: 4
Sessional Marks: 30
Univ-Exam Marks: 70

The 8085A µP. Architecture and Instruction Set:
Introduction to Microprocessors and Microcomputers, Internal Architecture and Functional/Signal Description of typical 8-bit µP.- 8085, Instruction Set and Timing Diagrams of 8085 µP.

Programming the 8085 µP.:
Assembly Language Programming Requirements, Programming Techniques: Looping, Counting, and Indexing, Counter and timing Delays, Stack and Subroutines, Code Conversion, BCD Arithmetic, 16-bit data Operations, Interrupts and Interrupt Service Routines

The 8086 µP. Architecture and Instruction Set:
Internal Architecture and Functional/Signal Description of 8086/8088 Segmented Memory, Maximum-Mode and Minimum-Mode Operation, Addressing Modes, Instruction Set and Timing Diagrams

Programming the 8086 µP.:
Assembly Language Requirements, Data Definition, COM and EXE program Files Programming techniques: Logical Processing, Arithmetic processing, Time Delay Loops Procedures, Data tables, Modular programming, and Macros

TEXT BOOKS:

REFERENCE BOOK:
IT2.2.4  COMPUTER ORGANIZATION  Credits: 4
(Emom with CSE 2.2.4)

Instruction:  3 Periods & 1 Tut /week  Sessional Marks: 30
Univ-Exam : 3 Hours  Univ-Exam Marks: 70

Register Transfer and Micro operations:
Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-
operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design:
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control,
Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete
Computer Description.

Microprogrammed Control:
Control Memory, Address Sequencing, Micro program Example.

Central Processing Unit:
Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing
Modes, Data Transfer and Manipulation, Program Control.

Computer Arithmetic :
Introduction, Addition and Subtraction, Decimal Arithmetic Unit.

Input-Output Organization:
Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer,
Priority Interrupt, Direct Memory Access.

Memory Organization:
Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory,
Virtual Memory.

Text Book:

Reference Book:
1. BASICS OF OBJECT ORIENTED PROGRAMMING: Introduction to Object Oriented Paradigm- procedural Paradigm – An overview of classes, objects and Methods inheritance and polymorphism.

2. Basics OF C++: Structure of a c++ program - preprocessor directives-data types and declaration-Expressions and operator precedence-Program flow control-functions-scope of variables-default arguments-dynamic allocation-new and delete operators.

3. DATA ABSTRACTION: Classes as objects, user defined data types, constructors & destructors, controlling and accessibility, class members, member functions, implementation of classes.

4. INHERETANCE: Derived classes-syntax of derived classes - access to the base class-overloading inherited member function- multiple inheritance- virtual base class virtual functions and polymorphism, static and dynamic bindings - virtual functions - pure virtual functions - dynamic binding through virtual functions- virtual function call mechanism - implications of polymorphism use of classes - virtual destructors - calling virtual functions in a base class constructor

C++ I/O- standard functions using C functions -Stream I/O in C++ -Manipulators - Formatted I/O- Overloading << and >> Operators -File I/O

5. POLYMORPHISM: Overloading functions and operators-runtime polymorphism-over loading new and delete operators.


7. EXCEPTION HANDLING IN C++: Benefits of exception handling troubles with standard C functions (setjmp and longjmp)-Proposed exception handling mechanism for C++

8. OBJECT ORIENTED DESIGN: Trends in software design-Notation for objects-Hybrid design methods -separation of Responsibilities-driven design-design phases and tools-step by step design-grady booch approach.

Text Books:
1. Object oriented Programming using C++: E. Balagurusamy, PHI.
2. The Unified Modeling Languages user Guide by Grady Booch Etal.(Pearson Education)

References:
1. Object Oriented Programming in C++: N. Barkakati, PHI
2. Object Oriented Programming through C++ by Robat Laphore.
3. Object Oriented Analysis and Design by Andrew Haigh – (Tata Mcgrah Hjill.)
IT 2.2.6  ENVIRONMENTAL STUDIES  Credits: 2

(Common with CSE 2.2.6)

Instruction:  3 Periods & 1 Tut /week  Sessional Marks: 30
Univ-Exam : 3 Hours  Univ-Exam Marks: 70

Module 1: Introduction
(a) Definition, Scope and importance
(b) Measuring and defining environmental development: indicators (1 lecture)

Module 2: Ecosystem
(a) Introduction, types, characteristic features, structure and functions of Ecosystems
   - Forest – Grass land  - Desert  - Aquatic (lakes, rivers and estuaries) (2 lectures)

Module 3: Environmental and Natural Resources management
(a) Land resource
   - Land as a resource  - Common property resource  - Land degradation  - Soil erosion and desertification  - Effects of modern agriculture, fertilizer – pesticide problems
(b) Forest resources
   - Use and over-exploitation-Mining and dams- their effects on forest and tribal people
© Water resources
   - Use and over-utilization of surface and ground water- Floods and droughts- Water logging and salinity- Dams  - benefits and costs- Conflicts over water
(d) Energy resources
   - Energy needs- Renewable and non-renewable energy source- Use of alternate energy sources - Impact of energy use on environment (8 lectures)

Module 4: Bio-diversity and its conservation
(a) Value of bio-diversity- consumptive and productive use, social, ethical, aesthetic and option values
(b) Bio-geographical classification of India- India as a mega diversity habitat
© Threats to biodiversity- Hot spots, habitat loss, poaching of wildlife, loss of species, seeds etc.
(d) Conservation of bio-diversity- In-situ and Ex-situ conservation (3 lectures)

Module 5: Environmental Pollution Local and Global Issues
(a) Cause, effects and control measures of
   - Air Pollution- Indoor air pollution- Water pollution- Soil pollution- Marine pollution- Noise pollution- Solid waste management, composting, vermiculture- Urban and industrial wastes, recycling and reuse
(b) Nature of thermal pollution and nuclear hazards
© Global Warming
(d) Acid rain
(e) Ozone depletion (8 lectures)

Module 6: Environmental problems in India
(a) Drinking water, Sanitation and Public health
(b) Effects of activities on the quality of environment
   - Urbanization- Transportation- Industrialization- Green revolution
© Water scarcity and Ground Water depletion
(d) Controversies on major dams- resettlement and rehabilitation of people: problems and concerns
(e) Rain water harvesting, cloud seeding and watershed management (5 lectures)
Module 7: Economy and Environment
(a) The economy and environment interaction
(b) Economics of development, preservation and conservation
© Sustainability: theory and practice
(d) Limits to Growth
(e) Equitable use of resources for sustainable lifestyles
(f) Environmental Impact Assessment (4 lectures)

Module 8: Social Issues and the Environment
(a) Population growth and environment
(b) Environmental education
© Environmental movements
(d) Environment vs Development (2 lectures)

Module 9: Institutions and Governance
(a) Regulation by Government
(b) Monitoring and Enforcement of Environmental regulation
© Environmental Acts
Water (Prevention and Control of pollution) act-Air (Prevention and Control of pollution) act-Envt. Protection act-Wild life Protection act-Forest Conservation act-Coastal Zone Regulations
(d) Institutions and policies relating to India
(e) Environmental Governance (5 lectures)

Module 10: International Conventions
(a) Stockholm Conference 1972
(b) Earth Summit 1992
© World Commission for environmental Development (WCED) (2 lectures)

Module 11: case Studies
(a) Chipko movement
(b) Narmada Bachao Andolan
© Silent Valley Project
(d) Madhura Refinery and Taj Mahal
(e) Industrialization of Pattancheru
(f) Nuclear reactor in Nagarjuna Sagar
(g) Tehri dam
(h) Ralegaon Siddhi (Anna Hazare)
(i) Kolleru lake-aquaculture
(j) Florosis in Andhra Pradesh (3 lectures)

