II YEAR I SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	P18CST03	Mathematical Foundations Of Computer Science	3	1	0	4	40	60
2	P18CST02	Data Structures	3	0	0	3	40	60
3	P18ITT01	Object Oriented Programming Through C++	3	0	0	3	40	60
4	P18ECT19	Digital Electronics	3	0	0	3	40	60
5	P18BST07	Mathematics-III	3	1	0	4	40	60
6	P18CSL02	Data Structures Lab	0	0	3	1.5	40	60
7	P18ITL01	Object Oriented programming, Through C++ Lab	0	0	3	1.5	40	60
8	P18MCT02	Environmental Sciences	2	0	0	0	0	100
Total Periods			**18**	**2**	**6**	**20**	**280**	**520**

B.Tech II Year I Semester **Course Structure**

L	T	P	C
3	1	0	4

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(IT)

Subject Code: P18CST03 **Internal Marks: 40**
External Marks: 60

Course Prerequisites:
An understanding of Mathematics in general is sufficient.

Course Objectives:
1. To explain with examples the basic terminology of functions, relations, and sets.
2. To perform the operations associated with sets, functions, and relations.
3. To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
4. To describe the importance and limitations of predicate logic.
5. To relate the ideas of mathematical induction to recursion and recursively defined structures.
6. To use Graph Theory for solving problems.

Course Outcomes:
1. Ability to illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
2. Ability to demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
3. Ability to represent and Apply Graph theory in solving computer science problems.

UNIT–I (12 Lectures)

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

UNIT-II (13 Lectures)

Relations: Basic Structures, Sets, Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties

UNIT-III (13 Lectures)

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application. Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT-IV (11 Lectures)

Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Baye's Theorem, Expected Value and Variance

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion- Exclusion, Applications of Inclusion-Exclusion

UNIT-V (11 Lectures)

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees

Text Books:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7th Edition, TMH.2007.
2. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.2008.
3. Discrete Mathematics for Computer Scientists and Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI, 2008.

References Books:

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblay and R. Manohar, TMH, 2008.
2. Discrete Mathematics- Richard Johnsonbaugh, 7th Edn., Pearson Education,2009.
3. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M. Parmenter.2/e, 2002.
4. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education, 2004.

Web References:

1. www.tutorialspoint.com
2. www.lecturenotes.in
3. www.nptel.ac.in

B.Tech II Year I Semester **Course Structure**

L	T	P	C
3	1	0	3

DATA STRUCTURES
(IT)

Subject Code: P18CST02 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: C-Programming

Course Objectives:
1. Comprehensive knowledge of data structures and ability to implement the same in software applications.
2. Exposure to algorithmic complexities, recursive algorithms, searching techniques.
3. Exposure to sorting technique, Applying stack techniques for logical operations.
4. Applying queue techniques for logical operations, Exposure to list representation models in various types of applications.
5. Implementation of tree in various forms, Advanced understanding of other variants of trees and their operations.
6. Orientation on graphs, representation of graphs, graph traversals, spanning trees Graphs.

Course Outcomes:
1. At the end of this course, the students will be able to
2. Student will be able to choose appropriate data structure as applied to specified problem definition.
3. Implement appropriate sorting/searching technique for given problem
4. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
5. Students will be able to implement Linear and Non-Linear data structures

UNIT-I (13 Lectures)

Data Structure, Recursion & **Searching:** Preliminaries of algorithm, Algorithm analysis and complexity. **Data Structure:** Definition, types of data structures.

Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Types of recursion (Linear, binary and Tail), recursive algorithms for factorial function, GCD Computation, Fibonacci sequence, Towers of Hanoi

Searching: List Searches using Linear Search, Binary Search, Fibonacci Search

UNIT-II (11 Lectures)

Sorting Techniques: Basic Concepts, Sorting by: Insertion (Insertion Sort), Selection (heap sort), Exchange (Bubble sort, Quick Sort), distribution (Radix sort) and merging (Merge sort) Algorithms.

Stacks: Basic Stack operations, Representation of a stack using arrays, Stack Applications: Reversing list, Infix to postfix transformation.

UNIT-III (12 Lectures)

Queues: Introduction, Representation of a Queue using arrays, Queue Operations, Applications of queues- Round Robin Algorithm, Circular Queues, Priority Queues.

Linked List: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications: single linked list to represent polynomial expressions, Circular linked list, Double linked list.

UNIT-IV (13Lectures)

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays, operations on a Binary tree, Binary Tree Traversals (recursive).

Advanced Tree Concepts: Binary search tree, Basic concepts, BST operations: Searching, insertion, deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees Definition and Examples only, Red-Black Trees-Definitions and Examples only (No operations)

UNIT-V (11 Lectures)

Graphs: Basic concepts, Graph Representations- Adjacency matrix, Adjacency lists, Graph algorithms: Graph Traversals (BFS & DFS), applications: Dijkstra's shortest path, Transitive closure, Minimum Spanning Tree using Prim's & Kruskal's Algorithm.

Text Books:

1. Data Structures, Richard F, Gilberg, Forouzan, 2/e, Cengage, 2007.
2. Data Structures and Algorithms, G.A.V.Pai, TMH,2008.

Reference Books:

1. Data Structure with C, Seymour Lipschutz, TMH, 2010.
2. Classic Data Structures, Debasis, Samanta, 2/e, PHI,2009.
3. Fundamentals of Data Structure in C, Horowitz, Sahni, Anderson Freed, 2/e, University Press, 2013.

Web References:

1. www.nptel.ac.in
2. www.udemy.com

B.Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

OBJECT ORIENTED PROGRAMMING THROUGH C++

(IT)

Subject Code: P18ITT01 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: C-Programming

Course Objectives:

1. To get a clear understanding of object-oriented concepts.
2. To understand object oriented programming through C++.

Course Outcomes:

1. Gain the basic knowledge on Object Oriented concepts.
2. Ability to develop applications using Object Oriented Programming Concepts.
3. Ability to implement features of object oriented programming to solve real world problems.

UNIT-I (10 Lectures)

Introduction to Object Oriented Programming: Need for Object Oriented Programming - Characteristics of Object Oriented Languages – Comparison of C and C++ - Structures: Structures - Enumerations – Functions: Simple Functions – Passing Arguments to Functions – Returning Values from Functions – Reference Arguments - Overloaded Functions – Recursion – Inline Functions –Default Arguments – Scope and Storage Class – Returning by Reference – const Function Arguments.

UNIT-II (9 Lectures)

Objects and Classes: A Simple Class – C++ Objects as Physical Objects – C++ Objects as Data types - Constructors – Objects as Function Arguments - Copy Constructor – Structures and Classes – Classes, Objects and Memory - Static class data – Constant Member functions and constant objects - Arrays and Strings: Array Fundamentals – Arrays as Class Member Data – Array of Objects – C-Strings – The Standard C++ String Class.

UNIT-III (9 Lectures)

Operator Overloading: Overloading Unary Operators – Overloading Binary Operators - Data Conversion – explicit and mutable keywords – Inheritance: Derived Class and Base Class – Derived Class Constructors – Overriding Member Functions – Which Function is Used – Class Hierarchies – Public and Private Inheritance – Levels of Inheritance- Multiple Inheritance – Ambiguity – Containership: Classes within classes.

UNIT-IV (9 Lectures)

Pointers: Address and Pointers – The Address of Operator - Pointers and Arrays – Pointers and Functions – Pointers and C-type Strings – Memory Management – Pointers to Objects – Pointers to Pointers - Virtual Functions: Virtual Functions - Friend Functions – Static Functions – Assignment and Copy Initialization – The this pointer – Dynamic Type Information.

UNIT-V (8 Lectures)

Streams: Stream Classes – Stream Errors — Overloading Extraction and Insertion Operators - Templates and Exceptions: Function Templates – Class Templates – Exception Handling- Types of Exceptions, Throwing Exceptions, Exception Classes. Multiple Throws and Catches, Uncaught Exceptions-Nested Try-Catch Blocks.

Text Books:

1. C++: The Complete Reference– Schildt H, 4th Ed, TMH, 1994.
2. The C++ Programming Language – Stroustrup B, 4/e, Addison-Wesley, 1997.
3. C++:How to program-Deitel &Deitel, 10/e, Pearson, 2017.

Reference Books:

1. Teach Yourself C++, Al Stevens,5/e, Wiley, 1997.
2. A Structured Approach using C++, Farouzan & Gilberg, Cengage India, 2012.
3. Object Oriented Programming with C++, R S Salaria, Khanna Publicaions, 2009.
4. Object Oriented Programming With C++, E Balagurusamy,6/e, TMH, 2013.
5. C++ Programming, Black Book, Steven Holzner, dreamtech, 2000.
6. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia, 2003.
7. Object Oriented Programming with ANSI and Turbo C++, Ashok Kamthane, Pearson, 2006.
8. The Compete Reference C++, Herbert Schlitz, TMH, 2017.

Web References:

1. www.cplusplus.com
2. www.stroustrup.com

B.Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

DIGITAL ELECTRONICS

(IT)

Subject Code: P18ECT19 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objectives:

1. Able to perform the conversion among different number systems; Familiar with basic logic gates -- AND, OR & NOT, XOR, XNOR; independently or work in team to build simple logic circuits using basic.
2. Understand Boolean algebra and basic properties of Boolean algebra; able to simplify simple Boolean functions by using the basic Boolean properties.
3. Able to design simple combinational logics using basic gates. Able to optimize simple logic using Karnaugh maps, understand "don't care".
4. Familiar with basic sequential logic components: SR Latch, D Flip-Flop and their usage and able to analyze sequential logic circuits.
5. Understand different memories and able to design different programming tables.

Course Outcomes:

1. Students will be aware of various number systems and conversion of number systems.
2. Students will be aware of theory of Boolean algebra & the underlying features of various logic gates.
3. Students will be aware of designing mapping method up to 6-variables.
4. Students will be able to use the concepts of Boolean algebra for the analysis & design of various combination logic and sequential circuits.
5. Students will be aware of different memories and their programming tables.

UNIT- I (9 Lectures)

Number Systems and Signed Binary Numbers : Number System, Types of Number Systems, Number base Conversions from one radix to another radix, Representation of Signed Binary Numbers, 2’s complement arithmetic, 1’s complement arithmetic.

UNIT- II (9 Lectures)

Boolean algebra : Logic gates, Laws of Boolean algebra, Principle of Duality, Principle of Complements, Reducing Boolean Expressions, Boolean Functions, Canonical and Standard Forms, M-Notations: Minterms and Maxterms,

UNIT- III (11 Lectures)

Gate level Minimization : Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don’t – Care Conditions, Implementation using NAND and NOR.

UNIT- IV (8 Lectures)

Combinational Logic Design : Introduction, Design Procedure, Adders, Subtractors, Binary Adder–Subtractor, Decoders, Encoders, Multiplexers.

UNIT- V (8 Lectures)

Programmable Logic Devices : Classification of memories, PROM,PAL,PLA – basic Structures, programming tables of PROM, PAL, PLA, Realization of Boolean function with PLDs , Merits & demerits of PROM, PAL, PLA. Comparison of PROM, PAL, PLA.

Text Books:

1. Digital Design, M.Morris Mano, Michael D Ciletti, 5/e, PEA, 2006.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage, 2003.

Reference Books:

1. Switching Theory and Logic Design, A.Anand Kumar, PHI, 2008.
2. Digital Electronics and Logic Design, Dr. Sanjay Sharma, S.K. Kataria & Sons, 2013.
3. Modern Digital Electronics, R.P. Jain, TMH, 2009.

Web References:

1. www.geeksforgeeks.org
2. www.learn.sparkfun.com

B.Tech II Year I Semester **Course Structure**

L	T	P	C
3	1	0	4

MATHEMATICS-III
(IT)

Subject Code: P18BST07 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Mathematics-I, Mathematics-II

Course Objectives:

1. The course is designed to equip **S:** the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The Fourier series of a periodic function and its application to the solution of partial differential equations.
3. To calculate the Fourier transform or inverse transform of common functions including Delta, Unit-Step.
4. Learn to find Solution of One dimensional Wave, Heat equation

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators.
2. Solve ordinary differential equations numerically using Euler's and RK method.
3. Analyze the spectral characteristics of signals using Fourier analysis. Classify systems based on their properties and determine the response
4. Find Fourier series and Fourier transforms for certain functions.
5. Identify/classify and solve the different types of partial differential equations.

UNIT- I (8 Lectures)

Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Newton- Raphson method.

Interpolation: Introduction- Forward differences- Backward differences. Newton's formula for interpolation- Lagrange's interpolation formula.

UNIT- II (10 Lectures)

Numerical Integration and solution of Ordinary Differential equations Trapezoidal rule- Simpson's 1/3rd and 3/8th rule Solution of ordinary differential equations by Taylor's series- Euler's method –Modified Euler's method, Runge- Kutta method of fourth order.

UNIT- III (9 Lectures)

Fourier series: Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series.

UNIT- IV (8 Lectures)

Fourier Transforms: Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier Transforms.

UNIT- V (10 Lectures)

First order Partial differential equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard types)equations. Method of separation of Variables- Solution of One dimensional Wave, Heat equation.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2015.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications, 2011.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India, 2011.
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn, 2002.
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press, 2010.
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning, 2016.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press, 2015.

Web References:

1. www.tutorial.math.lamar.edu
2. www.mathworld.wolfram.com
3. www.nptel.ac.in

B.Tech II Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

DATA STRUCTURES LAB
(IT)

Subject Code: P18CSL02 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: C- Programming

Course Objectives:

1. To choose the appropriate data structure and algorithm design method for a specified application.
2. To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Analyze worst-case running times of algorithms using asymptotic analysis and implement various data structures like linked lists.
2. Understand and implement stacks and queues using arrays and linked lists.
3. Analyze and implement various searching and sorting algorithms.
4. Design and implement appropriate hash function and collision-resolution algorithms

Exercise 1:

Write recursive program for the following

a) Write recursive C program for calculation of Factorial of an integer
b) Write recursive C program for calculation of GCD (n, m)
c) Write recursive program which computes the n^{th} Fibonacci number
d) Write recursive C program for Towers of Hanoi : N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Exercise 2:

a) Write recursive C program for functions to perform Linear search for a Key value in a given list.
b) Write recursive C program for functions to perform Binary search for a Key value in a given list.
c) Write recursive C program for functions to perform Fibonacci search for a Key value in a given list.

Exercise 3:

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
c) Write C program that implement Insertion sort,to sort a given list of integers in ascending order

Exercise 4:

a) Write C program that implement heap sort, to sort a given list of integers in ascending order
b) Write C program that implement radix sort, to sort a given list of integers in ascending order
c) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise 5:

a) Write C program that implement stack (its operations) using arrays
b) Write C program that implement stack (its operations) using Linked list

Exercise 6:

a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
b) Write C program that implement Queue (its operations) using arrays
c) Write C program that implement Queue (its operations) using linked lists

Exercise 7:

a) Write a C program that uses functions to create a singly linked list
b) Write a C program that uses functions to perform insertion operation on a singly linked list
c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 8:

a) Write a C program to Create a Binary Tree of integers
b) Write a recursive C program for traversing a binary tree in preorder, in order and post order.

Exercise 9:

Write a C program for BST operations (insertion, deletion)

Exercise 10:

a) Write a C program for finding minimum spanning tree in a graph by using Prim's algorithm.
b) Write a C program for finding minimum spanning tree in a graph by using Kruskal's algorithm.

B.Tech II Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB

(IT)

Subject Code: P18ITL01 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: C- Programming

Course Objective:

1. To get a clear understanding and to solve problems using Object-Oriented programming paradigms.

Course Outcomes:

1. Ability to effectively use compilers includes library functions, debuggers and trouble shooting.
2. Implement data structure algorithms through C++.

Exercise1

a) Write a program to find the sum of given non-negative integer numbers using a recursive function.
b) Write a program to find the factorial of the given number using the recursive function.
c) Write a function in C++ to generate a Fibonacci series of n numbers, where n is defined by a programmer.

Exercise 2

a) Write a C++ Program to demonstrate parameter passing methods.
b) Write a program in C++ to solve a general quadratic equation.ax2+bx+c=0

Exercise 3

Write a C++ program to perform the following

a) Matrix Addition
b) Matrix Subtraction
c) Matrix Multiplication
d) Transpose of a Matrix.

Exercise 4

a) Write a C++ Program to demonstrate function overloading.
b) Write a C++ Program to demonstrate overload the following operators.

i. Arrow operator
ii. Function call operator
iii. Insertion Operator(<<)
iv. Extraction Operator

Exercise 5

Write a program to perform the following arithmetic operations of a complex number using a class.

a) Addition of two complex numbers
b) substation of two complex numbers
c) Multiplication of tow complex numbers
d) Division of tow complex numbers

Exercise 6

a) Write a C++ Program to demonstrate template functions.
b) Write a C++ Program to demonstrate template class

Exercise 7

a) Write a C++ program to implement the following
   i. Single inheritance
   ii. Multiple inheritances
   iii. Multi-Level inheritance
   iv. Hybrid-inheritance.
b) Write a C++ program to demonstrate constructor and destructor calling sequence.

Exercise 8

Write a C++ program to demonstrate the usage of C++ Exception Handling mechanism.

Exercise 9

Write a C++ program to demonstrate runtime polymorphism

Exercise 10

Write a C++ program to demonstrate following

a)This pointer

b) Static data member

c) Static member function.

Exercise 11

Write a C++ program to demonstrate following

a) Friend function

b) Friend member function

c) Friend class

Exercise - 12

Implement stack and queue data structures using templates.

B. Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	0

ENVIRONMENTAL SCIENCE

(IT)

Subject Code: P18MCT02

Course Prerequisites:
Basic knowledge about sciences up to intermediate or equivalent level.

Course Objectives:

1. Overall understanding of the natural resources
2. Basic understanding of the ecosystem and its diversity
3. Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
4. An understanding of the environmental impact of developmental activities
5. Awareness on the social issues, environmental legislation and global treaties

Course Outcomes:
At the end of the course, the students will be able to acquire

1. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web
2. The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources
3. Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
4. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
5. Social issues both rural and urban environment and the possible means to combat the challenges and environmental assessment stages involved in EIA and the environmental audit.

UNIT-I (9 Lectures)

Multidisciplinary Nature Of Environmental Studies: Definition, Scope and Importance– Need for Public Awareness. Renewable energy Resources, Solar energy-solar cells, solar batteries, wind energy, wind mills, ocean energy, tidal energy and nonrenewable energy resources: LPG, water gas, producer gas. World food problems, degradation and Soil erosion - overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity.

UNIT-II (9 Lectures)

Ecosystems: Concept of an ecosystem. – Structure, Components and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Ecological pyramids - Food chains, food webs and Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest

ecosystem. b. Grassland ecosystem c. Desert ecosystem d. Aquatic – River and Lake Ecosystems.

UNIT-III (9 Lectures)

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 and aesthetic values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-IV (9 Lectures)

Environmental Pollution: Definition, Cause, Effects and Control measures of : a. Air Pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution, f. Nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – **Disaster management:** floods, earthquake, cyclone and landslides.

UNIT-V (9 Lectures)

Social Issues And The Environment: From unsustainable to sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management –Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies Population growth – Impacts on society, variation among nations. Environmental Impact Assessment (EIA) and Environmental Protection Acts.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press, 2005.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi, 2008.

