VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY HYDERABAD
B.TECH. II YEAR
(COMPUTER SCIENCE AND ENGINEERING; INFORMATION TECHNOLOGY)

III SEMESTER **R18**

Course Code	Title of the Course	L	T	P	Contact Hours/ Week	Credits
18BS1MT07	Probability, Statistics and Queuing Theory	3	0	0	3	3
18ES1CS02	Digital Logic Design	3	0	0	3	3
18PC1IT01	Data Structures	3	0	0	3	3
18PC1CS01	Mathematical Foundations for Computer Science	3	0	0	3	3
18PC1CS02	Object Oriented Programming through C++	3	0	0	3	3
18PC1IT02	Computer Organization	3	0	0	3	3
18PC2IT01	Data Structures Laboratory	0	0	3	3	1.5
18PC2CS01	Object Oriented Programming through C++ Laboratory	0	0	3	3	1.5
Total		**18**	**0**	**6**	**24**	**21**
18MN6HS02	Environmental Sciences	2	0	0	2	0

IV SEMESTER **R18**

Course Code	Title of the Course	L	T	P	Contact Hours/ Week	Credits
18HS1MG01	Engineering Economics and Accountancy	3	0	0	3	3
18PC1CS03	Software Engineering	3	0	0	3	3
18PC1IT03	Java Programming	3	0	0	3	3
18PC1IT04	Formal Languages and Automata Theory	3	0	0	3	3
18PC1CS04	Design and Analysis of Algorithms	3	0	0	3	3
18PC1CS05	Database Management Systems	3	0	0	3	3
18PC2IT02	Java Programming Laboratory	0	0	3	3	1.5
18PC2CS02	Database Management Systems Laboratory	0	0	3	3	1.5
18PC2IT03	IT Workshop	0	0	2	2	1
Total		**18**	**0**	**8**	**26**	**22**

L – Lecture T – Tutorial P – Practical

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Semester - CSE, IT	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18BS1MT07) PROBABILITY, STATISTICS AND QUEUING THEORY

COURSE PREREQUISITES: Permutations and Combinations, Basic statistics

COURSE OBJECTIVES: Student will gain knowledge of

- Elementary ideas in basic probability
- Different types of probability distribution functions
- Methods of calculating correlation and regression
- Various methods to test the hypothesis
- Concepts of queuing theory

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Solve problems involving basic probability
CO-2: Evaluate statistical parameters of different probability distributions
CO-3: Calculate correlation, regression, rank correlation coefficients
CO-4: Apply the knowledge of different probability distributions to test a hypotheses
CO-5: Apply the knowledge of different probability distributions to solve problems in queuing theory

UNIT-I:
Basic Probability: Sample space and events, Probability- The axioms of probability, some elementary theorems, conditional probability, Baye's theorem. Random variables - discrete and continuous distributions - Expectation of Discrete Random Variables, Moments, Variance of a sum.

UNIT-II:
Probability Distributions: Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions –related properties.

UNIT-III:
Correlation and Regression: Coefficient of correlation, regression coefficient, the lines of regression, rank correlation

UNIT-IV:
Testing of Hypothesis - Large Sample: Tests of hypothesis - null hypothesis, alternate hypothesis, type I, type II errors, critical region. Inferences concerning means and proportions. Test of hypothesis for single mean and difference between the means. Test of hypothesis for the proportions- single and difference between the proportions, confidence interval for the mean and proportions for large samples.

UNIT-V:
Tests of Significance - Small Samples: Tests of significance, t-distribution, F-distribution, Chi square distribution and their confidence intervals.

UNIT-VI:

Queuing Theory: Queuing theory -Arrival process and Service process- Pure birth and Death process, M/M/1 model with finite and infinite capacities, M/M/C model with infinite capacity.

TEXT BOOKS:

1. Richard A. Johanson, Probability and Statistics for Engineers, 1995, 5th Edition, Prentice-Hall.
2. Jay L. Devore, Probability and Statistics for Engineering & Sciences, 8th Edition, Cengage learning.
3. J. W. Cohen, The Single Server Queue, 1969, Wiley Interscience, New York, NY.

REFERENCES:

1. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. Gareth James, Daniela Written, Trevor Hastic, Robert Tibshirani, An Introduction to Statistical Learning with Applications in R

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B.Tech. III Semester - CSE, IT	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18ES1CS02) DIGITAL LOGIC DESIGN

COURSE OBJECTIVES:

- **Analyze** and explore uses of logic functions for building digital logic circuits
- **Explore** the combinational logic circuits
- **Examine** the operation of sequential (synchronous and asynchronous) circuits
- **Understand** the programming concepts of HDL for simulating any type of logic circuits

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Simplify the complex logic functions using k-maps and tabulation methods
CO-2: Build any type of combinational circuits that help in further designing memory elements
CO-3: Design Synchronous and Asynchronous sequential circuits using memory elements
CO-4: Apply the concepts of HDL for simulating the logic functions, combinational and sequential circuits

UNIT-I:
Numbers Systems and Codes: Review of number systems, number base conversion, binary arithmetic, binary weighted and non-weighted codes, Complements, Signed binary numbers, Error Detection and Correcting Codes, Binary Logic.

UNIT-II:
Boolean Algebra and Gate Level Minimization: Postulates and theorems, representation of switching functions, SOP and POS forms –Canonical forms, digital logic gates, Karnaugh Maps –minimization using three variable, four variable and five variable K-Maps, Don't Care Conditions, NAND and NOR implementation , Other Two-Level Implementation, Exclusive-OR function, Integrated Circuits, Hardware Description Language(HDL).

UNIT-III:
Design of Combinational Circuits: Combinational Circuits- Analysis and Design Procedure, Binary adder and subtractors, Binary multiplier, magnitude comparator, BCD adder, Decoders, Encoders, Multiplexers, Demultiplexers, HDL for Combinational Circuits.

UNIT-IV:
Design of Sequential Circuits: Combinational Vs Sequential Circuits, Latches, Flip Flops-RS flip flop, JK flip flop, T flip flop, D flip flop, Master-Slave Flip flop- Flip Flops excitation functions, Conversion of one flip flop to another flip flop, Asynchronous Vs Synchronous circuits, Analysis of clocked sequential circuits, State Table, State Diagram, State Reduction and State Assignment, Mealy and Moore Machines, HDL for Sequential circuits.