Module 12: Field Work
(a) Visit to a local area to document and mapping environmental assets- river/ forest/ grassland/ Hill/ Mountain.
(b) Study of local environment- common plants, insects, birds
© Study of simple ecosystems- pond, river, hill, slopes etc.
(d) Visit to Industries, Water treatment plants, affluent treatment plants. (5 lectures)
IT2.2.7 MICROPROCESSORS LAB Credits: 2

Lab: 3 Periods/week
Univ-Exam : 3 Hours

Sessional Marks: 50
Univ-Exam Marks: 50

Digital Logic Design Experiments :

1. TTL Characteristics and TTL IC Gates
2. Multiplexers & Decoders
3. Flip-Flops
4. Counters
5. Shift Registers
6. Binary Adders & Subtractors
7. A L U

Assembly Language Programming:

1. 8085 Assembly Language Programming according to theory course microprocessors-I using the following trainers:
   - Keyboard Monitor of 8085µP Trainer.
   - Serial Monitor of 8085µP Trainer with Terminal
   - 8085 Line Assembler of 8085µP Trainer with PC as Terminal
   - 8085 Cross Assembler using In-Circuit Emulator (ICE) with 8085µP Trainer and PC as Terminal

2. 8086 Assembly Language Programming according to theory course Microprocessor-I using the following:
   - PC Assembler using TASM or MASM, TD or SYMDEB or CVD(Code View debugger)

Graded Problems are to be used according to the syllabus of MICROPROCESSORS-I
PART - A

1. Define a class Complex and overload operators +, -, *, <<, >> for complex numbers.

2. Define a class Matrix and overload operators +, -, *, <<, >>.

3. Define a class String and write a C++ program to overload + for concatenation, >=, <=, == for comparison of two strings.

4. Define a class Set whose objects are integers. Write a C++ program to implement member functions Set (int SZ = 0), Void insert (int x), int find (int x), Void unionset (set, set), Void intersection (set, set), void difference (set, set).

5. Define a basic two-dimensional Shape class from which objects such as rectangle, circle which can be derived. Let the user specify the position, size, of drawing 2-D object.

6. Implement ‘static class member function’ using class Item which has a static member count.

PART – B

1. Implement Stack operations insertion, deletion
   (a) Infix to postfix conversion
   (b) Postfix evaluation
   (c) Extend insertion and deletion with exception handling and templates

2. Implement Queue operations insertion, deletion
   (a) Extend insertion and deletion with exception handling and templates

3. Implement Linked list operations insertion, deletion, traversal, concatenation.
   (a) Implement polynomial addition with linked list
   (b) Implement polynomial multiplication with linked list
   (c) Extend these operations with exception handling and templates

4. Implement tree operations insertion, searching, postorder traversal, inorder traversal, preorder traversal, deletion.
   (a) Extend these operations with exception handling and templates

5. Implement Queue operations using linked list.

6. Implement Stack operations with linked list.

7. Implement operations on Double linked list.
### III/IV B.TECH (IT) I – SEMESTER

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**TOTAL CREDITS** 29
IT3.1.1 DATA COMMUNICATIONS

Instruction: 3 Periods & 1 Tut /week  
Univ. Exam : 3 Hours

Credits: 4

Sessional Marks: 30  
Univ-Exam-Marks: 70

1. An Introduction to Data Communications:
A Communications Model, Data Communications and Data Communications Networking, Protocols and Protocol Architecture, Characteristics of Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments

2. Transmission Media:

3. The Data Communication Interface
Asynchronous and Synchronous Transmission, Line Configurations, Interfacing, Data Link Control Flow Control, Error Detection, Error Control, High-Level Data Link Control (HDLC), Other Data Link Control Protocols

4. Data Communications Hardware: Terminals

5. Modems:

TEXT BOOKS:
2. Mary E.S. Loomis, Data Communications, PHI-N.J.,1983 (Capter 3, Chapter 5)

REFERENCE BOOKS:
1. Behrouz A. Forouzan, Data Communications and Networking, 3rd Edition TMH, 2004
IT3.1.2 INTERNET CONCEPTS & JAVA PROGRAMMING Credits:4

Instruction: 3 Periods & 1Tut/Week
Univ_Exam:3 Hours

Sessional Marks: 30
Univ_ Exam Marks:70


Control Statements: If else, for, while, and do while loops, Switch statements.

Arrays & Structures: One Dimensional & Two Dimensional Arrays, Named Structures.

Functions: Parameter Passing, Static Modifier.

Features of JAVA: Classes and Interfaces, Threads and multithreaded programming, Exception handling, Introduction to packages, Math package, Lang package, Util package.


Networking:

Textbook:
1. “Introduction to Java programming, a primar ”, Balaguruswamy.
2. Java Complete Reference , Herbt Schild.

Reference Book: “Introduction to Java programming”, Daneal/Young PHI
**IT3.1.3 COMPUTER GRAPHICS Credits:4**

Instruction: 3 Periods & 1Tut/Week Sessional Marks: 30
Univ_Exam:3 Hours Univ_ Exam Marks: 70


**Over view of Graphics systems:** Video Display Devices- Raster Scan systems-random scan systems-Graphics monitors and workstations-Input devices-hard copy devices- Graphics software


**Attributes of Output Primitives:** Line and Curve Attributes-Color and Gray scale levels- Area Fill Attributes- Character Attributes-Bundled Attributes- Inquiry Functions- Antialiasing

**Two Dimensional Geometric Transformations:** Basic Transformations- Matrix Representations-Homogeneous Coordinates-Composite Transformations-Other Transformations-Transformations between Coordinate Systems- Affine Transformations-Transformation Functions- Raster methods for Transformations

**Two Dimensional Viewing:** The viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Two Dimensional Viewing Functions-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping- Text and Exterior Clipping

**Structure And Hierarchical Modeling:** Concepts of Structures and Basic models- Editing - Hierarchical Modeling with Structures-GUI and Interactive Input Methods- Windows and Icons-Virtual Reality Environments

**Three Dimensional Concepts and Object representations:** 3D display methods-3D Graphics-Polygon Surfaces- Curved Lines and Surfaces- Quadratic Surfaces-Super Quadrics-Blobby Objects-Spline Representations- Cubic Spline methods-Bézier Curves and Surfaces- B Spline Curves and Surfaces

**Three Dimensional Geometric and Modeling Transformations:** Translation- Rotation-scaling-Other Transformations-Composite Transformations-3D Transformation Functions-Modeling and Coordinate Transformations.

**Three Dimensional Viewing:** Viewing Pipeline- Viewing Coordinates- Projections- View Volumes- General Projection Transformations- Clipping-Hardware Implementations- Three Dimensional Viewing

**Chapters 1 to 12 except 10-9 to 10-22 of the Text book**

**Text Book:** Computer Graphics C Version by Donald Hearn & M. Pauline Baker
Pearson Education, New Delhi, 2004

**Reference Books:**
IT3.1.4  FORMAL LANGUAGES AND AUTOMATA THEORY  Credits: 4
(Common with CSE 3.1.4)

Instruction:  3 Periods & 1Tut/Week  Sessional Marks: 30
Univ_Exam: 3 Hours  Univ_ Exam Marks: 70

1. Finite Automata and Regular Expressions:
Basic Concepts of Finite State Systems, Deterministic and Non-Deterministic Finite Automata,
Finite Automata with e-moves, Regular Expressions, Minimization of Finite Automata, Mealy and
Moore Machines, Two-Way Finite Automata.

2. Regular sets & Regular Grammars:
Basic Definitions of Formal Languages and Grammars, Regular Sets and Regular Grammars,
Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for
Regular Sets, Myhill-Nerode Theorem, Minimization of Finite Automata.

3. Context Free Grammars and Languages:
Context Free Grammars and Languages, Derivation Trees, Simplification of Context Free
Grammars, Normal Forms, Pumping Lemma for CFL, closure properties of CFL’s, Decision
Algorithm for CFL.

