ANURAG
Engineering Engineers

# ANURAG GROUP OF INSTITUTIONS

(AUTONOMOUS)

**(Formerly CVSR College of Engineering)**

Venkatapur, Ghatkesar, Hyderabad – 500 088.

www.anurag.edu.in

**B.Tech. Programs:**

Chemical Engineering
Civil Engineering
Computer Science and Engineering
Electrical and Electronics Engineering
Electronics and Communication Engineering
Information Technology
Mechanical Engineering
Artificial Intelligence

**Pharmacy Programs:**

B.Pharmacy
Pharma-D
Pharma-D (Post Baccalaureate)
M.Pharm (Pharmaceutics)
M.Pharm (Pharmacology)
M.Pharm (Pharmaceutical Analysis & Quality Assurance)
M.Pharm (Industrial Pharmacy)

**M.Tech. Programs:**

M.Tech (Computer Science and Engineering)
M.Tech (Power Electronics & Electrical Drives)
M.Tech (Electrical Power Systems)
M.Tech (Machine Design)
M.Tech (VLSI System Design)
M.Tech (Embedded Systems)
M.Tech (Structural Engineering)

Master of Business Administration

# COURSE STRUCTURE AND DETAILED SYLLABUS

**II, III & IV – B.Tech – I & II Semesters**

**R18-Regulations**

## COMPUTER SCIENCE AND ENGINEERING

**FOR**
**B.TECH FOUR YEAR DEGREE COURSE**
**(Applicable for the batches admitted from 2018-19)**


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# COURSE STRUCTURE AND DETAILED SYLLABUS

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# ANURAG GROUP OF INSTITUTIONS

## AUTONOMOUS

**II YEAR I SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | T | P | Credits |
|---|---|---|---|---|---|---|
| A53024 | BS | Probability and Statistics | 3 | 0 | 0 | 3 |
| A53025 | PC | Discrete Mathematics | 2 | 0 | 0 | 2 |
| A53026 | PC | Object Oriented Programming | 3 | 0 | 0 | 3 |
| A53027 | PC | Data Structures | 3 | 0 | 0 | 3 |
| A53028 | ES | Digital Logic Design | 3 | 0 | 0 | 3 |
| A53029 | PC | Python Programming | 3 | 0 | 0 | 3 |
| A53211 | PC | Python Programming lab | 0 | 0 | 3 | 1.5 |
| A53212 | PC | Data Structures lab | 0 | 0 | 3 | 1.5 |
| A53013 | MC | Environmental Studies | 2 | 0 | 0 | 0 |
| **Total** | | | **19** | **00** | **06** | **20** |

**II YEAR II SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | T | P | Credits |
|---|---|---|---|---|---|---|
| A54023 | PC | Computer Organization | 3 | 0 | 0 | 3 |
| A54024 | PC | Formal Languages and Automata theory | 3 | 1 | 0 | 4 |
| A54025 | PC | Java Programming | 3 | 0 | 0 | 3 |
| A54026 | PC | Software Engineering | 3 | 0 | 0 | 3 |
| A54027 | PC | Database Management Systems | 3 | 0 | 0 | 3 |
| A54212 | HSS&M | Soft Skills for Success Lab | 0 | 0 | 2 | 1 |
| A54213 | PC | JAVA Programming Lab | 0 | 0 | 3 | 1.5 |
| A54214 | PC | Data Base Management Systems Lab | 0 | 0 | 3 | 1.5 |
| A54014 | MC | Gender Sensitization | 2 | 0 | 0 | 0 |
| **Total** | | | **17** | **01** | **08** | **20** |

**III YEAR I SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | T | P | Credits |
|---|---|---|---|---|---|---|
| A55039 | PC | Computer Networks | 3 | 0 | 0 | 3 |
| A55040 | PC | Operating Systems | 3 | 0 | 0 | 3 |
| A55041 | PC | Design and Analysis of Algorithms | 3 | 0 | 0 | 3 |
| A55042 | PC | Web Technologies | 2 | 0 | 0 | 2 |
| A55043 | HSS&M | Entrepreneurship Development | 3 | 0 | 0 | 3 |
| A55006<br>A55044<br>A55045 | OE-I | 1. Logical Reasoning, Verbal And Quantitative Ability<br>2. Operations Research<br>3. Language and Life skills | 3 | 0 | 0 | 3 |
| A55211 | PC | Web Technologies Lab | 0 | 0 | 3 | 1.5 |
| A55212 | PC | Operating Systems& Computer Networks Lab | 0 | 0 | 3 | 1.5 |
| **TOTAL** | | | **17** | **00** | **06** | **20** |

**III YEAR II SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | T | P | Credits |
|---|---|---|---|---|---|---|
| A56037 | PC | Compiler Design | 3 | 0 | 0 | 3 |
| A56038 | PC | Data Warehousing and Data Mining | 3 | 0 | 0 | 3 |
| A56039<br>A56040<br>A56041 | PE–I | 1. R programming<br>2. Unix Programming<br>3. Object Oriented Analysis and Design | 3 | 1 | 0 | 4 |
| A56042<br>A56043<br>A56044 | PE–II | 1.Machine Learning<br>2. E-Commerce<br>3.Cyber forensics | 3 | 0 | 0 | 3 |
| A56045<br>A56046<br>A56047 | PE –III | 1.Mobile Computing<br>2.Advanced Databases<br>3.Human Computer Interaction | 3 | 0 | 0 | 3 |
| A56213 | HSS&M | Advanced English Communication Skills Lab | 0 | 0 | 2 | 1 |
| A56214<br>A56215<br>A56216 | PE-I Lab | 1. R programming Lab<br>2. Unix Programming Lab<br>3. Object Oriented Analysis and Design Lab | 0 | 0 | 3 | 1.5 |
| A56217 | PC | Data Warehousing and Data Mining Lab | 0 | 0 | 3 | 1.5 |
| **TOTAL** | | | **15** | **01** | **08** | **20** |

**IV YEAR I SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | T | P | Credits |
|---|---|---|---|---|---|---|
| A57052 | HSS&M | Management Science | 3 | 0 | 0 | 3 |
| A57053 | PC | Information Security | 3 | 1 | 0 | 4 |
| A57054<br>A57055<br>A57056 | PE – IV | 1. Big Data<br>2. Distributed Systems<br>3. Soft Computing | 3 | 1 | 0 | 4 |
| A57057<br>A57058<br>A57059 | PE-V | 1. Internet of Things<br>2.Computer Graphics<br>3.Software Testing Methodologies | 3 | 0 | 0 | 3 |
| A57060<br>A57061<br>A57062 | PE-VI | 1. Data Science and Analytics<br>2. Cloud Computing<br>3. Image Processing | 3 | 0 | 0 | 3 |
| A57216 | PC | Information Security Lab | 0 | 0 | 3 | 1.5 |
| A57217<br>A57218<br>A57219 | PE-V LAB | 1. Internet of Things Lab<br>2. Computer Graphics Lab<br>3.Software Testing Methodologies Lab | 0 | 0 | 3 | 1.5 |
| A57220 | PW | Mini Project | 0 | 0 | 4 | 2 |
| **Total** | | | **15** | **02** | **10** | **22** |

**IV YEAR II SEMESTER** **COURSE STRUCTURE**

| Subject Code | Category | Subject Name | L | P | Credits |
|---|---|---|---|---|---|
| A58008<br>A58013<br>A58022 | OE-II | 1.Technical and Business Communication Skills<br>2. English for Professionals<br>3. Managerial Economics and Financial Analysis | 3 | 0 | 3 |
| A58002<br>A58004<br>A58023 | OE-III | 1. Negotiation Skills<br>2. Project Management<br>3. Value Engineering | 3 | 0 | 3 |
| A58213 | PW | Technical Seminar | 0 | 6 | 2 |
| A58214 | PW | Comprehensive Viva-Voce | 0 | 0 | 2 |
| A58215 | PW | Project Work | 0 | 15 | 10 |
| **Total** | | | **6** | **21** | **20** |

- HSS & M Humanities and Social Sciences including Management course
- Basic Science : **BS**
- Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc : **ES**
- Professional core : **PC**
- open elective: **OE**
- Mandatory Courses :**MC**
- PROJECT: **PW**
- Professional Elective : **PE**

## Credits Break-up

| S.NO | CATEGORY | | CREDITS |
|---|---|---|---|
| 1 | Basic Sciences | (24) | 22 |
| 2 | Engineering Sciences | (29) | 18 |
| 3 | Humanities and Social Sciences | (12) | 11 |
| 4 | Professional Core | (49 ) | 60 |
| 5 | Professional Elective Courses | (18 ) | 23 |
| 6 | Open Electives | (12) | 9 |
| 7 | Projects | (15) | 16 |
| **Total Credits** | | | **160** |

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| II Year B.Tech. CSE – I Sem | L | T/P/D | C |
|---|---|---|---|
| | 3 | 0 | 3 |

## PROBABILITY & STATISTICS

**Course Objectives:**

1. Understand Chance causes and random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
2. In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
3. To perform polynomial Curve Fitting , General Curve fitting and Interpolation , various types of Skewness and kurtosis , Correlations .
4. The types of sampling, Sampling distribution of means ,Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
5. Understanding the Experiments.

**Course Outcomes:**

The students will able to:

1. Identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
2. Calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering.
3. To interpolate using curve fitting and identify the Correlation between variables.
4. To estimate an unknown population parameter.
5. Design their experiment with the basic norms and test their design efficiency. It is useful to all the branches of engineering.

**Unit-I:**

**Introduction to Probability**, Addition theorem, Multiplication theorem (Two events only), Baye's theorem. Random variables, Discrete and continuous random variable, Definitions of Probability Distribution function, Probability mass function, Probability density function and properties. Definitions of Mathematical expectation, Variance of discrete and continuous random variable. Bivariate distributions and their properties, marginal and conditional distribution

**Unit-II:**

**Discrete Distributions**: Bernoulli, Binomial, Poisson distributions (definition and problems) their mean, variance and moment generating function.

Continuous Distribution: Normal, exponential distributions (definition and problems) related properties.

**Unit-III:**

**Measures of Central tendency**: Moments, Skewness and Kurtosis.

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.

Correlation and regression – Rank correlation

**Unit-IV:**

**Estimation:** Concept of Point estimation and its properties (definition only), Concept of interval estimation with examples.

Test of Hypothesis: Null & Alternative Hypothesis, Critical region, Type I and Type II errors, level of significance, one tail, two-tail tests.

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means

**Unit-V:**

**Small Sample tests**: t-Test for single mean, difference of means, paired t-test, F-test. Chi-square test for goodness of fit and independence of attributes. ANOVA: Introduction, ANOVA for one way classification only.

**Text Books:**

1. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.
2. Probability and Statistics for Engineers by Richard A Johnson, Pearson Education.

**References:**

1. Introduction to Probability by Charles M Grinstead, J Laurie Snell, American Mathematical Society.
2. Miller and John E. Freund, Probability & Statistics for Engineers, Prentice Hall of India.
3. Montgomery: Design and Analysis of Experiments, Wiley

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| II Year B.Tech. CSE - I Sem. | L | T / P / D | C |
|---|---|---|---|
| | 2 | 0 | 2 |

## DISCRETE MATHEMATICS

**Prerequisites:** Mathematics – I and II

**Course Objectives:**

1. Define the syntax and semantics of propositional and predicate logic.
2. Translate statements from a natural language into its symbolic structures in logic.
3. Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.
4. Apply the notion of relations on some finite structures, like strings and databases.
5. Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

**Course Outcomes:**

The students will be able to:

1. Distinguish between Statement Logic and Predicate Logic and also to know about applications of combinatorial problems.
2. Solve real world problems through recurrence relations.
3. Evaluate operations on discrete structures such as sets, functions, relations, and sequences for complex problems.
4. Design graph theory models of data structures and state machines for problems of connectivity
5. Define modern algebra for constructing and writing mathematical proofs.

**Unit – I**

**Foundations:** Basics, Sets, Fundamentals of Logic, Logical Inferences, First order logic and Other methods of Proof, Rules of Inference for Quantified Propositions. (Problems Only and Theorems without Proofs)

**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with &without repetitions, Constrained repetitions, and Principle of Inclusion and Exclusion. **(Problems Only and Theorems without Proofs)**

**Unit – II**

**Recurrence Relations:** Generating Functions, Calculating coefficient of Generating Function, Solving Recurrence relations by substitution method and Generating Functions, The Method of Characteristic Roots, Solutions to inhomogeneous recurrence relations. **(Problems Only and Theorems without Proofs)**

**Unit – III**

**Relations and Lattices:** Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattice, and Enumerations, Operations on Relations, Paths and Closures, Directed Graphs and adjacency matrices, topological sorting. **(Problems Only and Theorems without Proofs)**

**Unit – IV**

**Graphs:** Basic Concepts, Isomorphism's and Sub-graphs,Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs. **(Problems Only and Theorems without Proofs)**

**Unit – V**

**Algebraic structures:** Algebraic systems, examples and general properties, semi groups and monoids, groups, sub groups, homomorphism, isomorphism, rings.

**TEXT BOOKS:**

1. "Discrete Mathematics for Computer Scientists and Mathematicians" by Joe L. Mott, Abraham Kandel, Theodare P.Baker, Second Edition, PHI.

2. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

**REFERENCE BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science,J. P.Tremblay and P. Manohar,Tata McGraw Hill.

2. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

3. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 3 | 0 | 3 |

## OBJECT ORIENTED PROGRAMMING

**Prerequisites:** Any programming language

**Course Objectives:**

1. Understand the C++ program structure and also the basics of C++ Programming language.
2. Use input and output formatted stream classes and the file streams and file modes to access the files.
3. Know the template classes and functions and Runtime error and how to handle that error.

**Course Outcomes:**

Student will be able to:

1. Describe the important concepts of object oriented programming like object and class, Encapsulation, inheritance and polymorphism
2. Develop the applications using object oriented programming with C++.
3. Implement the concept of inheritance and polymorphism.
4. Apply I/O streams and files to develop programs for real time problems.
5. Apply advance features like templates and exception handling to make programs supporting reusability and sophistication

**Unit I :**

**Concepts of OOP:** Introduction to OOP, Procedural versus Object Oriented Programming, Principles, Benefits and applications of OOP.

**Object-Oriented Systems Development:** Introduction, Procedure-Oriented Paradigms, Procedure- Oriented Development Tools, Object Oriented Paradigm.

**Unit II :**

**C++ Basics:** Overview, Program structure, namespace, identifiers, variables, constants, enumerations, operators, typecasting, control structures.

**C++ Functions:** Simple functions Call and Return by reference, Inline functions, Overloading of functions, default arguments, friend functions, and virtual functions.

**Unit III :**

**Objects and classes:** Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading.

**Inheritance:** Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class.

**Unit IV:**
**Polymorphism:** Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism.
**I/O Streams:** Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators.

**Unit V:**
**Templates:** Function and class templates, overloading of template functions.
**Exceptions:** Basics of exception handling, exception handling mechanisms, throwing, catching mechanisms, rethrowing an exception.

**Text Books:**

1. E Balagurusamy, Object Oriented Programming with C++, , Sixth Edition, TATA McGraw Hill, 2013.
2. 'Herbert Schlitz ,The Complete Reference C++,Fourth Edition, TATA McGraw Hill, 2003.

**Reference Books:**

1. SauravSahay, Object Oriented Programming in C++, Second Edition, Oxford University Press, 2012.
2. Steven Holzner,C++ Programming, Black Book, Dreamtech
3. Robert Lafore , Object Oriented Programming in Turbo C++,, Galgotia
4. Ashok Kamthane, Object Oriented Programming with ANSI and Turbo C++, Pearson

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 3 | 0 | 3 |

## DATA STRUCTURES

**Prerequisites:** Any programming language

**Course Objectives:**

1. Understand various static and dynamic representations of data structures.
2. Understand fundamental algorithmic problems of various nonlinear data structures.
3. To be familiar with Graph representations and traversals.
4. Know the basic concepts of Hashing.

**Course Outcomes:**

Student will be able to:

1. Analyze the representation of various static, dynamic and, hierarchical data structures.
2. Design and implement the mechanism of stacks, general tree data structures with their applications.
3. Implement various algorithms on graph data structures, including finding the minimum spanning tree , shortest path with real time applications, etc.,
4. Implementation of various advance concepts of binary trees and graphs with real time applications.
5. Outline the concepts of hashing, collision and its resolution methods using hash function

**Unit I :**

**Introduction**: What is data structure, Types of data structures, Static and Dynamic representation of data structure and comparison. **Stacks:** Stacks definition, operations on stacks, Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack.

**Unit II :**

**Trees:** Basic terminology, Types of trees: Binary Tree: terminology, Complete and Full Binary Tree, Extended Binary Trees, Threaded Binary Trees and In order Threading. Representation of Trees using Arrays and Linked lists (advantages and disadvantages). Tree Traversal and Representation of Algebraic expressions; Algorithms for Tree Traversals.

**Heaps:** Introduction, types of Heaps – Min binary heap, Max binary heap.

**Unit III :**

Advanced concepts on trees: Representation and Creation of Binary Search Trees (BST), Algorithm for Inserting, deleting and searching in BST.Representation and advantages of AVL Trees, algorithms on AVL Trees-Insertion, Rotation and Deletion. Definition and advantages of B-trees, B + Trees, Red-Black Trees, M-way trees with examples.

**Unit IV:**

Graphs-Basic terminology, Representation of graphs: sequential representation (Adjacency, Path Matrix) Linked representation.

Graph Traversals-Breadth First Search, Depth First Search with algorithms. Definition and properties of Spanning Tree, Minimum Spanning Tree, Dijkstra Algorithms.

**Unit V :**

Hashing: General Idea, Hash Functions, Separate Chaining ,Open Addressing-Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extensible Hashing, Collisions in Hashing, Implementation of Dictionaries

**Text Books:**

1. Seymour Lipschutz, Schaum's Outlines ,Data Structures, Special Second Edition,Tata McGraw-Hill,.
2. Richard F.Gillberg&Behrouz A. Forouzan, Data Structures, A Pseudo code Approach with C, Second Edition, Cengage Learning, India Edition, 2005.

**Reference Books:**

1. Aaron M. Tenenbaum,Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, PHI Learning Private Limited, Delhi India.

2. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publications Pvt Ltd Delhi India.