UNIT-V:

Counters and Registers: Design of synchronous counters, Ripple Counters, Asynchronous counters, Registers, Shift Registers, HDL for counters and registers.

Memory: Random Access Memory, Read Only Memory, Programmable Logic Array, Programmable Array Logic.

UNIT-VI:

Asynchronous Sequential Logic: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and flow Tables, Race Free State Assignment, Hazards, Design examples.

TEXT BOOKS:

1. Digital Design, Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Switching and Finite Automata Theory by Zvi Kohavi, Tata McGraw-Hill.

REFERENCES:

1. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.
2. Switching and Logic Design, C. V. S. Rao, Pearson Education.
3. Digital Principles and Design Donald D. Givone, Tata McGraw-Hill, Edition.
4. Fundamentals of Digital Logic & Micro Computer Design, 5th Edition, M. Rafiquzzaman, John Wiley.

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B.Tech. III Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18PC1IT01) DATA STRUCTURES
(Common to CSE, ECE and IT)

COURSE OBJECTIVES:

- To impart the basic concepts of data structures and algorithms
- To introduce various searching and sorting techniques
- To demonstrate operations of linear and non-linear data structure
- To develop an application using suitable data structure

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Understand basic concepts of data structures, computation complexity
CO-2: Understand linear data structures, various sorting, searching techniques
CO-3: Understand various operations of linear and non-linear data structures
CO-4: Identify appropriate and efficient data structure to implement a given problem

UNIT-I:

Introduction to Data Structures: Abstract Data Types (ADT), Asymptotic Notations. Time- Space trade off. Searching: Linear Search and Binary Search Techniques and their time complexities.
Linear Data Structures: Stacks - ADT Stack and its operations: Applications of Stacks: Recursion, Expression Conversion and evaluation.

UNIT-II:

Linear Data Structures: Queues - ADT queue, Types of Queue: Linear Queue, Circular Queue, Dequeue: Operations on each types of Queues

UNIT–III:

Linked Lists: Singly linked lists: Representation in memory, Operations: Traversing, Searching, insertion, Deletion from linked list; Linked representation of Stack and Queue.
Doubly linked List, Circular Linked Lists: All operations

UNIT–IV:

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search Tree, AVL Tree; Tree Operations on each of the trees and their algorithms with time complexities.
B-Trees: Definition, Operations.

UNIT–V:

Priority Queue: Definition, Operations and their time complexities.
Sorting: Objective and properties of different sorting algorithms: Heap Sort, Merge Sort; Radix sort

UNIT–VI:

Dictionaries- Definition, ADT, Linear List representation, operations- insertion, deletion and searching, Hash Table representation, Hash function-Division Method, Collision

Resolution Techniques-Separate Chaining, open addressing-linear probing, quadratic probing, double hashing, Rehashing.
Graphs: Graph terminology –Representation of graphs –Graph Traversal: BFS (breadth first search) –DFS (depth first search) –Minimum Spanning Tree.

TEXT BOOKS:
1. Horowitz and Sahani, "Fundamental of Data Structure", Galgotia Publication
2. Lipschutz, "Data Structure", Schaum Series

REFERENCES:
1. Mark Allen Weiss, "Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition, Addison-Wesley Publishing Company
2. R. G. Dromey, "How to Solve it by Computer", 2nd Impression, Pearson Education.

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B.Tech. III Semester - CSE, IT	**L**	**T/P/D**	**C**
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(18PC1CS01) MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE

COURSE OBJECTIVES:

Throughout the course, Students will be expected to demonstrate their understanding of Discrete Mathematics by being able to do each of the following:

- Apply logical reasoning to a variety of problems
- Understand the concepts on elementary combinatorics and permutations
- Analyze the properties of graphs and trees
- Evaluate various methods for solving the recurrence relations

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Demonstrate problems using statement calculus, predicate logic and set theory
CO-2: Apply and calculate permutations and combinations
CO-3: Understand the use of graphs and trees as models
CO-4: Solve various problems using recurrence relation techniques

UNIT-I:

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.
Predicates: Quantifiers, Predicative logic, Free & Bound variables.

UNIT-II:

Set Theory: notations, inclusion and equality sets, operations on sets, Venn diagrams.
Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Hasse diagram.
Functions: Types of Functions, Inverse Function, Composition of functions, recursive Functions.

UNIT-III:

Elementary Combinatorics: Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, the principles of Inclusion – Exclusion, Pigeon hole principle.

UNIT-IV:

Graphs: Graphs and their Properties, Degree, Connectivity, Path, Cycle, Sub graph, Isomorphism, Eulerian and Hamiltonian Walks, Planar Graphs, Graph coloring, Chromatic Numbers.

UNIT-V:

Trees: Properties of trees – Distance and centers in tree – Rooted and binary trees. Spanning trees, BFS, DFS, Spanning trees in a weighted graph.

UNIT-VI:

Recurrence Relations: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relation

by substitution and Generating functions, the method of Characteristic roots, solution of Inhomogeneous Recurrence Relations.

TEXT BOOKS:

1. J. P. Trembly and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMG Edition, Tata McGraw-Hill.
2. J. L. Mott, A. Kandel, T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians," Second Edition, PHI.
3. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES:

1. C. L. Liu and D. P. Mohapatra, Elements of Discrete Mathematics - A Computer Oriented Approach, 3rd Edition, Tata McGraw-Hill
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw-Hill
3. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press.

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B.Tech. III Semester - CSE, IT	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18PC1CS02) OBJECT ORIENTED PROGRAMMING THROUGH C++

COURSE OBJECTIVES:

- Understand the basics of OOPs and features of C++ supporting object oriented programming
- Understand the dynamic allocation of objects and concept of friend
- Demonstrate the advanced object oriented programming features like inheritance polymorphism etc.
- Understand the usage of exception handling, File I/O, Standard template library

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Relate the basic concepts of oops to solve real problems
CO-2: Demonstrate the creation of objects and access specifiers
CO-3: Classify the advanced OOPs features like inheritance polymorphism etc. in developing the solution for a given problem
CO-4: Demonstrate exception handling, Streams, STL in formulating the solution for a given problem

UNIT-I:
Programming paradigms – Object-Oriented Paradigm: Elements of Object Oriented Programming, benefits of object oriented programming. Moving from C to C++. Classes and Objects-Class specification, definition, inline functions, Access specifiers, Passing and returning objects – Array of objects - Static members. Example programs

UNIT-II:
Constructors - Parameterized constructors - Constructor overloading. Copy constructor, Destructors, Default arguments –dynamic memory allocation- new, delete operators - "this" pointer, friend classes and friend functions. Example programs

UNIT-III:
Function overloading – Operator overloading- unary operator overloading- binary operator overloading-, operator overloading with friend function, Generic programming with templates-Function templates, class templates. Example programs

UNIT-IV:
Inheritance-Base class and derived class relationship-derived class declaration-Forms of inheritance- inheritance and member accessibility- constructors in derived class, abstract class, virtual functions, and pure virtual function.