Reference Books:

1. Environmental Science & Engineering by Dr. A. Ravikrishnan, Hitech Publishing Company Pvt. Ltd. 2013.
2. Perspectives in Environmental Studies, Second edition, Anubha Koushik and C.P. Koushik, New Age International (P) Limited, Publishers, 2004.

Web References:

1. www.tutorialspoint.com/
2. www.sophia.org/

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Department of Information Technology

II YEAR II SEMESTER

S.No	CODE	COURSE	L	T	P	Credits	Internal	External
1	P18CST01	Java Programming	3	1	0	4	40	60
2	P18ITT02	Computer Organization	3	0	0	3	40	60
3	P18ITT03	Software Engineering	3	0	0	3	40	60
4	P18CST06	Database Management Systems	3	0	0	3	40	60
5	P18CSL03	Free open source software	1	0	2	2	40	60
6	P18ITOX	*Open Elective – I*	2	0	0	2	40	60
7	P18CSL01	Java Programming Lab	0	0	3	1.5	40	60
8	P18CSL05	Database Management Systems Lab	0	0	3	1.5	40	60
9	P18MCT05	Indian Constitution	3	0	0	0	40	60
Total Periods			**18**	**1**	**8**	**20**	**360**	**540**

S.No	Subject Code	Offered By Dept.	Open Elective – I
1	P18MBO01	HSMC	Managerial Economics and Financial Analysis
2	P18ECO02	ECE	Introduction to Simulation Software
3	P18EST05	ME	Engineering Mechanics
4	P18ITO04	CSE/IT	Statistics with R

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	1	0	4

JAVA PROGRAMMING

(IT)

Subject Code: P18CST01 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: C++ - Programming and Object-Oriented Programming

Course Objectives:

1. To understand Object Oriented Programming concepts and basic characteristics of Java
2. To understand the principles of packages, inheritance and interfaces
3. To Implement exceptions and use I/O streams
4. To design and build simple Graphical User Interface application.

Course Outcomes:

After completion of the course, students will be able to:

1. Implement OOPS concepts in Java programs
2. Develop Java programs with the concepts of inheritance and interfaces
3. Design a Java applications using exceptions and I/O streams
4. Design interactive Java application using swings

UNIT I (9 Lectures)

OOPS-Fundamentals- Object Oriented Programming concepts - Abstraction - objects and classes - Encapsulation- Inheritance -Polymorphism- OOP in Java - Characteristics of Java- Java Source File -Structure- Compilation- Data Types - Variables and Arrays - Operators - Control Statements- Classes – Objects - Methods.

UNIT II (8 Lectures)

OOPS-Inheritance- Inheritance- constructors- polymorphism-Access specifier- Static members-Packages -Abstract classes- Interfaces and Inner classes-object cloning -Array Lists - Strings.

UNIT III (10 Lectures)

Exception Handling-Exception handling -try-catch, throw, throws, finally block, user defined exception-built-in exceptions- Stack Trace Elements-Input -Output Basics - Streams - Byte streams and Character streams - Reading and Writing Console - Reading and Writing Files.

UNIT IV (9 Lectures)

Concurrent Programming-Multi-threaded programming - thread life cycle- interrupting threads - thread states - thread priorities- thread synchronization- Inter-thread communication, daemon threads, thread groups-java Applets- Applet class, Applet structure, An Example Applet Program, Applet Life Cycle.

UNIT V (9 Lectures)

Graphics Programming- Graphics programming - Frame - Components- java.awt package, Container class, Layouts, Basics of event handling - event handlers -AWT event hierarchy - Swing Components- Text Fields, Text Areas - Buttons- Check Boxes – Radio Buttons - Lists- choices- Scrollbars - Windows -Menus - Dialog Boxes.

Text Books:

1. Java The complete reference, 8th Edition, Herbert Schildt, McGraw Hill Education, 2011.
2. Core Java Volume-I Fundamentals, 9th edition, Cay S. Horstmann, Gary Cornell, Prentice Hall, 2013.

Reference Books:

1. Java 2 Black book, Steven Holzner, Dream tech press, 2011.
2. The JAVA programming language, Third edition, K. Arnold and J. Gosling, Pearson Education, 2000.
3. An introduction to Object-oriented programming with Java, Fourth Edition, C.Thomas Wu, Tata McGraw-Hill Publishing company Ltd., 2006.

Web References:

1. www.tutorialspoint.com
2. www.beginnersbook.com
3. www.w3schools.com
4. www.udemy.com

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

COMPUTER ORGANIZATION

(IT)

Subject Code: P18ITT02 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Digital Electronics

Course Objectives:

1. Understand the architecture of a modern computer with its various processing UNITs. Also the Performance measurement of the computer system.
2. To understand various data transfer techniques in digital computer.
3. In addition to this the memory management system of computer.

Course Outcomes:

1. Ability to understand basic structure of computer.
2. Ability to perform computer arithmetic operations.
3. Ability to understand control UNIT operations.
4. Ability to design memory organization that uses banks for different word size operations.
5. Ability to understand the concept of cache mapping techniques.
6. Ability to understand the concept of I/O organization.

UNIT –I (8 Lectures)

Basic Structure Of Computers: Functional UNIT, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.

UNIT – II (10 Lectures)

Machine Instruction And Programs: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation.

Type Of Instructions: Component of Instructions: Logic Instructions, shift and Rotate Instructions Arithmetic and Logic Instructions, Branch Instructions, Input/output Operations.

UNIT –III (9 Lectures)

Computer Arithmetic : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic UNIT, Decimal Arithmetic operations.

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control UNIT.

UNIT –IV (9 Lectures)

The Memory Systems: Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, Interleaving

Secondary Storage: Magnetic Hard Disks, Optical Disks.

UNIT –V (9 Lectures)

Input / Output Organization: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)

Text Books :

1. Computer System Architecture, M.Moris Mano, 3rd Edition, Pearson/PHI, 2007.
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill, 2002.

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI, 2007.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson, 2005.
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition, 2005.

Websites References:

1. www.tutorialspoint.com
2. www.studytonight.com

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

SOFTWARE ENGINEERING

(IT)

Subject Code: P18ITT03 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objectives:

1. To make the students learn about the basic concepts on software engineering methods and practices and their appropriate application in software industry.
2. To develop an understanding of software process models and Software Development Life Cycle.
3. To provide an idea on software testing techniques.
4. To teach an understanding role of the different aspects of Software Project Management.

Course Outcomes:

At the end of the course student able to

1. Identify, formulate, and solve software engineering problems.
2. Elicit, analyze and specify software requirements with various stakeholders of a software development project.
3. Participate in design, development, deployment and maintenance of a medium scale software development project.
4. Convey technical material through oral presentation and interaction with an audience.
5. Evaluate the impact of potential solutions to software engineering problems in a global society, using the knowledge of models, tools, and techniques.

UNIT- I (10 Lectures)

Introduction to Software Engineering: The evolving role of software, Software Characteristics, 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), Process assessment, Product and Process.

UNIT-II (8 Lectures)

Process models: The waterfall model, Incremental process models, Evolutionary process models, the unified process.

Software Requirements: User requirements, System requirements, Functional and non-functional requirements, the Software Requirements Document (SRS).

UNIT-III (10 Lectures)

Requirements Engineering Process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

Project planning and estimation: Project Planning Activities, Software Metrics and Measurements, Project Size Estimation, Effort Estimation Techniques: COCOMO, PERT/CPM method.

UNIT-IV (8 Lectures)

Design Engineering: Design process and Design quality, Design concepts, Software Architecture, Architectural Styles and Patterns.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution

UNIT-V (9 Lectures)

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Validation testing, System testing, the art of Debugging, Black-Box and White-Box testing.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000
Quality standards.

Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc GrawHill International Edition, 2010.
2. Software Engineering- Sommerville , 9th edition, Pearson education, 2011.
3. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning, 2013.

Reference Books:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers, 2007.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, JohnWiely,2000.
3. Systems Analysis and Design- Shely Cash man Rosenblatt, Thomson Publications,2016.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies, 2004.

Websites References:

1. www.en.wikibooks.org/wiki/
2. www.slideshare.net/

B.Tech. II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

DATABASE MANAGEMENT SYSTEMS

(IT)

Course Code: P18CST06 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objectives:

1. Provides students with theoretical knowledge and practical skills in the design, use of databases and database management systems in information technology applications.

Course Outcomes:

After completion of this course, the students would be able to

1. Acquire knowledge in fundamentals of DBMS and identify the differences between traditional file system and DB systems.
2. Understand various DBMS models and how queries are being processed and executed in RDBMS.
3. Analyze DB design methodology and normalization process.
4. Discuss the various transaction and concurrency management techniques
5. Discuss various files indexing techniques.

UNIT – I (9 Lectures)

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

UNIT – II (10 Lectures)

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints and their importance.

Basic SQL : Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, views.

UNIT – III (9 Lectures)

Schema Refinement (Normalization): Problems Caused by Redundancy, Decompositions, Problems Related to Decomposition, Functional dependency, Properties of Functional dependency, Normal forms based on functional dependency - 1NF, 2NF and 3NF, concept

of surrogate key, Boyce-Codd normal form(BCNF), 4NF; Properties of Decompositions - Lossless join decomposition and dependency preserving decomposition.

UNIT – IV (9 Lectures)

Transaction Management And Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and save point. Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering: Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery. SQL constructs that grant access or revoke access from user or user groups. Basic PL/SQL procedures, triggers.

UNIT-V (8 Lectures)

Overview Of Storages And Indexing: Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization

Textbooks:

1. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH, 2014.
2. Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA, 2010.
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning, 2012.

Reference Books:

1. Database System Concepts. 6/e Silberschatz, Korth, TMH, 2013.
2. Introduction to Database Systems, 8/e C J Date, PEA, 2003.
3. The Database book: principles & practice using Oracle/MySql Narain Gehani, University Press, 2008.

Web References:

1. www.studytonight.com/dbms/
2. www.tutorialspoint.com/dbms/
3. www.beginnersbook.com/2015/04/dbms-tutorial/
4. www.w3schools.com/sql/

B.Tech II Year II Semester

Course Structure

L	T	P	C
1	0	2	2

Free Open Source Software

(IT)

Subject Code:P18CSL03

COURSE OBJECTIVES

- To teach students various unix utilities and shell scripting

Session-1

- Log into the system
- Use vi editor to create a file called myfile.txt which contains some text.
- correct typing errors during creation.
- Save the file
- logout of the system

Session-2

- Log into the system
- open the file created in session 1
- Add some text
- Change some text
- Delete some text
- Save the Changes
- Logout of the system

2. a) Log into the system

b) Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields

- 1425 Ravi 15.65
- 4320 Ramu 26.27
- 6830 Sita 36.15
- 1450 Raju 21.86

c) Use the cat command to display the file, mytable.

d) Use the vi command to correct any errors in the file, mytable.

e) Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)

f)Print the file mytable
g)Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)
h)Print the new file, mytable
i)Logout of the system

- Login to the system
- Use the appropriate command to determine your login shell
- Use the /etc/passwd file to verify the result of step b.
- Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
- Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

3) Write a sed command that deletes the first character in each line in a file.

- Write a sed command that deletes the character before the last character in each line in a file.
- Write a sed command that swaps the first and second words in each line in a file.

4) Pipe your /etc/passwd file to awk, and print out the home directory of each user.

- Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
- Repeat
- Part using awk

5) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

- Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

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

7) a) Write a shell script that computes the gross salary of a employee according to the following rules:
i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic. ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic The basic salary is entered interactively through the key board.

8) Write a shell script to search given number using binary search.

9) a)Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
c) Write a shell script to perform the following string operations:

i) To extract a sub-string from a given string.
ii) To find the length of a given string.

10) Write a shell script which will display Armstrong numbers from given arguments

11) Write a shell script to display factorial value from given argument list

12) Write a C program that simulates ls Command
(Use system calls / directory API)

Do the following Shell programs also

Write a shell script to check whether a particular user has logged in or not. If he has logged in, also check whether he has eligibility to receive a message or not

1. Write a shell script which will display the username and terminal name who login recently in to the unix system
2. Write a shell script to find no. of files in a directory
3. Write a shell script to check whether a given number is perfect or not
4. Write a menu driven shell script to copy, edit, rename and delete a file
5. Write a shell script for concatenation of two strings
6. Write a shell script which will display Fibonacci series up to a given number of argument
7. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat
   Rules: avg>=80 then grade A
   Avg<80&&Avg>=70 then grade B
   Avg<70&&Avg>=60 then grade C
   Avg<60&&Avg>=50 then grade D
   Avg<50&&Avg>=40 then grade E
   Else grade F
8. Write a shell script to accept empno,empname,basic. Find DA,HRA,TA,PF using following rules. Display empno, empname, basic, DA,HRA,PF,TA,GROSS SAL and NETSAL. Also store all details in a file called emp.dat
   Rules: HRA is 18% of basic if basic > 5000 otherwise 550
   DA is 35% of basic
   PF is 13% of basic
   IT is 14% of basic
   TA is 10% of basic
9. Write a shell script to demonstrate break and continue statements
10. Write a shell script to display string palindrome from given arguments
11. Write a shell script to display reverse numbers from given argument list
12. Write a shell script which will find maximum file size in the given argument list

13. Write a shell script which will greet you “Good Morning”, ”Good Afternoon”, “Good Evening’ and “Good Night” according to current time
14. Write a shell script to sort the elements in a array using bubble sort technique
15. Write a shell script to find largest element in a array
16. Write an awk program to print sum, avg of students marks list
17. Write an awk program to display students pass/fail report
18. Write an awk program to count the no. of vowels in a given file
19. Write an awk program which will find maximum word and its length in the given input File
20. Write a shell script to generate the mathematical tables.
21. Write a shell script to sort elements of given array by using selection sort.
22. Write a shell script to find number of vowels, consonants, numbers, white spaces and special characters in a given string.
23. Write a shell script to search given number using binary search.

B.Tech. II Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

DATABASE MANAGEMENT SYSTEMS LAB

(IT)

Course Code: P18CSL05 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objectives:

After Completion of this course student must be able to

1. Understand, analyze and apply SQL commands like DDL,DML,DCL to perform different Database operations
2. Understand and practice PL/SQL block, control statements and cursors.
3. Develop PL/SQL programs using, functions, procedures, packages and Triggers.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Know about SQL DDL,DML,DCL,TCL commands
2. Know how to write SQL Quires using set operators
3. Know about how to implement PL/SQL programs using conditional ,loops statements
4. Know about implementing of triggers, cursors and exceptions
5. Know about implementing procedures, functions and packages

Experiments List

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables).

2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

4. Queries using Conversion functions, STRING functions and DATE functions

5. i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section

   ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISEAPPLICATION ERROR. 8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

8. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

9. Write a PL/SQL block illustrating packages.

10. Write a PL/SQL code using CURSOR.

11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and Instead of Triggers.

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	0

INDIAN CONSTITUTION

(IT)

Subject Code: P18MCT05
Course Prerequisites: Nil

Course Objectives:

1. To know about Indian constitution.
2. To know about central government functionalities in India.
3. To know about state government functionalities in India.
4. To know about functions of Indian Constitution
5. To know about Indian society.

Course Outcomes:

Upon completion of the course, students will be able to

1. Understand the background and structure of Indian Constitution
2. Understand the functions of the Indian government
3. Understand the functions of the State government
4. Understand and abide the rules of the Indian constitution.
5. Understand and appreciate different culture among the people.

UNIT I (9 Lectures)

Introduction : Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II (9 Lectures)

Structure And Function Of Central Government : Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III (9 Lectures)

Structure And Function Of State Government

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV (9 Lectures)

Constitution Functions : Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries – Assessment of working of the Parliamentary System in India.

UNIT V (9 Lectures)

Indian Society: Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

Textbooks:

1. Introduction to the Constitution of India ,Durga Das Basu, Prentice Hall of India, New Delhi, 1994.
2. Indian Political System, R.C.Agarwal, S.Chand and Company, New Delhi, 1997.
3. Society: An Introduction Analysis, Maciver and Page, Mac Milan India Ltd., New Delhi, 2007.
4. Social Stratification in India: Issues and Themes, K.L.Sharma, Jawaharlal Nehru University, New Delhi, 1997.

Reference Books:

1. Introduction to the Constitution of India, 8/e, Sharma, Brij Kishore, Prentice Hall of India, New Delhi, 2011.
2. Indian Political System, U.R.Gahai, New Academic Publishing House, Jalaendhar, 1998.
3. Indian Social Problems, R.N. Sharma, Media Promoters and Publishers Pvt. Ltd, 1997.

Web References:

1. www.tutorialspoint.com/indian_polity/
2. www.clearias.com/indian-polity/
3. www.byjus.com/free-ias-prep/polity-notes-upsc/

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(IT)

Subject Code: P18MBO01 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objectives:

1. The Learning objective of this UNIT is to understand the concept and nature of Managerial Economic s and its relationship with other disciplines, Concept of Demand and Demand forecasting.
2. The Learning objective of this UNIT is to understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis.
3. The Learning Objective of this UNIT is to understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods and to know the different forms of Business organization
4. The Learning objective of this UNIT is to understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation
5. The Learning objective of this UNIT is to understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods

Course Outcomes:

1. The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand.
2. One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs.
3. One has to understand the nature of different markets and Price Output determination under various market conditions and with the knowledge of different Business UNITs.
4. The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
5. The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

UNIT – I (8 Lectures)

Introduction to Managerial Economics and demand Analysis : Definition of Managerial Economics-Scope of Managerial Economics and its relationship with other subjects-Concept of Demand, Types of Demand, Determinants of Demand-Demand Schedule, Demand Curve, Law of Demand and its limitations-Elasticity of Demand-Types of Elasticity of Demand and Measurement-Demand forecasting and its Methods.

UNIT – II (10 Lectures)

Production and Cost Analyses : Concept of Production function-Cobb-Douglas Production Function – Law of one Variable proportions- Isoquants and Isocosts and choice of Least cost factor combination-Concepts of Returns to Scale and Economics of Scale-Different Cost Concepts: Opportunity Costs, Explicit Costs and Implicit Costs -Fixed Costs, Variable Costs and Total Costs - Cost Volume Profit analysis - Determination of Break-Even Point (Simple Problem) Managerial Significance and limitations of Breakeven point.

UNIT – III (8 Lectures)

Introduction to Markets and Types of Business Organization : Market Structures: Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly – Features – Price and Output Determination– Other Methods of Pricing: Average Cost Pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing. Features and Evaluation of Sole Trader – Partnership – Joint Stock Company –Private Public Partnership - State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – IV (9 Lectures)

Introduction to Accounting & Financing Analysis : Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements (Simple Problems) GST basic concepts and Slab rates.

UNIT – V (10 Lectures)

Capital and Capital Budgeting : Capital Budgeting: Meaning of Capital-Meaning of Capital Budgeting-Time value of Money-Methods of appraising Project profitability: Traditional methods (payback period, accounting rate of return) and Modern Methods (Discounted cash flow method, Net present value method, internal rate of return method and profitability index)

Text Books:

1. Managerial Economics and Financial Analysis, Dr. N. Appa Rao, Dr. P. Vijay Kumar, Cengage Publications, New Delhi – 2011.
2. Managerial Economics and Financial Analysis, Dr. A. R. Aryasri, TMH, 2011.
3. Managerial Economics and Financial Analysis, Prof. J.V.Prabhakara rao, Prof. P. Venkatarao, Ravindra Publication, 2011.