3. A.K. Sharma , Data Structure Using C, Pearson Education India.

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 3 | 0 | 3 |

## DIGITAL LOGIC DESIGN

**Prerequisites:** Basic electrical engineering

**Course Objectives:**

1. Understand the concepts of Binary system and conversions.
2. Be familiar with the concepts of logical functions using Boolean algebra
3. Learn various combinational circuits.
4. Understand the functionality of flip flops and design of sequential circuits.
5. Know the concepts of basic memory system.

**Course Outcomes:**

Student will be able to:

1. Apply various number systems, floating point representations, complements, error detecting and correcting codes
2. Apply boolean algebraic principles and k-maps for simplification of boolean algebraic expressions
3. Design combinational circuits
4. Design sequential circuits
5. Compare various types of memories and their usage

**Unit I :**

**Number Systems:** Binary, Octal, Hex Decimal, and Conversions, range; Binary additions and subtractions (using 1c, and 2c), concept of overflow; representations of negative numbers using 1's and 2's complement and range; **BCD numbers:** Representation of 8421, 2421, Ex-3, Gray and self complementary codes; additions and subtractions on 8421 codes; **Error detecting codes:** even, odd parity, hamming codes; **Error correcting codes:** hamming codes, block parity codes; Floating point representation.

**Unit II:**

Boolean Algebra and Digital Logic GATES, Basic Boolean laws and properties; Boolean functions; canonical and standard forms (SOP, POS); Gate minimization using three and four variable K-Map's with and without don't cares. Encoders, Decoders, Multiplexers, D-Multiplexers;

**Unit III:**

Definition of combinational circuits, design procedure for half, full, decimal (8421) adders and subtractors; Combinational Circuit Design for BCD code converters;

**Unit IV:**

Sequential circuits, latches, Flip Flops; Analysis of clocked sequential circuits, State Reduction and Assignment, Register, Ripple Counters, Synchronous Counters, Other Counters.

**Unit V:**

**Types of Memory** – Main memory – random access memory, ROM, Types of ROM; Decoder and RAM interface: Address lines, data lines, chip select signal; Design of large memories using small memories, using decoders; problems in memory design; Cache Memory- design issues, hit and miss ratio related problems; Associative and Auxiliary memory;

**Text Books:**

1.M. Morris Mano, Digital Design, Third Edition, Pearson Education/PHI, 2001.

2.Roth, Fundamentals of Logic Design, Fifth Edition, Thomson, 2004

**Reference Books:**

1.John F. Wakerly, Digital Design, Principles and Practices, 4th Edition, Pearson / Prentice Hall, 2005.

2.Malvino& Leach, Digital Principles and Applications, Seventh Edition, Tata McGraw-Hill Education, 2010.

3.A.K. Maini, Digital Electronics, Principles and Integrated Circuits, 1st Edition, Wiley India Publications, 2007.

4.M. Morris Mano and Michael D. Ciletti, Digital Design, 5th Edition, Pearson Education, 2012.

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 3 | 0 | 3 |

## PYTHON PROGRAMMING

**Prerequisites:** Any programming language

**Course Objectives:**

1. Understand the basics and function of Python Programming Language.
2. Understand the string operation and sequences used in Python Programming Languages.
3. Know the classes and objects in Python Programming Language.
4. Use the reusability concepts in Python Programming Language.
5. Use Exception Handling mechanism in Python Programming Language.

**Course Outcomes:**

1. Identify the differences between scripts and programs
2. Solve the problems based on decision control statements
3. Develop programs on functions and data structures.
4. Write the programs on string operations
5. Use of python exceptions and packages

**Unit – I**

**Introduction to Python:**
Features of Python Language, Data Types, Operators, Expressions, Control Statement, Standard I/O Operations

**Functions and Modules:**
Declaration and Definition Function Calling, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Doc Strings, Built-in Functions,

**Unit – II**

**Strings and Regular Expressions:**
String Operations, Built-in String Methods and Functions, Comparing Strings, function in Regular Expression.
**Sequence:**
List, Tuples, Dictionaries.

**Unit – III**

**Implementation of classes and objects in Python:**

Classes and Objects, Class Method and Self Argument. The __Init__Method, Class Variables and Object Variables, The _Del__Method, Public and Private Data Members, Private Methods, Buil-in Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection(Destroying Objects).

**Unit – IV**

**Implementation of Inheritance in Python:**

Inheriting Classes in Python, Types of Inheritance, Composition/Containership, Abstract Classes and Interfaces, Meta class,

**Implementation of Operator Overloading in Python:**

Introduction, Implementing Operator Overloading, Overriding Methods

**Unit – V**

**Exception Handling in Python:**

Introduction, Handling Exception, Multiple Except Blocks and Multiple Exceptions, Finally Block.

**Python Packages:**

Introduction to Numpy, Pandas, Matplotlib, Tkinter

**Text Books**

1. "ReemaThareja", Python Programming using Problem Solving Approach, First Edition, Oxford Higher Eduction.

2 James Payne, Beginning Python using Python 2.6 and Python 3

**Suggested / Reference Books**

1 Kenneth A.Lambert, Fundamentals of Python

2 Charles Dierach, Introduction to Computer Science using Python

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 0 | 3 | 1.5 |

## PYTHON PROGRAMMING LAB

**Pre-requisite:** Any programming language

**Course Objectives:**

1. Understand the string operation and sequences used in Python Programming Languages.
2. Know the classes and objects in Python Programming Language.
3. Use the reusability concepts in Python Programming Language.
4. Use Exception Handling mechanism in Python Programming Language.

**Course Outcomes:**

Student will able to :

1. Develop programs on data types, operators and expressions
2. Apply the data structures in real time scenarios
3. Write the programs on strings and functions
4. Implement programs on class and related issues.
5. Use of python exception handling and packages.

Week-1:

Installation and Environment set up of Python & Programs on Data types

Week-2:

Programs on Standard I/O, Operators and Expressions

Week-3:

Programs on Functions

Week-4

Programs on different argument types

Week-5:

Programs on lists and Tuples

Week-6:

Programs on Dictionaries

Week-7:

Programs on Strings and string operations

Week-8:

Programs on Regular Expressions.

Week-9:

Programs on class & object, static and instance method implementation

Week-10:

Programs on Inheritance and Polymorphism

Week-11:

Programs on Abstract classes and interfaces

Week-12:

Programs on Exception Handling

Week13:

Demonstration of Numpy package

Week13:

Demonstration of Pandas package

Week-14:

Demonstration of matplotlib package

Week-15:

Demonstration of Tkinter package

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| II Year B.Tech. CSE - I Sem | L | T / P / D | C |
|---|---|---|---|
| | 0 | 3 | 1.5 |

## DATA STRUCTURES LAB

**Prerequisites:** Any programming language and a parallel course on data structures.

**Course Outcomes:**

Student will be able to:

1. Develop the programs on stacks and its applications.
2. Demonstrate the operations on trees.
3. Demonstrate the implementation of various advanced trees.
4. Design and implementation of programs on BST and Graph Traversals.

**Part-A**

1. Program to illustrate string built in functions
2. Program to evaluate postfix notations
3. Program to convert infix to postfix notation
4. Program to illustrate tree traversals
   a) In order b) Preorder c) Post order
5. Program to illustrate insertion, deletion and searching in Binary Search Tree.
6. Program to illustrate Graph traversals
   a) Breadth First Search
   b) Depth First Search
7. Program to illustrate Insertion, deletion and Rotation on AVL Trees.

**Part-B**

1. Program to illustrate Function Overloading to calculate area of a circle, rectangle and square
2. Program to illustrate virtual function
3. Program to illustrate default constructor, parameterized constructor and copy constructors
4. Program to illustrate single Inheritance, multiple inheritance, multilevel inheritance, hybrid inheritance
5. Program to illustrate run time polymorphism, compile time polymorphism
6. Program to illustrate Operator Overloading

   a)Unary Operator b) Binary Operator

7. Program to illustrate Exception Handling Mechanisms using try, catch, throw keywords
8. Program to illustrate formatted and unformatted I/O streams

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## ENVIRONMENTAL STUDIES

**Pre-requisites:** Engineering Chemistry

**Course Objectives:**

1. To introduce the knowledge about Environment.
2. To introduce students to the concepts of pollution, Biodiversity
3. To develop an awareness about global Environmental problems.
4. To learn to protect environment and awareness on legal issues
5. To learn about importance of sustainable development and role of IT in environment.

**Course Outcomes:**

1. Understand fundamental physical and biological principles that govern natural processes.
2. Understand fundamental concepts from the social sciences and humanities underlying environmental thought and governance.
3. Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems.
4. 4. Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.
5. Design and conduct independent research that contributes to environmental thought and/or problem solving.

**UNIT – I**

**Multidisciplinary nature of Environmental Studies**: Definition, Scope and Importance – Need for Public Awareness.

**Ecosystems**: Concept of an ecosystem – Classification, structure and function of different ecosystems - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids.

**Biodiversity and its conservation**: Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

**UNIT – II**

**Natural Resources**: Renewable and non-renewable – Natural resources and associated problems: Forest resources – Use and over – exploitation, deforestation,– Timber extraction, mining, dams and other effects on forest and tribal people: Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources: Equitable use of resources for sustainable lifestyles.

**UNIT – III**

**Environmental Pollution**: Definition, Cause, effects and control measures of different kinds of pollution (Air, Water, Soil, Marine, Noise, Thermal, Nuclear, e –Waste)

**Carbon Capture & Sequestration – d**ifferent storage sources, major disadvantages, environmental effect**s**

**Social Issues and the Environment**: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management. -Climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

**UNIT – IV**

**Waste management technology:** Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution, Disaster management: floods, earthquake, cyclone and landslides.

Waste water and sewage treatment technology: primary, secondary and tertiary treatments. Bioremediation, Phyto-remediation, ZLD (zero liquid discharge), membrane technology. Application of GIS and GPS system in environmental science.

**Environmental policy, Rules and regulations.** EIA (Environmental Impact Assessment) & EMP (ENVIRONMENTAL Management Plan) – Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act –Forest Conservation Act.-Public awareness. Global environmental problems and global efforts.

**UNIT – V**

**Towards sustainable future**: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. Environmental education, Conservation of resources. Urban sprawl, sustainable cities and sustainable communities, human health. Role of IT in environment, environmental ethics, concept of green building, Basic principles of Green engineering, clean development mechanism (CDM), Low carbon life cycle, Polluters-pay principle.

**TEXT BOOKS:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha, University Press Private Limited, Reprinted in 2005.
2. Environmental Studies: From Crisis to Cure by R.Rajagopalan, Oxford University Press, 2nd Edition, 2005

**REFERENCES:**

1. Environmental Science: Towards a Sustainable Future by Richard T.Wright. PHL Learning Private Ltd .New Delhi, 2008
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P.Ela. PHI Learning Pvt. Ltd. 4th edition, 2008

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| II Year B.Tech. CSE – II Sem | L | T / P / D | C |
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## COMPUTER ORGANIZATION

**Prerequisites:** Digital logic design

**Course Objectives:**

1. Understand instruction format, life cycle and CPU Architecture and Organization
2. Know the basic Architecture of Microprocessor.
3. Understand different types of I/O interfaces.
4. Familiar with the concepts of pipelining techniques.
5. Understand the Multiprocessor concepts

**Course Outcomes:**

Student will be able to:

1. Understand the basic organization of computer and different instruction formats and addressing modes.
2. Analyze the concept of pipelining, segment registers and pin diagram of CPU.
3. Understand and analyze various issues related to memory hierarchy.
4. Evaluate various modes of data transfer between CPU and I/O devices.
5. Examine various inter connection structures of multi processors.

**Unit -I:**

**Instruction:** Instruction Definition, instruction cycle, flow chart for instruction cycle, instruction storage, types of instruction formats (Zero, one, two and three address). Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

**Unit- II:**

**CPU-Organization:** 8086 – CPU – Block diagram and pin diagram, concept of pipelining, minimum and maximum mode, General purpose registers; segment register and generation of 20 bits address, segmentation of main memory, Addressing modes, systems bus, Types of flags.

**Unit -III:**

Memory Hierarchy, Main memory, memory address map, memory connection to CPU; auxiliary memory, Magnetic disks, magnetic tapes; cache memory, hit and miss ratio, direct, associative and set associative mapping; Micro-programmed control: control memory, address sequencing.

**Unit -IV:**

**I/O interface:** I/O Bus and Interface modules, I/O versus Memory Bus, isolated vs Memory-mapped I/O. Asynchronous data transfer-strobe control, Hand shaking; Modes of Transfer: Example of programmed I/O, interrupt-initiated I/O, software considerations. Daisy-Chaining priority. DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

**Unit -V:**

**Multi Processors:** Characteristics of Multi-Processor; Interconnection structures: Time shared common bus, multiport memory, crossbar switch, multi-stage switching network; Introduction to Flynn's classification**:** SISD, SIMD, MISD, MIMD (Introduction).

**Text Books:**

1. M. Morris Mano, Computer System Architecture, Third Edition, Pearson/PHI, 2011.
2. Douglas V Hall, Microprocessor and Interfacing, Second Edition, TATA McGraw Hill, 2006.

**Reference Books:**

1. Carl Hamacher, ZvonksVranesic, SafeaZaky, Computer Organization, 5 th Edition, McGraw Hill, 2002.
2. William Stallings, Computer Organization and Architecture, 6th Edition, Pearson/PHI, 2007.

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| II Year B.Tech. CSE –II Sem | L | T/P/D | C |
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## FORMAL LANGUAGES AND AUTOMATA THEORY

**Prerequisites:** Discrete mathematics and any programming language.

**Course Objectives:**

1. Familiar with concepts of NFA And DFA
2. Understand various Grammars like Regular grammars-right linear and left linear grammars
3. Familiar with concept of PDA
4. Aware of the concept of Turing Machines

**Course Outcomes:**

Student will be able to:

1. Appreciate the role and structure of Language theory.
2. Design of regular expressions for language constructs and conversions of NFA and DFA.
3. Demonstrate the derivations and properties of various CFG and Regular grammars.
4. Design of PDA for the given CFG.
5. Appreciate the role of the Turing machine as computational and universal machine.

**Unit -I:**

Fundamental concepts: Strings, Alphabets, Language operations, Regular Expressions, Regular Languages: Finite automata, Types of finite automata (FA)-Non deterministic Finite Automata (NFA), Deterministic Finite Automata(DFA), NFA with ε-Moves, regular expression representation; Regular expressions to NFA; NFA with ε-Moves to NFA without ε-Moves; NFA to DFA Conversions; Minimization of DFA (Proofs Not Required)

**Unit -II:**

DFA with more than two outputs: Moore and Melay machines, Pumping Lemma for Regular Sets: Closure properties of Regular Sets (Proofs Not Required): Context Free Grammars (CFG), Right most, Left most –derivations, Parse Trees; Operator Grammar: Unit productions; Chomsky normal forms; (Proofs Not Required)

**Unit -III**

Left recursion and Elimination of left recursion in CFG: Elimination of useless symbols and unit productions; Greibach Normal Form, Push Down automata (PDA): Types of PDA: Design of a PDA for a given CFG. (Proofs Not Required)

**Unit -IV:**

Regular Grammars (RG), Design of DFA for a given RG: Right linear and left linear Grammars and conversions: Definition of Context Sensitive Grammar (CSG) and Linear bounded automata (LBA) (Proofs Not Required).

**Unit -V:**

Definition of unrestricted Grammar and Turing Machine (TM): Chomsky hierarchy on Languages, Grammars and recognizers; Design of TM as recognizer; Types of TM: Computational problems of TM with multiple tracks; Decidability Problem; Churches hypothesis (Proofs Not Required)

**Text Book:**

1. John E.Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, Introduction to Automata Theory, Languages and Computation, Third Edition, Pearson, 2013.

**Reference Books:**

1. Daniel I.A.Cohen, Introduction to Computer Theory, Second Edition, John Wiley.
2. John C Martin, Introduction to languages and the theory of Computation, Third Edition, TATA McGraw Hill, 2014.
3. VivekKulakarni, Theory of Computation, Oxford University press 2013, Second Edition, 2014

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## JAVA PROGRAMMING

**Prerequisites:** Any programming language

**Course Objectives:**

1. Understand the concept of OOP and learn the basic syntax and semantics of the Java language and programming environment
2. Be familiar with the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
3. Understand Exceptional handling and multithreading concepts
4. Be familiar with GUI applications.

**Course outcomes:**

The students will be able to :

1. Explain the Object Oriented Programming concepts
2. Design programs using package and interfaces.
3. Apply the concepts of Exceptions and multithreading.
4. Develop GUI applications and AWT using Frames.
5. Design the programs using Applet and JDBC Concepts.

**Unit -I**

**Java Basics:** History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, static keyword,garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings.

**Unit- II**

**Inheritance** –Introduction, forms of inheritance- specialization, specification, construction, extension, limitation, combination, Member access rules, super uses, using final with inheritance

**polymorphism**- method overriding, abstract classes, Object class Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams

**Unit- III**

**Exception handling** - Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util- The Collection Interface, list interface, Queue interface, The Collection class: LinkedListClass, HashSetClass. TreeSetClass, StringTokenizer, Date, Random, Scanner.

**Multi threading**: Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.

**Unit- IV**

**Event Handling**: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. Text Book1:Ch22)

**AWT:** class hierarchy, component, container, panel, window, frame, canvas, graphics, Layout Manager – layout manager types – boarder, grid, flow, card and grib bag.

**Unit- V**

**AWT controls**: Labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – dialogs, menu bar.

**Applets** – Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.

**JDBC Connectivity**: JDBC Type 1 to 4 Drivers, connection establishment, QueryExecution

**Text Books**

1. Java- The Complete Reference, Seventh Edition, Herbert Schildt, Tata McGraw Hill
2. Database Programming with JDBC&JAVA, Second Edition,GeorgeReese, O'ReillyMedia

**Reference Books**

1. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.
2. Thinking in Java Fourth Edition, Bruce Eckel
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education

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## SOFTWARE ENGINEERING

**Prerequisites:** Any programming language

**Course objectives**

1. Understand the framework activities for a given project.
2. Choose a process model to apply for given project requirements.
3. Design various system models for a given scenario.
4. Design and apply various testing techniques.
5. Understand metrics for Process and Products.

**Course Outcomes:**

Student will be able to:

1.Utline the framework activities for a given project.
2. Apply Right process model for a given project.
3. Design various system models for a given Context.
4. Apply various testing techniques for a given project.
5.Identify various risks in project development.

**Unit -I:**

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), personal and team process models.