UNIT-V:
Exception Handling- Introduction, Principles Of Exception Handling, The Keywords Try, Throw and Catch, Exception Handling Mechanism, Multiple Catch Statements, list of exceptions, catch All exceptions, Standard Template Libraries – Containers , Iterators, Functions

UNIT-VI:
Files and Streams-Opening and Closing a file- file modes- file pointers and their manipulation, sequential access to a file-random access to a file-Reading and Writing.

TEXT BOOKS:

1. Mastering C ++, Venugopal, Rajkumar, Ravi Kumar, TMH
2. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 3rd Edition, 2008.

REFERENCES:

- The Complete Reference, C++, 4th Ed., Herbert Schildt, TMH

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B.Tech. III Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18PC1IT02) COMPUTER ORGANIZATION
(Common to CSE, EIE and IT)

COURSE OBJECTIVES:

- Describe the functional blocks of a computer to interpret the instructions and various addressing modes for the execution of instruction cycle
- Perform Arithmetic micro operations on integers and floating-point numbers
- Analyze the cost performance and design trade-offs in designing and constructing a computer processor including memory
- Discuss the different ways of communicating with I/O devices & interfaces and the design techniques to enhance the performance using pipelining, parallelism

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Interpret the functional architecture of computing systems
CO-2: Explore memory, control and I/O functions
CO-3: Impart the knowledge on micro programming
CO-4: Analyze instruction level parallelism, Concepts of advanced pipeline techniques

UNIT – I:
Functional Blocks of a Computer: CPU, memory, input-output subsystem, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
Case study – Instruction set of some common CPUs

UNIT – II:
Data Representation: Signed number representation, fixed and floating point representations, character representation.
Computer Arithmetic: **Integer Addition** and **Subtraction** - Ripple carry adder, carry look-ahead adder. **Multiplication** – Shift-and add, Booth multiplier, carry save multiplier. **Division** – Restoring and non-restoring techniques, floating point arithmetic.

UNIT – III:
Microprogrammed Control: Control memory, address sequencing, micro program example, and design of control unit, hardwired control, and micro programmed control.

UNIT – IV:
Memory System Design: Semiconductor memory technologies. SRAM vs DRAM.
Memory Organization: Memory interleaving, concepts of hierarchical memory organization, cache memory, cache size vs block size, mapping functions, replacement algorithms, write policies, virtual memory, secondary storage.

UNIT – V:
Peripheral Devices and their Characteristics: Input-output subsystems, I/O device interface, I/O transfers, - program controlled, Interrupt driven and DMA, privileged and non –privileged instructions, software interrupts and exceptions. Programs and

processes – role of interrupts in process state transitions, I/O device interfaces – SCSI, USB.

UNIT – VI:

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction pipe line, RISC pipeline Vector Processing, Array Processors

TEXT BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interfaces", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

REFERENCES:

1. Computer System Architecture, Third Edition by M. Morris Mano.
2. Computer Architecture and Organization, 3rd Edition by John P. Hayes, WCB/McGraw-Hill.
3. Computer Organization and Architecture: Designing for Performance, 10th Edition by William Stallings, Pearson Education.
4. Computer System Design and Architecture, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

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B.Tech. III Semester	**L**	**T/P/D**	**C**
	0	**3**	**1.5**

(18PC2IT01) DATA STRUCTURES LABORATORY
(Common to ECE, CSE and IT)

COURSE OBJECTIVES:

- To impart the basic concepts of data structures and algorithms
- To understand concepts about searching and sorting
- To understand the basic concepts about stacks, queues, lists
- To understand the concepts of trees and graphs

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Implement all operations on different linear data structures
CO-2: Develop all operations on different non-linear data structures
CO-3: Apply various searching and sorting techniques
CO-4: Apply appropriate data structure for any given problem

WEEK 1

a) Implement Stack using Array

WEEK 2

a) Program to convert infix expression to postfix expression.
b) Program to Postfix evaluation.

WEEK 3

Implement the following
a) Linear Queue using Array b) Circular Queue using Array

WEEK 4

Implement Dequeue using Array

WEEK 5

Implement Single Linked List operations

WEEK 6

Implement following
a) Circular Linked List Operations b) Double Linked List Operations

WEEK 7

Implement following
b) Stack using Linked List c) Queue using Linked List

WEEK 8

Implement BST operations

WEEK 9
Implement B Tree operations -

WEEK 10
Implement following sorting techniques
a) Merge b) Heap c) Radix

WEEK 11
Implement following Hashing Techniques
a) Separate Chaining b) Linear Probing

WEEK 12
Implement following Graph traversals
a) BFS b) DFS

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B.Tech. III Semester - CSE, IT	**L**	**T/P/D**	**C**
	0	**3**	**1.5**

(18PC2CS01) OBJECT ORIENTED PROGRAMMING THROUGH C++ LABORATORY

COURSE OBJECTIVES:

- Identify and practice the basic concepts of object-oriented programming
- To analyse the exception handling mechanism and dynamic allocation of objects
- To familiarize students with advanced concepts of object-oriented programming in C++
- To facilitate students with the skills required to solve problems using object oriented concepts

COURSE OUTCOMES: After completion of the course, the student will be able to

CO-1: Relate the basic concepts of oops for a given program using the features of C++

CO-2: Implement dynamic memory allocation of objects for effective memory usage

CO-3: Construct the programs using advanced OOP features like inheritance, Polymorphism and Generic programming

CO-4: Develop the programs using Exception Handling, STL and Streams

WEEK 1

Moving towards C to C++ -- Sample programs using C++, Sample programs using classes