Reference Books:

1. Managerial Economics, V. Maheswari, Sultan Chand, 2009.
2. Managerial Economics, Suma Damodaran, Oxford 2011.
3. Managerial Economics & Financial Analysis, Dr. B. Kuberudu and Dr. T. V. Ramana, Himalaya Publishing House, 2011.
4. Managerial Economics, Vanitha Agarwal, Pearson Publications 2011.
5. Financial Accounting for Managers, Sanjay Dhameja, Pearson, 2015.
6. Financial Accounting, Maheswari, Vikas Publications, 2018.
7. Managerial Economics and Financial Analysis, S. A. Siddiqui & A. S. Siddiqui, New Age International Publishers, 2012.

Web References:

1. www.lecturenotes.in/
2. www.nptel.ac.in/
3. www.crectirupati.com/

B.Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

INTRODUCTION TO SIMULATION SOFTWARE

(IT)

Subject Code: P18ECO02 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Nil

Course Objective:

1. By the end of this course, students in this class will understand the basic principles of programming and of implementing mathematical concepts by using MATLAB. Specifically, they will be able to write numerical algorithms and evaluate the computational results using graphical representations. The ultimate goal is to motivate the students for their profession and for future courses in curriculum.

Course Outcomes:

By the end of this course, the student will be able to

1. Translate mathematical methods to MATLAB code
2. Generalize results and represent data visually.
3. Students will be able to apply computer methods for solving a wide range of Engineering problems
4. Students will be able to utilize computer skills to enhance learning and performance in other engineering and science courses
5. Students will be able to demonstrate professionalism in interactions with industry

UNIT-1 (8 Lectures)

Introduction to Mat Lab

Historical Background, Applications, Scope of MATLAB, Importance of MATLAB for Engineers, Features, MATLAB Windows (Editor, Work Space, Command History, Command Window).Installation procedure of MATLAB. Operations with Variables, Naming and Checking Existence, Clearing Operations, Commands, Data types, Operators.

UNIT-II (9 Lectures)

Data and Data Flow in Mat Lab

Vectors, Matrix Operations & Operators, Reshaping Matrices, Arrays, Colon Notations, Numbers, Strings, Functions, File Input-Output, Importing and Exporting of data.

UNIT-III (8 Lectures)

Mat lab Programming

Conditional Statements, Loops, Writing Script Files, Error Correction, Saving Files, Worked out Examples.

UNIT-IV (10 Lectures)

Mat lab Advanced

Plotting, Graphics, Creating Plot & Editing Plot, GUI (Graphical User Interface).

Matlab- Algebra, Calculus, Differential, Integration, Polynomials, solving a system of linear equations.

UNIT-V (10 Lectures)

Simulink

Introduction, Importance, Model Based Design, Tools, Mathematical Modeling, Converting Mathematical Model into Simulink Model, Running Simulink Models, Importing Exporting Data, Solver Configuration, Masking Block/Model.

Text Books:

1. Getting Started With Mat lab: A Quick Introduction For Scientists And Engineers (English) by Rudra Pratap, OXFORD University Press, 1998.
2. Mat lab Programming by Y. Kirani Singh, B.B. Chaudhuri, PHI Publication, 2008.
3. Understanding MATLAB, A Textbook for Beginners by S.N. ALAM & S.S. ALAM,2013.

Reference Books:

1. MATLAB® Programming For Engineers Fourth edition by Stephen J. Chapman, 2012.
2. Applied Numerical Methods Using MATLAB 1st Edition by Won Y. Yang , Wenwu Cao, Tae-Sang Chung, John Morris, 2005.
3. Signal processing simulation using MATLAB by Dr. V.S.K REDDY & Dr.Y. Madhavee Latha, 2013.

Web References:

1. www.tutorialspoint.com/matlab/
2. www.ocw.mit.edu//

B.Tech. II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

ENGINEERING MECHANICS

Course Code: P18EST05 **Internal Marks: 40**
External Marks: 60

Course Prerequisites: Engineering Mathematics, Physics

Course Objectives:

1. Study various types of force systems, basic principles of mechanics of rigid bodies and Calculation the unknown forces through the use of equilibrium equations for a rigid body.
2. Analyze simple trusses using method of joints and method of sections
3. Study and determine centroid and centre of gravity of various composite shapes.
4. Study the concept of moment of inertia and the mathematical calculations involved in finding moments of inertia of two dimensional areas.
5. Learn principle of dynamics and apply it to impulse and momentum, work and energy which is useful to analyze turbo machineries.

Course Outcomes:

After completion of the course the student will be able to

1. Apply the principle of rigid body equilibrium and to determine unknown forces.
2. Analyze the force of friction and trusses using method of Joints and method of sections.
3. Find the centroid and center of gravity of composite areas
4. Calculate the moment of inertia of various shapes by integration and moment of inertia of composite areas.
5. Understand kinematics, kinetics and rotation of a rigid body

UNIT – I (9 Lectures)

Systems of forces: Resolution of coplanar and non-coplanar force systems (both concurrent and non-concurrent), Determining the resultant of planar force systems. Moment of force and its applications and couples.

Equilibrium of force system: Free body diagrams, equations of equilibrium of planar force systems and its applications. Problems on general case of force systems.

UNIT – II (8 Lectures)

Analysis of Trusses*:* Introduction, force calculations using method of joints and method of sections.

Theory of friction: Introduction, types of friction, laws of friction, application of friction to a single body & connecting systems. Wedge friction

UNIT – III (9 Lectures)

Centroid*:* Significance of centroid, moment of area, centroid of line elements, plane areas, composite areas, theorems of Pappus & its applications.

Center of gravity: CG of elementary and composite bodies

UNIT – IV (9 Lectures)

Moment of Inertia: Definition of MI, Polar Moment of Inertia, radius of gyration, transfers theorem, moment of Inertia of elementary & composite areas, and product of inertia. Mass moments of inertia for elementary and composite bodies

UNIT – V (10 Lectures)

Kinematics: Introduction, Rectilinear kinematics: Continuous motion, General curvilinear motion, Curvilinear motion: Rectangular components, Motion of a projectile, curvilinear motion: Normal and tangential components, Absolute dependent motion analysis of two particles.

Kinetics: Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation work done-Principle of work-energy-Impulse-momentum.

Text Books:

1. Engineering mechanics-statics and dynamics by A. K. Tayal - Umesh publications, Delhi (For numerical problems) , 2008.
2. Engineering mechanics by S. Timoshenko, D. H. Young and J V Rao -Tata McGraw-Hill Publishing Company Limited, New Delhi(For concepts) , 2009.
3. Engineering Mechanics by Dr. R. Kumaravelan, Scitech Publications, 2014.

Reference Books:

1. Engineering Mechanics by S.S.Bhavikatti, New Age international Publishers 2012.
2. Engineering Mechanics- Statics and Dynamics by Irving H. Shames, Pearson Education, 2006.
3. Singer's Engineering Mechanics: Statics and Dynamics, K.Vijaya Kumar Reddy and J Suresh Kumar, 3rd Edition SI UNITs-BS Publications, 2010.
4. A Textbook of Engineering mechanics statics anddynamics by J. L. Meriam and L. Kraige , Wiley India , 6th Edition , 2010.

Web References:

1. www.smartzworld.com/
2. www.lecturenotes.in/

B.Tech. II Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

JAVA PROGRAMMING LAB

Internal Marks: 40
External Marks: 60

Course Prerequisites: Object Oriented Programming Concepts

Subject Code: P18CSL01

Exercise - 1 (Basics)
a). Write a JAVA program to display default value of all primitive data type of JAVA
b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)
a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b). Write a JAVA program to sort for an element in a given list of elements using bubble sort
(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.
(d) Write a JAVA program using StringBufferto delete, remove character.

Exercise - 3 (Class, Objects)
a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.
b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)
a). Write a JAVA program to implement constructor overloading.
b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)
a). Write a JAVA program to implement Single Inheritance
b). Write a JAVA program to implement multi level Inheritance
c). Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)
a). Write a JAVA program give example for "super" keyword.
b). Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?

Exercise - 7 (Exception)
a).Write a JAVA program that describes exception handling mechanism
b).Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)
a). Write a JAVA program that implements Runtime polymorphism
b). Write a Case study on run time polymorphism, inheritance that implements in above problem

Exercise – 9 (User defined Exception)
a). Write a JAVA program for creation of Illustrating throw
b). Write a JAVA program for creation of Illustrating finally
c). Write a JAVA program for creation of Java Built-in Exceptions
d).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class .First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)

b). Write a program illustrating **isAlive** and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise – 11 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package.

c). Write a JAVA program that import and use the defined your package in the previous Problem

Exercise - 12 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b) Write a JAVA program to display analog clock using Applet.

c). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 13 (Swings)

a).Write a JAVA programto build a Calculator in Swings

b). Write a JAVA program to display the digital watch in swing tutorial.

Exercise – 14 (Swings - Continued)

a). Write a JAVA program that to create a single ball bouncing inside a JPanel.

b). Write a JAVA program JTree as displaying a real tree upside down

III YEAR I SEMESTER								
S. No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	P18CST08	Computer Networks	3	0	0	3	40	60
2	P18ITT04	Design & Analysis of Algorithms	3	1	0	4	40	60
3	P18CST09	Operating Systems	3	0	0	3	40	60
4	P18ITT05	Data Science	3	0	0	3	40	60
5	P18ITEX	Professional Elective – I	3	0	0	3	40	60
6	P18ITOX	*Open Elective-II*	2	0	0	2	40	60
7	P18ITL06	Data Science with R Lab	0	0	3	1.5	40	60
8	P18ITL07	Computer Networks Lab	0	0	3	1.5	40	60
9	P18MCT08	Design Thinking	0	0	4	2	40	60
Total Periods			**17**	**1**	**10**	**22**	**360**	**540**

Professional Elective – I		
S.No	**Course Code**	**COURSE**
1	P18ITE01	Advanced Data Structures (T1)
2	P18ITE02	Software Testing (T2)
3	P18ITE01	Principles of programming Languages(T3)
4	P18CSE03	Computer Graphics (T4)

S.No	***Subject***	***Offered***	***Open Elective – II***
1	P18ITO05	BS&H	Fuzzy Sets and Logic
2	P18MBO03	HSMC	Professional ethics
3	P18ECO03	ECE	Data Communications
4	P18CSO08	CSE/IT	IT systems Management

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

COMPUTER NETWORKS

(IT)

Internal Marks : 40

Course Code: P18CST08 **External Marks: 60**

Course Prerequisites: Operating System and Computer Architecture.

Course Objectives:

1. Understand state-of-the-art in network protocols, architectures, and applications.
2. To demonstrate the TCP/IP & OSI model merits & demerits.
3. Constraints and thought processes for networking research.
4. Problem Formulation- Approach- Analysis.
5. To know the role of various protocols in Networking.

Course Outcomes:

1. Enables the students to visualize the different aspects of networks, protocols and network design models.
2. Students should be understand and explore the basics of Computer Networks and Various Protocols.
3. Student will be in a position to understand the World Wide Web concepts.
4. Students will be in a position to administrate a network and flow of information further.
5. Student can understand easily the concepts of network security, Mobile.
6. Enables the students to compare and select appropriate routing algorithms for a network.

UNIT I: (9 Lectures)

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet.

Physical Layer: Guided transmission media, Wireless transmission media, Switching Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

UNIT II: (9 Lectures)

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols.

Multiple Access Protocols - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT III: (10 Lectures)

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms, IP addresses, CIDR, Subnetting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT IV: (9 Lectures)

Transport Layer: Services provided to the upper layers elements of transport protocol addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT V: (8 Lectures)

Application Layer- Introduction, providing services.

Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm.

Text Books:

1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu,2010.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH,2013.

References:

1. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, Firouz Mosharraf, McGraw Hill Education**.**
2. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

Web References:

1. en.wikipedia.org/wiki/
2. www.w3schools.com/
3. www.w3.org/
4. http://computing.dcu.ie/~humphrys/ca651/index.html
5. http://www.cs.ccsu.edu/~stan/classes/CS490/Slides/Networks4-Ch4-4.pdf
6. http://ecourses.vtu.ac.in/nptel/courses/Webcourse-contents/IIT-MADRAS/ComputerNetworks/pdf/
7. http://www.solarwinds.com/support/tutorials.aspx

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

OPERATING SYSTEMS

(IT)

Internal Marks : 40

Course Code: P18CST09 **External Marks: 60**

Course Prerequisites: Computer System fundamentals

Course Objectives:

1. Analyze the tradeoffs inherent in operating system design.
2. Summarize the various approaches to solving the problem of mutual exclusion in an operating system.
3. Understand the principles of Deadlocks.
4. Evaluate the trade-offs in terms of memory size (main memory, cache memory, auxiliary memory) and processor speed.
5. Demonstrate disk storage strategies, file strategies and system protection and security with different crypto models.

Course Outcomes:

1. Describe the important computer system resources and the role of operating system in their management and Identify the System.
2. Design various Scheduling algorithms and Apply the principles of concurrency.
3. Design deadlock, prevention and avoidance algorithms.
4. Compare and contrast various memory management schemes.
5. Design and Implement a prototype file systems.

UNIT I: (11 Lectures)

Computer System and Operating System Overview: Overview of Computer System hardware, Operating System Objectives and functions, Evaluation of operating System, Operating System Services, System Calls.

Process Management: Process Description, Process Control, Process States, Cooperating Processes , Inter-process Communication.

UNIT II: (13 Lectures)

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Threads Overview, Threading issues.

Synchronization: Background, The Critical-Section Problem, Peterson solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

UNIT III: (11 Lectures)

Dead Locks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT IV: (13 Lectures)

Memory Management Strategies: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table.

Virtual Memory Management: Background, Demand Paging, Page Replacement, allocation of frames, Thrashing.

UNIT V: (12 Lectures)

File system Interface: The concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation: File system structure, allocation methods, free space management

Mass storage structure, overview of Mass-storage structure, Disk scheduling.

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

References:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill
   Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata
   Mc Graw-Hill Education, 2007.

Web References:

1. https://nptel.ac.in/courses/106/106/106106144/
2. https://www.tutorialspoint.com/operating_system
3. https://www.youtube.com/playlist?list=PLEJxKK7AcSEGPOCFtQTJhOElU44J_JAun
4. https://www.pdf-archive.com/2016/12/25/operating-system-concepts-9th-edition/operating-system-concepts-9th-edition.pdf.

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	1	0	4

DESIGN AND ANALYSIS OF ALGORITHMS

(IT)

Internal Marks : 40

Course Code: P18ITT04 **External Marks: 60**

Course Prerequisites: Mathematics, Data Structures

Course Objectives:

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

1. Identify time, space complexities for different problems.
2. Implement Greedy Method to solve Problems.
3. Implement Dynamic Programming technique to solve Problems.
4. Able how to apply Backtracking and Branch & Bound Techniques in real-time problems.
5. Analyze the pattern-matching algorithms.

UNIT I: (12 Lectures)

Introduction: What is an Algorithm, Pseudo code Conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notations .
Divide and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort.

UNIT II: (12 Lectures)

The Greedy Method: The General Method, Knapsack Problem, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, Huffman Coding, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT III: (12 Lectures)

Dynamic Programming: The General Method, All Pairs Shortest Paths, Single – Source Shortest paths General Weights, String Edition, 0/1 Knapsack, Travelling Salesperson Problem.

UNIT IV: (12 Lectures)

Backtracking: The General Method, the 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles.

Branch and Bound: The Method, The 15-Puzzle problem, Traveling Salesperson.

UNIT V: (12 Lectures)

NP-Hard and NP-Complete Problems: Travelling salesman problem NP complete, NP-Hard Graph Problem (Clique Decision Problem).

Pattern Matching Algorithms: Knuth-Morris-Pratt KMP String Matching Algorithm, Rabin Karp String Matching Algorithm.

Text Books:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press.
2. Introduction to AlgorithmsThomas H. Cormen, PHI Learning.

References:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey
D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

Web References:

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://slideplayer.com/slide/5877267/

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DATA SCIENCE

(IT)

Internal Marks : 40

Course Code: P18ITT05 **External Marks: 60**

Course Objectives:

1. To understand the mathematical foundations required for data science.
2. To describe a flow process for data science problems.
3. To introduce basic data science algorithms and data visualization.
4. To learn machine tools and techniques.
5. To learn the ideas and tools for data visualization.

Course Outcomes:

1. Explain the basic terms of Linear Algebra and Statistical Inference.
2. Describe the Data Science process and how its components interact.
3. Apply EDA and the Data Science process in a case study.
4. Classify Data Science problems.
5. Analyze and correlate the results to the solutions.
6. Simulate Data Visualization in exciting projects.

UNIT 1 **9 Hrs.**

Linear Algebra: Algebraic view – vectors 2D, 3D and nD, matrices, product of matrix & vector, rank, null space, solution of over determined set of equations and pseudo-inverse. Geometric view - vectors, distance, projections, eigenvalue decomposition, Equations of line, plane, hyperplane, circle, sphere, Hypersphere.

UNIT 2 **9 Hrs.**

Probability And Statistics: Introduction to probability and statistics, Population and sample, Normal and Gaussian distributions, Probability Density Function, Descriptive statistics, notion of probability, distributions, mean, variance, covariance, covariance matrix, understanding univariate and multivariate normal distributions, introduction to hypothesis testing, confidence interval for estimates.

UNIT 3 **9 Hrs.**

Exploratory Data Analysis And The Data Science Process: Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process - Data Visualization - Basic principles, ideas and tools for data visualization

- Examples of exciting projects- Data Visualization using Tableau.

UNIT 4 **9 Hrs.**

Machine Learning Tools, Techniques And Applications: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Dimensionality Reduction, Principal Component Analysis, Classification and Regression models, Tree and Bayesian network models, Neural Networks, Testing, Evaluation and Validation of Models.

UNIT 5 **9 Hrs.**

Introduction To Python: Data structures-Functions-Numpy-Matplotlib-Pandas- problems based on computational complexity-Simple case studies based on python (Binary search, common elements in list), Hash tables, Dictionary.

TEXT / REFERENCE BOOKS

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.
2. Introduction to Linear Algebra - By Gilbert Strang, Wellesley-Cambridge Press, 5th Edition.2016.
3. Applied Statistics and Probability For Engineers – By Douglas Montgomery.2016.
4. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014. (free online)
5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.
6. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd Edition. ISBN 0123814790. 2011.
7. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, 2nd Edition. ISBN 0387952845. 2009. (free online)

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

COMPUTER GRAPHICS
(IT)

Internal Marks : 40

Course Code: P18CSE03 **External Marks: 60**

Course Prerequisites: Mathematics

Course Objectives:

1. Gain knowledge on two dimensional graphics and their transformations.
2. Gain knowledge about graphics systems and drawing algorithms.
3. Appreciate illumination and color models.
4. Understand the comparison between two and three dimensional graphics and their transformations.
5. Be familiar with clipping techniques.

Course Outcomes:

1. Apply output primitives on graphics.
2. Design two dimensional graphics, Apply clipping techniques to graphics.
3. Design three dimensional graphics, Transformations.
4. Design RGB Colour models and Apply Illumination and colour models.
5. Design animation sequences with tools.