**Unit -II:**

Process models: The waterfall model, Incremental process models, Evolutionary process model, Agile process. Software Requirements: Functional and non-functional requirements, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management

**Unit -III:**

System models: Context Models, Behavioral models, Data models, Object models, structured methods. Design Engineering: Design process and Design quality, Design concepts, the design model, Modeling component level design: design class based components, conducting component level design. Performing User interface design: Golden rules.

**Unit -IV:**

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, Product metrics : Software Quality, Metrics for Analysis Model- function based metrics, Metrics for Design Model-object oriented metrics, class oriented metrics, component design metrics, Metrics for source code, Metrics for maintenance.

**Unit -V:**

Metrics for Process and Products: Metrics for software quality. Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software Reviews, Formal technical reviews, Software reliability, The ISO 9000 quality standards.

**Text Books:**

1. Roger S. Pressman, Software Engineering - A practitioner‘s Approach, 6th edition. McGraw Hill International Edition, 2005.
2. Sommerville, Software Engineering, 7th edition, Pearson education, 2009 .

**Reference Books:**

1. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Publishers,3rd edition, 2008
2. James F. Peters, Witold Pedrycz, Software Engineering - an Engineering approach, JohnWiely, 2007.
3. Shely Cashman Rosenblatt, Systems Analysis and Design, Thomson Publications.
4. Waman S Jawadekar, Software Engineering Principles and Practice, The McGraw-Hill Companies, 2013.

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## DATABASE MANGEMENT SYSTEMS

**Prerequisites:** Any programming language.

**Course Objectives:**

1. To provide a sound introduction to Database management systems, Databases and its applications,
2. To familiarize the participant to give a good formal foundation on the relational model of data
3. To present SQL and procedural interfaces to SQL comprehensively
4. To give an introduction to systematic database design approaches conceptual design, logical design ,schema refinement and physical design
5. To introduce the concepts of transactions and transaction are processing and the issues and techniques relating to concurrency and recovery manager.

**Course Outcomes:**

Student will be able to:

1. Design Entity-Relationship Model for enterprise level databases.
2. Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
3. Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement
4. Use of suitable Indices and Hashing mechanisms for real time implementation.
5. Ability to analyze various concurrency control protocols and working principles of recovery algorithms.

**Unit -I:**

**Introduction to Database System Concepts:** Database-System Applications, Purpose of Database Systems, View of Data, Database Language, Database Design, Database Architecture, Database Users and Administrators.

**Introduction to the Relation Models and Database Design using ER Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features,

**Unit -II:**

**Introduction to SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested Sub queries, Modification of the Database.

**Intermediate and Advanced SQL:** Join Expressions, Views , Integrity Constraints, SQL Data Types, Authorization. Functions and Procedures, Triggers

**Unit -III:**

**Formal Relational Query Languages:** The Relational Algebra, Tuple Relational Calculus, The Domain Relational Calculus.

**Relational Database Design:** Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Decomposition Using Multi valued Dependencies, More Normal Forms.

**Unit -IV:**

**Indexing and Hashing:** Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

**Transactions:** Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels.

**Unit -V:**

**Concurrency Control:** Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols.

**Recovery System:** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems.

**Text Books:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition, Tata Mc Graw-Hill 2006.
2. Raghu Rama Kirshna, Johannes Gchrke, Database Management System, Third Edition, TATA MC Graw Hill, 2003.

**Reference Books:**

1. Peter Rob & Carlos Coronel, Data base Systems design, Implementation and Management ,7th Edition, 2007.
2. RamezElmasri, Shamkanth B. Navrate, Fundamentals of Database Systems, Pearson Education, 2008.
3. C.J. Date ,Introduction to Database Systems, Pearson Education

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## SOFT SKILLS FOR SUCCESS LAB

**Introduction:**

The primary focus of the course is to highlight various categories and applications of Soft Skills through various cases taken from the real field and other research case studies. The fundamental concepts and distinctions between Soft Skills and Hard Skills are discussed. The course is tailored very effectively to introduce various Soft Skill application examples.

**Objectives:**

To identify and participate in meaningful conversations

**Course Outcomes:**

**Students will be able to**

1 exhibit communication skills in various situations
2 handle the emotions with peers and classmates
3 demonstrate respect for the opinions, personal space, and beliefs of others
4 connect and work with others to achieve a set task
5 assess and identify the requirements and strengths within the team

**Unit-I**

Soft Skills Development: An Introductory Overview - Self-Discovery & Goal Setting - Johari Window

**Unit-II**

Personality Development - Body Language - Etiquette & Manners

**Unit-III**

Presentation Skills (Individual & Team) Oral & Written - Teamwork & Leadership Qualities

**Unit-IV**

Debates - Group Dynamics - Dos & Don'ts - Techniques to Participate and Conclude

**Unit-V**

Emotional Intelligence - Conflict Management - Stress Management

**Minimum requirements of infrastructural facilities for "Soft Skills for Success"**

**Laboratory**:

A spacious room with movable chairs, a Public Address System, and a Digital Stereo-Audio & Video system

**References:**

1. **Soft Skills for Everyone** by Butterfield, Jeff. New Delhi: Cengage Learning. 2010.
2. **Soft Skills** by Chauhan, G.S. & Sangeeta Sharma. New Delhi: Wiley. 2016.
3. **Working with Emotional Intelligence** by Goleman, Daniel. London: Banton Books. 1998.
4. **Theories of Personality** by Hall, Calvin S. et al. New Delhi: Wiley. 2011.
5. **Corporate Conversations** by Holtz, Shel. New Delhi: PHI. 2007.

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## JAVA PROGRAMMING LAB

**Prerequisites:** Data structures and a parallel course on java programming

**Course Outcomes:**

Student will be able to:

1. Explain Java Environment and use of Java Development Kit for the creation and execution of java programs
2. Develop programs on various concepts like data abstraction & data hiding, encapsulation, inheritance, polymorphism.
3. Develop the programs using interfaces and packages
4. Create and use threads and handle exceptions
5. Develop GUI applications using Applet and JDBC programs.

**Week 1:-**

1) Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables and instantiate its object

2) Writea program to find total, average of given two numbers by usingstatic keyword and this keyword?

**Week 2:-**

3) Write a program to illustrate types of constructors and constructor overloading

4) Write a java program to illustrate Method overloading

**Week 3:-**

5)Write a Java program to practice using String class and its methods.

6) Write a program to illustrate parameter passing Techniques.

**Week 4:**

7) Writea program to illustrate Array Manipulation

8) Write a java program to illustrate Recursion and nested class

**Week 5:-**

9) Write a program to illustrate types of inheritance.

10) Write a program to illustrate the use of creation of packages.

**Week 6:-**

11) Write a java program to demonstrate theconcept of polymorphism.

12) Write a java program to illustrate MethodOverriding?

**Week 7:-**

13)Write a program to illustrate Interfaces

14) Writea program to illustrate Files

**Week 8**:-

15) Write a program to illustrate try, catch, throw, throws and finally keywords

16) Write a program to implement the concept of Userdefined Exceptions.

**Week 9:-**

17) Write a program to illustrateStringTokenizer,Date, Random and Scanner classes?

18) Write a program to illustrate collection classes and interfaces

**Week 10:-**

19) Write a program to illustrate Multithreading?

20) Write a program to illustrate thread priorities.

**Week 11:-**

21) Write a program to illustrate Thread Synchronization

22) Write a program to illustrate Inter Thread Communication

**Week 12:-**

23) Write a program toillustrate applet concept.

24) Write a program toillustrate passing parameters to applet

**Week 13:-**

25) Writea program to illustrate EventHandling(keyboard,Mouse events)

**Week 14:-**

26) Write a program to illustrate AWT controls.

27) Write a program to develop a calculator application using AWT

**Week 15-16:-**

28) Write a program to illustrate JDBC.

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## DATABASE MANAGEMENT SYSTEMS LAB

**Prerequisites:** A parallel course on data base management systems.

**Course Outcomes:**

Student will be able to:

1. Use the SQL commands such as DDL, DML, DCL, TCL to create, manipulate, access data from database objects and providing authorization to access database by different users.
2. To apply various integrity Constraints on the database tables for preserving the integrity of the database.
3. Design and implement PL/SQL programs which include procedures, functions, cursor and triggers.

**Week 1:**

1.Database Schema for a customer-sale scenario
Customer(Cust id : integer, cust_name: string)
Item(item_id: integer,item_name: string, price: integer)
Sale(bill_no: integer, bill_data: date, cust_id: integer, item_id: integer, qty_sold: integer)

For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the bills for the current date with the customer names and item numbers
d) List the total Bill details with the quantity sold, price of the item and the final amount
e) List the details of the customer who have bought a product which has a price>200
f) Give a count of how many products have been bought by each customer
g) Give a list of products bought by a customer having cust_id as 5
h) List the item details which are sold as of today
i) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
Create a view which lists the daily sales date wise for the last one week

**Week 2:**

2 Database Schema for a Student Library scenario
Student(Stud_no : integer,Stud_name: string)
Membership(Mem_no: integer,Stud_no: integer)
Book(book_no: integer, book_name:string, author: string)
Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)

For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the student names with their membership numbers
d) List all the issues for the current date with student and Book names
e) List the details of students who borrowed book whose author is CJDATE
f) Give a count of how many books have been bought by each student
g) Give a list of books taken by student with stud_no as 5
h) List the book details which are issued as of today
i) Create a view which lists out the iss_no, iss _date, stud_name, book name
j) Create a view which lists the daily issues-date wise for the last one week

**Week 3:**
3 Database Schema for a Employee-pay scenario
employee(emp_id : integer,emp_name: string)
department(dept_id: integer,dept_name:string)
paydetails(emp_id : integer,dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)
payroll(emp_id : integer, pay_date: date)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List the employee details department wise
d) List all the employee names who joined after particular date
e) List the details of employees whose basic salary is between 10,000 and 20,000
f) Give a count of how many employees are working in each department
g) Give a names of the employees whose netsalary>10,000
h) List the details for an employee_id=5
i) Create a view which lists out the emp_name, department, basic, dedeuctions, netsalary
j) Create a view which lists the emp_name and his netsalary

**Week 4:**
4 Database Schema for a Video Library scenario
Customer(cust_no: integer,cust_name: string)
Membership(Mem_no: integer, cust_no: integer)
Cassette(cass_no:integer, cass_name:string, Language: String)
Iss_rec(iss_no: integer, iss_date: date, mem_no: integer, cass_no: integer)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the customer names with their membership numbers
d) List all the issues for the current date with the customer names and cassette names
e) List the details of the customer who has borrowed the cassette whose title is “ The Legend”
f) Give a count of how many cassettes have been borrowed by each customer
g) Give a list of book which has been taken by the student with mem_no as 5
h) List the cassettes issues for today

i) Create a view which lists outs the iss_no, iss_date, cust_name, cass_name
j) Create a view which lists issues-date wise for the last one week

**5 Week 5:**
Database Schema for a student-Lab scenario
Student(stud_no: integer, stud_name: string, class: string)
Class(class: string,descrip: string)
Lab(mach_no: integer, Lab_no: integer, description: String)
Allotment(Stud_no: Integer, mach_no: integer, dayof week: string)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the machine allotments with the student names, lab and machine numbers
d) List the total number of lab allotments day wise
e) Give a count of how many machines have been allocated to the 'CSIT' class
f) Give a machine allotment etails of the stud_no 5 with his personal and class details
g) Count for how many machines have been allocatedinLab_no 1 for the day of the week as "Monday"
h) How many students class wise have allocated machines in the labs
i) Create a view which lists out the stud_no, stud_name, mach_no, lab_no, dayofweek
j) Create a view which lists the machine allotment details for "Thursday".

**Week 6:**

6 Write a program to find largest number from the given three numbers.
7 Simple programs using loop, while and for iterative control statement.
8 Write a program to check whether the given number is Armstrong or not
9 Write a program to generate all prime numbers below 100.

**Week 7:**
10 Write a program to demonstrate the GOTO statement.
11 Write a program to demonstrate %type and %rowtype attributes

**Week 8:**
12 Write a program to demonstrate predefined exceptions
13 Write a program to demonstrate user defined exceptions
14 Create a cursor, which displays all employee numbers and names from the EMP table.

**Week 9:**
15 Create a cursor, which update the salaries of all employees as per the given data.
16 Create a cursor, which displays names of employees having salary > 50000.

**Week 10:**
17 Create a procedure to find reverse of a given number
18 Create a procedure to update the salaries of all employees as per the given data

**Week 11:**
19 Create a procedure to demonstrate IN, OUT and INOUT parameters
20 Create a function to check whether given string is palindrome or not.

**Week 12:**

21 Create a function to find sum of salaries of all employees working in depart number 10.

22 Create a trigger before/after update on employee table for each row/statement.

**Week 13:**

23 Create a trigger before/after delete on employee table for each row/statement.

24 Create a trigger before/after insert on employee table for each row/statement.

**Week 14:**

25 Create a Form to display employee details using SQL

26 Create a Report to generate all employee annual salaries

**Week 15:**

Review

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| II Year B.Tech. CSE – II Sem | L | T / P / D | C |
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## GENDER SENSITIZATION

**Course Objectives:**

1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

**Course Outcomes:**

Student will be able to:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Student will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

**Unit-I:**

**UNDERSTANDING GENDER:** Gender: Why Should We Study It? (Towards a World of Equals: Unit-1) Socialization: Making Women Making Men (Towards a World of Equals: Unit-2), Introduction. Preparing for Womanhood. Growing up Male. First lesions in Caste. Different Masculinities. Just Relationships: Being Together as Equals (Towards a World of Equals: Unit-12)Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Others and Fathers. Further Reading: Rosa Parks-The Brave Heart.

**Unit-II:**

**GENDER AND BIOLOGY:** Missing Women: Sex Selection and Its Consequences, (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic, Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit-10)Two or Many? Struggles with Discrimination.Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit-13)

**Unit-III:**

**GENDER AND LABOUR:** Housework: the Invisible Labour (Towards a World of Equals: Unit-3)"My Mother doesn't Work." "Share the Load."Women's Work: Its Politics and Economics (Towards a World of Equals; Unit-7)Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

**Unit-IV:**

**ISSUES OF VIOLENCE:** Sexual Harassment: Say No! (Towards a World of Equals: Unit-6) Sexual Harassment not Eve-Teasing- Coping with Everyday Harassment-Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8)Is Home a Safe Place? –When Women Unite (Film). Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit-11)Blaming the Victim-"I Fought for my Life…." – Further Reading: The Caste Face of Violence.

**Unit-V**

**GENDER STUDIES:** Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit-5), Point of View. Gender and the Structure of Knowledge. Further Reading: Unaknowledged.Women Artists of Telangana.Whose History? Questions for Historians and Others (Towards a World of EqualsReclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.Essential Reading: All the Units in the Textbook, "Towards a World of Eqals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagarj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

**Note:** Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

**Reference Books:**

1. Sen, Amartya, "More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. 'We Were Making Hisoty…' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studies Journal (14 November 2012) Available online at:http://blogs.wsj.com/ India real time/2012/11/14/by-the-numbers-where-Indian-women-work/>
3. K.Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2, Telugu and Kannada http://harpercollings.co.in/BookDetail.asp?Book Code=3732

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| III Year B.Tech. IT - I Sem | L | T / P / D | C |
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**COMPUTER NETWORKS**

**Course Objectives:**

1. Understand OSI & TCP/IP models.
2. Understand Data link layer Protocols
3. Explain Different routing protocols.
4. Mention Transport layer protocols.
5. Outline Application layer.

**Course Outcomes:**

The students will able to:

1. Analyze TCP/IP and OSI models and various protocols.
2. Identify suitable multiple access protocol for different networks.
3. Analyze various Routing Protocols.
4. List Techniques to improve QoS
5. Evaluate various responsibilities of application layer**.**

**Unit - I:**

**Network Models**-Layered Tasks, OSI model, Layers in the OSI model, TCP/IP protocol Suite, Addressing, Basics of switching.Data Link Layer: Error detection and Correction-CRC,Checksum. Data Link Control-Framing, Flow and Error Control.

**Unit - II:**

**Data Link Layer**: Wired LAN:Ethernet, Protocols,Noiseless Channels, Noisy Channels, HDLC. Multiple Access -Random Access, Controlled Access, Channelization.

**Unit- III:**

**Network Layer:** Internetworking: IPV4, IPV6, Transition from IPv4 to IPv6, Delivery, Forwarding and Routing- Delivery, Forwarding, Routing Tables: Static Routing Table ,Dynamic Routing Table, Unicast routing protocols.

**Unit- IV:**

**Transport Layer:** Process-to-Process delivery TCP, UDP, Congestion Control and Quality of Service-Data Traffic, Congestion Control, Quality of Service, Techniques to improve QoS.

**Unit-V:**

**Application Layer:** Name Space, Domain Name Space, Distribution of Name Space, DNS in Internet, Resolution, Domain Name Space (DNS) Messages, Electronic Mail, FTP, HTTP.

**Text books:**

1) Behrouz A Forouzan ,"Data Communications and Networking",4th Edition, McGraw-Hill.

**Reference Books:**

1) Andrew S. Tanenbaum, Computer Networks, Third Edition.
2) William Stallings, Data Communications, Eight Editions. Pearson Publishers.

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| III Year B.Tech. CSE - I Sem | L | T / P / D | C |
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## OPERATING SYSTEMS

**Course Outcomes:**

Student will be able to:

1. Summarize operating system and process management concepts
2. Apply process scheduling and synchronization related issues.
3. Understand Deadlock prevention, avoidance, detection, recovery mechanisms.
4. Analyze effectively memory management concepts
5. Illustrate various protection and security measures.

**Unit I:**

**Operating Systems Overview and Process Management -**Introduction-What operating system do, Operating system structure (uni-programmed and multi programmed), Operating system operations, Operating system services, System calls, Types of System calls.

Process Management- Process concepts, Process scheduling, Operations on processes, Inter process communication, Multithreaded programming: Overview, Multithreading models.

**Unit II:**

**Process Scheduling and Synchronization-**Process Scheduling – Basic concepts, Scheduling criteria, Scheduling algorithms, Thread scheduling.

Process coordination: Synchronization – Background, The critical section problem, Peterson's solution, Synchronization hardware, Semaphore, Classical problems of synchronization, Monitors.

**Unit- III:**

**Deadlocks-**System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Detection and avoidance, Recovery from deadlock.

**Unit IV:**

**Memory Management-**Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual memory management - Demand paging, copy-on-write, page-replacement, Thrashing.