WEEK 2

Programs on Parameter passing methods, Inline functions, Static members, Access specifiers

WEEK 3

Programs on default arguments, constructors, Constructor overloading, destructors, 'this' pointers

WEEK 4

Programs on Dynamic memory allocation, friend functions and classes

WEEK 5

Programs on function overloading, Operator Overloading

WEEK 6

Programs on function and class templates

WEEK 7

Programs on Inheritance- Different forms of inheritance

WEEK 8
Programs using abstract classes, polymorphism

WEEK 9
Sample Programs on Exception handling – Basic constructs
Programs on multiple catch statement, Exceptions in Constructors and destructors

WEEK 10
Programs using STL

WEEK 11
Programs on different operations on files

WEEK 12
Programs on random access to files

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B.Tech. III Semester	**L**	**T/P/D**	**C**
	0	**3**	**1.5**

(18MN6HS02) ENVIRONMENTAL SCIENCE

COURSE PREREQUISITES: Basic knowledge of environmental issues

COURSE DESCRIPTION:
Environmental science is the study of patterns and processes in the natural world and their modification by human activity. We as human beings are not an entity, separate from the environment around us, rather we are a constituent seamlessly integrated and co-exist with the environment around us. To understand current environmental problems, we need to consider physical, biological and chemical processes that are often the basis of those problems. The course requires the students to identify and analyse natural and human-made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them. This course will survey some of the many environmental science topics at an introductory level, ultimately considering the sustainability of human activities on the planet. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa.

COURSE OBJECTIVES:
- Recognize the impacts of human interventions towards environment
- List out the benefits in creating a sustainable environment
- Sketch out various activities in achieving a cleaner environment
- Emphasize the role of an individual for a better planet to live

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Gain a variety of experiences & acquire a basic knowledge about the environment & its allied problems
CO-2: Interpret the key components in safe guarding the environment
CO-3: Appraise the quality of environment in order to create a healthy atmosphere
CO-4: Familiarize with the individual responsibilities towards green revolution

MODULE 1: INTRODUCTION
Environmental Science: Introduction, Definition, scope and importance.

MODULE 2: AWARENESS ACTIVITIES
Small group meetings about:
- Water management
- Projects Vs Environment
- Generation of less waste
- Promotion of recycle use
- Impact of Science & Technology on Environment
- Avoiding electronic waste

MODULE 3: SLOGAN AND POSTER MAKING EVENT
- Food waste management
- Rain water harvesting

- Climate change
- Green Power
- Water conservation
- Green at work
- Role of IT in environment and human health
- Sustainable development

MODULE 4: EXPERT LECTURES ON ENVIRONMENTAL SCIENCE
- Environmental Impact Assessment
- Industrial waste treatment
- Organic farming/Vertical gardens/Hydroponics

MODULE 5: CLEANLINESS DRIVE
- Indoor air pollution
- Vehicular pollution
- VISUAL pollution
- Waste management at home
- Composting
- Plastic recycling

MODULE 6: CASE STUDIES
- HPCL disaster in Vizag
- Oleum gas leak in Delhi
- Mathura Refinery & Taj Mahal
- Conservation of Hussain Sagar lake
- The Cleanliest city of India-Surat
- Green Buildings in India
- KBR park in Hyderabad (Environmental protection Vs Development)
- Fluorosis
- Ecotourism & its impacts

TEXT BOOKS:
1. Environmental Studies for UG Courses, Erach Bharucha, UGC Publications, Delhi, 2004.
2. Textbook of Environmental Studies, Deeksha Dave, S. S. Katewa, Cengage Delmar Learning India Pvt., 2012.

REFERENCES:
1. Introduction to Environmental Science, Y. Anjaneyulu, BS Publications, 2004.
2. Environmental Studies by Anubha Kaushik & C. P. Kaushik, 4th Edition, New Age International Publishers.

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B.Tech. IV Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18HS1MG01) ENGINEERING ECONOMICS AND ACCOUNTANCY
(Common to EIE, CSE and IT)

COURSE OBJECTIVES:

- To explain the basic nature of pure economics and to analyse certain concepts of both Micro & Macro Economics and to know the role of managerial economics in solving problems of business enterprises
- To understand different forms of organizing private-sector and public-sector business enterprises and problems which have been encountered by public enterprises in India
- To describe each stage of product life cycle with the help of different costs and their role in maintaining optimum cost of production and overall profitability by considering different market competitions
- To analyse the process involved in preparation of project proposals, to estimate capital required to commerce and carryon business projects, to know the various sources of mobilizing required amount of capital and to evaluate investment opportunities
- To apply the basic accounting concepts & conventions and to analyse financial position of business enterprise

COURSE OUTCOMES: After completion of the course, the student will be able to

CO-1: Perform decision making function effectively in an uncertain framework by applying the concepts of economics, manage demand efficiently and plan future course of action

CO-2: Select suitable form of business organization which meets the requirements of business

CO-3: Fix the right price which can best meet the pre-determined objectives of the business under different market conditions

CO-4: Identify the best source of mobilising capital, select most profitable investment opportunity, carry out & evaluate benefit/cost, life cycle and Break-even analysis on one or more economic alternatives

CO-5: Analyze overall position of the business enterprise, therefore, take appropriate measures to improve the situation.

UNIT-I:

Introduction to Economics & Managerial Economics: Introduction to Economics: Definition, nature, scope and types of Economics. Concepts of Macro-Economics: Gross Domestic Product (GDP), Gross National Product (GNP), National Income (NI) & Rate of Inflation.

Managerial Economics: Definition, nature, scope & significance. Elements of Managerial Economics: Demand Analysis, Law of Demand, Elasticity of Demand and Demand Forecasting.

UNIT-II:

Forms of organizing Private and Public-Sector Business Enterprises: Private Sector Business Enterprises: (i) Sole Proprietorship - Definition, features, merits, limitations & suitability. (ii) Partnership - Definition, Partnership Act, features, types, merits, limitations, suitability. (iii) Joint-Stock Company - Definition, Companies Act, features, types, merits, limitations, suitability.

Public Sector Business Enterprises: Definition, features, objectives, merits, problems.

UNIT-III:

Market Structures, Product Life-Cycle (PLC), Pricing and Financial Accounting: Market Structures: Definition & common features of market and classifications of markets. Evaluation of market structures-Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly.