UNIT I: (9 Lectures)

OVERVIEW OF GRAPHICS SYSTEMS:

Raster scan systems, Random scan systems, Output primitives – points and lines, line drawing algorithms, circle and ellipse generating algorithms, filled area primitives.

UNIT II: (9 Lectures)

TWO DIMENSIONAL GRAPHICS:

Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III: (9 Lectures)

THREE DIMENSIONAL GRAPHICS:

Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surface; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces.

TRANSFORMATION AND VIEWING:

Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations.

UNIT IV: (9 Lectures)

COLOUR MODELS:

RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model.

UNIT V: (9 Lectures)

ANIMATIONS & REALISM ANIMATION GRAPHICS:

Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing – tweening. COMPUTER GRAPHICS REALISM: Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing, Tools like 3D Studio Max, Maya, Blender.

Text Books:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", , 3rd Edition, Addison- Wesley Professional,2013. (UNIT I, II, III, IV).
2. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007 (UNIT V).

References:

1. Donald Hearn and M. Pauline Baker, Warren Carithers,"Computer Graphics With Open GL", 4th Edition, Pearson Education, 2010.
2. Jeffrey McConnell, "Computer Graphics: Theory into Practice", Jones and Bartlett Publishers, 2006.
3. Hill F S Jr., "Computer Graphics", Maxwell Macmillan" , 1990.
4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.
5. William M. Newman and Robert F.Sproull, "Principles of Interactive Computer Graphics", Mc GrawHill 1978.

Web References:

1. https://nptel.ac.in/courses/106106090/
2. https://www.tutorialspoint.com/computer_graphics/index.htm
3. https://ptgmedia.pearsoncmg.com/images/9780321399526/samplepages/0321399528.pd

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

ADVANCED DATA STRUCTURES
(IT)

Internal Marks : 40

Course Code: P18ITE01 **External Marks: 60**

Course Prerequisites: Data Structures

Course Objectives:

1. Describe and implement a variety of advanced data structures (hash tables, priority queues, balanced search trees, graphs).
2. Analyze the space and time complexity of the algorithms studied in the course.
3. Identify different solutions for a given problem; analyze advantages and disadvantages to different solutions.
4. Demonstrate an understanding of external memory and external search and sorting algorithms.
5. Illustration of tries which share some properties of table look up, various issues related to the design of file structures

Course Outcomes:

1. Illustrate the data storing by using key, value pattern.
2. Be able to understand and apply amortized analysis on data structures including mergable heaps, and queues.
3. Illustration of Balanced trees and their operations.
4. Have an idea of applications of algorithms in a variety of areas, including linear programming and duality, string matching, game-theory.
5. Describe various files indexing techniques.

Unit-I:

Introduction: Static Hashing- Hash Table- Hash Functions- Secure Hash Function- Overflow Handling- Theoretical Evaluation of Overflow Techniques, Dynamic Hashing- Motivation for Dynamic Hashing -Dynamic Hashing Using Directories- Directory less Dynamic Hashing, Skip Lists.

Unit-II

Priority Queues: Model, Simple Implementation, Binary Heap-Structure Property-Heap-Order Property-Basic Heap Operations- Other Heap Operation, Applications of Priority

Queues- The Selection Problem Event Simulation Problem, Binomial Queues- Binomial Queue Structure – Binomial Queue Operation- Implementation of Binomial Queues.

Unit-III

Efficient Binary Search Trees:

Optimal Binary Search Trees, AVL Trees, Red-Black Trees, Definition- Representation of a Red- Black Tree- Searching a Red-Black Tree- Inserting into a Red Black Tree- Deletion from a Red-Black Tree- Joining Red-Black Trees, Splitting a Red-Black tree.

Multi-way Search Trees:

M-Way Search Trees, Definition and Properties- Searching an M-Way Search Tree, B-Trees, Definition and Properties- Number of Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- B+-Tree Definition- Searching a B+-Tree- Insertion into B+-tree- Deletion from a B+-Tree.

Unit-IV

Pattern matching and Tries : Pattern matching algorithms- the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm

Tries: Definitions and concepts of digital search tree, Binary trie, Patricia , Multi-way trie

Unit V

File Structures: Fundamental File Processing Operations-opening files, closing files, Reading and Writing file contents, Special characters in files.

Fundamental File Structure Concepts- Field and record organization, Managing fixed-length, fixed-field buffers.

Text Books :

1. Data Structures, A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.
2. Fundamentals of DATA STRUCTURES in C: 2nd ed, , Horowitz , Sahani, Anderson-freed, Universities Press
3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

Reference Books:

1. http://lcm.csa.iisc.ernet.in/dsa/dsa.html
2. http://utubersity.com/?page_id=878
3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
5. File Structures :An Object oriented approach with C++, 3rd ed, Michel J Folk, Greg Riccardi, Bill Zoellick

B.Tech III Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

PRINCIPLES OF PROGRAMMING LANGUAGE

(IT)

Subject Code: P18ITE01 **Internal Marks: 40**

External Marks: 60

Course Prerequisites: Nil

Course Objectives:

1. To understand and describe syntax and semantics of programming languages.
2. To understand data, data types, and basic statements.
3. To understand call-return architecture and ways of implementing them.
4. To understand object-orientation, and concurrency in programming Languages.
5. To develop programs in non-procedural programming paradigms.

Course Outcomes:

1. Describe syntax and semantics of programming languages.
2. Explain data, data types, and basic statements of programming languages
3. Design and implement subprogram constructs, Apply object - oriented, and Concurrency programming constructs.
4. Develop programs in Scheme, ML, and Prolog.
5. Understand and adopt new programming languages.

UNIT I (8 Lectures)

SYNTAX AND SEMANTICS : Evolution of programming languages, describing syntax, language translators, structure of compilers, context free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive - decent bottom - up parsing.

UNIT II (9 Lectures)

Data, Data Types, And Basic Statements: Names, variables, binding, type checking, scope, scope rules, lifetime of variable, primitive data types, strings, array types, associative arrays, record types, union types, pointers and references, expressions(arithmetic, relational and boolean)overloaded operators, type conversions, assignment statements , mixed mode assignments, control structures – selection, iterations, branching.

UNIT III (10 Lectures)

Subprograms: Subprograms, design issues, local referencing, parameter passing, design issues for functions.

Implementations: Semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping.

UNIT IV (9 Lectures)

Object- Orientation, Concurrency: Object – orientation, design issues for OOP languages, implementation of object, oriented constructs, concurrency, semaphores, Monitors, message passing, threads, statement level concurrency.

UNIT V (9 Lectures)

Functional & Logic Programming Languages: Fundamentals of functional programming languages, Programming with Scheme, – Programming with ML. Introduction to logic and logic programming, – Programming with Prolog.

Text Books:

1. Concepts of Programming Languages, Robert W. Sebesta, Tenth Edition, Addison Wesley, 2012.
2. Programming Languages, Principles & Paradigms, 2ed, Allen B Tucker, Robert E Noonan, TMH, 2002.

Reference Books:

1. The Scheme programming language, R. Kent Dybvig, Fourth Edition, MIT Press, 2009.
2. Elements of ML programming, Jeffrey D. Ullman, Second Edition, Prentice Hall, 1998.
3. The craft of Prolog, Richard A. O'Keefe, MIT Press, 2009.
4. Programming in Prolog: Using the ISO Standard, W. F. Clocksin and C. S. Mellish, Fifth Edition, Springer, 2003.

Web References:

1. www.geeksforgeeks.org/
2. www.slideshare.net/
3. www.ntu.edu.sg/

4. www.tutorialspoint.com/

5. www.computerscience.org/

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

SOFTWARE TESTING

(PROFESSIONAL ELECTIVE I)

Internal Marks : 40

Course Code: **External Marks: 60**

Course Prerequisites: Software Engineering

Course Objectives:

- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.

Course Outcomes:

- Interpret a model for testing and understand the process of testing.
- Visualize control flow graph and demonstrate complete path testing to achieve C1+C2 and identify the complications in a transaction flow testing and anomalies in data flow testing.
- Apply reduction procedures to control flow graph and simplify it into a single path expression.
- Able to understand the use of decision tables and KV charts in test case design.
- Identify effective approach for node reduction. And able to apply different testing tools to resolve the problems in Real time environment.

UNIT I: (8 Lectures)

Introduction: Purpose of Testing, Dichotomies, model for testing, consequences of bugs, Taxonomy of bugs.

Functional Testing : Boundary value Analysis, Equivalence class testing, Decision table based testing, Cause-effect graphing technique.

UNIT II: (9 Lectures)

Flow Graphs and Path testing: Basic concepts, Predicates, Path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Data flow testing: Basics of Data flow testing, strategies in dataflow testing, application of dataflow testing

UNIT III: (9 Lectures)

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

UNIT IV: (9 Lectures)

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

State, state graphs and Transition Testing: State Graphs, good and bad state graphs, state testing, testability tips.

UNIT V: (9 Lectures)

Graph matrices and Application: Motivational overview, matrix of graph relations, power of a matrix, node reduction algorithm,

Automated Test Data Generation: What is Automated Test Data generation. Approaches to test Data Generation, Test data Generation using Genetic Algorithm, Test Data Generation Tools

Text Books:

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing- Yogesh Singh, Camebridge

References:

1. Brain Marick; ―The Craft of Software Testing‖; Prentice Hall Series in innovative technology.
2. RenuRajaniPradeep Oak; ―Software Testing,Effectivemethods,Tools and Techniques‖;TMHI
3. Dr.K.V.K.K.Prasad, ―Software Testing Tools‖ –Dreamtech.
4. Edward Kit, ―Software Testing in the Real World‖ –Pearson.
5. Perry, ―Effective methods of Software Testing‖, John Wiley.

Web References:

1. https://freevideolectures.com › Computer Science › IIT Bombay
2. https://www.youtube.com/watch?v=gPE9emPFrwo
3. https://nptel.ac.in/courses/106105150
4. www.softwaretestinghelp.com
5. https://www.atlassian.com/landing/software-testing/

B.Tech III Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

COMPUTER NETWORKS LAB

(IT)

Internal Marks : 40

Course Code: P18ITL07 **External Marks: 60**

Course Objectives:

1. Understand the functionalities of various layers of OSI model.
2. Understand the operating System functionalities

Part-A:

1. Implement the data link layer farming methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials -CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Implementation of distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Implementation of RSA algorithm.

Part-B:

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Implementation of fork (), wait (), exec() and exit () System calls
3. Simulate the following.
   a) Multiprogramming with a fixed number of tasks (MFT)
   b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate the following page replacement algorithms.
   a) FIFO b) LRU c) LFU
6. Simulate the following File allocation strategies
   a) Sequenced b) Indexed c) Linked

B.Tech III Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

DATA SCIENCE LAB

(IT)

Internal Marks : 40

Course Code: P18ITL06 **External Marks: 60**

Course Objectives:

1. To introduce students to the valuable concepts of numpy, pandas and matplotlib in Data Science .
2. To develop analyzing skills to the students for solving practical problems.
3. To gain experience of doing independent study and research.

Course Outcomes:

1. Develop basic programs in Python.
2. Practice and Implement different kinds of Lists, DataFrame, Dictionaries
3. Create dataset and analyze the data by using numpy and pandas.
4. Design different types of plots by using matplotlib by using dataset.

Experiments:

1. Installation and run Anaconda software.
2. Python Program to find ASCII value of given number.
3. Python Program to Make a Simple Calculator.
4. Python Program to Count the Number of Each Vowel.
5. Python Program to Illustrate Different Set Operations.
6. Create List and apply different functions on it.
7. Create a tuple and apply different built-in functions on it.
8. Apply different string operations.
9. Create a dictionary and apply different operations like accessing, updating and deleting.
10. Create DataFrames and apply merge and join functions on it.
11. Create a Village Dataset and execute the below conditions:
    a) Check for any null values in the given dataset if you find any please remove them and
    continue to further tasks.

b) calculate the count of people living in hut and using smart TV.

c) Count the people using the different type of toilets in all villages.

d) For every village and for each and every income group count the number of illiterates.

e) What is the Proportion of House Holds getting the income through Business did not understand GST.

f) How Many people Having Smartphone and aware of digital fraud.

g) What is the ratio of Business Income Groups to Other Income Groups in using PHC.

12. Design different types of plots by using above dataset

a) Plot the Scatter plot Graph for the values obtained in 11 (b).

b) plot pie chart for the values across different villages obtained in 11 (c).

c) Plot the Bar Graph for the Values Obtained in 11 (d) by using subplots

PACEINSTITUTEOFTECHNOLOGY&SCIENCES,ONGOLE–532272
(AUTONOMOUS)
AR-18REGULATIONSB.TechCOURSESTRUCTURE

III YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	P18CST12	Web Technologies	3	0	0	3	40	60
2	P18CSE08	Cryptography and Network Security	3	0	0	3	40	60
3	P18CST10	Artificial Intelligence & Machine Learning	3	1	0	4	40	60
4	P18ITEX	Professional Elective-II	3	0	0	3	40	60
5	P18ITOX	*Open Elective –III*	2	0	0	2	40	60
6	P18ITT06	Theory of Automata and Compiler Design	3	0	0	3	40	60
7	P18CSL09	Web Technologies Lab	0	0	3	1.5	40	60
8	P18CSL07	Artificial Intelligence & Machine Learning Lab	0	0	3	1.5	40	60
9	P18ITM01	Mini Project	0	0	6	2	40	60
Total Periods			**17**	**1**	**12**	**23**	**360**	**540**

Professional Elective – II		
S.No	**Course Code**	**COURSE**
1	P18CSE04	Data Warehousing and Data Mining(T1)
2	P18CSE06	Distributed System (T2)
3	P18ITE05	Unified Modeling Language (T3)
4	P18CSE07	Middleware Technologies (T4)

S.No	***Subject Code***	***Offered ByDept.***	***OpenElective–III***
1	P18MBO04	HSMC	Management Science
2	P18ECO08	ECE	Fundamentals of Embedded Systems
3	P18ECO05	ECE	Microprocessors & Micro Controllers
4	P18CSO12	CSE/IT	Database Systems

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

WEB TECHNOLOGIES

(CSE&IT)

Internal Marks : 40

Course Code: P18CST12 **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

This course enables the students to identify the fundamental concepts for developing web application using PHP language for server side scripting, analyze how data can be transported using XML, develop a web applications with server side programming using java servlets & JSP Servlets and client side scripting with java script.

Course Outcomes:

1. Summarize the basic tags and properties in HTML, XHTML and CSS.
2. Create web pages using .client side scripting, validating of forms and XML.
3. Identify the role of server side scripting using PHP programming
4. Design dynamic web application using server side programming with java servlets.
5. Contrast on how to connect and retrieve data through web page from database using JDBC.

UNIT I: (9 Lectures)

HTML Common tags- List, Tables, images, forms, Frames, Links and Navigation,

CSS: Introduction, CSS Properties, Controlling Fonts, Text Formatting, Pseudo classes, Selectors.

UNIT II: (9 Lectures)

Client side Scripting: Introduction to Javascript: Javascript language – declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model.

UNIT III: (9 Lectures)

Introduction to PHP: Creating PHP script, Running PHP script, Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

UNIT IV: (9 Lectures)

A: Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a servlet, deploying a servlet,

B: The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions.

UNIT V: (9 Lectures)

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, JSP application design with MVC, Declaring variables and methods, sharing data between JSP pages, Requests and users passing control and data between pages, Sharing sessions and application data.

JDBC connectivity in JSP: Data base programming using JDBC, Studying javax.sql.* package, Accessing a database from a JSP page, Application specific database actions.

Text Books:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

References:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

Web References:

1. https://www.w3schools.com/html/
2. https://www.javatpoint.com/servlet-tutorial
3. http://nptel.ac.in/courses/106105084/

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	1	0	4

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(IT)

Internal Marks : 40

Course Code: P18CST10 **External Marks: 60**

Course Prerequisites: None

Course Objectives:

1. Explain Artificial Intelligence and Machine Learning
2. Illustrate AI and ML algorithm and their use in appropriate applications
3. Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
4. The ability to implement some basic machine learning algorithms .
5. Understanding of how machine learning algorithms are evaluated.

Course Outcomes:

1. Appraise the theory of Artificial intelligence.
2. Illustrate the working of AI Algorithms.
3. Demonstrate the applications of AI.
4. Recognize the characteristics of machine learning that make it useful to real-world Problems.
5. Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.

UNIT I: (11 Lectures)

What is artificial intelligence?, Problems, problem spaces and search, Heuristic search Techniques.

Knowledge representation issues, Predicate logic, Representation knowledge using rules.

UNIT II: (13 Lectures)

Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Candidate Elimination Algorithm, Inductive bias of Candidate Elimination Algorithm. **Decision Tree Learning:** Introduction, Decision tree representation, Appropriate problems, ID3 algorithm.

UNIT III: (12 Lectures)

Artificial Neural Network: Introduction, NN representation, Appropriate problems, Perceptron, Back propagation algorithm. **Bayesian Learning:** Introduction, Bayes theorem, Bayes theorem and concept learning.

UNIT IV: (12 Lectures)

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. **Binary classification and related tasks:** Classification, Scoring and ranking, Class probability estimation

UNIT V: (12 Lectures)

Supervised Learning : Regression Analysis, Linear Regression, Simple Linear Regression, Multiple Linear Regression, Backward Elimination, Polynomial Regression Classification :Classification Algorithm ,Logistic Regression, K-NN Algorithm, Support Vector Machine Algorithm ,Naïve Bayes Classifier

Text Books:

1. Elaine Rich, Kevin K and S B Nair, "Artificial Inteligence", 3 rd Edition, McGraw Hill Education, 2017.
2. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
3. Machine Learning, Tom M. Mitchell, MGH.

References:

1. Saroj Kaushik, Artificial Intelligence, Cengage learning
2. Stuart Rusell, Peter Norving , Artificial Intelligence: A Modern Approach, Pearson Education 2nd Edition
3. UnderstandingMachine Learning: From Theory toAlgorithms, Shai Shalev-Shwartz, Shai
   Ben David, Cambridge.
4. Machine Learning in Action, Peter Harington, 2012, Cengage.

Web References:

1. https://nptel.ac.in/courses/106106139/
2. https://nptel.ac.in/courses/106105077/
3. https://www.tutorialspoint.com/machine_learning_with_python/index.htm

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

CRYPTOGRAPHY & NETWORK SECURITY

(IT)

Internal Marks : 40

Course Code: P18CSE08 **External Marks: 60**

Course Prerequisites: Computer Networks

Course Objectives:

1. The main objective of this course is to teach students to understand and how to address various software security problems in a secure and controlled environment.
2. During this course the students will gain knowledge in various kinds of software security problems, and techniques that could be used to protect the software from security threats.

Course Outcomes:

1. Evaluate the use of encryption algorithm for achieving data confidentiality.
2. Apply Secure hash functions for attaining data integrity.
3. Analyse the security mechanisms for achieving authentication.
4. Analyse the protocols for achieving availability, access control to resources and protocols for non-repudiation
5. Explore the threats and remedial measures for system security .

UNIT I: (10 Lectures)

Introduction: Security Attacks(Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Availability) and Mechanisms, A Model for Internetwork security.

Symmetric Key Cryptography: Symmetric Encryption Principles, Symmetric Encryption Algorithms (DES,Triple DES and AES), Cipher Block Modes of Operations.