**Unit –V:**

**File System, System Protection and Security-**Storage management – File concept, Access methods, Directory and disk structure, File-system mounting. System protection- Goals of protection, principles of protection, Domain of protection, Access matrix.
System Security – Security problem, Program threats, System and Network threats.

**Text Book:**

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 9th edition, John Wiley, 2016.

**Reference Books:**

1. D.M. Dharmdhere, Operating Systems – A Concept based Approach, 2nd Edition. TMH, 2007.
2. Andrew S Tanenbaum, Modern Operating Systems, 3rd Edition, PHI, 2008.
3. Behrouz A. Forouzan,Richard F. Gilberg, Unix and shell programming, Cengage Learning 2009.

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| III Year B.Tech. CSE - I Sem | L | T / P / D | C |
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## DESIGN AND ANALYSIS OF ALGORITHMS

**Pre-requisites:** Discrete mathematics

1. Analyze the asymptotic performance of algorithms.
2. Paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
3. Synthesize efficient algorithms in common engineering design situations.
4. To utilize data structures and algorithmic design techniques in solving new problems

**Course Outcomes:**

Student will be able to:

1. Acquire the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm.
2. Apply the major graph algorithms for model engineering problems and knowledge of the greedy paradigm
3. Apply the dynamic-programming paradigm and recite algorithms that employ this paradigm.
4. Apply the concept of back tracking, branch and bound paradigm for real time problems.
5. Analyze the complexity of problems and differentiate that in terms of P and NP problems with examples.

**Unit I :**

**Introduction:** Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Disjoint Sets- disjoint set operations, union and find operations.

**Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

**Unit II :**

**Graphs:** breadth first search, depth first search, spanning trees, connected and bi connected components

**Greedy method:** General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

**Unit III :**

**Dynamic Programming:** General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

**Unit IV :**

**Backtracking:** General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Branch and Bound:** General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

**Unit V :**

**Lower Bound Theory : Comparison trees ,NP-Hard and NP-Complete problems:** Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Clique Decision Problem(CDP), Node cover decision problem.

**Text Books:**

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, Fundamentals of Computer Algorithms, , Galgotia publications pvt. Ltd, Second Edition, 2007.
2. Aho, Ullman and Hopcroft,Design and Analysis of algorithms, Pearson education, Reprint 2002.

**Reference Books:**

1. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai,Introduction to Design and Analysis of Algorithms A strategic approach, Mc Graw Hill,2005.
2. Allen Weiss,Data structures and Algorithm Analysis in C++,Third edition, Pearson education.

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## WEB TECHNOLOGIES

**Course Outcomes:**

Student will be able to:

1. Design static web pages and provide client side authentication.
2. Prepare Static Web pages With Validations.
3. Develop new tag sets using XML mechanism.
4. Design and develop web applications using JSP and MVC architecture.
5. Understand database connectivity and retrieving data using client/server database.

**Unit I:**

**INTRODUCTION TO WEB:** Understanding Internet and Web, Web Architecture, Web servers, protocols: HTTP, Introduction HTML: History of HTML, WWW, HTML Basics: Elements, Attributes, Tags, Tables, Forms, Frames.div and span tags.

**Unit II:**

**CSS:** Introduction to cascading style sheet, Types of style sheets, page layout, selectors, pseudo classes and elements.

**JAVA SCRIPT**: Introduction to scripting, control structures, conditional statements, Arrays functions, objects.

**HTML DOM:** Predefined object (Window, Location, History, Navigator). Events, DOM Node methods, Navigation, creating nodes, adding nodes, inserting nodes, removing & Replaces Nodes, Form object and Elements, DHTML with Java Script.

**Unit III:**

**XML:** Basics of XML, Elements, Attributes, validation, Name space.

XML Scheme Languages: Introduction to DTD, internal and external DTD, Elements of DTD, DTD Limitations, XML Schema, Schema structure, Elements, parsing XML: XML DOM, Document node, element node, Text node, Java and DOM, Navigating DOM Tree.

**Unit IV:**

**AJAX:** Introduction, Environment, Asynchronous communication, process steps, sending and Retrieving Information, Ajax with XML.

**Servlets :** Introduction, Lifecycle, Generic and HTTP servlet, passing parameters to servlet, HTTP servlet Request & Response interfaces, Deploying web Applications, Session Tracking: Hidden form fields, cookies, URL- Rewriting, session.

**Unit V:**

**JSP:** Introduction, Difference Between servlets & JSP, Anatomy of JSP page, JSP elements: Directives, comments, Expressions, scriptlets, Declaration, Implicit JSP objects, using Action elements.

**JDBC:** Introduction, JDBC Drivers, Loading Driver, establishing connection, Executing SQL statement in JSP pages, MVC architecture.

**Text Books:**

1. Uttam K. Roy, Web Technologies, 8th Impression, Oxford Publication, 2014.

**Reference Books:**

1. Sebesta, Programming World Wide Web, 4th edition, Pearson, 2008.
2. Chris Bates, Web Programming, building internet applications, 2nd edition, WILEY Dreamtech, 2012.
3. Dietel and Nieto, Internet and World Wide Web – How to program, 3rd edition, PHI/Pearson Education Asia, 2012.
4. Marty Hall and Larry Brown, Core Servlets and Java Server Pages Volume 1: Core Technologies, 2nd edition, Pearson 2012.

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| III Year B.Tech. CSE – I Sem | L | T / P / D | C |
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## ENTRPERNEURSHIP DEVELOPMENT

**Course Objectives:**

1. To provide insights into basic characteristics and process of entrepreneurship
2. To develop a business idea and prepare a bankable project report
3. To identify the methods to initiate ventures and the sources of finance
4. To create awareness about the legal challenges of entrepreneurship and IPR
5. To know and apply the various strategic and managerial concerns in the growth stage of the firms

**Course Outcomes:**

The students will be able to :

1. Interpret concepts and process of entrepreneurship.
2. Apply idea development strategies and prepare a bankable project report
3. Analyse various opportunities towards initiating ventures.
4. Recognize legal challenges of entrepreneurship.
5. Assess the strategic perspectives of entrepreneurship.

**UNIT- I**

**Introduction:**

Introduction to Entrepreneurship – Characteristics, Qualities, Key Elements and Skills of an Entrepreneur, entrepreneurial stress, Corporate entrepreneurship, Entrepreneurial process.

**UNIT –II**

**Business Plan Preparation:**

Search for business idea, project identification, project formulation and development, contents of business plan and Preparation of a Bankable Project Report.

**UNIT-III**

**Launching Entrepreneurial Venture:**

Opportunities identification, Methods to initiate Ventures, Creating new ventures, Acquiring existing ventures, Franchising. Sources of finance, Forms of capital requirements, funding agencies and supporting institutions.

**UNIT IV:**

**Legal challenges of Entrepreneurship:**

Intellectual Property Protection – Patents, Copyrights, Trademarks and Trade Secrets. The challenges of new Venture Startups- Poor financial understanding, critical factors for new venture development, Evaluation process, Feasibility criteria approach.

**UNIT V:**

**Strategic perspectives in Entrepreneurship**:

Strategic planning- Strategic Action, Strategic Positioning, Business Stabilization, Building the adaptive firms, understanding the growth stage, unique managerial concern of growing ventures.

**Text Book:**

1. D F Kuratko and T V Rao "Entrepreneurship- A South-Asian Perspective "Cengage Learning, 2012
2. Vasant Desai, Small Scale Industries and Entrepreneurship, HPH, 2012.

**References:**

1. Rajeev Roy, Entrepreneurship, 2e, Oxford, 2012.
2. B.Janakiram and M.Rizwana, Entrepreneurship Development:Text & Cases, Excel Books, 2011.
3. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.
4. Robert Hisrich et al, Entrepreneurship, 6e, TMH, 2012.
5. Nandan H, Fundamentals of Entrepreneurship, PHI, 2013
6. Shejwalkar, Entrepreneurship Development, Everest, 2011
7. Khanka, Entrepreneurship Development, S.Chand, 2012

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| III Year B.Tech. CSE – I Sem | L | T / P / D | C |
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**LOGICAL REASONING, VERBAL AND QUANTITATIVE ABILITY**

**(OE-1)**

**Pre requisites:** Basic Mathematics, Statistics and English

## Course Outcomes:

1. Enhance the problem solving ability of the students with focusing on basic concepts of arithmetic, algebra, geometry data analysis.
2. Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

**Unit I:**

**Number Systems:** Classification of numbers, Squares, Fractions, Simplifications, Divisibility Test, Power Cycle, Reminder Cycle, Factors, LCM, HCF, Application of LCM & HCF

**Ratio and Proportion:** Tricks to solve ratio, proportions, continuous proportions, Variations, Ages

**Percentages:** Percentage Increase/ Decrease , Results on population , Results on Depreciation, Simple Interest , Principal , Interest , Amount , Application of Simple Interest, Compound Interest , Compound Annually , Compound Half-yearly , Compound Quarterl, Difference between Compound Interest and Simple Interest

**Unit II:**

**Geometry:** Lines , Properties of lines , Triangles, Properties of Triangles, Angles , Sectors , Chords , Planes , Quadrilateral

**Mensuration:** Area & Perimeter of Triangle, Quadrilateral, Rectangle, Square, Parallelogram, Trapezium, Surface Area & Volume of 3D Figures

**Data Interpretation:** Table Charts, Pie Charts, Bar Graphs, Line Graphs

**Data Sufficiency:** Problems On all quant and Logical topics

**Unit III:**

**Seating Arrangement:** Circular arrangement, row arrangement, column arrangement, Square arrangement, Double row arrangement

**Syllogisms:** Two Statements & Conclusion, Three Statements & Conclusion, Six Statements

**Unit IV:**

**Number Series:** Letter Series, Number Series, Letter & Number Series

**Analogy:** Simple Analogy, Double Analogy, Word Analogy, Number Analogy, Choosing Analogy Pairs

**Coding & Decoding:** Letter Coding, Number Coding, Symbol Coding, Letter - Number Coding, Letter - Symbol Coding, Direct Coding, Indirect Coding

**Blood Relations**: Based on Dialogue or conversation, Based on puzzles

**Unit V:**

**Nouns**: Types of nouns, rules, usages and error spotting

**Pronouns:** Types of nouns, rules, usages and error spotting

**Articles:** Definite and indefinite articles, Omission of articles, rules, usage and error spotting

**Adjectives and Adverbs**: Types of nouns, rules, usages and error spotting

**Preposition**: Types of nouns, rules, usages and error spotting

## Text Books:

1. Verbal and Non Verbal Reasoning - *R.S.Agarwal.*
2. Quantitative Aptitude - *R.S.Agarwal.*
3. Quantitative Aptitude - *Abhijit Guha.*

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| III Year B.Tech. CSE - I Sem | L | T / P / D | C |
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## OPERATIONS RESEARCH

**(OE-1)**

**Course Objectives:**

1. Know a short history of OR and be able to explain the term OR and Appreciate the nature of Linear programming problem.
2. Understand replacement of depreciable assets
3. Introduce a suitable method when the problem is to maximize the objective function instead of minimizing it.
4. Know processing of n-jobs through two machines ,3 machines & etc
5. Exmaine the functions that inventory performs and its importance in managerial.

**Course Outcome**:

Student will able to :

1. Construct mathematical models for linear programming problem.
2. Use simplex methods for linear programming problem.
3. Identify minimum transportation and efficient assignment of work.
4. Use queuing models for service station establishment.
5. Apply network model in project management.

**Unit I** :

Introduction to Operation Research: Definition, Scope, Objectives, Phases, Models and limitations of Operation Research. Linear Programming Problem- Formulation, Graphical Solution of LPP, Simplex Method, Artificial Variable Technique (Big M and Two-Phase method) and Dual Simplex Method.

**Unit II :**

Transportation Problem, Formulation, Solution, Unbalanced Transportation problem. Finding basic feasible solutions- Northwest corner rule, least cost method and Vogel's approximation method. Optimality test MODI method. Assignment model: Formulation, Hungarian method for optimal solution, solving unbalanced problem and Traveling salesman problem.

**Unit III :**

Sequencing models: Solution of sequencing problem-Processing n x 2, n x 3, 2 x m and n x m. Game Theory: Competitive games, rectangular game with saddle point- minimax (maxmin) method of optimal strategies. Dominance principle, Rectangular games without saddle point – mixed strategy for 2 X 2 games. value of the game with Linear Programming. Methods

**Unit IV :**

Inventory models: Inventory costs, Models with deterministic demand-model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

**Unit V:**

Replacement models: Replacement of Items that deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

**Text Book:**

1. S. D. Sharma, Operations Research.

**Reference Books:**

1. Hamdy, A. Taha: Operation Research: An Introduction, PHI, 2007.
2. Hillier, F.S. Lieberman, G.J.: Introduction to operation research 8ed, Tata McGraw-Hill.
3. Gillett: Introduction to Operation Research, TMH.

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| III Year B.Tech. CSE – I Sem | L | T/P/D | C |
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## LANGUAGE AND LIFE SKILLS
**(OE-1)**

**Introduction:**

In today's global world, language is the weapon for success in both personal and professional life. It is highly essential to master the language for survival and to improve quality of life.

**Objective:**

The course helps to train the students to attain the skills set to manage life and career

**Course Outcomes:**

The students will be able to:

1. evaluate and accept the self for all positive changes
2. demonstrate assertiveness
3. manage emotions
4. develop emotional intelligence
5. depicting the positive thought process

**Prescribed Textbook:**

**Life Skills for Success** by Alka Wadkar. Sage Publications India Pvt Ltd. 2016.

**Unit I:**

**Respecting Oneself**

Self-esteem - Being Assertive - Recognising and Overcoming various Behavioural Traits - Self Management - Consequences of Being Disorganized

**Unit II:**

**Understanding the World Around**

Fallacies, Misconceptions - Paradoxes - Cultural Apathies - Distortions - Attributions - Conflict Resolution - Anger Management

**Unit III:**

**Positive and Pro-Active Thinking**

Nature and Significance - Being Pro-Active - Effective Thought Patterns - Logical Thinking - Flexibility & Adaptability

**Unit IV:**

**Emotions and Emotional Development**

Nature & Biology of Emotions - Expression of Emotions - Gender & Emotions - Emotional Abuse -Emotional Competence

**Unit V:**

**Social Skills**

Decency in Social Media - Limit Realization in Public and Social Networking - Relating to Others in Virtual World - Constructive Criticism - Awareness of Legal Issues

**References:**

1. **Developmental psychology** by Hurlock,E.B. New Delhi: McGrawHill. 1979.
2. **Explorations in Personality** by Murry, H.A. New York: Oxford University Press. 1938.
3. **Social Learning Theory** by Bandora. A. Englewood Cliffs, NJ: Prentice Hall. 1977.
4. **Step by Step: Learning Language Life Skills** by K.Nirupa Rani, Jayashree Mohanraj, B. Indira, B. Sai Lakshmi. Pearson.2012.
5. **Real English: A Multi-Skill Language Course with Values and Life skills** by Viva Education Publication.2013.

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## WEB TECHNOLOGIES LAB

**Course Outcomes:**

Student will be able to:

1. Design static web pages and provide client side authentication.
2. Develop new tag sets using XML mechanism.
3. Understand database connectivity and retrieving data using client/server database.
4. Design dynamic web pages and develop web applications using MVC architecture.

**Week-1:**

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

2) LOGIN PAGE:

**Week -2:**

Design the student REGISTRATION PAGE:

**Week- 3:**

Apply internal and external CSS (Cascading Style Sheets) for week1&2 pages.

**Week -4:**

VALIDATION:

Write JavaScript to validate the following fields of the above registration page.

**Week -5:**

Design the catalogue page.

**Week -6:**

Write an XML file which will display the Book information which includes the following: Write a Document Type Definition (DTD) to validate the above XML file.

**Week -7:**

Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. Deploy above all pages in to tomcat web server.

**Week -8:**

Write a program to display the HELLO WORLD message using servlet.

**Week - 9:**

Communicate two servlets using doGET and doPOST methods.

**Week -10:**

Write a program to create cookies and retrieval using servlet.

**Week -11:**

Write a program to display the HELLO WORLD message using JSP

**Week -12:**

Convert all above static web pages into the JSP pages.

**Week -13:**

Using registration form. Authenticate the user when he submits the login form using the user name and password from the database

**Week -14**

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount )) of each category. Modify your catalogue page (week 4)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

**Week -15**

Implement week -10 in MVC architecture.

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## OPERATING SYSTEM AND COMPUTER NETWORKS LAB
## PART A

**Course Outcomes:**

Student will be able to:

1. Understand system calls behavior and implement that can offer operating system services
2. Implement CPU scheduling algorithms
3. Implement the producer and consumer problem
4. Implement the deadlock avoidance using banker's algorithm
5. Implement Memory Management algorithms

1. Write programs to demonstrate system calls of UNIX operating system: fork, exec, getpid, getppid.
2. Write a programs to demonstrate system calls of UNIX operating system::exit, wait, close, stat, opendir, readdir
3. Write a program to implement multithreading?
4. Give the list of processes, their CPU burst times and arrival times, display or print the Gantt chart for FCFS and SJF. For each of the scheduling policy compute and print the average waiting time and average turnaround time
5. Give the list of processes, their CPU burst times and arrival times, display or print the Gantt chart for Priority and Round Rabin. For each of the scheduling policy compute and print the average waiting time and average turnaround time.
6. Implement producer consumer problem using semaphore?
7. Write a program to implement Banker's algorithm for deadlock avoidance?
8. Write a program to implement page replacement algorithms (FCFS, Optimal, LRU)

## PART B

**Course Objectives:**

1. Understand data link layer framing and Error detection methods.
2. Understand Different routing Protocols.
3. Understand Network toll
4. Understand Packet captured mechanism.

**Course Outcomes:**

1. Develop framing methods and detection mechanisms.
2. Implement Routing Protocols.
3. Installation of network tools like wireshark and ns2
4. Analyze packet capturing Mechanism.

.

**Programs:**

1. Implement the data link layer framing method Bit stuffing.
2. Implement the data link layer framing method Character Stuffing.
3. Implement CRC 16 .
4. Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using Distance Vector Routing
6. Demonstrate the Downloading and Installation of Open Source Network Tools
7. Use Open Source tool for packet capture and traffic analysis? How many packets passed through interface?