Product Life-Cycle and Pricing: Definition, various stages of PLC, and Life-Cycle Costs; objectives and methods of pricing.

Introduction to Financial Accounting: Definition, basic principles and double-entry book-keeping, practice of accounting process-Journal, ledger, trial balance and final accounts (simple problems)

UNIT-IV:

Financial Analysis through Ratios: Meaning, computation of ratios (i) Liquidity Ratios: Current Ratio and Quick Ratio, (ii) Solvency Ratios: Interest Coverage Ratio and Debt-Equity Ratio, (iii) Activity Ratios: Stock/Inventory Turnover Ratio and Debt Turnover Ratio, (iv) Profitability Ratios: Gross Profit Ratio, Net Profit Ratio & Earning Per Share(EPS) Ratio.

UNIT-V:

Management Accounting: Definition & nature of Management Accounting. Capital: Types of capital, factors influencing capital requirements, sources of mobilising Fixed and Working Capital.

UNIT-VI:

Cost Accounting: Cost Accounting: Definition, Types of costs – Opportunity cost, Explicit/Out-of-Pocket cost, Implicit/Imputed cost, Fixed cost, Variable cost, Semi-Variable cost, Differential cost, Sunk cost, Total cost, Average cost & Marginal cost. Break-Even/Cost-Volume-Profit (CVP) Analysis (Simple Problems).

TEXT BOOKS:

1. Managerial Economics and Financial Analysis by Aryasri, 2009; Tata McGraw-Hill.
2. Managerial Economics by Varshney & Maheswari, 2009; Sultan Chand.
3. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri and Eshan ul Haque , 2010, 13th Edition, Pearson Education/ Prentice Hall of India.

REFERENCES:

1. Indian Economy by Misra S. K. and Puri, Himalaya Publishers.
2. Textbook of Business Economics by Pareek Saroj, Sunrise Publishers
3. Financial Accounting for Management: An Analytical Perspective by Ambrish Gupta, Pearson Education.
4. Managerial Economics by H. Craig Peterson & W. Cris Lewis; Prentice Hall of India.

5. Guide to Proposal Writing by Jane C. Geever & Patricia McNeill, Foundation Centre.

Website:

https://www.amazon.com/exec/obidos/tg/detail/-/0879547030/ref=ase_learnerassoci-20/102-4728473-7056968?v=glance&s=books

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester - CSE, IT	**L**	**T/P/D**	**C**
	3	**0**	**3**

(18PC1CS03) SOFTWARE ENGINEERING

COURSE OBJECTIVES:

- Identify the importance of software engineering principles and software process framework
- Understand contemporary approaches for design model and requirements validation
- Explore various metrics and quality assurance strategies
- Analyse different strategies for testing and risk management

COURSE OUTCOMES: After completion of the course, the student will be able to

CO-1: Analyse software engineering framework activities and process models that can be tailored with appropriate methods for developing the projects

CO-2: Design relevant software system models from the available software requirements and validate desired user model with realistic constraints

CO-3: Deliver quality software products by applying software testing strategies and product metrics over the entire system life cycle

CO-4: Specify contemporary issues of handling risk management in Software development

UNIT-I:

Introduction to Software Engineering: Software characteristics, changing nature of software, software myths.

A Generic View of Process: Software engineering-A layered technology, process frame work, The Capability Maturity Model Integration (CMMI)

UNIT-II:

Process Models: The water fall model, Incremental process models, evolutionary process models, 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:

Modeling with UML: Modeling Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams – Activity Diagrams - Package Diagrams - Component Diagrams – Deployment Diagrams -Diagram Organization-Diagram Extensions.

UNIT-IV:

Design Engineering: Design process and design quality, design concepts, design model.

Testing Strategies: A strategic approach to software testing, Testing Strategies, Black box and White box testing.

UNIT-V:

Product Metrics: Metrics for analysis model, Metrics for design model, Metrics for source code, Metrics for testing, Metrics for maintenance

Metrics for Process and Projects: Software measurement, Metrics for software quality

UNIT-VI:

Risk Management: Reactive vs. Proactive risk strategies, Software risks, Risk identification, Risk projection, RMMM plan

Quality Management: Quality concepts, Software quality assurance, Formal technical reviews, ISO 9000 Quality standards.

TEXT BOOKS:

1. Roger S. Pressman, Software engineering - A practitioner's Approach, McGraw-Hill International Edition, 6th Edition, 2001.
2. Ian Sommerville, Software engineering, Pearson Education Asia, 7th Edition, 2000.
3. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.

REFERENCES:

1. Pankaj Jalote - An Integrated Approach to Software Engineering, Springer Verlag, 1997.
2. James F. Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
3. Ali Behforooz and Frederick J. Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

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(18PC1IT03) JAVA PROGRAMMING

COURSE OBJECTIVES:

- **Understand** fundamental concepts and constructs of Java
- **Implement** Different object-oriented Concepts in Java
- **Develop** the concepts of Multi-Threading and IO-Streams
- **Establish** connection to the databases

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Write Java programs using various programming constructs using Java
CO-2: Solve different mathematical problems using OOP Paradigm
CO-3: Understand and use Java Collection Framework
CO-4: Design and **analyze** the solutions for Thread and database connectivity concepts

UNIT-I:
Java Evolution: Java Features - How Java differs from C and C++ - Java and Internet - Java and World Wide Web - Web Browsers - Hardware and Software Requirements - Java Environment. Overview of Java Language: Simple Java Program - Java Program Structure - Java Tokens- Java Statements - Implementing a Java Program - Java Virtual Machine - Constants - Variables - Data types - Scope of Variables-Symbolic Constants-Type Casting and type promotions – Operators, Operator Precedence and Associativity - Control Statements – break - continue- Arrays-Multi dimensional arrays, Wrapper Classes - Simple examples.

UNIT-II:
Classes and Objects - Constructors – methods - this keyword – garbage collection-finalize - Overloading methods and constructors - Access Control- Static members – nested and inner classes – command line arguments - variable length arguments.
Inheritance: types of inheritance, benefits of inheritance. super keyword, Polymorphism, dynamic method dispatch –abstract classes – exploring String class.