UNIT II: (8 Lectures)

Public-Key Cryptography and Message Authentication: Approaches to Message Authentication, Secure Hash Functions, Message Authentication Codes, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures.

UNIT III: (9 Lectures)

Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

UNIT IV: (9 Lectures)

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V: (9 Lectures)

Intruders and Malicious Software: Intruders, Intrusion Detection, Viruses and Related Threats, Trusted System.

Firewalls: Firewalls-Characteristics, Types of Firewalls, Placement of Firewalls, Firewall Configuration.

Text Books:

1. Cryptography and Network Security: Principles and Practice,6th Edition, William Stallings, Pearson Education,2011.
2. Network Security Essentials (Applications and Standards), William Stallings, Pearson Education.
3. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC Press, 2013.

References:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press).
2. Principles of Information Security, Withman , Thomson.
3. Introduction to Cryptography, Buchmann, Springer.

Web References:

1. https://onlinecourses.nptel.ac.in/noc18_cs07/preview
2. https://www.coursera.org/learn/cryptography
3. https://www.coursera.org/specializations/computer-network-security
4. https://www.youtube.com/watch?v=Q-HugPvA7GQ&list=PL71FE85723FD414D7

B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DATA WARE HOUSING AND DATA MINING
(CSE,CSIT,IT)

Internal Marks : 40

Course Code: P18CSE04 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

1. Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
2. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Course Outcomes:

1. Ability to know the functionalities of data mining and how the data to be preprocessed to improve the data and mining results.
2. Able to Understand different types data preprocessing techniques
3. Able to analyze different types classification and prediction methods.
4. Able to Use various kinds of association rules and association analysis algorithms
5. Ability to Use different types of cluster analysis and mining the complex types of data.

UNIT I: (11 Lectures)

Introduction: Why Data Mining? What Is Data Mining?1.3 What Kinds of Data Can Be Mined?1.4 What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity

UNIT II: (13 Lectures)

Data Pre-processing: Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization

UNIT III: (11 Lectures)

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for

expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

UNIT IV: (13 Lectures)

Classification: Alterative Techniques, Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks

Association Analysis: Basic Concepts and Algorithms: Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm. **(Tan &Vipin)**

UNIT V: (12 Lectures)

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. **(Tan &Vipin)**

Text Books:

1. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.(UNIT-I,III,IV,V)
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier. (UNIT-I,II)

References:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning..
2. Data Mining :VikramPudi and P. Radha Krishna, Oxford.
3. Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
4. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.

Web References:

1. https://swayam.gov.in/nd1_noc20_cs12/preview
2. https://www.tutorialspoint.com/Data Mining
3. https://www.youtube.com/watch?v=ykZ-UGcYWg&list=PLLspfyoOYoQcI6Nno3gPkq0h5YSe81hsc

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

DISTRIBUTED SYSTEM

(CSE&IT)

Internal Marks : 40

Course Code: P18CSE06 **External Marks: 60**

Course Prerequisites: Database Management System

Course Objectives:

1. Understand how data is collected and distributed in a database across multiple physical locations.
2. To Gain advanced knowledge on creating and maintaining databases in distributed environment, how to handling all types of queries, query optimization techniques.
3. To improve database performance at end-users worksites.
4. Understand and to get knowledge of advanced features of object orientation and interoperability object management in distributed environment.
5. Management of distributed data with different levels of transparency.

Course Outcomes:

1. Achieve advanced knowledge on creating and maintaining databases in distributed environment.
2. Able to handle all types of queries, query optimization techniques.
3. Know how to use Foundations of Distributed Concurrency Control.
4. Recognize how to Query Processing Layers in Distributed Multi-DBMS.
5. Identify with how to implement Object Orientation and Interoperability.

UNIT I: (9 Lectures)

Distributed Databases:

Features of Distributed versus Centralized Databases, Distributed Database Management Systems (DDBMSs)

Principles Of Distributed Databases -Levels of Distribution Transparency: Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT II: (9 Lectures)

Distributed Database Design:

A Framework for Distributed Database Design, the Design of Database Fragmentation, the Allocation of Fragments.

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.

The Management of Distributed Transactions: A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions.

UNIT III: (9 Lectures)

Concurrency Control:

Foundations of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control Based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

Reliability: Basic Concepts, Non-blocking Commitment Protocols, Reliability and Concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency.

UNIT IV: (9 Lectures)

Distributed Object Database Management Systems:

Architectural Issues: Alternative Client/Server Architectures, Cache Consistency.

Object Management: Object Identifier Management, Pointer Swizzling, Object Migration Distributed Object Storage, Object Query Processing Architectures, Query Processing Issues, Query Execution. Transaction Management in Object DBMSs, Transactions as Objects.

UNIT V: (9 Lectures)

Database Interoperability:

Database Integration: Scheme Translation, Scheme Integration. Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues. Transaction and Computational Model, Multi database Concurrency Control, Multi database Recovery.

Object Orientation and Interoperability:

Object Management Architecture, CORBA and Database Interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability.

Text Books:

1. Stefano Ceri and Giuseppe Pelagatti, *"Distributed Databases– Principles and Systems"*, 1st Edition, Tata McGraw-Hill Edition, 2008.

2. M Tamer Ozsu, Patrick Valduriez, *"Principles of Distributed Database Systems"*, 2nd Edition, Pearson Education. (Last 2 Units).

References:

1. M. Tamer ozsu, Patrick Valduriez, *"Principles of Distributed Data Base Systems"*, 3rd Edition, Springer, 2011.

Web References:

1. https://www.tutorialspoint.com/distributed_dbms/distributed_dbms_databases.htm
2. https://www.geeksforgeeks.org/distributed-database-system/

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

MIDDLEWARE TECHNOLOGIES

(CSE&IT)

Internal Marks : 40

Course Code: P18CSE07 **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

1. The course provides details about the modern component platforms.
2. Based on practical examples, details about modern middleware technologieswill be analyzed.
3. Students get the chance to gain in-depth knowledge about their favorite middleware platform.

Course Outcomes:

1. Have learnt the different types of server client concepts.
2. Learn the design of EJB architecture.
3. Deploy EJB for specific applications.
4. Build an application using CORBA.
5. Build an application using COM.

UNIT I: (9 Lectures)

CLIENT / SERVER CONCEPTS:

Client – Server – File Server, Database server, Group server, Object server, Web server .Middleware – General Middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

UNIT II: (9 Lectures)

EJB ARCHITECTURE:

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT III: (9 Lectures)

EJB APPLICATIONS:

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

UNIT IV: (9 Lectures)

CORBA:

CORBA – Distributed Systems – Purpose - Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB - Building an application with CORBA.

UNIT V: (9 Lectures)

COM:

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling - Remoting.

Text Books:

1. Robert Orfali, Dan Harkey and Jeri Edwards, “The Essential Client/Server Survival Guide”, Galgotia Publications Pvt. Ltd., 2002.
2. Tom Valesky,”Enterprise Java Beans”, Pearson Education, 2002.

References:

1. Jesse Liberty, “Programming C#”, 2nd Edition, O’Reilly Press, 2002.
2. Mowbray, ”Inside CORBA”, Pearson Education, 2002.
3. Jason Pritchard,”COM and CORBA side by side”, Addison Wesley, 2000.

Web References:

1. https://www.tutorialspoint.com/ejb/index.htm
2. https://www.ece.uvic.ca/~itraore/seng422-06/notes/arch06-6-1.pdf
3. https://nptel.ac.in/content/storage2/courses/106105087/pdf/m17L42.pdf

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

Theory of Automata and Compiler Design

(IT)

Internal Marks : 40

Course Code: P18ITT06 **External Marks: 60**

Course Prerequisites: Programming Languages, computer architecture, data structures and simple graph algorithms, logic or algebra.

Course Objectives:

- To understand the various phases in the design of a compiler.
- To understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes.
- To introduce lex and yacc tools.
- To learn to develop algorithms to generate code for a target machine.

Course Outcomes:

- Ability to design, develop, and implement a compiler for any language.
- Able to use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
- Ability to design algorithms to generate machine code

UNIT I

Fundamentals: Introduction, Basic Concepts, Introduction to Formal Proofs, Inductive proofs, Introduction to Defining Language, Kleen Closures, Arithmetic Expressions, Graphs, Trees, Finite State Machine, Acceptance of Strings and Languages, Deterministic Finite Automata, Non-Deterministic Finite Automata.

UNIT II

Finite Automata:Introduction, Significance of Nondeterministic Finite Automation, NFA with Є – Transactions, Conversions and Equivalence , NFA to DFA Conversion, Minimization of FSM, Equivalence between Two FSMs.

UNIT III

Grammar Formalism: Introduction, Regular Grammar, Equivalence between Regular Grammar and FA, Conversation of Right – Linear Grammar to Left Linear Grammar, Context Free Grammar.

Overview of Language Processing : Introduction, Preprocessors, Compiler, Assembler, Interpreters, Linkers and loaders, structure of compiler, Phases of compiler

UNIT IV

Lexical Analysis : Introduction , Role of Lexical Analysis, Lexical Analysis Vs Parsing, Token, Patterns and Lexeme, Lexical Errors, Input Buffering, Regular Expressions

UNIT V

Syntax Analysis : Introduction, Role of Parser, Context Free Grammar(CFG), Classification of Parsing Techniques, Top Down Parsing, Recursive Descent Parser

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages andComputation, 3rdedition, Pearson Education, India.

2. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.

REFERENCE BOOKS:

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.
2. Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.
3. Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.
4. Formal Languages & Automata Theory, A.A.Puntambekar, First Edition, Technical Publications .
5. Compiler Design, A.A.Puntambekar, First Edition, Technical Publications

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

UNIFIED MODELING LANGUAGE
(IT)

Internal Marks : 40

Course Code: P18ITE05 **External Marks: 60**

Course Prerequisites: Software Engineering, OOPS

Course Objectives:

- To understand how to solve complex problems
- Analyze and design solutions to problems using object oriented approach
- Study the notations of Unified Modeling Language

Course Outcomes:

- Ability to find solutions to the complex problems using object oriented approach
- Represent classes, responsibilities and states using UML notation
- Identify classes and responsibilities of the problem domain
- Represent the data dependencies of a simple program using UML
- Represent user and programmatic interactions using UML

UNIT I:

Why we model: The Importance of Modeling, Principles of Modeling, Object-Oriented Modeling

Introducing the UML: An overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle

UNIT II:

Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces Types, and Roles, Packages, Instances

UNIT III:

Structural Modeling: Class Diagrams, Object Diagrams

Basic Behavioral Modeling: Interactions, Use Cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams

UNIT IV:

Advanced Behavioral Modeling: Events and Signals, State Machines, State chart Diagrams,

Architectural Modeling: Components, Deployment, Component Diagrams, Deployment Diagrams

UNIT V:

Case Study: Library Management Systems, Online shopping, Student Information System, Employee Information System

TEXT BOOKS:

1. Unified Modeling Language User Guide, The Grady Booch, James Rumbaugh, Ivar Jacobson, Publisher: Addison Wesley, First Edition

REFERENCE BOOKS:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O"Reilly

B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

MANAGEMENT SCIENCE

Internal Marks : 40

Course Code: P18MBO04 **External Marks: 60**

COURSE OBJECTIVES:

- To understand the application of management science in decision making process& its importance, evaluation of management thought, how organisation structure is designed and its principle and types.
- To understand the types of management about work study, how quality is controlled, control charts and inventory control and their types.
- To learn the main functional areas of organisation i.e., Financial Management, Production Management, Marketing Management, Human resource Management, Product life cycles and Channels of Distribution.
- The learning objective of this unit is to understand the Development of Network and Identifying Critical Path.
- The learning objective of this unit is to understand the concept of strategic management, and the basic concepts of MIS, MRP, JIT, TQM, Six sigma, CMM, Supply chain management, ERP, Business Process Outsourcing, bench marking and business process re-engineering.

COURSE OUTCOMES:

- Able to apply the concepts & principles of management in real life. The student will be able to design & develop organization structure for an enterprise.
- Able to apply PPC techniques, Quality Control, Work-study principles in industry.
- The student can identify and apply Marketing, HRM, and Production Strategies and implement them effectively.
- Able to develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project.
- Able to develop Mission, Objectives, Goals & strategies for an enterprise in dynamic environment and apply modern management techniques MIS, ERP, TQM, SCM, BPR, and Bench Marking wherever possible

UNIT-I:

Introduction to management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation –

Decision making process-Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure.

UNIT – II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT – III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans (Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationalising change through performance management.

UNIT-IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

UNIT –V

Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process –SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies.

Contemporary Management Practices: basic concepts of MIS, Total Quality Management (TQM), Six Sigma, Supply chain management, Enterprise Resource Planning(ERP), Business process Re- engineering and Bench Marketing,

Text Books:

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'* Cengage, Delhi, 2012.

2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

References:

1.Philip Kotler & Armstrong: Principles of Marketing, Pearson publications

2. Biswajit Patnaik: Human Resource Management, PHI, 2011

3. Hitt and Vijaya Kumar: Starategic Management, Cengage learning

4. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011

Web References:

1. https://mrcet.com/downloads/digital_notes/ECE/II%20Year/Management%20Science.pdf
2. https://books.askvenkat.org/management-science-textbook-aryasri-pdf/
3. https://nptel.ac.in/courses/122/102/122102007/
4. https://nptel.ac.in/courses/122/108/122108038/
5. http://www.universityofcalicut.info/SDE/Management_science_corrected_on13April2016.pdf

B.Tech III Year II Semester

Course Structure

L	T	P	C
2	0	0	2

FUNDAMENTALS OF EMBEDDED SYSTEMS

Internal Marks: 40

Course Code: P18ECO08 **External Marks: 60**

Course Prerequisite: Microprocessors and Microcontrollers

Course Objectives:

1. Building Blocks of Embedded System
2. Various Embedded Development Strategies
3. Bus Communication in processors, Input/output interfacing.
4. Various processor scheduling algorithms.
5. Basics of Real time operating system and example tutorials to discuss on one real time operating system tool.

Course Outcomes: After going through this course the student will be able to

1. Analyze the Embedded systems and suggest for a given application.
2. Utilize the various Embedded Development Strategies
3. Analyze about the bus Communication in processors.
4. Built up the knowledge on various processor scheduling algorithms.
5. Examine basics of Real time operating system.

UNIT I **(9 Lectures)**

INTRODUCTION TO EMBEDDED SYSTEMS: Introduction to Embedded Systems –Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDED NETWORKING **(9 Lectures)**

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols RS232 standard – RS422 – RS 485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I^2C) –need for device drivers.

UNIT III **(9Lectures)**

EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

UNIT IV RTOS BASED EMBEDDED SYSTEM DESIGN **(9 Lectures)**

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance.

UNIT V **(9 Lectures)**

EMBEDDED SYSTEM APPLICATION AND DEVELOPMENT: Case Study of Washing Machine- Automotive Application- Smart card System Application- ATM machine –Digital camera

Text Books:

1. Peckol, “Embedded system Design”, John Wiley & Sons,2010
2. Lyla B Das,” Embedded Systems-An Integrated Approach”, Pearson, 2013
3. Shibu. K.V, “Introduction to Embedded Systems”, 2e, Mc graw Hill, 2017.

Reference Books:

1. Raj Kamal, „Embedded System-Architecture, Programming, Design“, Mc Graw Hill, 2013.
2. C.R.Sarma, “Embedded Systems Engineering”, University Press (India) Pvt. Ltd, 2013.
3. Tammy Noergaard, “Embedded Systems Architecture”, Elsevier, 2006.
4. Han-Way Huang, “Embedded system Design Using C8051”, Cengage Learning, 2009.
5. Rajib Mall “Real-Time systems Theory and Practice” Pearson Education, 2007.

Web References:

1. https://www.edx.org/learn/embedded-systems
2. https://www.udemy.com/course/introduction-to-embedded-systems/
4. https://nptel.ac.in/courses/108/102/108102045/
5.

B.Tech III Year II Semester

Course Structure

L	T	P	C
2	0	0	2

MICROCPROCESSORS & MICROCONTROLLERS

Internal Marks: 40

Course Code: P18ECO05 **External Marks: 60**

Course Prerequisite: Switching Theory and Logic Design

Course Objectives:

1. Understand the theory and basic architectures of 8086 microprocessors
2. Learn the assembly language programming.
3. Understand Interfacing of 8086, With memory and other peripherals
4. Study the features 8051 microcontroller and programming.
5. Learn the features of PIC microcontroller families.

Course Outcomes: After going through this course the student will be able to

1. Describe the microprocessor capability in general and explore the evaluation of microprocessors.
2. Write the assembly language programming
3. Describe 8086 interfacing with different peripherals and implement programs.
4. Describe hardware concepts, development of programs for 8051 Micro controller and interfacing.
5. Describe hardware features of PIC microcontroller families.

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UNIT-I **(9 Lectures)**

8086 ARCHITECTURE: Main features, pin diagram/description, 8086 microprocessor family, 8086 internal architecture, bus interfacing unit, execution unit, interrupts and interrupt responses, 8086 system timing, minimum mode and maximum mode configuration, Advanced microprocessors.

UNIT-II **(8 Lectures)**

8086 PROGRAMMING: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT-III **(10 Lectures)**

8086 INTERFACING : Semiconductor memories interfacing (RAM,ROM), 8254 software programmable timer/counter, Intel 8259 programmable interrupt controller, software and hardware interrupt applications, Intel 8237a DMA controller, Intel 8255 programmable peripheral interface, keyboard interfacing, alphanumeric displays (LED,7-segment display, multiplexed 7-segment display, LCD), Intel 8279 programmable keyboard/display controller, stepper motor, A/D and D/A converters.

UNIT-IV **(8 Lectures)**

Intel 8051 MICROCONTROLLER: Architecture, Memory organization, counters/timers, serial data input/output, interrupts. Assembly language programming: Instructions, addressing modes, simple programs. Interfacing: keyboard, displays (LED, 7-segment display unit), A/D and D/A converters.

UNIT-V **(10 Lectures)**

PIC MICROCONTROLLER: Introduction, characteristics of PIC microcontroller, PIC microcontroller families, memory organization, parallel and serial input and output, timers, Interrupts, PIC 16F877 architecture, instruction set of the PIC 16F877.

Text Books:

1. Microprocessors and Interfacing – Programming and Hard ware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rd Edition.
2. The 8051 Microcontroller & Embedded Systems Using Assembly and C by Kenneth J.Ayala, Dhananjay V.Gadre,Cengage Learninbg , India Edition.

References Books:

1. The Intel Microprocessors-Architecture, Programming, and Interfacing by Barry B.Brey, Pearson, Eighth Edition-2012.
2. Microprocessors and Microcontrollers-Architecture, Programming and System Design by Krishna Kant, PHI Learning Private Limited, Second Edition, 2014.

Web References:

1. https://nptel.ac.in/courses/106108100/
2. https://www.sanfoundry.com/best-reference-books-microprocessors-microcontrollers/

B.Tech III Year II Semester

Course Structure

L	T	P	C
2	0	0	2

DATABASE SYSTEMS
(CSE)

Internal Marks : 40

Course Code: P18CSO12 **External Marks: 60**

Course Prerequisites: None

Course Objectives:

1. Provides students with theoretical knowledge
2. Design a database system andunderstand the issues involved in implementing the database.