4. Push down Automata and Deterministic CFL:
Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and
Push-Down Automata.

5. Universal Turing Machines and Undecidability:
Design and Techniques for Construction of Turing Machines, Undecidability of PCP, Chomsky
Hierarchy, Regular Grammars, Unrestricted Grammars, Context Sensitive languages, Relationship
between classes of languages.

TEXT BOOKS:  Introduction to Automata Theory, Languages
& Computation By J.E.Hopcraft & Jeffery D.Ulman – Narosa
Publishing Company.

REFERENCE BOOKS:
Theory of Computer Science By Mishra & Chandra
Sekharan, PHI.
An Introduction To Formal Languages and Automata,3e By Peter Linz – Narosa Publishing House.
**File Processing Operations**
Physical and logical files, opening, reading & writing and closing files in C, seeking and special characters in files, physical devices and logical files, file-related header files in C

**Secondary Storage**
Disks – organization, tracks, sectors, blocks, capacity, non-data overhead, cost of a disk access, Magnetic Tape – types, performance, organization estimation of tape length and data transmission times, disk vs tape, CD-ROM – CD-ROM as a file structure, physical organization, strengths and weakness of cd-roms, storage hierarchy

**Byte Journey and buffer Management**
File manager, I/O buffer, I/O processing, buffer strategies and bottlenecks

**File Structure Concepts**
A stream file, field structures, reading a stream of fields, record structures and that uses a length indicator, Mixing numbers and characters – use of a hex dump, reading the variable length records from the files

**Managing records in C files**
Retrieving records by keys, sequential search, direct access, choosing a record structure and record length, header records, file access and file organization

**Organizing files for performance**
Data compression, reclaiming space – record deletion and storage compaction, deleting fixed-length records for reclaiming space dynamically, deleting variable-length records, space fragmentation, replacement strategies.

**Indexing**
Index, A simple index with an entry sequenced file, basic operations on an indexed, entry sequenced file, indexes that are too large to hold in memory, indexing to provide access by multiple keys, retrieval using combination of secondary keys, improving the secondary index structure – inverted lists

**Indexed sequential file access and prefix B+ Trees**
Indexed sequential access, maintaining a sequence set, adding a simple index to the sequence set, the + tree, simple prefix B^+
content of the index: separators instead of keys, the simple tree
prefix B
maintenance, index set block size, internal set block size, internal structure of index set blocks: a variable
B^+ tree order B-tree, loading a simple prefix

**Special Note: Implementation in C only**

**Hashing**
Collisions in hashing, a simple hashing algorithms, hashing functions and record distributions, memory requirements, collision resolution by progressive overflow, buckets, deletions

**Extendable hashing**
Working of extendable hashing, implementation, deletion, extendable hashing performance

**Designing file structure for CD-ROM**
Tree structure on CD-ROM, hashing files on CD-ROM, CD-ROM file structure

**Text Book:** File Structures – An Object Oriented Approach with C++ by Michael J. Folk, Bill Zoellick and Greg Riccardi, Pearson
IT3.1.6  OPERATING SYSTEMS  Credits:4
(Common with CSE 3.1.6)

Instruction: 3 Periods & 1 Week./Week  Sessional Marks: 30
Univ_ Exam: 3 Hours  Univ_ Exam Marks: 70


Processes: Introduction to Processes, Inter Processor Communication, Classical IPC Problems, Process Scheduling

Memory Management: Memory Management without Swapping or Paging, Swapping, Virtual Memory, Page Replacement Algorithms, Modeling paging algorithms, Design issues for paging systems, Segmentation


Deadlocks: Resources, Deadlocks, The O----ptical Algorithm, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention, Other Issues


Text Book: Modern Operating Systems by Andrew S. Tanenbaum

IT3.1.7 OPERATING SYSTEMS LAB Credits: 2

Lab: 3 periods/week
Univ_Exam: 3 hours.

Sessional Marks: 50
Univ_Exam marks: 50

1. Study of laboratory environment:
   Hardware specifications, software specifications
2. Simple Unix-C programs:
   Programs using system calls, library function calls to display and write strings on standard output device and files.
3. Programs using fork system calls.
2. Programs for error reporting using errno, perror( ) function.
3. Programs using pipes.
4. Shell programming.
5. Programs to simulate process scheduling like FCFS, Shortest Job First and Round Robin.
6. Programs to simulate page replacement algorithms like FIFO, Optimal and LRU.
7. Programs to simulate free space management.
8. Programs to simulate virtual memory.
10. Programs to simulate deadlock detection.

References:
Unix concepts and applications by Sumitabha Das, TMH Publications.
Unix programming by Stevens, Pearson Education.
Shell programming by Yashwanth Kanetkar.
Operating System Concepts by Silberschatz, and Peter Galvin.
1. (a) Program to display the area of a rectangle.
   (b) Program to find Sum of series $1 + x + x^2 + x^3 + \ldots$. 

2. (a) Write a class to display the area of rectangle and inherit this class into other class which is displaying perimeter of a rectangle and implement.
   (b) Write a class to add three no’s inherit this class into other class to add five no’s and implement it.

3. (a) write a program to print the path, filename and extension for a given path of a file.
   (b) write a program to receive two command line arguments check whether they are equal or not.

4. (a) A program to take two arguments and divide the first argument with second argument and display the result. Display the error message if divide by zero without abnormal exit.
   (b) A program to accept more than one string and arrange them in alphabetical order.
   (c) Write a program to display simultaneously output of even and odd numbers starting from one to specified number.

5. Write a program to accept data from keyboard and write it into a file.

6. Write a java program to implement stack & Queue operations.

7. Write a program to draw line and circle using mouse.

8. Write a applet program for drawing the bar chart.

9. Write a applet program to design a calculator for implementing basic functions like +,-,*,/. 

10. Write a program to check active ports in system.
# III/IV B.TECH (IT) II-SEMESTER

B.TECH (IT) 3rd YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXMINATION With effect from 2007-2008 admitted batch

<table>
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</table>
The Theory of Automata: Definition and description, Transition systems, properties, Acceptability of string, NDFA, Equivalence in between DFA & NDFA. Grammars, Types of Grammars, Grammars and Automata, Regular expressions, Finite Automata and Regular expressions, Regular sets and Regular Grammars.

Overall view of Compilers: Brief discussion on various phases of Compilers.

Design of lexical analyzer.


Syntax Directed Translation: Syntax directed translation and implementation, Intermediate code, Postfix notation, parsing tree, Three address Code, Quadruples, Triples.


Brief discussion on symbol tables, Run-time storage administration.

chapters: 1,2,3,4,5,6,7,9,10,11,12,15 of the text book.