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## COMPILER DESIGN

**Pre-requisites:** Formal language and automata theory

**Course objectives:**

1. To introduce the concepts of text processing.
2. To introduce major parsing methods.
3. To introduce the principal ideas in syntax directed definitions and translations and intermediate code generation for subsets programming languages.
4. To introduce the methods of code optimization
5. To introduce different code generation algorithms

**Course Outcomes:**

Student will be able to:

1. Formulate tokens for various programming languages .
2. Apply principles of parsing techniques to do syntax analysis.
3. Formulate semantic rules to do semantic analysis.
4. Apply optimization techniques on the intermediate code.
5. Generate the target code.

**Unit I:**

**Introduction to Compilers:** Structure of Compiler-Phases of Compiler, Symbol Table Management, Grouping of Phases into Passes, Compiler Vs Interpreter.

**Lexical Analysis:** Role and need of Lexical Analyzer, Input Buffering, Regular expressions for identifiers, Signed numbers etc.., A Language for specifying Lexical Analyzer, Lexical phase errors.

**Unit II:**

**Syntactic Specification:** Context Free Grammars, Derivations and Parse Trees, Capabilities of Context Free Grammars, Syntactic Phase errors, Semantic errors.

**Basic Parsing Techniques**: Parsers, Shift-Reduce Parsing, Operator-Precedence parsing, Top-Down parsing, Predictive parsers.

**Unit III:**

**Construction of efficient Parsers:** LR Parsers, Canonical collection of LR(0) items, Constructing SLR parsing tables, Constructing LR parsing tables, Constructing LALR parsing tables, using Ambiguous grammar, Comparison of SLR,LALR and CALR parsers, Comparison of Top down and Bottom up parsers.

**Unit IV:**

**Syntax Directed Translation:** Syntax Directed Translation schemes, Intermediate codes, Postfix notation, Three Address code, Quadruples and triples.
**Symbol table:** Contents of Symbol table, Data Structures for symbol tables, representing scope information.
**Run-Time Environments**: Storage Organization, Stack allocation of space, Access to nondata.

**Unit V:**
**Code Optimization:** Principal sources of optimization, Loop optimization, Copy Propagation, Dead code elimination, Redundant sub expression elimination.

**Code Generation**: Object programs, problems in Code generation, A Machine Model, A Simple Code generator, Register allocation and assignment, Peephole optimization.

**Text Book:**

1. Alfred V Aho, Jeffrey D Ullman, Principles of Compiler Design, Pearson Education, 2001.

**Reference Books:**

1. J P Trembly and P G Sorenson, The Theory and practice of Compiler Writing, Mc Graw Hill, 2005.
2. Alfred V Aho, Ravi sethi ,Jeffrey D Ullman, Compilers-Principles , Techniques and Tools , Pearson Education, second edition.
3. Dick Grone, Henri E Bal, Ceriel J H Jacobs, Modern Compiler Design, Wiley Dreamtech, 2006.

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## DATA WAREHOUSING AND DATA MINING

**Course Outcomes:**

Student will be able to:

1. Design a data mart or data warehouse for any organization
2. Apply Association and classification knowledge to different data sets
3. Apply the clustering Techniques for different data sets
4. Explore recent trends in data mining such as web mining, spatial-temporal mining

**Unit I:**

**Data Warehouse and OLAP Technology**: what is a Data Warehouse, Multidimensional Data Model, OLAP Operations on Multidimensional Data, Data Warehouse Architecture

**Cube computation:** Multiway Array Aggregation, BUC

**Unit II:**

**Introduction to Data Mining**: Fundamentals of data mining, Data Mining Functionalities, Data Mining Task Primitives,Major issues in Data Mining.

**Data Preprocessing**: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction

**Unit III:**

**Mining Frequent Pattern:** Associations and Correlations: Basic Concepts,Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules,

**Classification and Prediction:** Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification.

**Unit IV:**

**Cluster Analysis**: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods-K-means, PAM, Hierarchical Methods-BIRCH, Density-Based Methods-DBSCAN, Outlier Detection.

**Unit V:**

**Pattern Discovery in real world data**: Mining Time-Series Data, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web, Data Mining Applications

**Text Book:**

1. Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Second Edition, Elsevier, 2007.

**Reference Books:**

1. Alex Berson and Stephen J. Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw Hill, Tenth Reprint, 2007.

2. Arun K.Pujari , Data Mining Techniques,2nd Edition, Universities press.

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## R PROGRAMMING
(PE-I)

**Course Outcomes:**

1. Apply operations on basic data types using R
2. Apply various operators on data frames, factors and list
3. Develop functions using iterative programming for real world problems
4. Analyze the data by plotting using R
5. Formulate linear and multiple regression models for time series data & web data

**Unit – I**

**Basics of R:** Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors**:** Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting, Matrices**:** Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.

**Unit – II**

**Factors and Data Frames :** Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames,

**Lists:** Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.

**Unit – III**

**Iterative Programming in R:** Introduction, While Loop, For Loop, Looping Over List.

**Functions in R:** Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R, Cumulative Sums and Products, Calculus in R, Input and Output Operations.

**Unit – IV**

**Apply Family in R :** Introduction, Using Apply in R, Using Lapply in R, Using Sapply, Using Tapply in R: Split Function, Using Mapply in R, Charts and Graphs : Introduction, Pie Chart: Chart Legend, 3D Pie Chart, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.

**Unit-V**

**Data Interfaces:** Introduction, CSV Files: Syntax, Importing a CSV File, Excel Files: Syntax, Importing an Excel file, Binary Files: Syntax, XML Files, Web Data, Databases.

**Statistical Applications**: Introduction, Basic Statistical Operations, Linear Regression Analysis, Chi-Squared Goodness of Fit Test, Chi-Squared Test of Independence, Multiple Regression, Time Series Analysis.

**Text Books:**

1. K G Srinivas ,G M Siddesh "Statistical programming in R", Oxford Publications.

**References:**

1. K Beginning R: The Statistical Programming Language,Mark Gardener,Wrox

2. Y. anchang Zhao ,R and Data Mining: Examples and Case Studies . Elsevier in December 2012.

3. Avril Coghlan ,A Little Book of R For Time Series,Release 0.2.

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## UNIX PROGRAMMING

(PE-I)

**Prerequisites:** Operating systems

**Course Objectives:**

1. To understand the UNIX Features and Basic Commands.
2. To understand various UNIX Utilities
3. Able to implement Shell Programs.
4. To know the concept of files, process and signals
5. Compressive study of to inter process communication through message Queues, semaphores and Shared Memory.

**Course Outcomes:**

Student will be able to:

1.Outline the architecture, features and basic commands of unix operating System.
2. Analyze various types of unix utilities .
3. Solve real time applications using shell scripting .
4.Outline the basic File System Structure, Process and Signals .
5. Evaluate different IPC mechanisms using system calls .

**Unit I:**

**Introduction to Unix:**Architecture of Unix, Features of Unix , Basic Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

**Unit II :**

**Unix Utilities:**Introduction to unix file system, file handling utilities, security by file permissions, **process utilities:** ps, **disk utilities:** unlink, du, df, mount, umount, find, unmask, ulimit, **networking commands:** w, finger, arp, ftp, telnet, rlogin.**Text processing utilities:** tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk and **backup utilities:**cpio.

**Unit III :**

**Working with the Bourne again shell(bash):** Introduction, shell responsibilities, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, test command, control structures, arithmetic in shell, functions. pipes and input redirection, output redirection, here documents.

**Unit IV:**

**Files:** File Concept, Files System Structure, Inodes, File Attributes, File Types, Library functions, the standard I/O and formatted I/O in C, kernel support for files, System calls, file descriptors.

**Process:** Process concept, Kernel support for process, process attributes, process control-process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs.

**Signals:** Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, pause, abort, sleep functions.

**Unit V:**

**Inter-process Communications:** Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory. **Message Queues:** Kernel support for messages, Unix system V APIs for messages, client/server example. **Semaphores**: Kernel support for semaphores, Unix system V APIs for semaphores. **Shared Memory:** Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

**Text books:**

1. Sumitabha Das, Unix Concepts and Applications, 4th edition, TMH, 2006.
2. T.Chan, Unix System Programming using C++, PHI, 2012.

**Reference Books:**

1. N.Mathew, R.Stones,Wrox, Beginning Linux Programming, 4th edition, Wiley India Edition.
2. W.R.Stevens, Unix Network Programming, PHI, 2001.
3. Graham Glass, King Ables, Unix for programmers and users, 3rd Edition, Pearson Education, 2003.
4. B.A.Forouzan and R.F.Gilberg, Unix and Shell programming, Cengage Learning, 2009.
5. W.R.Stevens, Advanced Programming in the Unix environment, 2nd Edition, Pearson Education, 2001.

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## OBJECT ORIENTED ANALYSIS AND DESIGN
(PE-I)

**Course Outcomes:**

Student will be able to:

1. Recognize the concepts and principles of object oriented programming concepts.
2. Understand the purposes, major components and key mechanisms of Class and object diagram.
3. Describe the basic resource management responsibilities of Interaction Diagram.
4. Knowledge on State-chart Diagram.
5. Applying the techniques for Component and Deployment Diagrams.

**Unit I:**

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.
**Basic Structural Modeling: Classes**, Relationships, common Mechanisms, and diagrams.

**Unit II:**

**Advanced Structural Modeling:** Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages
**Class & Object Diagrams:** Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.

**Unit III:**

**Basic Behavioral Modeling-I:** Interactions, Interaction diagrams.
**Basic Behavioral Modeling-II:** Use cases, Use case Diagrams, Activity Diagrams. Design Use cases, Use case diagrams, Interaction diagram and Activity diagram for library system.

**Unit IV:**

**Advanced Behavioral Modeling:** Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Design State machine for different objects in library system

**Unit V**

**Architectural Modeling:** Component, Deployment, Component diagrams and Deployment diagrams. Design and document of library system.

**Text Book:**

1. Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, 7th Impression, Pearson Education, 2008.

**Reference Books:**

1. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, UML2 Toolkit, 2nd Edition, WILEY-Dreamtech India Pvt. Ltd., 2012.
2. Meilir Page-Jones, Fundamentals of Object Oriented Design in UML, Illustrated Edition, Pearson Education, 2000.
3. Pascal Roques, Modeling Software Systems Using UML2, 1st edition, WILEY-Dreamtech India Pvt. Ltd., 2011.
4. Atul Kahate, Object Oriented Analysis & Design, 1st Edition, The McGraw-Hill Companies, 2007.
5. Mark Priestley, Practical Object-Oriented Design with UML, 2nd Edition, TATA McGrawHill, 2005.

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## MACHINE LEARNING
## (PE-II)

**Prerequisites:** Data Structures, Probability and statistics.

**Course Objectives:**

To understand the need for machine learning for various problem solving

1. To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
2. To understand the latest trends in machine learning
3. To design appropriate machine learning algorithms for problem solving

**Course Outcomes**:

Student will be able to:

1. Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
2. Discuss the decision tree algorithm and identity and overcome the problem of over fitting
3. Apply the back propagation algorithm and genetic algorithms to various problems
4. Usage of Bayesian concepts to machine learning
5. Analyze the appropriate machine learning approaches for various real time problems

**UNIT I :**

**INTRODUCTION**

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

**UNIT II :**

**NEURAL NETWORKS AND GENETIC ALGORITHMS**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

**UNIT III :**

**BAYESIAN AND COMPUTATIONAL LEARNING**

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

**UNIT IV :**

**INSTANT BASED LEARNING**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

**UNIT V :**

**ADVANCED LEARNING**

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

**TEXT BOOK:**

1. Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

**REFERENCES:**

1. Ethem Alpaydin, ―Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
2. Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.

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## E-COMMERCE
## (PE-II)

**Course Objectives:**

1. Examine current and emerging issues of managing E-commerce.
2. Evaluate planning and frameworks required for E-commerce.
3. Distinguish the legal and ethical issues involved in E commerce .
4. Explain the marketing strategies aligned to E-commerce.

**Course outcomes:**

1. Outline the trends in E- commerce and the use of the internet.
2. Examine the business impact and potential of E- Commerce
3. Apply the concepts of internet security and multimedia in business applications
4. Apply the technologies required to design and prototype web based information system.

**Unit I :**

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models

**Unit II :**

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Action, EDI Architecture, EDI software Implementation, and Value added networks.

**Unit III :**

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

. **Unit IV:**

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

. **Unit V :**

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

**Text Book**

1. Frontiers of electronic commerce – Ravi Kalakota, Andrew B.Whinston, Pearson.

**Reference Books**

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia
3. E-Commerce.Efrain Turbon, Jae Lee, Davi King, H.Michael Chang.
4. Electronic Commerce-Gray P.Schneider-Thomson E-Commerce-Business,Technology,Society,Kenneth,C.Taudon,Carol Guyerico Traver

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## CYBER FORENSICS
**(PE-II)**

**Course Outcomes:**

Student will be able to:

1. Perform a forensic investigation by following guidelines to secure the crime or corporate scene.
2. Learn what legal issues are involved and what rights the person of interest has.
3. Perform digitally and court approved images of evidence to be used in a court of law.
4. Learn how to document and store evidence.
5. Learn how to analyze evidence using commercial forensic software and also how to create a report of the said evidence.

**Unit I**: Computer Forensics and Investigations: What is computer Forensics? Use of computer forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceeding, Computer Forensics services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists.
Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of law Enforcement-Computer forensic Technology – Types of Business computer Forensic Technology. **Computer Forensics Evidence and capture**: Data Recovery Defined Data Backup and Recovery – The Role of Back-up in Data Recovery – The Data – Recovery Solution

**Unit II: Evidence Collection and Data Seizure**: Why Collection Evidence? Collection Options - Obstacles - Types of Evidence – The Rules of Evidence – General Procedure – Collection and Archiving –Methods of Collection – Artifacts – Collection Steps – **Controlling Communication:** The Chain of Custody duplication and Preservation of Digit Evidence: Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collection and Preserving computer Forensics Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Conserdation – Practical Implementation

**Unit –III: Computer Forensics analysis and validation**: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions **Network Forensics:** Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics using network tools, examining the honey net project

**Unit –IV: Processing Crime and Incident Scenes**: Identifying Digital Evidence, Collecting the Evidence in Private-Sector Incident Scenes, Processing law Enforcement Crime Scenes,

Preparing for a Search, Securing a Computer Incident or Crime Scene, Sizing Digital evidence at the Scene, Storing Digital evidence, obtaining a Digital Hash.
**Current Computer Forensics Tools**: Evaluating Computer Forensics Toll Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software

**Unit –V: E-mail Investigations** Cell Phone and Mobile Device Forensics: Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Understanding E-mail Servers, Using Specialized E-mail Forensics Tools, Understanding Mobile Device Forensics, Understanding Acquisition Procedure for Cell Phones and Mobile Devoices

**Text Books:**

1. John R.Vacca, Computer Forensics, Computer Crime Investigation, firewall Media, New Delhi
2. Nelson, Phillips Enfinger, Steuart, Computer Forensics and Investigations, Cengage Learning.

Reference Books:

1. Keith J. Jones, Richard Bejthich, Curtis W Rose ,Real Digital Forensics, Addition-Wesley Pearson Education.
2. Tony Sammesand Bairn Jenkinson, Forensic Compiling A Practitioner's Guide, , Springer International edition.
3. Christopher L.T.Brown, Computer Evidence Collection & Presentation, Firewall Media.
4. Jesus Mena ,Homeland Security, Techniques & Technologies, Firewall Media.

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## MOBILE COMPUTING
**(PE- III)**

**Course Outcomes:**

Student will be able to:

1: Explain the architecture of cellular wireless communication?

2: Identify network layer protocols to support mobility of mobile devices.

3: Analyze TCP protocols problems and their technical feasibility.

4: Design routing protocol for MANET.

5: Use various Application layer protocols available for mobile communication

**Unit I:**

Introduction to MC, Applications, limitations, and architecture. GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.(Wireless) Medium Access Control : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

**Unit II:**

Mobile Network Layer : Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

**Unit III:**

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

**Unit IV:**

Mobile Ad hoc Networks (MANETs): Routing, Destination sequence, distance vector Dynamic source routing alternative metrics, overview Adhoc routing protocols.

**Unit V:**

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth User scenarios, Architecture, security, link management) and J2ME.

**Text Books:**

1. Jochen Schiller, Mobile Communications , ,2nd edition, Addison-Wesley, 2004.
2. Asoke K Talukder, Mobile Computing , 2nd Edition, McGraw Education

**References Books:**

1. Reza Behravanfar, Mobile Computing Principles, Designing and Developing Mobile Applications with UML and XM, ISBN: 0521817331, Cambridge University Press, October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, Fundamentals of Mobile and Pervasive Computing, ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, Principles of Mobile Computing, Springer, second edition, 2003.
4. Martyn Mallick, Mobile and Wireless Design Essentials, Wiley DreamTech, 2003.

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## ADVANCED DATABASES
## (PE-III)

**Course Outcomes:**

Student will be able to :

1. Design a distributed database system with Local Independence, Hardware Independence , Ability to achieve Local autonomy, Location Transparency, Fragmentation Transparency, Replication Transparency
2. To execute distributed query executed at several different Data Processing sites.
3. Understands the Query optimization to perform transparently by the DDBMS.
4. Develop the distributed system which may heterogeneous and should provide DBMS independence

**UNIT – I:**

Features of Distributed versus Centralized Databases, Principles Of Distributed Databases - Levels of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Parallel Database Systems-Parallel Architectures, Parallel DBMS Techniques, Distributed Database Design, A framework for Distributed Database Design, The Design of Database Fragmentation, The Allocation of Fragments.

**UNIT – II:**

Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries, Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

**UNIT – III:**

The Management of Distributed Transactions, A Framework for Transaction Management , Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions, Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

**UNIT – IV:**

Reliability, Basic Concepts, Non-blocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and

Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

**UNIT – V:**

Distributed Object Database Management ,Object Distributed Design, Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution , Transaction Management, Transaction Management in Object DBMS , Transactions as Objects.

**Text Books:**

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

**REFERENCES**

1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez
- Pearson Education.

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### HUMAN COMPUTER INTERACTION

### (PE-III)

**Course Outcomes:**

The students will able to:

1. Identify and formulate characteristics and components of graphical user interface.
2. Analyze various design paradigms for human computer interaction.
3. Design & implement human computer interaction using various design techniques.
4. Support Design rules to use HCI in the software process.