Course Outcomes:

1. Create conceptual data model using Entity Relationship Diagram
2. Design conceptual and logical database models for an application.
3. Normalize relational database design of an application.
4. Implement the need for Indexing and Hashing and illustrate transactional processing.
5. Implement the various files indexing techniques.

UNIT I: (6 Lectures)

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Specialty Databases, Data Storage and Querying, Database Architecture , Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas, Other aspects of Database Design.

UNIT II: (6 Lectures)

Relational Model: Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Additional Basic Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, JoinExpression.

UNIT III: (6 Lectures)

Schema Refinement (Normalization): Problems Caused by Redundancy, Decompositions, Problems Related to Decomposition, Functional dependency, Properties of Functional

dependency, Normal forms based on functional dependency - 1NF, 2NF and 3NF, concept of surrogate key, Boyce-Codd normal form(BCNF), 4NF; Properties of Decompositions – Lossless join decomposition and dependency preserving decomposition.

UNIT IV: (6 Lectures)

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability, Transaction Isolation Levels, Implementation of IsolationLevels.

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Multiples Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations.

UNIT V: (6 Lectures)

Overview of Storages And Indexing: Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization.

Text Books:

1. Abraham Silberschatz, Henry F Korth, S Sudharshan, *Database System Concepts,* 6th Edition, McGraw-Hill International Edition,2011
2. Date CJ, Kannan A, Swamynathan S, *An Introduction to Database System* , 8th Edition, PearsonEducation-2006.
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning,2012.
4. Database Management Systems,Rajesh Narang,Second Edition,2018.

References:

1. Database System Concepts. 5/e Silberschatz, Korth, TMH,2002.
2. Introduction to Database Systems, 8/e C J Date, PEA,2000.
3. The Database book principles & practice using Oracle/MySql Narain Gehani, University Press,2008.

Web References:

1. www.academy.vertabelo.com
2. www.w3schools.com
3. www.codecademy.com

B.Tech III Year II Semester

Course Structure

L	T	P	C
0	0	3	2

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB

Internal Marks : 40

External Marks: 60

Course Code: P18CSL07

Course Objectives

- Explain Artificial Intelligence and Machine Learning
- Illustrate AI and ML algorithm and their use in appropriate applications
- Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
- The ability to implement some basic machine learning algorithms .
- Understanding of how machine learning algorithms are evaluated.

List of Experiments:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.

5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using *k*-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

9. Write a program to implement *k*-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Course Outcomes:

6. Appraise the theory of Artificial intelligence.
7. Illustrate the working of AI Algorithms.
8. Demonstrate the applications of AI.
9. Recognize the characteristics of machine learning that make it useful to real-world Problems.
10. Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.

Note: The creation of sample database for the purpose of the experiments is expected to be predecided by the instructor

Text Books:

4. Elaine Rich, Kevin K and S B Nair, "Artificial Inteligence", 3 rd Edition, McGraw Hill Education, 2017.
5. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
6. Machine Learning, Tom M. Mitchell, MGH.

B.Tech III Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

WEB TECHNOLOGIES LAB

(CSE&IT)

Internal Marks : 40

Course Code: P18CSL09 **External Marks: 60**

Course Prerequisites: Java Programming

Course Outcomes:

5. Create a static web pages using HTML and CSS.
6. Develop JavaScript code for data validation.
7. Integrate frontend and backend technologies in client-server systems.
8. Design dynamic web applications using PHP and JSP.
9. Demonstrate database connectivity for developing web applications.

The students have to choose one of the following project and do the all 12 experiments related to that project.

1. Training and placement cell.
2. School Education System.
3. University Management System.
4. Hospital Management System.

The following are the experiments related to Training and Placement cell project. For the remaining projects, the concern lab instructor has to decide the experiments according to the websites given as examples.

List of Experiments

Experiment 1: Design the following static web pages required for a Training and placement cell web site.
1) Home Page 2) Login Page 3) Registration page

Experiment 2: 4) Company Details Page 5) Alumni Details Page 6) Placement Staff Details Page

Experimen 3: 7) Student personal Info Page 8) Student Academic Info page 9) Semester Wise Percentage & their Aggregate page

Experiment 4: Validate login page and registration page using regular expressions.

Experiment 5: Apply different font styles, font families, font colors and other formatting styles to the above static web pages.

Experiment 6: Install wamp server and tomcat server, access above developed static web pages using these servers.

Experiment 7: Write a servlet/PHP to connect to the database, Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration.

Experiment 8: Write a JSP/PHP to connect to the database, Insert the details of the student academic information with student academic info page.

Experiment 9: User Authentication:

Assume four users user1user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ".
Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Experiment 10: Write a JSP which does the following job:

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

Experiment 11: write a JSP to insert the student's semester wise percentages and calculate aggregate and insert into database.

Experiment 12: write a JSP to search the students according to their aggregate and produce sorted list or according to their Enroll number.

IV YEAR I SEMESTER								
S. No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	P18ITT08	Web Scripting languages	3	0	0	3	40	60
2	P18CST11	Big Data Technologies	3	0	0	3	40	60
3	***Professional Elective – III***		3	0	0	3	40	60
	P18CSE22	Pattern Recognition(T1)						
	P18ITE06	Concurrent Parallel Programming(T2)						
	P18CSE13	Multimedia and Application Development (T3)						
	P18CSE12	Image Processing(T4)						
4	***Professional Elective-IV***		3	0	0	3	40	60
	P18CSE19	Internet of Things (T1)						
	P18ITE07	Software Project Management (T2)						
	P18CSE15	Soft Computing Techniques(T3)						
	P18CSE16	Cloud Computing (T4)						
5	***Open Elective-IV***		2	0	0	2	40	60
	P18MBO05	HSMC — Entrepreneurial Development						
	P18MET02	MECH — ROBOTICS						
	P18ECO11	ECE — Introduction to Wireless Networks						
	P18ITO01	CSE/IT — Distributed Databases						
6	P18ITL03	Scripting language Lab	0	0	3	1.5	40	60
7	P18CSL09	Hadoop & Big Data Lab	0	0	3	1.5	40	60
8	P18ITL04	Android Application Development Lab	0	0	3	2	40	60
9	P18CSL12	Employability skills	2	0	0	2	40	60
Total Periods			**16**	**0**	**9**	**21**	**360**	**540**

B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	1	0	3

WEB SCRITING LANGUAGES

(IT)

Internal Marks : 40

Course Code: **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

. This course introduces the script programming paradigm.
- Introduces scripting languages such as Perl, Ruby and TCL.
- Learning TCL.

Course Outcomes:

- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
- Acquire programming skills in scripting language.

UNIT I: (9 Lectures)

Introduction to Scripting Languages: Overview, Ruby, Rails, the structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services

UNIT II: (9 Lectures)

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT III: (9 Lectures)

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT IV: (9 Lectures)

Advanced Perl

Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT V: (9 Lectures)

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

TK: TK-Visual Tool Kits, Fundamental Concepts of TK, TK by example, Events and Binding, Perl-TK.

Text Books:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas Second edition

References:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J.P. Flynt, Cengage Learning.

Web References:

4. https://www.w3schools.com/html/
5. https://www.javatpoint.com/servlet-tutorial
6. http://nptel.ac.in/courses/106105084/

B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

BIG DATA TECHNOLOGIES

Internal Marks : 40

Course Code: P18CST11 **External Marks: 60**

Course Prerequisites: Fundamentals of Java Programming

Course Objectives:

1. Understand the big data characteristics, importance and HDFS
2. Apply the MapReduce concepts to work with the big data.
3. Able to Understand Hadoop I/O.
4. Apply Pig latin, Apache Spark tools to solve the word count example.
5. Apply Hive structure to Hadoop data.

Course Outcomes:

1. Understand HDFS Architecture to store the data in a distributed environment
2. Apply MapReduce concepts to work with the big data.
3. Implementation of custom writable in Hadoop I/O.
4. Able to Apply Pig latin, Apache Spark tools to work with big data problems
5. Apply hive client to store and work with big data.

UNIT I: (9 Lectures)

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, Validity), Importance of Big Data.

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Datanode, Secondary Namenode, JobTracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT II: (9 Lectures)

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

UNIT III: (9 Lectures)

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators.

UNIT IV: (9 Lectures)

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.

Apache Spark: Introduction to Apache spark, features, components, RDD, installation, writing word count using apache spark, hadoop vs spark.

UNIT V: (9 Lectures)

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

Text Books:

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly 2009 (UNIT-I,II,III,IV,V).
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012 (UNIT-I).

References:

1. Hadoop in Action by Chuck Lam, MANNING Publ.
2. Hadoop in Practice by Alex Holmes, MANNING Publishers
3. Mining of massive datasets, Anand Rajaraman, Jeffrey D Ullman, Wiley Publications.

Web References:

1. https://nptel.ac.in/courses
2. https://www.tutorialspoint.com/spark
3. https://www.youtube.com/watch?v=zez2Tv-bcXY
4. https://www.youtube.com/watch?v=VSbU7bKfNkA

B.Tech IV Year - I Semester

Course structure

L	T	P	C
3	0	0	3

Pattern Recognition

Course Code: P18CSE22 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Image Processing, Artificial Intelligence, Machine Learning

Course Objectives:

1. To enable the students to understand the fundamentals of Pattern recognition.
2. To make the students should learn to choose an appropriate feature, Pattern classification algorithm for a pattern recognition problem
3. To make the students properly implement the algorithm using modern computing tools such as Matlab, OpenCV, C, C++ and correctly.
4. To analyze, and report the results using proper technical terminology

Course Outcomes:

At the end of this course the student will be able to

1. understand the fundamentals of pattern recognition and machine learning algorithms
2. design and implement certain important pattern recognition techniques
3. develop applications by using pattern recognition algorithms.
4. construct machine learning models for pattern recognition
5. present the various patterns using mathematical models.

UNIT I **(8 Lectures)**

Introduction to Pattern Recognition: Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition,Pattern Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature, Feature Selection,

UNIT II **(10 Lectures)**

Nearest Neighbor Based Classifiers: Nearest Neighbor Algorithm, Variants of the NNAlgorithm, Use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection, Bayes Classifier: Bayes Theorem, Minimum error rate classifier, Estimation of Probabilities, Comparison with the NNC, Naive Bayes Classifier,

UNIT III **(10 Lectures)**

Hidden Markov Models: Markov Models for Classification, Hidden Markov Models, Classification Using HMMs, Classification of Test Patterns. Decision Trees: Introduction,

Decision Trees for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Example of Decision Tree Induction.

UNIT IV **(12 Lectures)**

Support Vector Machines: Introduction, Linear Discriminant Functions, Learning the Linear Discriminant Function, Neural Networks, SVM for Classification, Linearly Separable Case, Non- linearly Separable Case. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers, Evaluation of Classifiers, Evaluation of Clustering

UNIT V **(10 Lectures)**

Clustering: Clustering and its Importance, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets, An Application to Handwritten Digit Recognition: Description of the Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns.

Text Books :

1. Pattern Recognition an Introduction, V. Susheela Devi M. Narasimha Murty, University Press.
2. Pattern Recognition, Segrios Theodoridis,Konstantinos Koutroumbas, Fourth Edition, Elsevier

Reference Books :

1. Pattern Recognition and Image Analysis, Earl Gose, Richard John Baugh, Steve Jost, PHI 2004.
2. C. M. Bishop, „Neural Networks for Pattern Recognition“, Oxford University Press, Indian Edition, 2003.
3. Pattern Classification, R.O.Duda, P.E.Hart and D.G.Stork, Johy Wiley, 2002

Web References:

1. https://en.wikipedia.org/wiki/Pattern_recognition#:~:text=Pattern%20recognition%20is%20the%20automated,computer%20graphics%20and%20machine%20learning.
2. https://www.geeksforgeeks.org/pattern-recognition-introduction/
   https://www.tutorialspoint.com/biometrics/pattern_recognition_and_biometrics.htm

B.Tech IV Year - I Semester

Course structure

L	T	P	C
3	0	0	3

CONCURRENT AND PARALLEL PROGRAMMING

(PROFESSIONAL ELECTIVE)

Course Code:

Internal Marks: 40
External Marks: 60

COURSE OBJECTIVES:

• Improvement of students comprehension of CPP, new programming concepts, paradigms and idioms
• Change of ’mood’ regarding Concurrency counter-intuitiveness
• Proactive attitude: theoretical teaching shouldn’t be so dull
• Multipath, individually paced, stop–and–replay, personalized learning process
• Frequent assessment of learning advances on the subject

COURSE OUTCOMES:

• Understanding improvement of CPP concepts presented
• The number of reinforcement–exercises assigned
• The time required for the resolution of exercises
• Compliance level with the new model of theoretical teaching

UNIT- 1

Concurrent versus sequential programming, Concurrent programming constructs, race Condition, Synchronization primitives.

UNIT-II

Processes and threads,Interprocess communication, Livelock and deadlocks, starvation, and deadlock prevention, Issues and challenges in concurrent programming paradigm and current trends.

UNIT-III

Parallel algorithms – sorting, ranking, searching, traversals, prefix sum etc.,

UNIT- IV

Parallel programming paradigms – Data parallel, Task parallel, Shared memory and message passing, Parallel Architectures, GPGPU, pthreads, STM,

UNIT-V

OpenMP, OpenCL, Cilk++, Intel TBB, CUDA

TEXT BOOKS:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.

REFERENCES:

1. GadiTaubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
2. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
3.. Fred B. Schneider. On Concurrent Programming, Springer.
4. Brinch Hansen. The Origins of Concurrent Programming: From Semaphor

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1. https://link.springer.com/
2. https://www.researchgate.net/
3. https://nptel.ac.in/
4. https://www.tutorialspoint.com/
5. https://www.javatpoint.com/

B. Tech IV Year - I Semester

Course structure

L	T	P	C
3	0	0	3

Multimedia and Application Development

(Professional Elective – IV)

Course Code: P18CSE13 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Nil

Course Objectives:

1. To give each student a firm grounding in the fundamentals of the underpinning technologies in graphics, distributed systems and multimedia
2. 2. To teach students about the principled design of effective media for entertainment, communication, training and education
3. 3. To provide each student with experience in the generation of animations, virtual environments and multimedia applications, allowing the expression of creativity
4. 4. To provide each student with a portfolio of their own completed work at the end of the programme

Course Outcomes:

At the end of this course the student will be able to

1. Demonstrate knowledge and understanding of the concepts, principles and theories of Multimedia Applications and Virtual environments
2. Demonstrate knowledge and understanding of the current issues involved with development and deployment of multimedia system
3. Analyse and solve problems related to their expertise in Multimedia Applications
4. Demonstrate their ability to extend their basic knowledge to encompass new principles and practice
5. Demonstrate their computing, technical and theoretical skills by developing a substantial Multimedia application.

Unit-1 **(7** Lectures)

Fundamental concepts: Fundamental concepts in Text and Image-Multimedia and hypermedia. World Wide Web, overview of multimedia software tools.

Graphics and Image: data representation graphics/image data types, file formats.

Unit-2 **(7** Lectures)

Color in image and video: color science, color models in images, color models in video.

Basic concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Unit-3 **(**12 Lectures)

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding.

Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zero tree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

Unit-4 (10 Lectures)

Video Compression Techniques: Introduction to video compression,Video compression based on motion compensation,Search for motion vectors. MPEG.

Basic Audio Compression Techniques: ADPCM, Vocoders, Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP. MPEG Audio Compression: Psychoacoustics, Equal-Loudness Relations, Frequency Masking, Temporal Masking, MPEG Audio, MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithm, MPEG-2 AAC (Advanced Audio Coding).

Unit-5 (8 Lectures)

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications,Quality of Multimedia Data Transmission,Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, t Media-on-Demand (MOD).

Text Books:

1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHIl l Pearson Education
2. Multimedia System Design, Andleigh and Thakarar , PHI
3. Multimedia Technology & Application, David Hillman, Galgotia Publications.

References:

1. Rajan Parekh “Principles of Multimedia” (Tata McGraw-Hill)
2. S.J.Gibbs & D.C.Tsichritzis “Multimedia Programming”, Addison Wesley 1995
3. P.W.Agnew & A.S.Kellerman “Distributed Multimedia”, AddisonWesley 1996
4. C.A.Poynton, “A Technical Introduction to Digital Video” Wiley1996
5. F.Fluckiger, “Understanding Networked Multimedia”, Prentice- Hall 1995

Web References:

1. https://www.tutorialspoint.com/multimedia/index.htm
2. https://www.wisdomjobs.com/e-university/multimedia-tutorial-270.html
3. https://dokumen.tips/documents/the-manualscom-fundamentals-of-multimedia-by-ze-nian-li-and-mark-s-drew-solution-manual.html

B.Tech. IV Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

IMAGE PROCESSING

(PROFESSIONAL ELECTIVE III)

Internal Marks : 40

Course Code: P18CSE12 **External Marks: 60**

Course objectives

- At the end of the course the students will understand the
- Fundamental concepts in digital image processing and enhancement in spatial domain.
- Approaches used in enhancement in frequency domain and image segmentation.
- Image restoration and image compression techniques.
- Morphological transformations, and image representation and description.

Course outcomes

- At the end of the course the students will be able to
- Define image processing systems, and develop algorithms for image enhancement techniques in spatial domain.
- Develop enhancement techniques in frequency domain and image segmentation
- Develop image restoration, and image compression techniques.
- Implement morphological transformation algorithms, and select various descriptors for image representation.

Course Content:

UNIT I (08 Periods)

Introduction: Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

Digital Image Fundamentals: Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels.

UNIT II (10 Periods)

Image Enhancement in the Spatial Domain: Some Basic Gray Level Transformation, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, smoothing spatial Filters, Sharpening spatial Filters.

Image Enhancement in the Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain, smoothing frequency domain Filters, Sharpening frequency-domain Filters.

UNIT III (10 Periods)

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

Image Restoration: A Model of the Image Degradation/Restoration Process, Linear, Position-Invariant Degradations, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering.

UNIT IV (10 Periods)

Image Compression: Image Compression Models, Error-free Compression, Lossy Predictive Compression, Image Compression Standards.

Morphological Image Processing: Dilation and Erosion, The Hit-or-Miss Transformation, Some basic Morphological Algorithms.

UNIT V (08 Periods)

Representationand Recognition: Representation, Boundary Descriptors, Regional Descriptors.

Image Recognition: Patterns and pattern classes – Matching by minimum distance classifier – Matching by Correlation

Text Book:

1.Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing' Addison Wesley Pubs (Second Edition).

Reference Books:

Image Processing. Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac, Roger Boyle (Second Edition).

A.K.Jain, 'Fundamentals of Digital Image Processing' PHI.

David Salomon : Data Compression – The Complete Reference, Springer Verlag New York Inc., 4th Edition

Web References:

1. http://www.imageprocessingbasics.com/
2. www.imageprocessingplace.com/root_files_V3/tutorials.htm
3. www.library.cornell.edu/preservation/tutorial/intro/intro-01.html
4. www.olympusmicro.com/primer/digitalimaging/javaindex.html

B.Tech. IV Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

INTERNET OF THINGS

(PROFESSIONAL ELECTIVE IV)

Course Code: P18CSE19 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Computer Networks,Analog and Digital Communication, Machine Learning

Course Objectives:

1. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
2. Formulate a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
3. Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
4. Design and carry out an empirical evaluation of different algorithms on problem formulation, and state the conclusions that the evaluation supports.