Text Book
Principles of Compiler Design by Aho, D. Ullman

Reference Books:
IT3.2.2 DESIGN AND ANALYSIS OF ALGORITHMS Credits: 4
(Common with CSE 3.2.2)

Instruction: 3 Periods & 1 Tut/week  
Univ. Exam: 3 Hours  
Sessional Marks: 30  
Univ-Exam-Marks: 70


Space and Time Tradeoffs – Sorting by Counting – Input Enhancement in string Matching – Hashing – B-Trees


Text Book:
Introduction to Design & Analysis of Algorithms by Anany Levitin, Pearson Education, New Delhi, 2003

Reference Books:
1. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald R. Rivest & Clifford Stein, Prentice Hall of India, New Delhi, New Delhi
3. Fundamentals of algorithmics, Gilles Brassard & Paul Bratley, Prentice Hall of India, New Delhi
IT3.2.3 DATABASE MANAGEMENT SYSTEMS Credits: 4

(Common with CSE 3.2.3)

Instruction: 3 Periods & 1 Tut/week
Univ. Exam: 3 Hours

Sessional Marks: 30
Univ-Exam-Marks: 70

**Introduction to DBMS:** Overview, File system vs DBMS, Advantages of DBMS, Storage data, queries, Transaction Management, DBMS structure

**E-R model:** Entities, Attributes and Entity sets, Relation ship and Relation ship sets, Features of ER model, Conceptual database design with ER model

**Relational model:** Integrity constraints over relations and enforcement, Querying relation data, Logical database design, views, destroying/altering tables and views

**Relational Languages:** algebra and calculus

**SQL:** Basic SQL, Query, union, interest, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, cursors, ODBC and JDBC, Triggers and Active database, designing active databases

**Schema refinement and normal forms:** Schema refinement, fds, reasoning normal forms, normalization up to 3rd & BC normal forms, lossless join & dependency preserving decomposition

**Transaction management:** Transaction concept, transactions and schedules, concurrent execution of transactions, lock – based concurrency control, crash recovery

**Concurrency control:** Lock management, specialized locking techniques, concurrency control without locking

**Crash Recovery:** Aries, recovering from a system crash, media recovery

**Text Book:** Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill
IT3.2.4 COMPUTER NETWORKS Credits: 4

Instruction: 3 Periods & 1 Tut /week
Univ. Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks: 70

Local Area Networks: LAN Overview.
High Speed LANs: Ethernet, Token Ring.
Wireless LANs.

Wide Area Networks: Circuit Switching and Packet Switching
Routing in Switched Networks
Principles of Cellular Networks

Internet Protocols: Basic protocol functions
Principles of Internetworking
Connectionless Internetworking
Internet Protocol

Transport protocols: Connection oriented Transport Protocol Mechanisms
TCP, TCP Congestion Control
UDP

Distributed Applications: E-Mail, HTTP

Textbooks:
1. WILLIAM STALLINGS, Data and Computer Communications, Seven Edition, Pearson Education Asia, 2004

Reference Books:

IT3.2.5 WEB TECHNOLOGIES Credits: 4

Instruction: 3 Periods & 1 Tut/week
Univ. Exam: 3 Hours
Sessional Marks: 30
Univ-Exam-Marks: 70

Introduction: Java, Distributed computing and J2EE: Requirements of web architecture, web application lifecycle, XML and J2EE, the package of J2EE Applications, Java Script.

The Design and Development of a J2EE Application: J2EE Layers, J2EE Application Components, J2EE Architecture, Development Methodology and process, sample applications introduced; Task list for building J2EE Applications: Completing prerequisite Tasks, designing the database, creating tables and columns, defining the application, creating a backend interface, creating the interface, building pages, creating data access objects, validating your code, refining your code.

JDBC: Introduction; JDBC Architecture: API and Drives, The JDBC API, Retrieving and updating Data, SQL-to-Java Data Types, JDBC Execution Types, Metadata, Scrollable Resultsets, updating rows, transaction support, Batch Statements, JDBC 2.1 New Data Types, JDBC 2.0 Optional package API.

Servlets: What are Servlets?, Benefits of Servlets, use as controller in MVC and the sample application, basic HTTP, servlet container, Servlets API, service method detail, HML clients, servlet lifecycle, HTTP response header, session management, dispatching requests, Servlets with JDBC, web applications.

Java server pages: introduction: features of JSP Pages, the components of a JSP page, developing and deploying JSP pages, JSP architectures; practical development with tag libraries: JSP syntax, Tag libraries

Enterprise JavaBeans: Introduction; Enterprise JavaBeans overview, distributed programming overview, EJB framework, Session and entity Beans, Attributes of a Bean, Parts of a Bean, container-managed persistence(CMP) and bean managed, the lifecycle of enterprise JavaBeans, java message service (JMS) and message driven beans (MDB), distributed programming services, common object request broker architecture (CORBA) and remote method invocation (RMI), Transaction and transaction management, Security, deployment, personal roles for EJB Development, building session beans: creating session beans, Entity beans.

Text Book:
J2EE UNLEASHED – Joseph J. Bambara, Paul R.Allen, Mark Ashnault, Ziyad Dean, Thomas Garben, Sherry Smith – SAMS Techmedia

Reference Book:
The J2EE Tutorial- Stepahnie Bodoff, Dale Green, Kim Hasse, Eric Jendrock, Monica Pawlan, Beth Stearns-Pearson Education –Asia.
Overview of operations Research: OR models – OR Techniques


Dual problems- Relation between primal and dual problems – Dual simplex method


Network Models: Definitions – CPM and PERT – Their Algorithms
Integer Programming : Branch and Bound Algorithms cutting plan algorithm.

Dynamic Programming: Recursive nature of dynamic programming – Forward and Backward Recursion

Deterministic Inventory Models: Static EOQ Models – Dynamic EOQ models.


Books:

1. Introduction to Operations Research by HILLIER/LIEBERMAN, Tata McGraw Hill
IT3.2.7 WEB TECHNOLOGIES LAB Credits: 2

Lab: 3 Periods/week
Univ-Exam: 3 Hours

Sessional Marks: 50
Univ-Exam-Marks: 50

Each student should develop two projects out of this list using JSP,JDBC,J2EE

1. Design Airlines Ticket Reservation System
2. Design ONLINE Banking system.
3. Design Library Information system
4. Design Gram Panchayat Information system for House tax, water tax, wealth tax, Library tax collection, phone bill, Electricity bill collection
5. Design student information system portal which maintain attendance, marks etc.
6. Design online examination system.
IT3.2.8  DBMS LAB  Credits:2

Lab: 3 Periods/week  Sessional Marks:  50
Univ-Exam : 3 Hours  Univ-Exam-Marks: 50

Study features of a commercial RDBMS package such as ORACLE/DB2, MS Access, MYSQL & Structured Query Language (SQL) used with the RDBMS.( Select two of RDMSs)

Laboratory exercises should include defining schemas for applications, creation of a database, writing SQL queries, to retrieve information from the database, use of host languages, interface with the embedded SQL, use of forms & report writing packages available with the chosen RDBMS product.

Some sample applications, which may be programmed, are given below:
Accounting package for a shop,
Database manager for a Magazine agency or a newspaper agency,
Ticket booking for performances,
Preparing greeting cards & birthday cards,
Personal accounts - Insurance, loans, mortgage payments, etc.,
Doctor's diary & billing system,
Personal bank account, Class marks management, Hostel accounting,
Video Tape library, History of cricket scores,
Cable TV transmission program manager,
Personal library.
### IV/IV B.TECH (IT) I – SEMESTER

**B.TECH (IT) 4th YEAR I-SEMESTER SCHEME OF INSTRUCTION AND EXMINATION With effect from 2007-2008 admitted batch**

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<td>OBJECT ORIENTED SOFTWARE ENGINEERING</td>
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<td>ADVANCE OPERATING SYSTEMS</td>
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**Elective - I**:  
1. Satellite and Mobile Communications  
2. Embedded systems  
3. Visual Programming Techniques  
4. Combinatorics & Graph Theory  
5. Random Processes in Computer Engineering  
6. Artificial Intelligence
IT4.1.1 Object Oriented Software Engineering Credits:4
(Common with CSE 4.1.1)

Instruction: 3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks:70

Instruction:

1. Software Engineering:
   Software related problems, software engineering, concepts, development activities
2. Modeling: Modeling
   with UML
3. Project Communications:
   Project communication, modes, mechanisms and activities
4. Requirements:
   Requirements elicitation, concepts, activities & managing requirements elicitation
5. Analysis:
   Analysis overview, concepts, activities and managing analysis
6. System Design:
   Design overview, concepts, activities and managing system design
7. Object Design:
   Object design overview, concepts, activities and managing object design
8. Rationale Management:
   Rationale overview, concepts, activities and managing rationale
9. Testing:
   Testing overview, concepts, activities and managing testing
10. Software Configuration Management:
    Configuration Management overview, concepts, activities and managing configuration management
11. Project Management:
    Project management overview, concepts, activities and managing project management models and activities.