UNIT-III:
Packages and Interfaces: Defining and accessing a package – understanding CLASSPATH – access protection importing packages – Interfaces - Defining and implementing an interface, Applying interfaces
Exception Handling-Fundamentals, usage of try, catch, multiple catch clauses, throw, throws and finally. Java built in Exceptions and creating user defined exceptions.

UNIT-IV:
The Collection Framework: Collection Objects – Sets, Lists, Queues, Maps – ArrayList-LinkedList - Vector– HashSet– LinkedHashSet– TreeSet– HashMap– Hashtable. Retrieving Elements from Collections – Enumeration, Iterator, List Iterator – String Tokenizer and Arrays Class – Sorting using Comparable and Comparator.

UNIT – V:

Multithreaded Programming: Java Thread life cycle model – Thread creation - Thread Exceptions - Thread Priority – Synchronization - Runnable Interface - Interthread Communication - Deadlock - Suspending, Resuming and stopping threads.

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams – Character streams, Serialization, File Class and Methods.

UNIT – VI:

JDBC: JDBC Architecture, JDBC – ODBC Connectivity Steps, Connectivity steps with mysql database, Statement, PreparedStatement, CallableStatement, ResultSet, ResultSetMetaData, DatabaseMetaData, Transaction Management, Batch Processing, RowSet Interface. REST API's.

TEXT BOOKS:

1. The Complete Reference Java J2SE, 5th Edition, Herbert Schildt, TMH Publishing Company Ltd., New Delhi.
2. Big Java, 2nd Edition, Cay Horstmann, John Wiley and Sons.

REFERENCES:

1. Java How to Program, Sixth Edition, H. M. Dietel and P. J. Dietel, Pearson Education/PHI
2. Core Java 2, Vol. 1, Fundamentals, Cay S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol. 2, Advanced Features, Cay S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

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	3	**0**	**3**

(18PC1IT04) FORMAL LANGUAGES AND AUTOMATA THEORY

COURSE OBJECTIVES:

- **Explain** the theoretical foundations of computer science concerning– the relationships between languages and machines, the inherent limits of what can be computed, and the inherent efficiency of solving problems using machines such as FA, PDA , LBA and TM
- **Identify** a language's location in the Chomsky hierarchy (regular sets, context-free, context-sensitive, and recursively enumerable languages)
- **Convert** among equivalently powerful notations for a language, including among DFAs, NFAs, and regular expressions, and between PDAs and CFGs
- **Build** the foundation for students to pursue research in the areas of automata theory, formal languages, compiler design and computational power of machines

COURSE OUTCOMES: After completion of the course, the student will be able to

CO-1: List computational devices according to their computational power, and tools which will allow us to tell if a device is powerful enough to solve a given computational problem

CO-2: Relate the concept of the grammar with the concept of programming language

CO-3: Design Solutions for problems related to Finite Automata, RE, CFG, PDA and Turing Machine

CO-4: Analyze various problems and categorize them into P, NP, NP-Complete and NP-Hard problems

UNIT-I:

Introduction: Alphabet, languages and grammars, Chomsky hierarchy of languages. Regular languages and finite automata: Deterministic Finite Automata (DFA), nondeterministic finite automata (NFA) and equivalence with DFA, NFA with ε - moves, Conversion to NFA without ε moves, minimization of finite automata, equivalence between FAs, Finite Automata with Outputs – Mealy machine, Moore machine and equivalence.

UNIT-II:

Regular Languages and Finite Automata: Regular sets, Regular expressions and languages, Operations on Languages - Union, Concatenation, Kleen Closure, equivalence between finite automata and regular expressions, Regular grammars: Definition, productions, derivation, right linear and left linear grammars, and equivalence with Regular grammars and finite automata, properties of regular languages, pumping lemma for regular languages

UNIT – III:

Context-free languages: Context-Free Grammars (CFG) and Languages (CFL), parse trees, sentential forms, right most and left most derivations of strings, ambiguity in CFG, Left recursion and left factoring in context free grammars, Chomsky and Greibach normal forms, Pumping Lemma for context-free languages, closure properties of CFLs

UNIT – IV:

Pushdown Automata: definition, model, acceptance of CFL, Pushdown Automata (PDA), Acceptance by final state and acceptance by empty stack and its equivalence, Equivalence of CFG and PDA (proofs not required), Nondeterministic Pushdown Automata (NPDA), **Context Sensitive Grammars**: Context-Sensitive Grammars (CSG) and languages, Linear Bounded Automata (LBA) and equivalence with CSG.

UNIT – V:

Turing Machine: The basic model for Turing Machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, unrestricted grammars and equivalence with Turing Machines, nondeterministic TMs and equivalence with deterministic TMs, variants of Turing Machines.

UNIT – VI:

Computability Theory: Undecidability: Church-Turing Thesis, universal Turing Machine, undecidable problems about languages. LR (0) grammar, decidability of problems, Post's Correspondence Problem - The classes P and NP.

TEXT BOOKS:

1. "Introduction to Automata Theory, Languages and Computations", H. E. Hopcroft, and J. D. Ullman, Second Edition, Pearson Education, 2003.
2. "Theory of Computer Science- Automata Languages and Computation", Mishra and Chandra Sekaran, Second Edition PHI.

REFERENCES:

1. "Elements of the theory of Computation", H. R. Lewis and C. H. Papadimitriou, Second Edition, Pearson Education/PHI, 2003
2. "Introduction to Languages and the Theory of Computation", J. Martin, Third Edition, TMH, 2003.
3. "Formal Languages and Automata Theory", K. V. N. Sunitha , N. Kalyani, 1st Edition, TMH, 2010
4. "Automata and Computability", Dexter C. Kozen Undergraduate Texts in Computer Science, Springer.

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(18PC1CS04) DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES:

- Reinforce algorithms analysis methods
- Ability to analyse running time of an algorithm
- Understand different algorithm design strategies
- Familiarity with an assortment of important algorithms

COURSE OUTCOMES: After completion of the course, the student will be able to

CO-1: Apply algorithm design techniques and concepts to solve given engineering problem

CO-2: Analyze running times of algorithms using asymptotic analysis

CO-3: Develop efficient algorithms for computational tasks

CO-4: Computing complexity measures of algorithms

UNIT-I:

Introduction: Characteristics of algorithm. Analysis of algorithms: Asymptotic analysis of complexity bounds – best, average and worst-case behaviour; Performance measurements of Algorithm, Time and space trade-offs.