Course Outcomes:

At the end of this course the student will be able to

1. Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
2. Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
3. Develop different M2M communication models
4. Compare and contrast the threat environment based on industry and/or device type.
5. Understand and Implement various IoT cloud based services.

Unit-I: (8 Lectures)

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples of IoTs, Design Principles For Connected Devices

Unit-II: (9 Lectures)

Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations, Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability**.**

UNIT-III (12 Lectures)

Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes.

UNIT-IV (10 Lectures)

Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems, Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services.

UNIT-V (9 Lectures)

Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology, Sensing the World.

TEXTBOOKS:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERNCE BOOKS:

1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things CunoPfister , Oreilly

Web References:

4. https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT
5. https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
6. https://www2.deloitte.com/content/dam/insights/us/articles/iot-primer-iot-technologies-applications/DUP_1102_InsideTheInternetOfThings.pdf

B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	1	0	3

SOFTWARE PROJECT MANAGEMENT

(IT)

Internal Marks : 40

Course Code: **External Marks: 60**

Course Prerequisites: Software Engineering

Course Objectives:

At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project managementfrom the perspectives of planning, tracking and completion of project
- To compare and differentiate organization structures and project structures
- To implement a project to manage project schedule, expenses and resources withthe application of suitable project management tools

Course Outcomes:

Upon the completion of the course students will be able to:-

- Apply the process to be followed in the software development life-cycle models.
- Apply the concepts of project management & planning.
- Implement the project plans through managing people, communications and change
- Conduct activities necessary to successfully complete and close the Software projects
- Implement communication, modeling, and construction & deployment practices insoftware development.

UNIT I (9 Lectures)

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of software Economics: Software economics, Pragmatic software cost estimation.

UNIT II (9 Lectures)

Improving Software Economics: Reducing software product size, improving software processes, improving team effectiveness, improving automation, achieving required quality, peer inspections.

Life cycle Phases: Engineering and production stages, inception, elaboration, construction, transition phases, Artifacts of the process, Artifacts evolution over the life cycle, Test artifacts, Management artifacts.

UNIT III (9 Lectures)

Model Based Software Architecture: Management perspective and Technical perspective, Workflows of the process, Software process workflows, Iteration workflows.

Checkpoints of the process: Major milestones, Minor milestones, periodic status assessments.

UNIT IV (9 Lectures**)**

Iterative process planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process.

Project organization and responsibilities: Line of business organizations, project organizations, evaluation of organizations, automation building blocks.

UNIT V (9 Lectures)

Risk management: Categories of risk, A frame work for dealing with risk, risk identification, risk assessment, risk planning, risk management, evaluating risks to the schedule, applying PERT techniques

Feature software project management: modern project profiles, next generation software economics, modern process transitions.

Text Books:

1) Software Project Management, Walker Royce, Pearson Education, 2005.
2) Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.

Reference Books:

1) Software Project Management, Joel Henry, Pearson Education.
2) Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005.
3) Effective Software Project Management, Robert K.Wysocki, Wiley,2006.

Web References:

1.https://www.tutorialspoint.com/
2.https://www.guru99.com/
3.https://www.javatpoint.com/

B.Tech IV Year - I Semester **Course structure**

L	T	P	C
3	0	0	3

SOFT COMPUTING TECHNIQUES

(PROFESSIONAL ELECTIVE)

Course Code: P18CSE15 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Nil

Course Objectives:

To introduce the concepts in Soft Computing such as Artificial Neural Networks, Fuzzy logic- based systems, genetic algorithm-based systems and their hybrids.

Course Outcomes:

At the end of this course the student will be able to

1. To Learn about soft computing techniques and their applications.
2. To Analyze various neural network architectures.
3. To Define the fuzzy systems.
4. To Understand the genetic algorithm concepts and their applications.
5. To Identify and select a suitable Soft Computing technology to solve the problem; construct a solution.

Unit-I: (8 Lectures)

Introduction to Soft Computing: Artificial neural networks - biological neurons, Basic models of artificial neural networks – Connections, Learning, Activation Functions, McCulloch and Pitts Neuron, Hebb network..

Unit-II: (9 Lectures)

Artificial Neural Networks : Perception networks – Learning rule – Training and testing algorithm, Adaptive Linear Neuron, Back propagation Network – Architecture, Training algorithm.

UNIT-III **(10 Lectures)**

Fuzzy Logic and Fuzzy systems:

Fuzzy logic - fuzzy sets - properties - operations on fuzzy sets, fuzzy relations - operations on fuzzy relations.

Fuzzy systems: Fuzzy membership functions, fuzzification, Methods of Membership value assignment - intuition-inference-rank ordering, Lambda –cuts for fuzzy sets, Defuzzification methods.

UNIT-IV **(10 Lectures)**

Genetic Algorithms: Truth values and Tables in Fuzzy Logic, Fuzzy propositions, Formation of fuzzy rules -Decomposition of rules –Aggregation of rules, Fuzzy Inference Systems – Mamdani and Sugeno types, Neuro-fuzzy hybrid systems –characteristics – classification.

UNIT-V **(9 Lectures)**

Hybrid systems: Introduction to genetic algorithm, operators in genetic algorithm - coding - selection - cross over – mutation, Stopping condition for genetic algorithm flow, Genetic -neuro hybrid systems, Genetic-Fuzzy rule based system.

Text Books

1. S. N. Sivanandam and S. N.Deepa, Principles of soft computing - Wiley India.
2. Timothy J. Ross, Fuzzy Logic with engineering applications – Wiley India.

References

1. N. K. Sinha and M. M. Gupta, Soft Computing & Intelligent Systems: Theory & Applications-Academic Press /Elsevier. 2009.
2. Simon Haykin, Neural Network- A Comprehensive Foundation- Prentice Hall International, Inc.
3. R. Eberhart and Y. Shi, Computational Intelligence: Concepts to Implementation, Morgan Kaufman/Elsevier, 2007.
4. Ross T.J. , Fuzzy Logic with Engineering Applications- McGraw Hill.
5. Driankov D., Hellendoorn H. and Reinfrank M., An Introduction to Fuzzy Control- Narosa Pub.
6. Bart Kosko, Neural Network and Fuzzy Systems- Prentice Hall, Inc., Englewood Cliffs Goldberg D.E., Genetic Algorithms in Search, Optimization, and Machine Learning- Addison Wesley.

B.Tech IV Year - I Semester

Course structure

L	T	P	C
3	0	0	3

CLOUD COMPUTING

Course Code: P18CSE16 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Nil

Course Objectives: The student will learn about

1. The cloud environment, building software systems and components that scale to millions of users in modern internet.
2. Cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and Virtualizations.
3. Developing cloud based software applications on top of cloud platforms.
4. Programming and Software Environments on different cloud platforms.
5. Understanding of cloud resource management scheduling algorithms and file systems.

Course Outcomes: The Student

1. Apply the key dimensions of the challenge on Cloud Computing
2. Assessment of the economics, financial, and technological implications for selecting cloud computing for own organization
3. Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
4. Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas.
5. Accessing the data from different file systems on different cloud flat forms.

UNIT I: Systems modeling, Clustering: (9 Lectures)

Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency

UNIT II: Virtual Machines and Virtualization: (6 Lectures)

Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices.

UNIT III: Cloud Platform Architecture: (10 Lectures)

Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT IV: Cloud Programming and Software Environments: (8 Lectures)
Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS- Simple Storage Service(S3) Architecture and Microsoft Azure, Emerging Cloud Software Environments.

UNIT V: (12 Lectures)
Cloud Resource Management and Scheduling and Storage Systems: Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Two level Resource Allocation Architecture.
Scheduling Algorithms for Computing Clouds: Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.
Storage models: Distributed file systems, general parallel file systems. Google file system. Apache Hadoop, BigTable, Megastore.

TEXT BOOKS:
1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.\
3. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti,University

Suggested / Reference Books:
3. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
4 .Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

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B.Tech. IV Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

ENTREPRENEURSHIP DEVELOPMENT

(OPEN ELECTIVE IV)

Course Code:P18MBO05 **Internal Marks: 40**

External Marks: 60

Course Objectives :

To provide an introduction to entrepreneurship and its development process. It also enables the student to learn about project formulation, appraisal, financial and implementations. Further it attempts to provide conceptual clarification to small scale industry and the stages involved in the establishment of small business.

Course Outcomes:

1. To identify the importance of entrepreneurship in India.
2. To evaluate the training methods adopted in increasing entrepreneurship in India
3. To understand the preparation of projects and evaluating them
4. To study the growth of small and micro enterprises and the reasons for their downfall in industry
5. To understand the institutional support given for entrepreneurs in India.

UNIT 1: (10 Lectures)

Entrepreneurship: Importance and growth - Characteristics and Qualities of Entrepreneur- Role of Entrepreneurship, Ethics and Social Responsibilities. Women Entrepreneurship: Role & Importance, Problems of Women Entrepreneurs – corporate entrepreneurship – mobility of entrepreneur – entrepreneurial motivation.

UNIT 2: (10 Lectures)

Training: Designing Appropriate Training Programme to inculcate Entrepreneurial Spirit - Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees. Creativity and Entrepreneurship: Sources and Methods of Ideas Planning and Development of Programmes, Design Thinking Tools.

UNIT 3: (10 Lectures)

Planning and Evaluation of Projects: Growth of Firm – Project identification and selection - Factors inducing growth- - Project Feasibility Study - Post Planning of Project-Project Planning and Control.

UNIT 4: (10 Lectures)

Small and Micro Enterprises: Importance, definitions, classification, Classification of Industry – policies and their support to MSMEs - growth and growth strategies – sickness in small business and remedies – small entrepreneurs in International business.

UNIT 5: (8 Lectures)

Institutional Support to Entrepreneur and MSMEs: Role of Government - Role of IDBI, NIESBUD, SISI, DIC - Financial Institutions-Commercial Banks, Entrepreneurial Development Institutes, Universities and other Educational Institutions offering Entrepreneurial Development Programme.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books:

1. Arya Kumar: "Entrepreneurship", Pearson, Publishing House, New Delhi, 2012.
2. VSP Rao, Kuratko: "Entrepreneurship', Cengage Learning, New Delhi,

References:

1. K.Ramachandran: "Entrepreneurship Development", TMH, New Delhi, 2012
2.B.Janakiram, M Rizwana: "Entrepreneurship Development" Excel Books, New Delhi, 2011.
3.Rajeev Roy: "Entrepreneurship", Oxford University Press, New Delhi,2012
4. P.C.Shejwalkar: "Entrepreneurship Development", Everest Publishing House, New Delhi, 2011.

Web References :

1. https://segera-wisuda.blogspot.com/2016/05/46-ebooks-entrepreneurship-download-free.html
2. https://www.free-ebooks.net/book-list/entrepreneurship
3. https://lecturenotes.in/subject/35/entrepreneurship-development-ed
4. *164.100.133.129:81/econtent/Uploads/Entrepreneurship_Development.pdf*
5. *ncert.nic.in/ncerts/l/lebs213.pdf*

B.Tech. IV Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

ROBOTICS

Internal Marks: 40

Course Code: P18MET02 **External Marks: 60**

Course Prerequisite: Kinematics of Machinery

Course Objectives:

1. To give students practice in applying their knowledge of mathematics, science and Engineering and to expand this knowledge into the vast area of robotics.
2. To understand the basic components of robotics.
3. To understand the motion analysis and kinematic of robotics.
4. Mathematical approach to explain how the robotic arm motion can be described.
5. The students will understand functioning of sensors and actuators.

Course Outcomes:

After completion of the course the student will be able to

1. Identify various robot configurations.
2. Identify the various components of robots.
3. Carryout kinematic and dynamic analysis for simple serial kinematic chains.
4. Perform the mathematical approach for motion of robots.
5. Perform trajectory planning for a manipulator by avoiding obstacles and Select appropriate actuators and sensors for a robot based on specific application

UNIT – I: (9 Lectures)

INTRODUCTION: Robotics in Automation, CAD/CAM and Robotics- An over view of Robotics – Applications of Robotics – Classification by coordinate system and control system.

UNIT – II: (9 Lectures)

COMPONENTS OF THE INDUSTRIAL ROBOTICS: Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – III: (9 Lectures)

MOTION ANALYSIS: Homogeneous transformations as applicable to rotation and translation- problems.

MANIPULATOR KINEMATICS: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

DYNAMICS: Differential transformation and manipulators, jacobians- problems Dynamics-Lagrange- Euler and Newton – Euler formulations – Problems.

UNIT-IV: (9 Lectures)

General considerations in path description and generation. Trajectory planning and Avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – robot programming, languages and software packages – description of paths with a robot programming language.

UNIT-V: (9 Lectures)

ROBOT ACTUATORS AND FEEDBACK COMPONENTS: Actuators: Pneumatics, Hydraulic actuators, Electric and stepper motors. Feedback components: Position sensors – potentiometers, resolvers, encoders – velocity sensors.

Text Books:

1. Industrial Robotics by Groover, M P/Pearson edu.
2. Robotics and Control by Mittal R K & Nagrath I J, TMH Publishers

Reference Books:

1. Robotics by Fu K S, McGraw Hill Publishers.
2. Robotic Engineering by Richard D. Klafter, Prantice Hall publishers.
3. Robot Analysis and Control by H.Asada and J.J.E. Slotine, BSP Books pvt. Ltd.
4. Introduction to Robotics by John J. Craig, Pearson Edu.

Web References:

1. https://www.iare.ac.in
2. https://www.millibar.com
3. https://www.coursehero.com
4. https://link.springer.com
5. https://www.ulektzbooks.com

B.Tech. IV Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

INTRODUCTION TO WIRELESS SENSOR NETWORKS

(OPEN ELECTIVE IV)

Internal Marks: 40

Course Code: P18ECO11 **External Marks: 60**

Course Prerequisite: Computer Networks

Course Objectives:

1. Identify and Distinguish between the notion of Wired and Wireless Networks.
2. Analyze the basic concepts for designing a routing Protocol for MANETs.
3. Learn the concepts of Security issues for designing MAC and routing protocol for MANETs.
4. Apply Fundamental principles Characteristics for designing Sensor Networks for communications.
5. Learn different tools and applications of wireless sensor networks**.**

Course Outcomes: After going through this course the student will be able to

1. Describe the fundamental aspects of sensing and communication under diverse environment and scenarios.
2. Analyze the connection among transceiver design and topology.
3. Applying the MAC protocol and Network layer for demonstrating the communications aspects in Ad-hoc networks
4. Evaluating the end to end performance of Transport layer and its delivery needs in Ad-hoc Environment
5. Creating a simulation environment with software according to the terrain used.

UNIT I (9 Lectures)

OVERVIEW OF WIRELESS SENSOR NETWORKS: Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints and challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks.

ARCHITECTURES: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit.

UNIT II **(9 Lectures)**

NETWORKING Technologies: Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs, WANETs.

UNIT III **(9 Lectures)**

MAC and ROUTING Protocols for Wireless Sensor Networks: Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols. Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols.

UNIT IV **(9 Lectures)**

TRANSPORT LAYER AND SECURITY PROTOCOLS: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions

UNIT V **(9 Lectures)**

SECURITY IN WSNs: Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning

SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges.

APPLICATIONS of WSN: S Ultra wide band radio communication, Wireless fidelity systems. Future directions, Home automation, smart metering Applications

Text Books:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press
3. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

Reference Books:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, and Applications”, John Wiley, 2007.

2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.
4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer
5. Wireless Sensor Networks – S Anandamurugan , Lakshmi Publications

Web References:

1.http://www.engr.iupui.edu/~dskim/manet/
2.https://ieeexplore.ieee.org/document/1547799
3.https://onlinelibrary.wiley.com/doi/10.1002/0470095121.ch2

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DISTRIBUTED DATABASES

(IT)

Internal Marks : 40

Course Code: P18ITO01 **External Marks: 60**

Course Objectives:

1.In-depth study of the classical distributed database management issues such as distribution design, distributed query processing and optimization, and distributed transaction management.

2.To study more current distributed database management topics such as pervasive compuitng, Web data management, different distribution models.

Course Outcomes:

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object-oriented database system and related development.
4. Understand distributed database systems architecture and design.
5. Be able to apply methods and techniques for distributed quey processing and optimisation.

Unit – I

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, DDMBS Architecture

Distributed Database Design: Distribution Design issues, Fragmentation, Allocation.

Unit – II

Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization

Unit _ III

Transaction Management: Definition, properties of transaction, types of transactions

Distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

Unit-IV

Distributed DBMS Reliability: Reliability concepts and measures, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Unit-V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

TEXT BOOKS

1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOKS:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

WEB RERENCES

1. https://www.tutorialspoint.com/distributed_dbms/distributed_dbms_databases.htm
2. https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch21.htm
3. https://www.tutorialride.com/distributed-databases/distributed-databases-tutorial.htm
4. https://www.sciencedirect.com/topics/computer-science/distributed-databases
5. https://nptel.ac.in/

B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

SCRITING LANGUAGES LAB

(IT)

Internal Marks : 40

Course Code: **External Marks: 60**

Course Prerequisites: Any High-level programming language (C, C++)

Course Objectives:

To Understand the concepts of scripting languages for developing web-based projects To understand the applications the of Ruby, TCL, Perl scripting languages

Course Outcomes:

. Ability to understand the differences between Scripting languages and programming languages

. Able to gain some fluency programming in Ruby, Perl, TCL

List of Experiments

Week 1:

a) Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer.

b) Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.

Week 2:

a) Write a Ruby script which accept the user's first and last name and print them in reverse order with a space between them

b) Write a Ruby script to accept a filename from the user print the extension of that

week 3:

a)Write a Ruby script to find the greatest of three numbers

b)Write a Ruby script to print odd numbers from 10 to 1

week 4:

a)Write a Ruby scirpt to check two integers and return true if one of them is 20 otherwise return their sum

b)Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100

week 5:

a)Write a Ruby script to print the elements of a given array

b)Write a Ruby program to retrieve the total marks where subject name and marks of a student stored in a hash

week 6:

a)Write a TCL script to find the factorial of a number

b).Write a TCL script that multiplies the numbers from 1 to 10

week 7:

a) Write a TCL script for Sorting a list using a comparison function

b) Write a TCL script to (i)create a list (ii)append elements to the list (iii)Traverse the list (iv)Concatenate the list

week 8:

a)Write a TCL script to comparing the file modified times.

b)Write a TCL script to Copy a file and translate to native format.

Week 9:

a) Write a Perl script to find the largest number among three numbers.

b)Write a Perl script to print the multiplication tables from 1-10 using subroutines.

Week 10:

a) Write a Perl script to substitute a word, with another word in a string. b) Write a Perl script to validate IP address and email address.

b)Write a Perl script to print the file in reverse order using comm

B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	2	1.5

HADOOP & BIG DATA LAB

Internal Marks : 40

Course Code: P18CSL09 **External Marks: 60**

Experiments:

1. Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed
   a. Local
   b. Pseudo distributed
   c. Fully Distributed
2. Implement the following file management tasks in Hadoop:
   Adding files and directories
   Retrieving files
   Deleting files
   Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
4. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
5. Install and Run Pig
6. Write Pig Latin scripts to sort, group, join, describe, and filter your data.
7. Install and Run Hive
8. Hive to create, alter, and drop databases, tables, views, functions, and indexes

B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	2	2

ANDROID APPLICATION DEVELOPMENT LAB

Course Code: P18ITL04

Course Objectives:

- To learn how to develop Applications in android environment.
- To learn how to develop user interface applications.
- To learn how to develop URL related applications.