Text Book:
Object-Oriented Software Engineering: Conquering Complex and Changing Systems
Bernd Bruegge and Allen H. Dutoit
Pearson Education Asia

Reference Book:
Object-Oriented Software Engineering: Practical software development using UML and Java
Timothy C. Lethbridge and Robert Laganiere
McGraw-Hill Higher education
IT4.1.2 NETWORK PROTOCOLS Credits:4

Instruction: 3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours
Sessional Marks: 30
Univ-Exam-Marks: 70

IP ADDRESSING: Decimal Notation-Classes- special addresses - A simple Internet-Unicast and Broadcast addresses - Applying for IP addresses-Private networks.

SUBNETTING AND SUPERNETTING: Subnetting- Masking-Examples of Subnetting – Variable length Subnetting- Supernetting.

INTERNET PROTOCOL: Data gram-Fragmentation-Options- Checksum- IP design.
ARP and RARP: ARP- ARP design – RARP

INTERNET CONTROL MESSAGE PROTOCOL: Types of Messages- Message formats- Error reporting- Query- Checksum- ICMP design.

INTERNET GROUP MANAGEMENT PROTOCOLS: Multicasting- IGMP-Encapsulation- Multicast Backbone- IGMP design.

USER DATAGRAM PROTOCOL: Process to process communication-User datagram – Checksum- UDP operation- uses of UDP – UDP design.


APPLICATION LAYER AND CLIENT-SERVER MODEL: Client-server Model-Concurrency-Processes

BOOTP and DHCP: BOOTP-DHCP

DOMAIN NAME SYSTEM: Name Space-Domain name Space-Distribution of Name space-DNS in the Internet-Resolution- DNS Messages- Types of Records-Compression-DDNS-Encapsulation.


FILE TRANSFER PROTOCOL: Connections- Communication-Command Processing-File Transfer-User Interface-Anonymous FTP.


SOCKET INTERFACE: Definitions-Sockets-Byte ordering- Address Transformation-Byte manipulation Function-Information about Remote Host- Socket System Calls- Connectionless Iterative server- UDP Client/Server Programs-Connection oriented Concurrent Server - TCP Client/Server Programs.


IV/IV B. Tech (IT) 1st Semester
IT4.1.3 ADVANCED OPERATING SYSTEMS Credits:4

Instruction: 3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks:70


Remote Procedure Calling: Introduction, Features of RPC, User package, Design issues, Classes of RPC system, Interface definition language, exception handling, delivery guarantees, implementation, interface processing, binding, Locating the binder, RPC in Unix system

Synchronization in Distributed systems: Clock synchronization, Logical Clocks, Physical Clocks, Clock synchronization algorithms, Mutual exclusion, A centralized algorithms, A distributed algorithms, A token ring algorithms, comparison of the three algorithms, Election algorithms, The Bully algorithms, Ring algorithms, Dead Locks in distributed systems, Distributed deadlock detection.


Distributed File and Directory Services: Distributed file service requirements, File service components, Flat file service, Directory Service, Client module, Design issues, implementation techniques.

Distributed shared memory Introduction: Shared memory, Consistency models, Page based Distributed shared memory, Shared – variable Distributed shared memory, Object based Distributed Shared Memory.

TEXT BOOK: Distributed Operating systems, Andrew s.Tanenbanm
IT4.1.4 MANAGEMENT PRINCIPALES
(Common with CSE 4.1.4)

Instruction: 3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks: 70

1. Nature and functions of management:
   - Importance of management – definition of management – management process – Roles of manager – management _ a science or art – management _ a profession.
2. Planning:
   - Nature of planning – Importance of planning – Types of planning – Steps on planning.
3. Decision – Making:
   - Meaning of decision – Types of decisions.
4. Organization :
   - Span of management – principles of organizing – departmentalization.
5. Authority Delegation and Decentralization :
   - Source of formal authority – difference between authority and power – line and staff authority – delegation of authority – decentralization of authority.
6. Coordination:
   - Need for coordination – Types of coordination – Techniques of coordination.
7. Direction:
   - Requirements of effective direction – Motivation.
8. Importance of communication – Purposes of communication - Formal ommunication - Informal communication – Barriers to communication – Principles of effective Communication.
9. Leadership:
   - Difference between a leader and a manager – Characteristics of leadership – Functions of a leader – Approaches to leadership – Effective leadership – Leadership style in Indian organizations.
10. Managerial control :
    - Steps in a control process – Need for control – Types of control methods – Essentials of Effective control systems.
11. Social Responsibilities of Business :
    - Meaning of social responsibility – social responsibilities of business towards different groups.

Text Book:

IT4.1.5 Elective -1 SATELLITE & MOBILE COMMUNICATIONS Credits: 4

Instruction: 3+1 Periods /Week  Sessional Marks: 30
Univ Exam: 3 Hours  Univ Exam Marks: 70

Principles of satellite communications: Evolution and growth of communication satellites, synchronous satellites, satellite frequency allocation and band spectrum, general and technical characteristics of satellite communication systems, advantage of satellite communication systems, active and passive satellites, advent of digital satellite communications.

Communication satellite link design: Introduction, General link design Equations, System Noise temperature, C/N and G/T ratio. Atmospheric and Ionospheric effects on link design, Uplink design, complete link design, interference effects on complete link design, earth station parameters.

Multiple Access Techniques: Introduction, TDMA, TDMA frame structure, TDMA Burst structure, TDMA frame efficiency, TDMA super frame. CDMA.


Cellular, Mobile and Personal communications: Introduction, Cellular concept and its initial implementation, Digital cellular mobile systems.

Text books:
1. Satellite communications
   -- Dr. D.C Agarwal
   khanna publishers
2. Mobile and personal communication systems and services
   -- Rajpandya.
   PHI publications

Reference Books:
1. Mobile Cellular Telecommunications
   2nd edition
   --WilliamC.Y.Lee
IT4.1.5  Elective-I  EMBEDDED SYSTEMS  Credits:4

Instruction:  3 Periods & 1 Tut./Week  Sessional Marks:  30
Univ.-Exam : 3 Hours  Univ-Exam-Marks:70

Introduction to embedded systems hardware needs; typical and advanced, timing diagrams, memories (RAM, ROM, EPROM). Tristate devices, Buses, DMA, UART and PLD’s. Built-ins on the microprocessor.

Interrupts basics, ISR; Context saving, shared data problem. Atomic and critical section, Interrupt latency.

Survey of software architectures, Round Robin, Function queue scheduling architecture, Use of real time operating system.

RTOS, Tasks, Scheduler, Shared data reentrancy, priority inversion, mutex binary semaphore and counting semaphore.

Inter task communication, message queue, mailboxes and pipes, timer functions, events. Interrupt routines in an RTOS environment.

Embedded system software design using an RTOS. Hard real-time and soft real time system principles, Task division, need of interrupt routines, shared data.

Embedded Software development tools. Host and target systems, cross compilers, linkers, locators for embedded systems. Getting embedded software into the target system.

Debugging techniques. Testing on host machine, Instruction set emulators, logic analysers. In-circuit emulators and monitors.

Text Books:

2. Sriram V Iyer and Pankaj Gupta, Embedded Real Time Systems programming, TMH, 2004

Reference Books:

IT4.1. Elective -1 VISUAL PROGRAMMING TECHNIQUES Credits:4

Instruction: 3+1 Periods /Week
Univ Exam: 3 Hours

Sessional Marks: 30
Univ Exam Marks: 70

Visual Basic Language: Variables, Constants, Arrays, Collections, Procedures, Arguments, Function return Values, Control Flow statements, Loop statements, Nested Control structures.