**UNIT - I**

**Introduction** : Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

**The graphical user interface** – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface. [T1]

**UNIT – II**

**Design process** – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. [T1 & R1]

**UNIT – III**

**Screen Designing** : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design. [T1 & R1]

**UNIT – IV**

**Windows** – New and Navigation schemes selection of window, selection of devices based and screen based controls.

**Components** – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors. [T1]

**UNIT - V**

**Software tools** – Specification methods, interface – Building Tools.

**Interaction Devices** – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers. [T2 & R1]

**Text Books:**

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

**References:**

1. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech,

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## ADVANCED ENGLISH COMMUNICATION SKILLS LAB

### 1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

### 2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

1. **Vocabulary Building** – synonyms and antonyms, Word Roots, One-Word Substitutes, Prefixes and Suffixes, Study of Word Origin, Analogy, Idioms and Phrases.

2. **Reading Comprehension –** Reading for Facts, Guessing meanings from context, Scanning, Skimming, Inferring Meaning, and Critical Reading.

3. **Writing Skills** –Structure and presentation of different types of writing - Resume Writing /E-Correspondence/Statement of Purpose.

4. **Technical Writing**- Technical Report Writing, Research Abilities/Data Collection/Organizing Data/Tools/Analysis.

5. **Group Discussion** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Coherence.

6. **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/Seminars, Written Presentations through Projects/ PPTs/e-mails etc.

7. **Interview Skills** – Concept and Process, Pre-Interview Planning, Opening Strategies, Answering Strategies, Interview through Telephone and Video-Conferencing.

**Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

**Suggested Software**:

- Clarity Pronunciation Power – part II
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech.
- TOEFL & GRE( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from _train2success.com'
  i. Preparing for being Interviewed,
  ii. Positive Thinking,
  iii. Interviewing Skills,
  iv. Telephone Skills,
  v. Time Management
  vi. Team Building,
  vii. Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

**Text Books:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.

6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysha Vish hwamohan, Tata Mc Graw-Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.
12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

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## R PROGRAMMING LAB
## (PE-I LAB)

**Course outcomes:**

1. Perfom vector and matrix operation using R
2. Organize data using data frames and list
3. Generate different charts and graphs using R
4. Create a linear regression model using different types of data

Week-1:

Installation and Environment set up R and Rstudio

Week-2:

Experiments on Vector Arithmetic operations

Week-3:

Experiments on Matrices operations

Week-4

Experiments on Arrays functions

Week-5:

Experiments on Factors

Week-6:

Experiments on Data Frames

Week-7:

Experiments on List operations

Week-8:

Write R scripts which demonstrate logical operations and Conditional Statements

Week-9:

Write R scripts which demonstrate Looping Over List

Week-10:

Write R scripts which demonstrate Nested Functions and Function Scoping

Week-11:

Experiments on Mathematical Functions in R

Week-12:

Experiments on Calculus in R

Week13:

Experiments on Lapply, Sapply and Apply functions

Week-14:

Genarte different Charts and Graphs using R

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## UNIX PROGRAMMING LAB
## (PE-I LAB)

**Course Outcomes:**

Student will be able to:

1. Describe and use the Unix operating system.
2. Describe and use the fundamental Unix system tools and utilities.
3. Describe and write shell scripts in order to perform basic shell programming.
4. Understand the Unix file system.

1. Write a shell script that accepts a file name, starting and ending numbers as arguments and displays all the lines between the given line numbers.

2. Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
   a. To delete first character
   b. Deletes last second character in every line.
   c. First word and second word goes to second word and first word in every line.

3. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.

4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

6. Write a shell script to list all of the directory files in a directory.

7. Write a shell script to find factorial of a given number.

8. Write a shell program to demonstrate the following
   a) test command b) functions c) here document

9. Write a C program that takes one or more file or directory names as command line input and reports the following information on the file.
   1. File type 2. Number of links 3.read, write and execute permissions
   4. Time of last access

10. Write a C program that redirects a standard output to a file. Ex: ls>f1.

11. Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.

12. Write a C program to create a zombie process.

13. Write a C program that illustrates how an orphan is created.

14. Write a C program that illustrates the following.
    a) Creating a message queue.
    b) Writing to a message queue.
    c) Reading from a message queue.

15. Write a C program that illustrates inter process communication using shared memory system calls.

16. Write a C program that counts the number of blanks in a text file using standard I/O

17. Write a C program that illustrates communication between two unrelated processes using named pipe.

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## OBJECT ORIENTED ANALYSIS AND DESIGN LAB

**Course Objectives:**

1. Identify Use Cases and develop the Use Case model.
2. Identity the conceptual classes and develop a domain model with UML Class diagram.
3. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
4. Identify the business activities and develop an UML Activity diagram.
5. Design the State Chart diagram.

**Course Outcomes:**

The students will be able to:

1. The students understands the process to be followed in the software development life cycle
2. Find practical solutions to the problems
3. Solve specific problems alone or in teams
4. Manage a project from beginning to end

**Projects**

**1 .ATM System**
**2. Online Quiz System**
**3. Library management**

Week 1-2 : Model use case diagrams for the above specified projects

Week 3-4 : Model class diagrams for the above specified projects

Week 5-6: Model activity diagrams for the above specified projects

Week 7-8 : Model sequence diagrams for the above specified projects

Week 9-10: Model collaboration diagrams for the above specified projects

Week 11-12: Model state chart diagrams for the above specified projects

Week 13-14: Model component diagrams for the above specified projects

Week 15-16: Model Deployment diagrams for the above specified projects

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## DATA WAREHOUSING AND DATA MINING LAB

. **Course Outcomes:**

Student will be able to:

1. The data mining process and important issues around data cleaning, pre-processing and integration**.**
2. The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.

**Week 1:**

Design multi-dimensional data models namely star, snowflake and Fact constellation schemas for one enterprise (Like banking) using open source tools like Pentaho Data Integration and Pentaho Business Analytics.

**Week 2-3:**

Apply below preprocessing techniques on given dataset.

Handling Missing Values, Remove records having a NULL value, Replace Numeric attributes by mean value, Remove Nominal attributes having null value, Sampling, Discretization (Binning) , Normalization.

**Week 4-5:**

Demonstrate performing association rule mining on data sets using Aprori and FP growth algorithms with different support and confidence values. Compare association rule mining results of Aprori and FP growth for given dataset, and deduce which algorithms is performing best and poor for each dataset and justify.

**Week 6-7:**

Demonstrate performing classification on data sets using Id3, J48 classification algorithm. Compare classification results of ID3, J48 and Naïve-Bayes classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

**Week 8-9:**

Demonstrate performing clustering on given data sets using k-means clustering algorithm with different values of k (number of desired clusters). Compare with other clustering techniques available in Weka. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

**Week 10-16:**

Study projects on data mining techniques.

Decide groups (3 members). Submission of abstract, introduction, related work and progress review, Final report and final presentations.

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## MANAGEMENT SCIENCE

**Course Objectives:**

1. To explain the concepts of Management theories and practices.
2. To analyze the interrelated functional activities of management.
3. To access the key activities of a manager in HR and Marketing.
4. To know the various techniques in Project Management.
5. To explain the contemporary issues and challenges faced by an organization.

**Course Outcomes:**

The students will be able to :

1. To evaluate the concepts of business management and approaches.
2. To understand interconnections between the developments of key functional areas of management.
3. To analyze ethically conscious and socially responsible managers, capable of contributing to the development of nation and quality of life.
4. To develop PERT/CPM charts for project and estimate time and cost of a project.
5. To understand management contemporary concepts and practices to handle the various activities.

**Unit-I**

**Introduction to Management:** Nature and importance of management, Functions of Management, Taylor's Scientific Management Theory, Fayol's principles of management, Maslow's theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two factor Theory of Motivation. Systems Approach to Management, Leadership Styles, Social Responsibilities of Manager, Organization levels and types of organization structures.

**Unit-II**

**A) Operations Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass production), Work Study - Basic procedure involved in Method Study and Work measurement- Statistical Quality Control - X chart, R chart, C chart, P chart, (simple problems), Acceptance Sampling, Deming's contribution to quality.
**B) Materials Management:** Objectives, Need for inventory control, EOQ, ABC Analysis, Purchase procedure, Stores management and Stores records, Supply chain management.

**Unit –III**

**A) Human Resources Management (HRM):** Evolution of HRM, Concepts of HRM, Basic functions of HR Manager - Manpower Planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.
**B) Marketing:** Functions of Marketing, Marketing Mix, Marketing strategies based on Product Life cycle, Channels of distribution.

**Unit –IV**

**Project Management(PERT/CPM):** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method(CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing.(Simple problems)

**Unit –V**

**Strategic & Contemporary Management Practices:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Basic concepts of Just-In-Time (JIT) system, Total Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) levels, Value Chain Analysis.

**TEXT BOOKS:**

1. Kotler Philip and Keller Kevin Lane, Marketing Management, Pearson, 2012.
2. Aryasri, Management Science, TMH, New Delhi, 2009

**REFERENCES:**

1. Koontz and Weihrich, Essentials of Management, McGraw Hill, 2012.
2. Thomas N. Duening and John M. Ivancevich Management, Principles and Guidelines, Biztantra, 2012.
3. KanishkaBedi, Production and Operations Management, Oxford University Press, 2012.
4. Samuel C. Certo, Modern Management, 2012.
5. Schermerhorn, Capling, Poole and Wiesner, Management, Wiley, 2012.
6. Parnell, Strategic Management, Cengage, 2012.
7. Lawrence R Jauch, R. Gupta and William F. Glueck, Business Policy and Strategic Management Science, McGraw Hill, 2012.

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## INFORMATION SECURITY

**Course Objectives:**

2. Compare and analyze different encryption Algorithms.
3. Summarize authentication functions using MAC and Hash.
4. Analyze security importance of various web applications.
5. Categorize various types of intruders and viruses

**Course Outcomes:**

The students will able to **:**

1. Analyze the importance of information Security in real world.
2. Designing and analysis of different encryption Algorithms.
3. Understand the MAC and Hash function algorithms
4. Use of MAC and hash in different layers
5. Know different types of intruders and viruses.

**Unit I:**

Information Security: Introduction, History of Information security, What is Security, CNSS Security Model, Components of Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Security Systems Development Life Cycle.

**Unit II :**

Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography, Symmetric key Ciphers: DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , AES structure, Analysis of AES , Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange.

**Unit III:**

Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Functions, MAC Algorithms: Secure Hash Algorithm, Whirlpool, HMAC, Digital signatures, X.509, Kerberos.

**Unit IV**

Security at layers (Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME.

**Unit V**

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls.

**Text Books:**

1. Michael E. Whitman, Herbert J. Mattord,Principles of Information Security, CENGAGE Learning, 4th Edition.
2. William Stallings, Cryptography and Network Security, Pearson Education,4th Edition

**Reference Books:**

1. C K Shyamala, N Harini, Dr T R Padmanabhan, Cryptography and Network Security : Wiley India, 1st Edition.
2. Bernard Menezes, Network Security and Cryptography: CENGAGE Learning
3. AtulKahate, Cryptography and Network Security: McGraw Hill, 2nd Edition

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## BIG DATA
## (PROFESSIONAL ELECTIVE -IV)

**Course Objectives:**

1. To understand the performance management this interprets the meaning of big data in company databases using pre-determined queries and multidimensional analysis.
2. To understand the Data exploration i.e. makes heavy use of statistics to experiment and get answers to questions those managers might not have thought of previously.
3. To understand the social analytics measure the vast amount of non-transactional data that exists today.
4. To understand the decision science which involves experiments and big data analysis

**Course Outcomes:**

The students will able to :

1. Know about sources of BigData and Analyzing Tools.
2. Map statistical methods to analyze huge data.
3. Know the other frameworks in Distributed File Systems.
4. Know to create cluster in Hadoop distributed file system.
5. Apply Map Reduction in HDFS.

**Unit I:**

**INTRODUCTION TO BIG DATA**

Introduction to BigData ,Characteristics of Big Data, Traits of Big data,Challenges of Conventional Systems, Sources of Big Data, Evolution Of Analytic Scalability, Analytic Processes and Tools, Analysis vs Reporting, Modern Data Analytic Tools, Statistical Concepts: Sampling Distributions -Re-Sampling -Statistical Inference -Prediction Error.

**Unit II:**

**BIG DATA IN ENTERPRISE**

Problems with traditional large-scale systems, Big Data in enterprise, Comparison with other systems, Hadoop Frame work.

**Unit III:**

**INTRODUCTION TO HADOOP**

**History of Hadoop, Data Storage and Analysis,**Hadoop -Setup hadoop -Pseudo mode-Cluster mode-IPv6-Installation of java, hadoop-Configurations of hadoop.

**Unit IV:**

**HDFS** The Hadoop Distributed File System-HDFS Design and Architecture-HDFS Concepts-Interacting HDFS using command line-Interacting HDFS using Java APIs-Dataflow-Blocks-Replica-Hadoop Processes-Name node-Secondary name node-Job tracker-Task tracker-Data node.

**Unit V:**

**MAP REDUCE**

How MapReduce Works-Anatomy of a Hadoop Cluster-Hadoop Ecosystem Components-Developing Map Reduce Application-Phases in Map Reduce Framework-Map Reduce Input and Output Formats-Introduction to Writing a MapReduce Program-The MapReduce Flow-Examining a Sample MapReduce Program-Basic MapReduce API Concepts-The Driver Code-The Mapper-The Reducer.

**Introduction to Languages and Databases**

HadoopProgramming languages: Pig, Hive

NOSQL Databases: Cassandra, Mongo, Cloudera, CouchDB, HBase

**Text Books:**

1. Bill Franks, “Taming the Big data tidal wave”,SAS , Wiley, 2012.
2. Tom White “ Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.

**Reference Books:**

1. Michael Minelli, Michele Chambers, AmbigaDhiraj,JimStogdill, “BigDataBigAnalytics : Emerging Business Intelligence and Analytic Trends for Today's Businesses”, 1st Edition,Wiley Publications,2013
2. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012
3. PeteWarden, “Big Data Glossary”, O’Reilly, 2011.

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## DISTRIBUTED SYSTEMS
## (PROFESSIONAL ELECTIVE -IV)

**Course Objectives:**

1. Hardware and software issues in modern distributed systems.
2. Topics may include distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
3. Examples from current popular distributed systems such as peer-to-peer (P2P) systems will be analyzed.
4. To design and implement sample distributed systems.
5. Understand the concept of transactions their properties , how concurrency control can be assured and how transactions can be distributed

**Course Outcomes:**
The students will able to :

1. Gain enough understanding of distributed operating Systems.
2. Apply the principles underlying in the functioning of distributed systems.
3. Analyze and estimate the impact of different design choices, system features on distributed systems.
4. Appreciate the design and implement distributed algorithms.
5. Need for concurrency control in operating systems and applications, both mutual exclusion and condition synchronization.

**Unit I:**

**Characterization of Distributed Systems:** Introduction, Examples of Distributed systems, Resource sharing and web, challenges, Architectural model: Client Server model,Proxy Servers and Caches,Peer process model ,Fundamental model:Interaction model,Security model.

**Unit II:**

**Distributed file system:** Characteristics of file systems, Distributed file system requirements, File service architecture.**Name Services:**Name space ,Name resolution,The Domain Name System,DNS name servers,Directory services, discovery services in Jini

**Unit III:**

**Time and Global States**: Clocks, events and Process states, Synchronizing physical clocks, logical clocks, distributed debugging. Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication.

**Unit IV:**

**Transactions and Concurrency control:** Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. **Distributed Transactions**: Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

**Unit V:**

**Replication:**System model , group communication,Fault –tolerant services,Passive(primary-backup) replication,Active replication,Transactions with replicated data.Distributed shared memory:Message passing versus DSM,Implementation approaches ,Design and implementation issues,Synchronization model,Consistency model,Granularity,Thrashing

**Text Books:**

1. G Coulouris, J Dollimore, T Kindberg, Distributed Systems Concepts and Design, Third Edition, Pearson Education.

**Reference Books:**

1. S.Mahajan and S.Shah, Distributed Computing, Oxford University Press.
2. PradeepK.Sinha, Distributed Operating Systems Concepts and Design, PHI.
3. M Singhal, N G Shivarathri, Advanced Concepts in Operating Systems, Tata McGraw-Hill Edition.
4. K.P.Birman, Reliable Distributed Systems, Springer.
5. A.S. Tanenbaum and M.V. Steen, Distributed Systems: Principles and Paradigms, Pearson Education.
6. R.Chow, T.Johnson, Distributed Operating Systems and Algorithm Analysis, Pearson.
7. A.S.Tanenbaum, Distributed Operating Systems, Pearson Education.

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## SOFT COMPUTING
## (PROFESSIONAL ELECTIVE- IV)

**Course Objectives:**

1. To learn the key aspects of soft computing.
2. To understand the features of neural networks and its applications.
3. To study fuzzy logic components.
4. To know about the components and building block hypothesis of genetic algorithms.
5. To know working of Swarm Intelligent systems.

**Course Outcomes:**

The students will able to:

1. Acquire the knowledge soft computing and correlation with other computing techniques.
2. Comprehend the knowledge of artificial neural networks and its generations.
3. Understand the Fuzzy logic structure and operations.
4. Know the concept of genetic algorithms and its applications.
5. Understand applications of Swarm Systems.

**UNIT I:**

**Introduction To Soft Computing And Neural Networks :** Soft Computing Introduction, Artificial intelligence, Artificial Neural Networks, Fuzzy Systems, Genetic Algorithm and Evolutionary Programming, Expert Systems: Expert System Architecture, Rule-based Expert System, Basic Activities of an Expert System, Expert System Tools, Expert Building Tools, Expert System Shells, Applications of Expert Systems, Future Scope of Expert Systems, Comparison among Intelligent Systems.

**UNIT II:**

**Artificial Neural Networks:** Introduction to neural networks, Biological Inspiration, Biological Neural Networks to Artificial Neural Networks, Classification of ANN: Neural Networks Architecture, Neural Networks learning/ Training, Training and Testing Modes, Active/ Transfer function.

**UNIT III:**

**Fuzzy Logic :** Introduction to fuzzy logic, Human learning ability, imprecision and uncertainty, Undecidability, Probability theory Vs Possibility Theory, Classical sets and Fuzzy Sets : Representation of Classical Set and Fuzzy Set , Basic Properties of Fuzzy Sets, Fuzzy set Operations : Intersection, Union, Complement, Important Terminologies, Properties, Fuzzy Arithmetic. Fuzzy Relations, Fuzzy composition.

**UNIT IV:**

**Genetic Algorithms:** Introduction to Genetic Algorithms, Genetic Algorithms, Procedures of Genetic Algorithms: Genetic representations, Selection, Genetic operators, Mutation, Natural inheritance operators.