List of Experiments

1 Create an Android application that shows Hello + name of the user and run it on an emulator.

(b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.

2 Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use

(a) Linear Layout , (b) Relative Layout and (c) Grid Layout or Table Layout.

3 Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

4 Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate

action should be invoked using intents.

5 Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6 Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.

7 Create a user registration application that stores the user details in a database table.

8 Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	2	2

EMPLOYABILITY SKILLS

Course Code: P18CSL12

Course Objectives:

The main aim of this course is

To learn how to make effective teams, personality development and leadership skills.

- To learn skills for discussing and resolving problems on the work site
- To assess and improve personal grooming
- To promote safety awareness including rules and procedures on the work site
- To develop and practice self management skills for the work site

Course Outcomes:

By the end of this course, the student

- Recite the corporate etiquette.
- Make presentations effectively with appropriate body language
- Be composed with positive attitude
- Apply their core competencies to succeed in professional and personal life

A list of vital employability skills from the standpoint of engineering students with discussion how to potentially develop such skills through campus life.

UNIT-1

Career Mapping: Inculcate workplace and professional etiquettes. Tips for Success.

Etiquette and Manners – Social and Business.

Time Management – Concept, Essentials, Tips.

UNIT-2

Personality Development – Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills.

Decision-Making and Problem-Solving Skills: Meaning, Types and Models, Group and Ethical Decision-Making, Problems and Dilemmas in application of these skills, Case studies and discussions etc.

UNIT-3

Conflict Management: Conflict - Definition, Nature, Types and Causes; Methods of Conflict Resolution.

Stress Management: Stress - Definition, Nature, Types, Symptoms and Causes; Stress Analysis Models and Impact of Stress; Measurement and Management of Stress

UNIT-4

Teamwork and Leadership Skills: Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Leadership and Assertiveness Skills: A Good Leader; Leaders and Managers; Leadership Theories; Types of Leaders; Leadership Behaviour; Assertiveness Skills.

UNIT-5

Emotional Intelligence: Meaning, History, Features, Components, Intrapersonal and Management Excellence; Strategies to enhance Emotional Intelligence.

References Books:

1) Wallace, Personality Development, India Edition, CENGAGE Learning, 2008.
2) P.Subba Rao ,Personnel and Human Resource Management , Himalaya Publishing House; Fifth Edition,2015
3) Ramachandran and Karthik, From campus to Corporate, India, PEARSON Publication, 2016.
4) Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
5) S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.
6) Raman, Meenakshi & Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

Related Activities

- Comparing company Work culture, Nature and Management styles - company information.
- Handling personnel matters – eg Time management, Communication at work.
- Role plays of chairing business meetings and negotiations.
- Conflicts resolution Games
- Team building and leadership skills Case studies and discussions
- Find out the leadership styles of various companies CEO’s.
- Tips for Enhancing Your Own Emotional Intelligence or Teams

IV YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	***Professional Elective-V***		3	0	0	3	40	60
	P18CSE20	User Interface Design(T1)						
	P18CSE18	Information Retrieval Systems (T2)						
	P18CSE17	E – Commerce(T3)						
	P18CSE23	Cyber Security(T4)						
2	***Professional Elective-VI***		3	0	0	3	40	60
	P18CSE21	Mobile Computing(T1)						
	P18CST14	Block Chain Technology(T2)						
	P18CSE24	Human Computer Interaction (T3)						
	P18ITE07	Design patterns(T4)						
3	P18ITP03	Project	0	0	12	6	80	120
Total Periods			**6**	**0**	**12**	**12**	**160**	**240**

B.Tech. IV Year II Sem. **L T P C**

3 0 0 3

USER INTERFACE DESIGN

(PROFESSIONAL ELECTIVE - V)

Course Code: P18CSE20 **Internal Marks: 40**

External Marks: 60

Course Prerequisite:Engineering Mathematics I

Course Objectives:

- To describe the web user Interface
- To describe the structure of user Interface and design process
- To organize the web systems and control

Course Outcomes:

- Able to describe the Characteristics of Graphics Interface and its Principles.
- Able to design the standards and structures for Human computer interaction.
- Able to understand the components of web systems and text boxes.
- Able to demonstrate the Guidance of multimedia systems and its accessibility
- Able to summarize the concepts of windows layout and visualization

UNIT- I **(10 Lectures)**

INTRODUCTION Human–Computer Interface – Characteristics Of Graphics Interface – Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

UNIT -II **(10 Lectures)**

HUMANCOMPUTER INTERACTION User Interface Design Process – Obstacles – Usability –Human Characteristics In Design
– Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus– Graphical Menus.

UNIT-III **(10 Lectures)**

WINDOWS Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device– Based Controls Characteristics– Screen – Based Controls – Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.

UNIT- IV **(8 Lectures)**

MULTIMEDIA Text For Web Pages – Effective Feedback– Guidance & Assistance– Internationalization– Accessibility– Icons– Image– Multimedia –Coloring.

UNIT- V **(7 Lectures)**

WINDOWSLAYOUT– TEST Prototypes – Kinds Of Tests – Retest – Information Search – Visualization – Hypermedia – WWW– SoftwareTools.

TEXT BOOKS:

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley& Sons, 2001.
2. Ben Sheiderman, "Design The User Interface", Pearson Education,1998.

REFERENCE BOOKS:

1. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.

WEB REFERENCES:

1. http://www.annaunivedu.in/2012/08/it2024-user-interface-design-syllabus.html#ixzz3xlplel6R
2. http://www.vidyarthiplus.in/2014/10/it2024-user-interface-design-two-marks.html

B.Tech. IV Year II Sem. **L T P C**

3 0 0 3

INFORMATION RETRIEVAL SYSTEMS

(PROFESSIONAL ELECTIVE - V)

Course Code:P18CSE18

Course Objectives:

1 Demonstrate genesis and diversity of information retrieval situations for text and hyper media.

2 Describe hands-on experience store, and retrieve information from www using semantic approaches.

3 Demonstrate the usage of different data/file structures in building computational search engines.

4 Analyze the performance of information retrieval using advanced techniques such as classification, clustering, and filtering over multimedia.

Course Outcomes:

1.Describe the objectives of information retrieval systems and models like vector-space, probabilistic and language models to iidentify the similarity of query and document

2. Implement clustering algorithms like hierarchical agglomerative clustering and k-means algorithm.

3. Understand relevance feedback in vector space model and probabilistic model.

4. Design the method to build inverted index

UNIT-I **(8 Lectures)**

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

UNIT-II **(9 Lectures)**

Information Retrieval System Capabilities: Search, Browse, Miscellaneous

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing.

UNIT-III **(10 Lectures)**

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT-IV **(8 Lectures)**

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT-V **(10 Lectures)**

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

TEXTBOOK :

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

REFERENCES :

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrival By Yates Pearson Education.
3. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

WEB REFERENCES:

6. https://link.springer.com/
7. https://www.researchgate.net/
8. https://nptel.ac.in/
9. https://www.tutorialspoint.com/
10. https://www.javatpoint.com/

B.Tech IV Year - II Semester **Course Structure**

L	T	P	C
3	0	0	3

E-COMMERCE
(PROFESSIONAL ELECTIVE V)

COURSE CODE:P18CSE17 **Internal Marks:40**
External Marks:60

Course Prerequisite: Nil

Course Objectives:

1. Understand the significance of E-Commerce
2. Understand the different network platforms.
3. Understand the mechanisms for Securing E-Commerce
4. Understand the payment system in E-commerce.
5. Understand the mechanisms for Marketing & Advertising in E-Commerce

Course Outcomes:

At the end of this course student will able to

1. Learn about E-Commerce platforms.
2. Design applications for E-Commerce
3. Securely perform online transactions
4. Get knowledge on online payment system in E-Commerce.
5. Design mechanism for marketing & advertising in the E-commerce world

UNIT I **(9 Lectures)**

Introduction to E-Commerce: What is E-Commerce, Benefits, Impact of E-Commerce, Classifications, Web 2.0 based social networking platform for social media e-commerce, Applications, What is business Model, Conventional Trading Process, EDI, Building blocks of EDI, Value Added Networks, Benefits of EDI, Applications.

UNIT II **(9 Lectures)**

E-Commerce: Architectural Framework, FTP Application, e-mail, WWW Server, HTTP, Web Server Implementations, Information Publishing, Web Browsers, HTML, CGI, Multi Media Content, Other Multimedia Objects, VRML.

UNIT III **(10 Lectures)**

Securing E-Commerce: Why Information on Internet is vulnerable, Security Policy, Procedures and Practices, Site Security, Protecting the Network, Firewalls, Securing the Web Services, Importance of Supply Chain Management, Impact of E-Commerce Technologies on Supply Chain Management.

UNIT IV **(8 Lectures)**

E –Commerce Payment Mechanism : Introduction to Online Payment Systems, Requirements Metrics of a Payment System, E – Cheque, E – Cash, E – Payment Threats & Protections.

UNIT V **(9 Lectures)**

E-Commerce Marketing: Influence on Marketing, Search Engines and Directory Services. Internet Advertising, Mobile Commerce-Introduction, Framework, Home – shopping, Tele-marketing, Agents in E-Commerce.

Text Books:

1. "Electronic Commerce-Framework Technologies and Applications", Bharat Bhaskar, 4th Edition, 2013, McGrawHill.

Reference Books:

1. "Introduction to Electronic Commerce", Third Edition, Turban, David King, Lang, Pearson.
2. "E-Commerce Fundamental Application", Chan, Lee, Dillon, Chang, Wiley India.
3. "Global Electronic Commerce", West Land, Clark, University Press.
4. "E-Commerce and Mobile Commerce Technologies", Pandey, Srivastava and Shukla, S. Chand Publications.
5. "E-Business: Theory and Practices", Canzer, Cengage Publishers.

Web References:

1. https://sites.google.com/site/bus14101love/e-commerce-social-networking-and-web-2-0
2. https://whatis.techtarget.com/definition/Web-server
3. https://www.tutorialspoint.com/internet_technologies/web_servers.htm
4. https://techterms.com/definition/web_publishing
5. https://www.slideshare.net/swatichauhan133/vrml-swati
6. https://www.vistainfosec.com/blog/what-are-the-best-practices-for-securing-e-commerce-business/
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8. https://www.searchenginewatch.com/2013/09/26/major-search-engines-and-directories/
9. https://study.com/academy/lesson/market-influences-definition-examples.html
10. https://www.thedroidsonroids.com/blog/what-is-mcommerce-definition-and-types-of-mobile-commerce
11. https://www-users.cs.umn.edu/~gini/csom.html

B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

CYBER SECURITY

(IT)

Internal Marks : 40

Course Code: P18CSE23 **External Marks: 60**

Course Objectives:

- To introduce the fundamental concepts of information and cyber security in the business enterprise.
- To explore the threats and vulnerabilities associated with business systems.
- To understand the core domains of security as presented in widely accepted cyber security frameworks.
- To explain critical cyber security technical components as related to the respective security domains.
- To introduce cyber risk management concepts.
- To explore the challenges of communicating cyber security concepts to business executives.

Course Outcomes:

- Understand the broad set of technical, social & political aspects of Computer Security
- Describe the operational and organizational security Aspects
- Have understood the fundamentals of cryptography
- Explain Authentication Methods
- Understand the purpose of Intrusion detection system

UNIT I: (9 Lectures)

INTRODUCTION SECURITY AND SECURITY TRENDS

Introduction about Security, Basic Security Terminology, Security Models,The Computer Security Problems, Attacks and Targets, Approaches to Computer Security, Ethics.

UNIT II: (12 Lectures)

OPERATIONAL AND ORGANIZATIONAL SECURITY

Introduction about Policies and Procedures, Standards and Guidelines:-Security Awareness and Training, Interoperability, Agreements:- The Security Perimeter, Physical Security, Environmental Issues, Wireless, Electromagnetic Eavesdropping, People:- A Security Problem, People as a Security Tool.

UNIT III: (12 Lectures)
CRYPTOGRAPHY AND ENCRYPTION

Introduction about Cryptography, Cryptography:- Historical Perspectives, Algorithms, Hashing Functions, Symmetric, Encryption:- Asymmetric Encryption, Quantum Cryptography, Cryptography Algorithm Use.

UNIT IV: (9 Lectures)
AUTHENTICATION AND REMOTE ACCESS

Introduction about Authentication, Users, Groups and Role Management:- Password Policies, Single Sign On, Security Controls and Permissions:- Preventing Data Loss or Theft, Introduction to Remote Access:-The Remote Access Process, Remote Access Methods.

UNIT V: (9 Lectures)
INTRUSION DETECTION SYSTEM

History of Intrusion Detection System, IDS Overview:- Network -Based IDSs, Host-Based IDSs, Intrusion Prevention System:- Honey pots and Honey nets Tools.

Text Books:

1.W.A.Coklin, G.White, Principles of Computer Security: Fourth Edition, McGrawHill, 2016.
2.William Stallings, Cryptography and Network Security Principles and Practices, Seventh Edition,Pearson

References:

1.Achyut S. Godbole, Web Technologies: TCP/IP, Web/Java Programming, and Cloud Computing, Tata McGraw-Hill Education, 2013

B.Tech. IV Year II Sem. **L T P C**

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MOBILE COMPUTING
(PROFESSIONAL ELECTIVE - VI)

Course Code: P18CSE21 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Operating Systems

Course Objectives:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer& Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.

Course Outcomes:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad-hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

UNIT - I **(8 Lectures)**

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Hand held Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT – II **(10 Lectures)**

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE802.11)

Mobile Network Layer:IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT – III **(10 Lectures)**

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT - IV **(7 Lectures)**

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT - V **(10 Lectures)**

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing:WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices,Android.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition,2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press,2007, ISBN: 0195686772.

REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition,2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct2004.

WEB REFERENCES:

1. https://dattashingate.files.wordpress.com/2018/07/specialized-mac-sdmafdmatdma-and-cdma.pdf
2. https://www.iith.ac.in/~tbr/teaching/docs/transport_protocols.pdf
3. https://www.coursehero.com/file/34566257/unit-5-full-notes-in-pdfpdf/
4. http://www.cruiserselite.co.in/downloads/btech/materials/4/1314/mc/unit-6.pdf

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BLOCKCHAIN TECHNOLOGY
(PROFESSIONAL ELECTIVE - VI)

Course Code: P18CST14 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Cryptography

Course Objectives:

The blockchain technology course allows

1.The students to explore the driving force behind the crypto currency Bit coin.
2. Along with the Decentralization, Cryptography,
3. Bit coins with its alternative coins,
4. Smart contracts and outside of currencies.

Course outcomes:

At the end of the course the student will be able to:

1. Understand the types, benefits and limitation of blockchain.
2. Explore the blockchain decentralization and cryptography concepts.
3. Enumerate the Bitcoin features and its alternative options.
4. Describe and deploy the smart contracts
5. Summarize the blockchain features outside of currencies.

Unit-1: Intoduction

Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.

Unit-2

Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys

Unit-3

Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B:Alternative Coins, Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash

Unit-4

Smart Contracts and Ethereum: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.

Unit-5

Alternative Blockchains: Blockchains Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, Media

Textbook/ Textbooks

1. Mastering Blockchain - Distributed ledgers, decentralization and Smart contracts explained, Author- Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1- 78712-544-5, 2017

Reference Books

1. Bitcoin and Crypto currency Technologies, Author- Arvind Narayanan, Joseph Bonneau,Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University, 2016

2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Author- Daniel Drescher, Apress, First Edition, 2017

3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014

Web References:

1. https://www.javatpoint.com/blockchain-tutorial
2. https://www.tutorialspoint.com/blockchain/index.htm
3. https://www.guru99.com/blockchain-tutorial.html
4. https://www.simplilearn.com/tutorials/blockchain-tutorial

B.Tech IV Year - II Semester

Course structure

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HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE)

Course Code: P18CSE24 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Knowledge of Computer and Its Architecture

Course Objectives:

1. To provide basic methodologies and processes for designing interfaces.
2. To improve the interaction between users and computers by making computers more usable and receptive to the user‘s needs.
3. To provide relevant principles of behaviour, mostly derived from cognitive science and psychology and other sources that describe human ethologic in particular environment, especially technological ones.
4. To make the students familiar with developing new interfaces and interaction techniques.

Course Outcomes:

At the end of this course the student will be able to

1. Identify the elements of good user interface design through effective GUI.
2. Identify the importance of human characteristics and understanding business functions.
3. Analyze screen design principles for making good decisions based on technological considerations in interface design.
4. Select the window, device and screen based controls through navigation schemes.
5. Identify the basic components and interaction devices to interact with the computers.

Unit-I: (9 Lectures)

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.

Unit-II: (9 Lectures)

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT-III (10 Lectures)

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.

UNIT-IV (8 Lectures)

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

UNIT-V (9 Lectures)

Components – text and messages, Icons and images – Multimedia, colour – uses, problems with choosing colours.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Text Books:

1. Wilbert O Galitz, ‖The Essential Guide to User Interface Design‖, Wiley DreamaTech, Third Edition, 2007.

Reference Books:

1. Ben Shneiderman,CatherinePlaisant,―Designing the User Interface‖,Fourth Edition, Pearson Education ,2008.
2. ALAN DIX, JANET FINLAY, GREGORYD. ABOWD, RUSSELL BEALE,―HumanComputer Interaction‖,Third Edition,PEARSON,2009.

Web References:

1. http://ps.fragnel.edu.in/~dipalis/prgdwnl/eguid.pdf
2. https://www.alljntuworld.in/download/human-computer-interaction-materials-notes/
3. http://www.crectirupati.com/sites/default/files/lecture_notes/HCI-notes.pdf

B.Tech. IV Year II Sem. **L T P C**

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DESIGN PATTERNS
(PROFESSIONAL ELECTIVE - VI)

Course Code:P18ITE07

Course Objectives:

- The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building an application
- This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others.

Course Outcomes:

- Create software designs that are scalable and easily maintainable
- Understand the best use of Object Oriented concepts for creating truly OOP programs
- Use creational design patterns in software design for class instantiation
- Use structural design patterns for better class and object composition
- Use behavioral patterns for better organization and communication between the objects
- Use refactoring to compose the methods for proper code packaging
- Use refactoring to better organize the class responsibilities of current code

UNIT – I (10 Lectures)

Introduction: What is a design pattern? design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT – II (9 Lectures)

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary

UNIT – III (9 Lectures)

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Structural Pattern part-1: Adapter, Bridge, Composite.

UNIT – IV (9 Lectures)

Structural Pattern part-II : Decorator, Façade, Flyweight, Proxy.

Behavioral Patterns part-1: Chain of Responsibility, Command, Interpreter, iterator.

UNIT – V (9 Lectures)

Behavioral Patterns part-II : Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of behavioral patterns.

TEXT BOOK:

1. Design Patterns, Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern's in Java, Vol –I, Mark Grand, Wiley Dream Tech.
2. Patterns in Java, Vol-II, Mark Grand, Wiley Dream Tech.
3. Java Enterprise Design Patterns Vol-III, Mark Grand, Wiley Dream Tech.
4. Head First Design Patterns, Eric Freeman, O'reily publications