Working with Forms: Appearance of forms, Designing Menus, Building Dynamic forms at runtime, Drag and Drop Operations.

Basic ActiveX Controls: The Textbox Control, The List Box and Combo Box Controls, The scrollbar and Slider Controls, The File Controls.

Getting Started in Visual C++: Parts of Visual C++ program – application object – main window object, view object document object. Event oriented window programming, device context. Microsoft foundation classes an overview

Event Handling: Reading keystrokes, handling mouse, creating menus, tool bars, buttons, status bar prompts, dialog box, check box, radio buttons, list boxes, combo boxes, sliders, serialization, file handling, multiple documents.

File Handling: Understanding and working with objects, controls, file handling, debugging

Creating ActiveX controls: DLLs, OLE, Object technologies. Creating internet program’s using visual C++ and visual basic. Creating Active X controls. Connecting to database using VC++ and visual basic.

Text Books:
Mastering Visual Basic 6 –Evangelos Petroutsos –BPB Publications
Visual C++ 6 - Steven Holzner –BPB publications
IT4.1.5 Elective- I COMBINATORICS & GRAPH THEORY Credits:4

Instruction: 3 Periods & 1 Tut./week  Sessional Marks: 30
Univ.-Exam : 3 Hours  Univ-Exam-Marks:70

PART I: COMBINATORICS

2.COMINATORICS: Basics of counting-Combinations and Permutations- Enumeration of Combinations & Permutations without repetitions and without repetitions- with constrained repetitions-Binomial Coefficients-Binomial and Multinomial theorems- Principle of Inclusion- Exclusion

PART II GRAPH THEORY


TEXT BOOKS:

2. Douglas B. West, “Introduction to Graph Theory”, Pearson Education Asia, New Delhi. (Chapters 1,2,3,4,5,6,7)

REFERENCE BOOKS:

3. Robin J. Wilson, “Introduction to Graph Theory” Pearson Education Asia, New Delhi.
IT4.1.5  

Elective- I RANDOM PROCESSES IN ENGINEERING  
Credits:4

Instruction:  3 Periods & 1 Tut./week  
Univ.-Exam : 3 Hours  

Sessional Marks:  30  
Univ-Exam-Marks:70

1. **STOCHASTIC PROCESSES**: Notion of Stochastic Process, Classification of Stochastic Process according to Time and State Space; Discrete time Markovchains, \( n \) th step transition probabilities, stationary distribution of Markovchains, Poisson process, Properties of Poisson; Birth and Death Process, Time dependent Birth and Death process, Renewal theory, Applications of elementary renewal theorem and key renewal theorem.


3. **QUEUEING THEORY**: Non Markovian queues, Phase type Technique, Embedded Markovchains Technique, GI/G/I Queues model, Polzak. Kintchins formula, queues with bulk arrivals queues with bulk services.

4. **PRIORITY QUEUING MODELS**: Queues in Series, Queues in Parallel, Scheduling algorithms, Throughput analysis and waiting time distributions, Applications of Queuing theory in Communication Networks.


**REFERENCES:**

2. Probability and Statistics with Reliability, Queueing & Computer Science Applications – By Kishore S. Trivedi (Prentice Hall)
IT4.1.5  Elective- I ARTIFICIAL INTELLIGENCE  Credits:4

Instruction:  3 Periods & 1 Tut. /Week  Sessional Marks:  30
Univ.-Exam : 3 Hours  Univ-Exam-Marks:70

Introduction to Artificial Intelligence, Artificial Intelligence Technique, Representation of a problem as
State space search, production systems, Problem characteristics, Production System characteristics

Heuristic Search Technologies
Generate & Test Hill Climbing, Best First search, Problem reduction, Constraint satisfaction, Means
Endo Analysis

Predicate Logic
Proof with Backward Chaining, Resolution, question answering.

Representing Knowledge Using Rules:
Procedural Vs Declarative knowledge, Logic Programming, Forward Vs Backward Reasoning,
Matching, Control Knowledge

Symbolic Reasoning with uncertainty
Non-monotonic Reasoning, Dependency – Directed Backtracking TMS.
Statistical Reasoning with Bayes Theorem, certainty Factors & Rule Based System, DS- Theory.

Weak & Strong Slot Filler Structures
Semantic nets, Frames, Conceptual dependencies, Scripts

Planning
Block world, Components of a Planning System, Goal State Planning, Non Linear Planning,
Hierarchical Planning.

Natural Language Processing
Syntactic Analysis, Semantic Analysis, Discusses and Pragmatic Processing.

Expert Systems
Representing and Using Domain Knowledge, Expert Systems Shells, Explanation

Text Books:
2. Introduction to Artificial Intelligence & Expert Systems, Paterson. PHI
1. Identifying well known ports on a Local/Remote System:
   By trying to listen to the various well-known ports by opening client connections. If the exception does not occur then the remote port is active else the remote port is inactive.

2. Writing a chat application:
   i) One-One: By opening socket connection and displaying what is written by one party to the other.
   ii) Many-Many (Broadcast): Each client opens a socket connection to that chat server and writes to the socket. Whatever is written by one party can be seen by all other parties.

3. Data retrieval from a Remote database:
   At the remote database a server listens for client connections. The server accepts SQL Queries from the client executes it on the database and sends the responses to the client.

4. Mail Client:
   i) POP Client: Gives the server name, user name and password, retrieve the mails and allow manipulation of mailbox using POP commands.
   ii) SMTP Client: Gives the server name, send email to the recipient using SMTP commands.

5. Simulation of Telnet:
   Provide a user interface to contact well known ports so that client server interaction can be seen by the user.

6. Simple file transfer between two systems (without protocols):
   By opening socket connection to our server on one system and sending a file from one system to another.

7. HTTP Server:
   Develop a HTTP server to implement the following commands.
   GET, POST, HEAD, DELETE.
   The server must handle multiple clients.

1) Downloading Image Files from HTTP server: Using Java URL connection class (Ref. Book: Java Network Programming-Orielly)
IT4.1.8  Object Oriented Software Engineering Laboratory  Credits:2

Lab: 3 Periods/week  Sessional Marks: 50
Univ.-Exam : 3 Hours  Univ-Exam-Marks:50

Computing Platform:
   Each student group chooses its own platform, subject to approval by the instructor

Course Objectives:
   1. They can design and implement complex software solutions using state of the art
      software engineering techniques.
   2. They have working knowledge of UML, source control, and project management.
   3. They have deep knowledge of the technologies they used for implementing their project.
   4. They know how to test and document software.
   5. They are capable of working as part of a software team and develop significant
      projects under a tight deadline.
   6. They are able to present their work in a professional manner.

Topics to be Covered:
   4. Object-oriented design.
   5. Debugging.

Syllabus Flexibility:
   High. The students are free to chose a project based on the instructor's approval.

Assessment Methods:
   1. Group meetings with faculty: initial proposal, code review, tracer-bullet implementation
do, final demo.
   2. Design documents. Write-up.
   4. Presentations.

   the students give their final presentations and demos.
   Also, each project team meets individually with the instructor at least four times during the
   semester. The agenda for each of the four meeting is as follows:

   1. Team presents project idea and has it approved by instructor. (first month)
   2. design/code review. Instructor goes over design/code with the team to point out
      problems and formalize requirements. Instructor determines requirements for tracer-
      bullet implementation. (second month)
   3. Tracer-bullet implementation demo. Team shows that it has achieved full vertical
      integration functionality. Instructor notices missed requirements and reminds students
      of requirements for final project.(beginning of third month).

   Final meeting. Verify requirements, design, documentation, testing, write-up, division of
   labor, etc. (last month).