Divide and conquer General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT-II:

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

UNIT-III:

Dynamic Programming: General method, Principle of optimality, applications-Multistage graphs, 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:

Graph and Pattern Matching Algorithms: Graph Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS), connected and biconnected components, Topological Sorting.

Pattern Matching Algorithms: Brute Force method, Knuth-Morris-Pratt algorithms

UNIT-VI:

NP Hard and NP-Complete problems: P, NP, NP-complete and NP-hard. Cook's theorem

Randomized Algorithm: Hiring Problem, Randomized Quick Sort

TEXT BOOKS:

1. Fundamentals of Computer Algorithms – E. Horowitz et al, Galgotia Publications.
2. Introduction to Algorithms, 4th Edition, Thomas H. Cormen, Charles E. Lieserson, Ronald L. Rivest and Clifford Stein, MIT Press/McGraw-Hill.

REFERENCES:

1. Algorithm Design, 1st Edition, Jon Kleinberg and Eva Tardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T. Goodrich and Roberto Tamassia, Wiley.
3. Algorithms – A Creative Approach, 3rd Edition, Udi Manber, Addison-Wesley, Reading, MA.
4. Introduction to the Design and Analysis of Algorithms, Anany Levitin, 3rd Edition, Pearson Publications.

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	3	**0**	**3**

(18PC1CS05) DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

- **Introduction** of Data Base Management concepts and to give the description of structure of Data Base systems
- **Understand** concepts of ER model and model the data base for the given scenarios and prepare the database through normalization
- **Know** the features of various models of data and query representations
- **Introduce** the concepts and protocols related to transaction management and understand the concepts of data storage

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Appreciate the underlying concepts of database system architecture and technologies
CO-2: Develop database schema for a given scenario
CO-3: Query the database using the relevant programming language
CO-4: Design schedules using multiple transactions

UNIT-I:
Introduction to Databases and Database Management System: Database system Applications, Advantages of DBMS over File System, Data Models, Instances and schema, View of Data, Database Languages –DDL, DML, DCL, Database Users and Administrator, Database System Architecture.

UNIT-II:
Database Design and ER diagrams: Attributes and Entity Sets, Relationships and Relationship Sets, Constraints, Keys, Design Issues, Entity-Relationship Diagram, Extended E-R Features, Database Design with ER model, Database Design for a schema.

UNIT-III:
Introduction to the Relational Model: Structure of RDBMS, Integrity Constraints over Relations, Querying Relational Data, Relational Algebra and Relational Calculus.
Introduction to SQL: Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations, Join Operations, Sub queries and correlated queries, views, Triggers, Cursors, Embedded SQL, Overview of NoSQL database.

UNIT-IV:
Functional Dependencies: Introduction, Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies.
Schema Refinement in Database Design: Problems Caused by Redundancy, Decompositions – Problem Related to Decomposition, Lossless Join Decomposition, Dependency Preserving Decomposition, FIRST, SECOND, THIRD Normal Forms, BCNF, Multivalued Dependencies, FOURTH Normal Form.

UNIT-V:

Transaction Management: Transaction state, Implementation of atomicity and Durability, Concurrent executions – Serializability, Recoverability.

Concurrency Control: Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling

Recoverability: Failure Classification, Storage Structure, Recovery and Atomicity- Log Based recovery, Recovery with concurrent transactions, Checkpoints.

UNIT-VI:

File Organization: Organization of records in file, Data Dictionary Storage.

Indexing and Hashing: Basic Concepts, Ordered Indices+ Tree Index files, B tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing with Hashing.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, Sudarshan, Seventh Edition, McGraw-Hill.
2. Introduction to Database Systems, C. J. Date, Pearson Education.

REFERENCES:

1. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, Tata McGraw-Hill.
2. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
3. Database Systems Design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition, Cengage Learning.

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	0	**3**	**1.5**

(18PC2IT02) JAVA PROGRAMMING LABORATORY

COURSE OBJECTIVES:

- **Write** the Java Programs related to classes and methods
- **Build** Solutions for exceptions and basic I/O streams
- **Develop** solid Java programming skills and the ability to design simple case studies
- **Implement** the concepts of object oriented to develop a real world application

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Analyze and **design** a computer program to solve real world problems based on object-oriented principles
CO-2: Implement concurrent programming using Multithreading concepts
CO-3: Identify appropriate Collection classes in problem solving
CO-4: Establish connection to the database using Java

WEEK 1:

1. Write a Java program to print all the twin primes below 1000. (A twin prime is a prime number that differs from another prime number by two. (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43), .821, 823), etc. .
2. Write a Java program to implement matrix multiplication. (Take the input from keyboard).
3. Write a Java program for sorting a given list of names in ascending order.

WEEK 2:

4. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the run of the two values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value in the Fibonacci sequence.
5. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

WEEK 3:

6. Write a Java program that checks whether a given string is a palindrome or not from command line. Ex: MALAYALAM is a palindrome.
7. Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.
8. Write a Java program to implement constructor overloading.

WEEK 4:

9. Write a Java program to implement variable length arguments
10. Write a Java program to implement the use of inner classes.

WEEK 5:

11. Write a Java program to implement dynamic method dispatch.
12. Write a Java program that illustrates how run time polymorphism is achieved.

WEEK 6:

13. Write a Java program that illustrates the following
    - Creation of simple package.
    - Accessing a package.
    - Implementing interfaces.
14. Write a Java program that illustrates built in exceptions.
15. Write a Java program to throw an exception "Insufficient Funds" while withdrawing the amount in the user account.

WEEK 7:

16. Write a Java program for creating multiple threads
    a. Using Thread class b. Using Runnable interface
17. Write a Java program for creating multiple threads. The main method sleeps for 10 seconds at the end of which all the threads should be terminated.

WEEK 8:

18. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

WEEK 9:

19. Write a Java program to create a file and write data into the file using Character Stream.
20. Write a Java program that reads on file name from the user then displays information about whether the file exists, whether the file is readable, whether the file is writable, the contents of file and the length of the file in bytes.

WEEK 10:

21. Write a Java program to perform the following operations on ArrayList, LinkedList, HashSet.
    a. Insertion
    b. Deletion
    c. Retrieval

WEEK 11:

22. Write a program to store Employee objects in a TreeSet and sort the objects based on employee salary using Comparator/Comparable.