**UNIT V:**

**Swarm Intelligent System(SIS):** Introduction to Swarm Intelligence, Background of **SIS**, Strengths and Weakness, Application of SI Techniques, Scope of Swarm Intelligent Systems. Ant Colony System: Biological Ant Colony System, Artificial Ant Colony System, Working of an Ant Colony System, Probabilistic Transition Rule, Pheromone Updating, Solution Evaluation, Working of Ant Colony Optimisation, Ant Colony Optimisation Algorithm for TSP: Formulation and Implementation.

**Text Books:**

1. N.P. Padhy, S.P.Simon, Soft Computing, OXFORD University press 2015.

**Reference Books:**

1. Mitchell Melanie, An Introduction to Genetic Algorithm, Prentice Hall, 1998.
2. James A. Freeman and David M. Skapura, Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Edition, 2003.
3. S.N.Sivanandam, Introduction to Genetic Algorithms, S.N.Deepa, Wiley, 2007.
4. S. N. Sivanandam, S. Sumathi and S. N. Deepa, Introduction to Fuzzy Logic using MATLAB, Springer, 2007.

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## INTERNET OF THINGS
## (PE - V)

**Prerequisites:** Computer networks and operating systems

**Course Objectives:**

1. To understand the basics of Internet of Things
2. To get an idea of some of the application areas where Internet of Things can be applied
3. To understand the middleware for Internet of Things
4. To understand the concepts of Web of Things
5. To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing

**Course Outcomes:**

Student will be able to:

1. Identify and design the new models for market strategic interaction
2. Design business intelligence and information security for WoB
3. Analyze various protocols for IoT
4. Design a middleware for IoT
5. Analyze and design different models for network dynamics

**Unit I:**

**Introduction to Internet of Things (IoT)** - Definition and characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates.

**Unit II:**

Domain Specific IoTs Introduction, Home Automation, cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

IoT and M2M Introduction to M2M, Difference between IoT and M2M, SDN and NFV to IoT. Basics of IoT System Management with NETCOZF, YANG NETCONF, YANG, SNMP NETOPEER

**Unit III :**

Developing Internet of Things: IoT Platform Design Methodology, Introduction, IoT Design Methodology, Case Study on the IoT System for Whether Monitoring, Motivation for using Python.

**Unit IV :**

IoT Systems –Logical Design using Python, Introduction, Installing Python, Python Data Types and Data Structures, Control Flow and Functions, Modules , Packages, File Handling, Date/Time Operations, Classes, Python packages of Internet of Things,JSON,XML,HTTP,Lib and URL lib, SMTP lib.

**Unit V :**

IoT Physical Device and Endpoints, What is an IoT Device, Exemplary Device: Raspberry $P_i$ About Raspberry Board, Linux on Raspberry $P_i$ ,Raspberry $P_i$ Interfaces, Serial, SPI, I2C. Programming Raspberry $P_{i\ with}$ Python, Other IoT Devices.

**Text Book:**

1. ArshdeepBahga and Vijay Madisetti,Internet of Things A Hands –on approach, Universities Press, 2015.

**Reference Books:**

1. HonboZhou,The Internet of Things in the Cloud: A Middleware Perspective, CRC Press, 2012
2. Dieter Uckelmann, Mark Harrison, Florian Michahelles, Architecting the Internet of Things, Springer – 2011
3. David Easley and Jon Kleinberg,Networks, Crowds, and Markets: Reasoning About a Highly Connected World, Cambridge University Press, 2010
4. Olivier Hersent, Omar Elloumi and David Boswarthick,The Internet of Things: Applications to the Smart Grid and Building Automation, Wiley, 2012

# ANURAG GROUP OF INSTITUTIONS

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IV Year B.Tech. CSE - I Sem

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## COMPUTER GRAPHICS
## (PE - V)

**Prerequisites:** Any programming language, mathematics –I and data structures.

**Course Objectives:**

1. To exemplify the major computer graphics application areas.
2. To create computer models of 2D And 3D objects using mathematical knowledge and skills.
3. Understanding the 2D and 3D transforms
4. Introducing the curves and surface
5. Concepts of illumination and shading

**Course Outcomes:**

Student will be able to:

1. To discriminate the various structures of Computer Graphics system.
2. To analyze basic principles of implementing Computer Graphics primitives.
3. To compare and contrast between implementation of 2D and 3D Transformations.
4. To differentiate the techniques for representing 3D geometrical objects.
5. To analyze requirements and constraints for hidden surface removal and rendering methods.

**Unit I:**

**Introduction:** Computer-Aided design, Presentation graphics, Computer Art, Entertainment, Education and Training, Visualization, Image processing, Graphics user interfaces.

**Graphics Systems:** Video display devices, Raster scan systems, Random scan systems, Input devices, Hard-copy devices, Graphics software.

**Unit II:**

**Basic Graphic algorithms:** Overview, Scan converting lines, Scan converting Circles, Scan converting Ellipse, Filling polygons, Clipping lines (Cohen Sutherland & Liang Barsky), Clipping polygons (Sutherland Hodgeman).

**Unit III:**

**Geometrical Transformations:** 2D Transformation (Translation, Rotation, Scaling, Shearing & reflection), Homogeneous co-ordinates and matrix representation of 2D transformations, Composition of 2D transformations, the window-to-view port transformation.

**3D Transformations**: Matrix representation of 3D Transformations (Translation, Rotation, Scaling, Shearing & reflection.).

**Unit IV:**
**Viewing in 3D:** Projections, Specifying an arbitrary 3D view, Examples of 3D viewing
**Curves and surfaces:** Polygon meshes, Hermite curves, Bezier curves, Bezier surfaces, B-Spline surfaces.

**Unit V:**
**Visible surface determination:** classification of visible surface determination algorithms (Back -Face Detection, Depth-Buffer, Scan line), BSP- Tree Method and Octree Method.
**Illumination and Shading:** Illumination models (Ambient Light, Diffuse & Specular Reflection and Phong Model), Shading models for Polygons (Gouraud&Phong).

**Text Books:**

1. Donald Hearn and M. Pauline Baker, Computer Graphics C version, 2nd Edition, Pearson, 2011.

**Reference Books:**

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles and Practice in C, 2nd Edition, Pearson ,2013,.

2. D.F. Rogers, Procedural Elements for Computer Graphics, 2nd Edition.

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## SOFTWARE TESTING METHODOLOGIES

**(PE - V)**

**Prerequisites:** Software engineering.

**Course Objectives:**

1. Understand fundamentals of Software testing.
2. To understand Path, Transaction, Dataflow & Domain testing Strategies.
3. To analyze node reduction algorithm.
4. To explore the logic & state testing strategies.
5. Acquire knowledge on various automated testing tools

**Course Outcomes:**

Student will be able to:

1. Prioritize & categorize the bugs and take necessary measures.
2. Apply Path, Transaction, and Dataflow& Domain testing Strategies.
3. Identify Number of test cases by applying node reduction algorithm.
4. Apply logic & state testing strategies.
5. Understand various automated testing tools.

**Unit – I**

**Introduction**: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

**Flow graphs and Path testing: Basics** concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing .

**Unit – II**

**Transaction Flow Testing:** Transaction flows, transaction flow testing techniques.

**Dataflow testing:-**Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**Unit – III**

**Domain Testing:-**domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing.

**Paths, Path products and Regular expressions**: Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**Unit – IV**

**Logic Based Testing**: Overview, decision tables, path expressions, kv charts, specifications.

**State, State Graphs and Transition testing:** State graphs, good & bad state graphs, state testing.

**Unit – V**

**Matrices and Application:** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm. Study of different automated testing tools.

**Text Books:**

1. Boris Beizer, Software Testing techniques, Second edition, Dreamtech, 2014.
2. Dr.K.V.K.K.Prasad, Software Testing Tools, First edition, Dreamtech, 2007.

**Reference Books:**

1. Glenford Myers,et.el., The art of Software testing, 2nd edition, Wiley Dreamtech, 2004.
2. Brain Marrick, The craft of software testing 1st edition, Pearson Education, 2007.
3. N.Chauhan, Software Testing, 1st edition, Oxford University Press, 2010.

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## DATA SCIENCE AND ANALYTICS
## (PE-VI)

**Course Objectives:**

1. To gain a foundational understanding of data science.
2. To understand the data exploration analysis in data science.
3. To understand and use basic machine learning algorithms for predictive modeling.
4. To understand and use the various graphics in R and Tableau for data visualization.
5. To understand the ethical and privacy issues in data science.

**Course Outcomes:**

The students will be able to:

1. Describe what Data Science is and the skill sets needed to be a data scientist.
2. Explain the significance of exploratory data analysis (EDA) in data science.
3. Apply basic machine learning algorithms for predictive modeling.
4. Learn to persuade effective visualization of given data.
5. Reason around ethical and privacy issues in data science conduct and apply ethical practices.

**Unit I:**

**INTRODUCTION TO DATA SCIENCE**
Introduction: What is Data Science, Big Data and Data Science hype – and getting past the hype,
Why now? – Datafication, Current landscape of perspectives, Skill sets needed, Statistical Inference, Populations and samples, Statistical modeling, probability distributions, fitting a model, Introduction to R.

**Unit II:**

**EXPLORATORY DATA ANALYSIS AND THE DATA SCIENCE PROCESS**
Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA, The Data Science Process, Case Study.

**Unit III:**

**BASIC MACHINE LEARNING ALGORITHMS**
Linear Regression, k-Nearest Neighbors (k-NN), k-means, Motivating application: Filtering Spam, Why Linear Regression and k-NN are poor choices for Filtering Spam, Naive Bayes and why it works for Filtering Spam.

**Unit IV:**
**DATA VISUALIZATION**
Basic principles, ideas and tools for data visualization, Examples of inspiring (industry) projects, Introduction to Tableau. Creating own visualization of a complex dataset.

**Unit V:**
**DATA SCIENCE AND ETHICAL ISSUES**
Discussions on privacy, security, ethics, A look back at Data Science, Next-generation data scientists.

**Text Books:**

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline.
   O'Reilly. 2014.
2. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.

**Reference Books:**

1. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning,
   Second Edition. ISBN 0387952845. 2009.
2. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.

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## CLOUD COMPUTING
## (PE-VI)

**Prerequisites:** Computer organization and computer networks.

**Course Objectives:**

1. To understand the concepts of virtualization and its benefits
2. To impart fundamental concepts in the area of cloud computing.
3. To impart knowledge in applications of cloud computing.
4. To understand various services in cloud applications
5. To know the architecture of disaster recovery and security of cloud

**Course Outcomes:**

Student will be able to:

1. Compare and contrast different cloud architecture
2. Learn & Implement Virtualization
3. Analyze and design storage mechanisms
4. Apply security mechanism for the Cloud.
5. Understand Disaster recovery in Cloud

**Unit I:**

**Introduction to Virtualization**: Objectives of virtualization, history of virtualization, benefits of virtualized technology, the virtual service desk, what can be virtualized, related forms of computing, cloud computing, software as a service – SaaS, grid computing, utility computing, virtualization processes.

**Virtualization Technologies-I**: Ubuntu (server edition),Altiris, Windows server, Software virtualization, VMware, Intel virtualization, Red Hat virtualization, Soft grid application, Linux virtualization, Desktop virtualization, Hardware virtualization, Resource virtualization, Processor virtualization, Application virtualization.

**Unit II:**

**Virtualization Technologies-II:** Storage virtualization, Virtualization density, Para-virtualization, OS virtualization, Virtualization software, Data Storage virtualization, Intel virtualization technology, Thinstall virtualization suite, Net framework virtualization, Windows virtualization on Fedora, Storage virtualization technologies, Virtualization level, Security monitoring and virtualization, Oracle virtualization.

**Unit III:**

**Virtualization and Storage Management:** The heart of cloud computing-virtualization, defining virtualization, why virtualize, what can be virtualized, where does virtualization happen, how does virtualization happen, on the road to storage virtualization, improving

availability using virtualization, improving performance through virtualization, improving capacity through virtualization, business value for virtualization.

**Unit IV:**

**Introduction to Cloud Computing**: Cloud Introduction and overview- Components, Infrastructure and Services, Why Use Cloud Computing, Benefits and Limitations, Cloud Application Architectures, Cloud Infrastructure Models, Cloud Computing Technology- Hardware & Software Infrastructure

**Cloud Computing Architecture:** Requirements, Introduction to Cloud Computing Architecture, various kinds of Cloud Computing Architecture, Grid Computing, Transactional Computing, On Demand Computing, and Distributed Computing.

**Unit V**:

**Security:** Security issues in Cloud Computing - Data Security, Network Security, and Host Security

**Disaster Recovery:** Disaster Recovery Planning, Disasters in the Cloud, Disaster Management.

**Scaling a Cloud Infrastructure**- Capacity Planning, Cloud Scale.

**Case Studies**: Amazon S3, Google APP Engine, IBM Clouds, Oracle OBIEE

**Text Books:**

1. Ivanka Menken, Gerard Blokdijk ,Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book, 2009.
2. George Reese, Cloud Application Architectures Building Applications and Infrastructure in the Cloud, O'Reilly Media Press, 2009.

**Reference Books:**

1. Anthony T. Velte, Tobe J. Velte, Robert Elsenpeter, Cloud Computing: A Practical Approach, Publication Person Education, 2009
2. Tom Clark, Storage Virtualization: Technologies for Simplifying Data Storage and Management, Addison-Wesley, 2005
3. Curtis Brian J.S. Chee, Cloud Computing Technologies and Strategies of the Ubiquitous Datacenter, 2010

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**IMAGE PROCESSING**
**(PE-VI)**

**Course Objectives**

1. Analyze general terminology of digital image processing
2. Understand the image noise models and enhancement methods
3. Evaluate the image segmentation methodologies
4. Understand the colour image processing techniques
5. Apply image processing algorithms in practical applications

**Course outcomes:**

The students will able to:

1. Acquire the knowledge about fundamental concepts of digital image processing system.
2. Understand the image noise models and enhancement techniques
3. Comprehension of different image segmentation and restoration methodologies
4. Analyze the concepts of colour image processing.
5. Acquire the knowledge of morphological operations and image processing related areas.

**Unit-I**

Introduction : Definition, Types of images-Based on Attributes, colors, dimensions, data types, Fundamental steps in image processing, image processing applications, Digital image processing operations – Basic relationships and distance metrics, Classification of image processing operations- Arithmetic operations, Logical operations.

**Unit – II**

Image enhancement and restoration – Image quality and need for image enhancement, image enhancement point operations-piecewise linear functions, Histogram based techniques, Spatial filtering concepts.
Categories of image degradations- noise modeling, image restoration in the presence of noise only- Mean filters, order statistics filters.

**Unit-III**

Image Segmentation : introduction, classification of image segmentation algorithms, detection of discontinuities, edge detection- stages in edge detection, types of edge detectors,

First-order edge detection operators, second-order derivatives filters, edge operator performance, edge linking algorithms, principle of thresholding.

**Unit –IV**

Colour image processing: introduction, devices of colour imaging-Types of cameras, colour monitors, colour image storage -and processing, colour models-RGB Colour Model, HSI Colour Models, HSV Colour Model, HLS Colour Models, TV Colour Models, Colour quantization, Image filters for colour images.

**Unit –V**

Image Morphology: Need for morphological processing, morphological operators, Hit-or-Miss transform, Basic morphological algorithms, Gray-scale morphology.

Related topics- Artificial neural networks, Hard computing, Soft computing and image processing, Genetic algorithms,.

**Text books**

1. Digital image processing, S. Sridhar, OXFORD University press.

**References**

1. Digital image processing, Gonzalez R.C., Woods R.E, 3rd Edition, Pearson, Prentice-Hall of India Pvt.Ltd. New Delhi.
2. Image Processing, Analysis and Machine Vision, by Milan Sonka, Vaclav Hlavac and Roger Boyle,
3. Fundamentals of Digital Image Processing, by Anil K. Jain, Prentice- Hall of India Pvt. Ltd, New Delhi.

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## INFORMATION SECURITY LAB
## (PC)

**Course outcomes:**

1. Implement port scanning.
2. Investigate security of network
3. Analysis of packet protocols, IP spoofing.
4. Implement various encryption algorithms.
5. Implement Brute Force algorithm

Software Requirements: NMAP, WIRESHARK,JCRYPT TOOL.

Week 1

1. Installation of NMAP.

Week 2

2. Implement port scanning with NMAP

Week 3

3. Perform the following using NMAP
   .Find ports on a system
   .Find active machines
   .Find the version of remote OS.

Week 4

4. Installation of Wireshark.

Week 5

5. Perform an experiment to sniff for router traffic by using Wireshark.

Week 6,7

6. Implement Simple Data Encryption Standard (SDES) Algorithm through C program

Week 8,9

7. Implement Diffie–Hellman key exchange algorithm through C program.

Week 10

8. Installation of Jcrypt tool

Week 11

9. Implement DES algorithm using Jcrypt tool

Week 12

10. Implement RSA algorithm using Jcrypt tool

Week 13

11. Implement HASH algorithm using Jcrypt tool

Week 14

12. Implement SHA1 algorithm using Jcrpty tool

Week 15

13. Implement brute force algorithm in C .

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## INTERNET OF THINGS LAB

**(PE - V)**

**Course Objectives:**

1. Identify different types of sensors
2. Differentiate microcontroller and microprocessor
3. Construct a hardware setup for IoT Application
4. Identify IoT Enabling Technologies
5. Develop IoT Application

**Course Outcomes:**

Student will be able to:

1. Understand the basics of Internet of Things
2. Differentiate IoT and M2M.
3. Understand IoT Design Methodology.
4. Develop python code using Python Programming Language.
5. Develop a IoT Application using Raspberry Pi.

## List of Experiments:

1. Study and Install Arduino IDE.
2. Write a Program using Arduino IDE for buzzer.
3. Write a program using Arduino IDE for Blink LED.
4. Write a Program for RGB LED using Arduino.
5. Write a Program for monitor temperature using Arduino.
6. Write a Program for LDR sensor using Arduino.
7. Write a Program for Ultrasonic Sensor using Arduino.
8. Write a Program for IR Sensor using Arduino.
9. Study and Configure Raspberry Pi.
10. Study and Install Raspbian Operating System on Raspberry Pi.