Sessional Marks Allotment:  Monthly
Meeting Participation:  10%  Monthly
Progress Reports:  15%  Design/code
General Software Engineering Tips:
Be careful when making major modifications and keep backups! A good motto: There is no such thing as a safe software change.
One of the biggest mistakes that even professional software teams make is modifying code at the last minute. Either resist the urge to make last minute changes, or keep them isolated and well-marked so that they can be backed out easily if necessary.
Test, test, test!!! You must test your system thoroughly after making any change, no matter how small. Else you will not know if a bug was introduced! You will get no sympathy if you break your system at the last minute.

Regression Testing:
A good habit to get into: frequently run your program on an extensive test set.
Once you have a prototype, create a set of examples that your program handles correctly. Generate files of the input and the correct output as a test set.
When you make significant changes, run your program on the test set. If the output is different, then you will know that you’ve introduced a bug. (Or if the output is improved, you should update the test set.)
Put together an extensive regression set! If it alerts you to one major bug (and it always does), then it is time well spent.
After verifying that a new change is “safe”, save a version of your entire system! Never, EVER make changes to the saved version – it is a reliable version that you can recover in an emergency.

Documentation:
Get into the habit of documenting your code quickly as you go. If you think you’ll remember why you did something, you are probably wrong.
Computer scientists typically hate to do documentation. One reason is that they leave it all for the end!
Get into the habit of writing small comments as you go. A few comments, explaining what’s happening and why, can make a world of difference.
When you make a change, mark it with your initials, the date, a brief explanation, and an example. This will help enormously if the change needs to be removed or modified, and will prevent thrashing.

Working as a Team:
Be honest and realistic with your teammates when setting goals. If you fail to meet a promised deadline, it affects the whole team, not just you.
Communication is crucial! Don’t make major decisions by yourself, and let people know when you are behind or ahead of schedule.
Try to exploit each other’s strengths.
## IV/IV B.TECH (IT) II – SEMESTER

**B.TECH (IT) 4th YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXMINATION** With effect from 2007-2008 admitted batch

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<tr>
<th>Sub.Ref.No.</th>
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<th>Credits</th>
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<td>Theory</td>
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<td>IT 4.2.2</td>
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### Elective:

1. WAP
2. Multimedia Systems
3. Internet and Application Technologies
4. VHDL
5. Data Ware housing & Data Mining
IT4.2.1 E-Commerce Credits:4

Instruction: 3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks:70


Electronic cash and electronic payment schemes – Internet Monitory Payment and Security requirements – payment and purchase order process – online electronic cash.


Text Books:
Web Commerce Technology Hand Book
Daniel Minoli, Emma Minoli
McGraw Hill

Reference:
Frontiers of Electronic Commerce
Ravi Kalakotar, Andrew B.Whinston
Addison-Wesley
IT4.2.2  CRYPTOGRAPHY AND NETWORK SECURITY  

(Credit: 4)

Instruction:  3 Periods & 1 Tut. /Week  
Univ.-Exam : 3 Hours  

Sessional Marks:  30  
Univ-Exam-Marks: 70

INTRODUCTION: The need for security-security approaches-principles of security-Plain Text and Cipher Text-substitution and Transposition Techniques-Encryption and Decryption-Symmetric and Asymmetric Cryptography-Stechnology-key range and key size-types of attacks

SYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS: Algorithm types and modes-overview of symmetric key cryptography-DES-IDEA-RC5-BLOWFISH-AES-Differential and Linear Cryptanalysis.

ASYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS: Overview of asymmetric key cryptography- RSA algorithm-symmetric and asymmetric key cryptography together-digital signatures-knapsack algorithm-some other algorithms.

PUBLICATION INFRASTRUCTURE: Introduction-Digital certificates- Private Key management-The PKIX model-Public Key Cryptography Standards- XML, PKI and Security

INTERNET SECURITY PROTOCOLS: Basic concepts-SSL-SHTTP-TSP-SET-SSL versus SET-3D
secure protocol-Electronic money-Email security-WAP security-security in GSM


PRACTICAL IMPLEMENTATIONS OF CRYPTOGRAPHY/SECURITY: Cryptographic solutions using
Java-Cryptographic solutions using Microsoft-cryptographic toolkits-security and operating systems

NETWORK SECURITY: Brief Introduction to TCP/IP- firewalls-IP security-Virtual Private Networks- case studies on cryptography and security.

TEXT BOOK:

REFERENCE BOOKS:
1. **Introduction:** What is WAP, History, Architecture and future of WAP.
2. **The user interface:** User interface basics, Text entry, using the cache, Types of WML cards, Graphics.
   WAP development Tools and Software: Editors and Emulators, SDK’s, Converting Images.
3. **Working with WML:** WML basics: Writing WML code, some examples, Graphics, Templates.
   Forms and User input: The Options Menu, Events, Variables, Input Tag.
4. **Database-Driven WAP:** ASP and WAP, ActiveX Data Objects (ADO), methods of converting existing HTML web site to WAP, M-Commerce and Security, Push Technology and Telematics.
5. **Sample Applications:** Currency Converter, User Directory, Scheduling, E-Commerce

**Text Books:**
1. WAP ‘A beginners Guide’ -------  DALE BULBROOK
2. WAP Development with WML and WML Script-------  BEN FORTA and KEITH
IT4.2.3       Elective-II MULTIMEDIA SYSTEMS       Credits:4

Instruction:    3 Periods & 1 Tut. /Week          Sessional Marks:  30
Univ.-Exam : 3 Hours                                Univ-Exam-Marks:70

INTRODUCTION:
Definition - CD-ROM and multimedia.
Multimedia applications: business - schools - homes - public places and virtual reality. Introduction to
making of multimedia: hardware - software - creativity - and organization.

MULTIMEDIA TOOLS:
Macintosh and windows production platforms - 3-d modeling and animation - image-editing tools -
sound editing tools - animation - video - and digital movie tools - linking multimedia objects - office
suites - word processors - spread sheets - databases - presentation tools. Authoring tools - Card and
Page-based authoring tools - Icon Based authoring tools - time based authoring tools - object oriented
authoring tools - cross platform-authoring tools

MULTIMEDIA BUILDING BLOCKS:
Text: About fonts and faces - text in multimedia - computers and text - Font editing and design tools -
Hypermedia and Hypertext.
Sound: Multimedia system sounds - MIDI versus digital audio - digital audio - making MIDI audio -
audio file format - working with sounds in windows - working with sounds on the Macintosh - NIFF -
Adding sounds to multimedia - Towards professional sounds - production tips.
animation that works. Video: How video works - Broadcast video standards - Integrating computers and
television - Shooting and Editing - Video tips - Recoding formats - Digital video

MULTIMEDIA AND THE INTERNET:
Internet fundamentals: Internetworking - Connections - Internet services - The World Wide Web - Tools
for the World Wide Web: Web servers - Web browsers - Web page makers and Site builders - Plug-ins
and Delivery vehicles - Beyond HTML

DESIGNING FOR THE WORLD WIDE WEB:
Working on web - Text for web - Images for web - Sound for web - Animation for web.

TEXTBOOKS: Multimedia: Making It Work - Tay Vaughan

REFERENCE BOOKS:
3. Advanced multimedia programming - Steve Rimmer
4. Multimedia Literacy - Fred T.Hofstetter  MGHill
IT4.2.3 Elective-II INTERNET AND ITS APPLICATION TECHNOLOGIES Credits: 4

Instruction: 3 Periods Lec & 1Tut/week  
Univ-Exam: 3 Hours  
Sessional Marks: 30  
Univ-Exam-Marks: 70

**Introducing ASP.NET:** Problems with older versions of Active Server Pages, The Benefits of ASP.NET, Choosing the Appropriate Development Environment, Setting up the Development Environment.


Working with Web Server Controls: The Web server control hierarchy, Label Control, TextBox Control, Button and LinkButton Control, Hyperlink control, Image and ImageButton Control, CheckBox and RadioButton Controls, DropDownList and ListBox Controls, Validation Controls.