WEEK 12:

23. Write a Java program to establish the connection to the database and perform the following operations.
    a. Retrieval
    b. Insertion
    c. Deletion
24. Write a Java program to call the stored procedure from a database.

WEEK 13:

25. Explore REST APIs.

TEXT BOOKS:

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd., New Delhi.
2. Big Java, 2nd Edition, Cay Horstmann, John Wiley and Sons

REFERENCES:

1. Java How to Program, Sixth Edition, H. M. Dietel and P. J. Dietel, Pearson Education/PHI
2. Core Java 2, Vol. 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol. 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education

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	0	**3**	**1.5**

(18PC2CS02) DATABASE MANAGEMENT SYSTEMS LABORATORY

COURSE OBJECTIVES:

- **Provide** the fundamental concepts of database creation
- **Implement** the concepts of Data manipulation
- **Develop** procedures for querying Multiple tables
- **Understand** the concepts of PL / SQL

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Apply Integrity constraints for creating consistent RDBMS environment
CO-2: Implement SQL functions using the DUAL table
CO-3: Create, maintain and Manipulate the Data through SQL commands
CO-4: Develop Triggers, query through PL /SQL structures

WEEK 1

Implement the following using DUAL table:

a) Character functions ,
b) Numeric functions
c) Date functions and
d) Conversion functions.

WEEK 2

Practice DDL and DML commands on a basic table without integrity constraints.

WEEK 3

Practice DDL and DML commands on a Relational Database, specifying the Integrity constraints.
(Primary Key, Foreign Key, CHECK, NOT NULL)

WEEK 4

Apply the concepts of Joins, SET operations and SQL functions on any two relational schemas

WEEK 5-7

Apply the concepts of Joins, SET operations and SQL functions on the following schema:

a) Employee

Name	Datatype	width	Constraint	Description
Empno	Integer	4	Primary Key	Employee Number
Ename	Varchar	20		Employee Name
Job	Char	12		Designation
Mgr	Integer	4		Manager Number
Hiredate	Date			

Sal	Number	(8,2)		Salary
Comm	Number	(6,2)		Commission
Deptno	Integer	2	Foreign Key	Department Number

b) Dept

Name	Datatype	width	Constraint	Description
Deptno	Integer	2	Primary Key	Department Number
Dname	Varchar	12		Department Name
Loc	Char	10		Location

c) Salgrade

Name	Datatype	width	Constraint	Description
Grade	Integer	1		Grade
Hisal	Integer	4		Upper scale of salary
Losal	Integer	5		Lower scale of salary

WEEK 8 – 11:

End to end implementation of a schema for a specific system along with the illustrations of querying.

A system is described by specifying the functional and non-functional requirements. Based on this description, the major entities are identified and modelled. Further the relationships are modelled to form the initial schema. The schema is further refined by removing redundancies through normalization. Also based on the query requirements, the schema is remodelled to facilitate querying. Finally an illustration of various queries to extract required information from the system is shown using SQL / MYSQL.

The five major workflows to be implemented are:

1. System Specification
2. Design of Initial Schema
3. Schema refinement using functional dependencies and normalization
4. Schema refinement using query requirements
5. Illustration of querying the system using SQL / MYSQL.

WEEK 12

Implementation of PL / SQL concepts

WEEK 13

Creating and executing CURSORS.

WEEK 14

Creation and application of TRIGGERS on a Relational schema.

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	0	**2**	**1**

(18PC2IT03) IT WORKSHOP

COURSE OBJECTIVES:

- **Train on** PC Hardware and productivity tools including Word, Excel, PowerPoint
- **Learn** the MATLAB environment and its programming fundamentals
- **Ability** to write programs using commands and functions
- **Able** to handle polynomials , and use 2D graphic commands
- **Implement** Image pre-processing techniques

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Customize their PC and their own documents
CO-2: Devise their own content using **word and excel**
CO-3: Understand the use of various MATLAB commands
CO-4: Design their own algorithms using MATLAB environment

LIST OF EXPERIMENTS:

WEEK-1

1. To identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral. Students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.(Audio-Visual Presentation)

2. Hardware Trouble shooting: Hardware trouble shooting of a PC which does not boot due to improper assembly or defective peripherals. Identify the problem and fix it to get the computer back to working condition.(Audio-Visual Presentation)

3. Software Troubleshooting: Malfunctioning of CPU due to system software problems. Fix the problem to get back computer to working condition.(Audio-Visual Presentation)

WEEK-2

4. Students customize their web browsers with the LAN proxy settings, bookmarks, search tool bars and pop up blockers. Also, plug-ins like Macro-media Flash should be configured. Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google by using filters.
(Audio-Visual Presentation& Practice)

5. Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their

computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.(Audio-Visual Presentation& Practice)

WEEK-3 & WEEK-4

6. Using **Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word. Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clip-art, Drawing toolbar and Word Art, Formatting Images, Text boxes, Paragraphs and Mail Merge in word.

WEEK-5 & WEEK-6

7. Using **excel** creating a Scheduler and Calculating GPA– Features to be covered:- Grid lines, Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting.

WEEK-7 & WEEK-8

8. Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts, Lines and Arrows , Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides in and Power point. Students will be given model power point presentation which needs to be replicated.

WEEK-9 & WEEK-10

9. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.

10. Data types, Constants and Variables, Character constants, operators, Assignment statements, Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.

WEEK-11

11. Input-Output functions, Reading and Storing Data. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.

12.Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices, Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.

WEEK-12

13. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.

14. Read an Image and construct Color Histogram.

WEEK-13

15. Installation of Windows and Linux OS (Audio-Visual Presentation).

WEEK-14

16. Practice of MS-DOS & Linux commands (Basic commands)

TEXT BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e, McGraw-Hill.
3. Upgrading and Repairing, PC's 18/e, Scott Muller QUE, Pearson Education
4. Bansal R. K, Goel A. K., Sharma M. K., "MATLAB and its Applications in Engineering", Pearson Education, 2012.

REFERENCES:

1. Comdex Information Technology Course Tool Kit by Vikas Gupta, Wiley Dreamtech
2. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)
3. Amos Gilat, "MATLAB-An Introduction with Applications", Wiley India, 2009.
4. Stephen J. Chapman, "Programming in MATLAB for Engineers", Cengage Learning, 2011.