11. Write a Python Program for LED blink using Raspberry Pi.
12. Write a Python Program for RGB LED using Raspberry Pi
13. Write a Python Program for monitor temperature using Raspberry Pi.
14. Write a Python Program for LDR sensor using Raspberry Pi.
15. Write a Python Program for Ultrasonic Sensor using Raspberry Pi.
16. Write a Python Program for IR Sensor using Raspberry Pi.

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## COMPUTER GRAPHICS LAB
## (PE - V LAB)

**Prerequisites:** A parallel course on computer graphics.

**Course Objectives:**

1. To learn the principles and commonly used paradigms and techniques of computer graphics. To provide students with a foundation in graphics applications programming.
2. To gain a proficiency with OpenGL, "a standard specification defining a cross-language, cross-platform API for writing applications that produce 2D and 3D computer graphics."
3. To develop a facility with the relevant mathematics of computer graphics and understand 3D visualization.
4. To understand, visualize and control the real time universe.
5. The massive data sets being produced by cheap sensors are useless unless they can be understood by people.

**Course Outcome:**

Student will be able to:

1. Design algorithms for different geometric shapes line, circle, and ellipse.
2. To implement graphics primitives and demonstrate geometrical transformations.
3. To create interactive graphics applications using one or more graphics application programming interfaces.
4. Develop design drawings that demonstrate computer graphics and design skills.
5. Effectively and creatively solve a wide range of graphic design problems.

**Week 1.**
Recursive subdivision of tetrahedron to form 3D Sierpinski gasket

**Week 2**
Implementation of Line Algorithm – DDA andBresenham Mid-Point Line.

**Week 3**
Implementation of Bresenham Mid-Point Circle Algorithm

**Week 4**
Implementation of Bresenham Mid-Point Ellipse Algorithm.

**Week 5**
Cohen Sutherland 2D line clipping Algorithm

**Week 6**
Liang-Barsky Line Clipping Algorithm with Window to viewport Mapping

**Week 7**
Sutherland – Hodgeman Polygon clipping Algorithm.

**Week 8 & 9**

2-D Geometric Transformations (Translation, Rotation, Scaling, Reflection, Shearing)

**Week 10**

2-D Composite Transformations

**Week 11 & 12**

3-D Transformations (Translation, Rotation, Scaling)

**Week 13**

3-D Composite Transformations

**Week 14**

Simple shaded scene consisting of a tea pot on a table

**Week 15**

Bezier Curves Drawing

**Week 16**

Review

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## SOFTWARE TESTING METHODOLOGIES LAB

## (PE - V LAB)

**Prerequisites:** A parallel course on software testing.

**Course Objectives:**

1. Demonstrate the working of software testing tools with c language.
2. Study of testing tools
3. Writing test cases for various applications.

**Course Outcomes:**

Student will be able to:

1. Find practical solutions to the problems
2. Solve specific problems alone or in teams
3. Manage a project from beginning to end
4. Work independently as well as in teams
5. Define, formulate and analyze a problem

1. Write Program in 'C' Language to demonstrate the working of the following constructs: DO…WHILE, WHILE, SWITCH, FOR, IF-ELSE.

2. "A Program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3 .Take any system and study its system specifications and report the various bugs.

4. Write the test cases for any known application.

5 . Create a test plan document for any application.

6. Study of any web testing tool

7. Study of any bug tracking tool

8. Study of any test management tool

9. Study of any functionality testing tool.

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## TECHNICAL AND BUSINESS COMMUNICATION SKILLS
## (Open Elective-II)

**Introduction**

The course is intended to expose the students to learn and practice the five communication skills thinking, listening, speaking reading, and writing in English, the global language of communication. It reflects some of the approaches in English language teaching and learning currently in practice around the world.

**Objective:**

To help the students to develop effective communication skills in all communicative contexts for professional advancement

**Course Outcomes**:

The students will be able to:

1. communicate technical and business correspondence
2. reflect on the themes discussed
3. recognize ethical implications of technical communication in professional contexts
4. identify the contemporary issues in engineering from environmental, societal, economic, and global perspectives
5. demonstrate ethical decisions in complex situations

**UNIT-I:**

**E-World & E-Communication**

E-language **-** E-governance **-** E-commerce/E-business **-** E-banking **-** E-waste

**UNIT-II:**

**Business Establishment & Infrastructure Development**

Power Supply **-** Industrial Park **-** Business Correspondence: Follow-up letters - Acceptance & Rejections **-**Persuasive letters **-** Resignation letters

**UNIT-III:**

**Technology and Society**

Robot Soldiers **-** For a Snapshot of a Web **-** Placing an order - Proposal Writing **-** Patents & Rights (National & International) **-** Intellectual Property - Nanotechnology

**UNIT-IV:**

**Ethics in Business Communication**

Ethical issues involved in Business Communication - Ethical dilemmas facing managers **-** Ethical Code & Communication - Standards in Daily Life - Total Quality Management - World University Ranking

**UNIT-V:**

**Management Information System**

Corporate Governance - Business Process Outsourcing - Project Management Communication - Marketing Communication

**Prescribed Textbook:**

1. **English and Communication Skills for Students of Science and Engineering** by S P Dhanavel. Orient Black Swan. 2009.

**References:**

1. **Business Communication** (Second Edition) by Meenakshi Raman & Prakash Singh by Oxford University Press. 2012.
2. **Language and Communication skills for Engineers** by Sanjay Kumar & Pushp Lata by Oxford University Press. 2018.
3. **Business Communication** by Anjali Kalkar, et.al. Orient BlackSwan. 2010.
4. **Technical Communication** by Paul V. Anderson. Cengage. 2014.
5. **Engineering Communication** by Charles W. Knisely & Karin I. Knisely. Cengage. 2015.

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## ENGLISH FOR PROFESSIONALS
## (Open Elective-II)

**Introduction:**

The course aims at preparing the students with the tools needed for successful communication at the professional front. It is designed to improve students' academic and professional skills which the employers are currently looking for.

**Objective:**

To prepare the students to use the language effectively in all professional pursuits

**Course Outcomes:**

The students will be able to:

1. analyze the language use in communicative process
2. describe the process and product
3. interpret the ideas in group activities
4. apply different approaches to comprehend the written text
5. write any technical and official correspondence within the framework

**UNIT-I**

**Essentials of Communication:**

Essentials of Grammar **-** Rudiments of Communications Skills (Listening, Speaking, Reading, and Writing) - Applied Grammar and Usage - Non-Verbal Communication

**UNIT-II**

**Listening Skills:**

Art of Listening - Developing Effective Listening Skills - Process of Listening, Intensive & Extensive Listening

Podcasts, Vodcasts (ICT enabled) - Five steps to Active Listening - Effective and Ineffective Listening Skills -Listening & Note-Taking

**UNIT-III**

**Speaking Skills:**

Dynamics of Effective Speaking - Group Discussion - Simulated Presentations, Process & Product Descriptions - Proxemics, Paralinguistic Features

**UNIT-IV**

**Reading Skills:**

The Art of Effective Reading - Basic steps to Effective Reading - Extensive and Intensive Reading -

Approaches to Efficient Reading - Reading Comprehension

**UNIT-V**

**Writing Skills:**

Art of Condensation - Descriptive Writing Techniques - Writing & Answering Memos, Circulars -
Inter & Intra Official Communication - Writing Minutes of Meeting - Netiquette - E-mail & Blog Writing - Note-Making

**Prescribed Textbook:**

1. **Business Communication (Second Edition)** by Meenakshi Raman & Prakash Singh. Oxford University Press. 2012.

**References:**

1. **Communicating at Work** (Seventh edition) by Adlar, Ronarld.B. McGrawHill. 2004.
2. **Cambridge English for Engineering Professionals** by Mark Ibbotson. Cambridge University. 2008.
3. **Professional Communication** by Aruna Koneru. McGrawHill. 2017.
4. **The Effective Communicator** by Adair John. Jaico Publishing House. 1995.
5. **Oxford English for Careers** by Oxford University Press.

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## MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

## (Open Elective-II)

**Course Objectives:**

1. To explain the fundamentals of the key elements of a business organization.
2. To learn practical approach to various functional areas of decision making.
3. To Compare different Pricing Strategies.
4. To enhance a knowledge of Capital Budgeting Techniques.
5. To solve the problems using Rations analysis.

**Course Out comes:**

The students will be able to:

1. Describe the concept of demand and its determinants in Managerial decisions.
2. Analyze the cost concepts and breakeven analysis in production.
3. Evaluate the market structures and different Pricing Strategies.
4. Apply the capital budgeting techniques in financial decisions.
5. Application of Ratios in solving of business problems and taking correct decisions.

**UNIT – I**

**Introduction to Managerial Economics:** Definition, Nature and scope of Managerial Economics, Demand Analysis- Demand Determinants, Law of Demand and its exceptions.

**Elasticity of Demand:** Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Statistical Methods, Expert Opinion Method, Test Marketing, Controlled Experiments, Judgmental Approach to Demand Forecasting)

**UNIT – II**

**Theory of Production and Cost Analysis:** Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs.

**Cost Analysis:** Cost concepts, Opportunity Cost, Out of Pocket Costs vs. Imputed Costs. Breakeven Analysis (BEA) – Determination of Breakeven Point (simple problems), Managerial Significance and limitations of BEA.

**UNIT – III**

**Market Structures& Pricing Policies:**

**Market structures:** Types of Competition, Features of Perfect Competition, Monopoly and Monopolistic Competition, Price - Output determination in Perfect Competition and monopoly.

**Objectives and Policies of Pricing:** Objectives of pricing**,** Methods of Pricing - Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two - Part Pricing, Block Pricing, Peak Load Pricing, Cross Subsidization.

**UNIT – IV**

**Introduction to Financial Accounting:** Accounting, Double-Entry Book Keeping, Journal, Ledger, and Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**UNIT – V**

**Financial Analysis through ratios:** Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and Quick Ratio), Activity Ratios ( Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios ( Debt – Equity, Interest Coverage Ratio), and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Profit Ratio, P/E Ratio and EPS).

**TEXT BOOKS:**

1. Varshney & Maheshwari, Managerial Economics, Sultan Chand& Sons, 2014.
2. S.A. Siddiqui and A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad, 2013.

**REFERENCES:**

1. R. K. Sharma & Shashi K Gupta, Financial and Management Accounting, 4th Ed., Sultan Chand.
2. V. Rajasekaran & R. Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Domnick Salvatore, Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
4. Subhash Sharma & M. P. Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2012.
5. S. N. Maheshwari & S. K. Maheshwari, Financial Accounting, Vikas 2012.
6. Truet and Truet, Managerial Economics; Analysis, Problems and Cases, Wiley, 2012.
7. Dwivedi, Managerial Economics, Vikas 2012.
8. M. Kasi Reddy and S.Saraswathi, Managerial Economics and Financial Accounting, PHI, 2012.
9. Erich A. Helfert, Techniques of Financial Analysis, Jalco, 2007.

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| IV Year B.Tech. CSE II Sem | L | T/P/D | C |
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## NEGOTIATION SKILLS

## (Open Elective-III)

**Course Objectives:**

1. To familiarize the students with various negotiation approaches and styles.
2. Understand & develop effective strategies for each stage of a negotiation
3. Identify Cross – cultural challenges that arise in negotiations
4. Enhance communication skills, emphasizing effective listening, persuasion & relationship building
5. Strengthen creative ability to expand the option for resolving a dispute.

**Course outcomes:**

The students will be able to

1. Describe negotiation theories, concepts and tactics to manage negotiations
2. Explain the importance of various factors impacting negotiations.
3. Apply effective negotiation strategies and tactics for different scenarios
4. Identify negotiation practices towards building relationships
5. Evaluate various conflict resolution strategies.

**Unit I:**

**Introduction to Negotiation**: Introduction, Concept of Negotiation, Characteristics of a Negotiating Situation, Basic Negotiation Skills, Interpersonal Skills in Negotiation, Theories of Negotiation.

**UNIT II**

**Types of Negotiation:** Types of Negotiation, Principles of Negotiation, Steps of Negotiation, Win-Win Negotiation, Negotiation Tactics, Factors Affecting Success in Negotiation.

**Unit III:**

**Strategies of Negotiation:** Fundamentals of Negotiation, Effective Strategies to develop Negotiation Skills, Anchoring / BATNA, Process of Negotiation and Negotiation Phases.

**Unit IV:**

**Improving Negotiation skills:** Enhancing Communication skills for effective Listening, Persuasion & Relationship Building, establishing Trust-Building Relationships.

**Unit V:**

**Managing Negotiation:** Managing Different Types of Negotiations**,** Cross –Cultural Challenges in Negotiations, Industrial Negotiation: Collective Bargaining, Arbitration, Origins of Conflict, Dispute Resolution.

**TEXT BOOKS:**

1. Fredluthans, Organisational Behavior, 9th ed, Prentice Hall.
2. Roger Fischer, Essentials of Negotiations, Harward Business School Press.

**REFERENCES:**

1. Beverly DeMarr and Suzanne De Janasz, Negotiation and Dispute Resolution, Prentice Hall, 2013.
2. Roy J Lewicki, Bruce Barry, and David M Saunders, Essentials of Negotiation, 5th Edition, McGraw Hill, 2011
3. Malhotra, Deepak, Negotiating the Impossible: How to Break Deadlocks and Resolve ugly Conflicts (without money or muscle). Oakland, CA: Berrett-Koehler Publishers, 2016.
4. Fatima, Shaheed; Kraus, Sarit; Wooldridge, Michael, Principles of Automated Negotiation. Cambridge, UK; New York: Cambridge University Press, 2015.
5. Subramanian, Guhan, Dealmaking: New Dealmaking Strategies for a Competitive Marketplace. New York: W. W. Norton & Company, 2011.

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## PROJECT MANAGEMENT

**(Open Elective-III)**

**Course Objectives:**

1. To understand the concept of Project Management.
2. To know about the different approaches to project screening and planning.
3. To explain about the factors of risk involved in project execution.
4. To understand about team leading and functional cooperation.
5. To know about the project performance and future trends in the project management.

**Course Outcomes:**
The students will be able to

1. Explain about the life cycle and other concepts of Project Management.
2. Apply different approaches to project screening and planning
3. Analyze different risk factors in project execution
4. Estimate how to lead a team, to get functional cooperation
5. Build performance evaluation reports and future trends in project management.

**UNIT-I**

**Introduction:** Meaning, Need, Principles Project Lifecycle and its Phases, Project Management Research in brief, Project Management today, Organization strategy and structure and culture, Format of organization structure, Stake holder Management, Organization Culture, creating a culture for Project Management.

**UNIT-II**

**Project Identification and Planning:** Defining the project, Project Identification Process, Approaches to Project Screening and Selection, Project Planning, Work Breakdown Structure, Financial Module, Getting Approval and Compiling a Project Charter, setting up a Monitoring and Controlling Process.

**UNIT-III**

**Project Execution:** Initiating the Project, Controlling and Reporting Project Objectives, Conducting project evaluation, Risk, Risk Management Factors, Project Management, Four

Stage Process, Risk Management an Integrated Approach, Cost Management, Creating a Project Budget.

**UNIT-IV**

**Leading Project Teams:** Building a Project Team, Characteristics of an effective Project Team, achieving Cross- Functional Co-operation, Virtual Project Teams, Conflicts Management, Negotiations.

**UNIT-V**

**Performance Measurement and Evaluation:** Monitoring Project Performances, Project Control Cycles, Earned Value Management, Human factors in Project Evaluation and Control, Project Termination, Types of Project Terminations, Project Follow-up. Current and Future Trends in Project Management.

**TEXT BOOKS:**

1. Gray, Larson, Project Management, Tata McGraw Hill, 2015
2. Jeffery K. Pinto, Project Management, Pearson Education, 2015

**REFERENCES**

1. Enzo Frigenti, Project Management, Kogan, 2015
2. R. Panneerselvam & P. Senthil Kumar, Project Management, PHI, 2015
3. Thomas M. Cappels, Financially Focused Project Management, SPD, 2008.

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## VALUE ENGINEERING

## (Open Elective-III)

**Course Objectives:**

1. To understand the concept of value engineering in productivity
2. To understand the different phases of value engineering projects
3. To learn the various decision alternatives
4. To learn value engineering in non-hardware projects
5. To identify the value engineering team and coordinate in different services

**Course Outcomes:**

The student will be able to:

1. Apply the importance of value engineering concepts in productivity
2. Analyze the different phases of value engineering projects
3. Evaluate the different decision alternatives and choose the best alternative for optimization
4. Determine the value engineering concept in non-hardware projects and programmes
5. Analyze the value engineering teams with the help of case study.

**UNIT-I**

**Introduction**: Value engineering concepts, advantages, applications, problem recognition, and role in productivity, criteria for comparison, element of choice. Level of value engineering in the organization, unique and quantitative evaluation of ideas.

**UNIT-II**

**Value Engineering and Job Plan**: Introduction, orientation, information phase, speculation phase analysis phase. Selection and Evaluation of value engineering projects, Project selection, methods selection, value standards, application of value engineering methodology.

**UNIT-III**

**Value Engineering Techniques**: Selecting Products and Operation for Value Engineering action, Value Engineering Programmes, Decision Making for Optimum Alternative, Use of Decision Matrix, Make or Buy, Measuring Profits, Reporting Results, Follow up, Use of advanced technique like Function Analysis System.

**UNIT–IV**

**Versatility Of Value Engineering**: Value engineering operation in maintenance and repair activities, Value Engineering in non-Hardware Projects. Initiating a Value Engineering Programme

**UNIT–V**

**Value Engineering Level of Effort**: Value Engineering Team, Co-coordinator, Designer, different Services, Construction Management Contracts, Value Engineering Case Studies.

**TEXT BOOKS**:

1. Anil Kumar Mukhopadhyaya, "Value Engineering: Concepts Techniques and applications", SAGE Publications 2010.
2. Del L. Younker, "Value Engineering analysis and methodology", Marcel Dekker Inc, New York, 2004

**REFERENCES:**

1. Alphonse Dell'Isola, "Value Engineering: Practical Applications for Design, Construction, Maintenance & Operations", R S Means Co., 1997
2. Richard Park, "Value Engineering: A Plan for Invention", St. Lucie Press, 1999.
3. Miles, L.D., "Techniques of Value Analysis and Engineering", Second Edition, McGraw Hill 1989.
4. Khanna, O.P., "Industrial Engineering and Management", Dhanpat Rai & Sons, 1993.
5. Anil Kumar Mukhopadhyaya, "Value Engineering Mastermind: From concept to Value Engineering Certification", SAGE Publications, 2003