Using Data Bound Web Controls: Data-Binding Basics, Single Value Data Binding, Repeating Binding Control Methods, Repeating Binding Control Events, Mapping Fields to the Control, Data Bound Controls.

Data Access with ADO.NET: Connected versus Disconnected Data, ADO.NET Data Provides, ADO.NET data Namespaces, Primary Data Objects, Modified Table Data, Using the DataGrid to modify Data, Updating the Data store, Paging the DataGrid, Storing data with the DataGrid.


**Text Book:** ASP.NET BIBLE – Glenn Johnson- Wiley Dreamtech publications
IT4.2.3  Elective-II V H D L  Credits:4

Instruction:  3 Periods & 1 Tut. /Week
Univ.-Exam : 3 Hours

Sessional Marks: 30
Univ-Exam-Marks:70

1. Overview of Digital Design with Vermilion HDL
2. Hierarchical Modeling Concepts
3. Basic Concepts
4. Modules and ports
5. Gate-Level Modeling
6. Dataflow Modeling
7. Behaviour Modeling
8. Tasks and Functions

Text Book:

   Education Pte. Ltd. (chapters: 1,2,3,4,5,6,7,8), 2001
Reference Books:

IT4.2.3 Elective-II DATA WARE HOUSING AND DATA MINING Credits:4

Instruction: 3 Periods & 1 Tut. /Week  Sessional Marks: 30
Univ.-Exam : 3 Hours  Univ-Exam-Marks:70

1. Introduction to Data Mining:
   Motivation and importance, What is Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Interestingness of a pattern Classification of Data Mining Systems, Major issues in Data Mining.

2. Data Warehouse and OLAP Technology for Data Mining
   What is a Data Warehouse? Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of Data Cube Technology, Data Warehousing to Data Mining

3. Data Preprocessing
   Why Pre-process the Data? Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation

4. Data Mining Primitives, Languages and system Architectures
   Data Mining Primitives: What defines a Data Mining Task?, A Data Mining query language, Designing Graphical Use Interfaces Based on a Data Mining Query language, Architectures of Data Mining Systems

5. Concept Description: Characterization and comparison
   What is Concept Description? Data Generalization and summarization-based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between different Classes, Mining Descriptive Statistical Measures in large Databases

6. Mining Association rule in large Databases, Association Rule Mining, Mining Single- Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transactional Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

7. Classification and prediction
   Concepts and Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back-propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods like k-Nearest Neighbor Classifiers, Case- Based Reasoning, Generic Algorithms, Rough Set Approach, Fuzzy Set Approaches, Prediction, Classifier Accuracy

8. Cluster Analysis
   What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods

Text Book:
Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufman Publications

Reference Books:
1. Introduction to Data Mining, Adriaan, Addison Wesley Publication
2. Data Mining Techniques, A.K.Pujari, University Press
IT4.2.4 GRAPHICS & MULTIMEDIA LABORATORY Credits: 2

Lab: 3 Periods/week  Sessional Marks: 50
Univ. Exam: 3 Hours  Univ-Exam-Marks: 50


1. Drawing various types of lines and curves.
2. Creating various types text and fonts.
3. Creating two dimensional objects using the lines and curves
4. Animating the two dimensional pictures using transformations.
5. Coloring the pictures and Zooming.
6. Creating an object and applying animation of key framing.
7. Creating three dimensional objects using wire frame modeling.
8. Rotation, scaling and translating the 3 D objects.
9. Coloring the 3 D objects.
10. Shading the 3 D objects
11. Rendering the objects
13. Creating rugged surfaces based on fractal geometry.

Multimedia:

1. Preproduction & Presentation Graphics: Create a 7-10 slide presentation in your favorite presentation graphics application. (Power point is suggested; Corel Presentations 9 is free and is acceptable.)
2. Typefaces and Graphics: Create 1 vector and 1 bitmap graphic; they must be your original work created in any of the acceptable tools.
4. Production Planning and Design: Create a proposal of project. Include summary, flowchart, element and resource lists.
5. User Interface Design & Graphics II: Create a user interface for your final project. Include 2 backgrounds and 1 button set. Aim for a cohesive look.
6. Multimedia Sound: Create 2 soundtracks and 2 EFX sounds for a previous project.
7. Digital Video: Use video capture to digitize your video shoot ro another video source to create short production (15-45 seconds)
8. Create three basic Web pages using Dreamweaver / flash or other authoring package or write bare HTML if you are able; pages must be linked and must include at least one graphic per page.

Books:
GUIDELINES for preparing the report of the Project Work

FORMAT FOR PREPARATION OF PROJECT REPORT

FOR

B. TECH. (IT)

1. ARRANGEMENT OF CONTENTS:

   The sequence in which the project report material should be arranged and bound should be as follows:

   1. Cover Page & Title Page
   2. Bonafide Certificate
   3. Abstract
   4. Table of Contents
   5. List of Tables
   6. List of Figures
   7. List of Symbols, Abbreviations and Nomenclature
   8. Chapters
   9. Appendices
   10. References

   The table and figures shall be introduced in the appropriate places.

2. PAGE DIMENSION AND BINDING SPECIFICATIONS:

   The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be printed in black letters and the text for printing should be identical.

3. PREPARATION FORMAT:

   3.1 Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in Appendix 1.

   3.2 Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14, as per the format in Appendix 2.

   The certificate shall carry the supervisor’s signature and shall be followed by the supervisor’s name, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the student. The term ‘SUPERVISOR’ must be typed in capital letters between the
supervisor’s name and academic designation.

3.3 **Abstract** – Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.

3.4 **Table of Contents** – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in Appendix 3.

3.5 **List of Tables** – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

3.6 **List of Figures** – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.

3.7 **List of Symbols, Abbreviations and Nomenclature** – One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.

3.8 **Chapters** – The chapters may be broadly divided into 3 parts (i) Introductory chapter, (ii) Chapters developing the main theme of the project work (iii) and Conclusion.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

☑ Each chapter should be given an appropriate title.

☑ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.

☑ Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

3.9 **Appendices** – Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.

☑ Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc.

☑ Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.

☑ Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
3.10 List of References – The listing of references should be typed 4 spaces below the heading “REFERENCES” in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

REFERENCES


3.10.1 Table and figures - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non-verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

4. TYPING INSTRUCTIONS:

The impression on the typed copies should be black in colour.

One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style ‘Times New Roman’ and Font size 14.

* * * * *
TITLE OF PROJECT REPORT

A PROJECT REPORT

Submitted by

NAME OF THE CANDIDATE(S)

in partial fulfillment for the award of the degree

of

BACHELOR OF TECHNOLOGY

IN

INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING

ANDHRA UNIVERSITY AUTONOMOUS COLLEGE OF ENGINEERING

ANDHRA UNIVERSITY : VISAKHAPATNAM - 530003

MONTH & YEAR
SPECIMEN

SOME PERFORMANCE ASPECTS CONSIDERATIONS OF
A CLASS OF ARTIFICIAL NEURAL NETWORK

A PROJECT REPORT

Submitted by

SANDHY. A

GAYATHRI. R

in partial fulfillment for the award of the degree

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ANDHRA UNIVERSITY AUTONOMOUS COLLEGE OF ENGINEERING

ANDHRA UNIVERSITY:: VISAKHAPATNAM-530 003

MAY 2005
(A typical specimen of Bonafide Certificate)

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BONAFIDE CERTIFICATE

<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

Certified that this project report “..........TITLE OF THE PROJECT...............”
is the bonafide work of “..........NAME OF THE CANDIDATE(S)............”
who carried out the project work under my supervision.

<<Signature of the Head of the Department>>

SIGNATURE
<<Signature of the Supervisor>>

<<Name>>

HEAD OF THE DEPARTMENT
<<Name>>

SUPERVISOR

<<Academic Designation>>

<<Department>>

<<Full address of the Dept & College >>

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