



**JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY,  
JAIPUR**

**Faculty of Education and Methodology  
Department of Science & Technology**

**SYLLABUS**

**BACHELOR OF COMPUTER APPLICATION (BCA)  
COMPUTER SCIENCE & ENGINEERING (CSE)**

**SESSION – 2022-23**

**DURATION – 3 YEARS (6 SEMESTERS)**

**SYLLABUS FOR:  
1-3 YEAR**



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## PROGRAM DETAIL

<b>Name of Program</b>	Bachelor of Computer Application (BCA)
<b>Program Code</b>	BCA
<b>Mode of Program</b>	Semester
<b>Duration of Program</b>	3years/ 6 Semester
<b>Total Credits of Program</b>	202
<b>Curriculum Type and Medium Choice</b>	English

### Program Outcomes:

- The curriculum is designed to bridge the gap between the IT industry and academia by incorporating the latest technologies into the curriculum along with practical training sessions and collaborative learning experiences led by a dedicated and qualified learning community.
- BCA is a three-year professional undergraduate program.
- This is the science that deals with the theory and methods of information processing in digital computers, the design of computer hardware and software, and the applications of computers.
- This program is designed with the intention of producing highly skilled, adaptable IT graduates in industries with the ability to design IT based solutions for the modern world.
- Practical sessions in computer laboratories using various programming languages and tools provide a deep conceptual understanding of the subjects to broaden the horizons of self-experience of the students.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## SYLLABUS DETAIL

### I Semester

Nature of Course	Course Name	C	T	P
Mathematics	Mathematics- I	6	6	0
Core Computer Science	Computer Fundamentals	6	6	0
Core Computer Science	Fundamentals of Digital Systems	6	5	1
Core Computer Science	C Programming	6	4.5	1.5
Core Computer Science	Technical Communication	6	6	0
University Compulsory Course	English Communication	1	1	0
University Compulsory Course	Extra-Curricular Activities	1*	0	1
University Compulsory Course	Community Development Activities	1*	0	1
Portfolio Development Activity	Portfolio (Government/Corporate/ Entrepreneur)	0.8	0.8	0
<b>Total Credits</b>		<b>33.8</b>	<b>29.3</b>	<b>4.5</b>

For Theory 1 Credit equal to 10 Hours

For Practical 1 Credit equal to 20 Hours



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## II Semester

Nature of Course	Course Name	C	T	P
Mathematics	Mathematics –II	6	6	0
Management	Financial and Accounting Management	6	6	0
Core Computer Science	Data Structures	6	4	2
Core Computer Science	Database Management System	6	5	1
Core Computer Science	Principles of Programming Languages	6	6	0
University Compulsory Course	Extra Curricular Activities	1*	0	1
University Compulsory Course	Community Development Activities	1*	0	1
Portfolio Development Activity	Portfolio (Government/Corporate/Entrepreneur)	3.2	2.2	1
University Optional Course	Professional Activity	--	--	0
<b>Total Credits</b>		<b>35.2</b>	<b>29.2</b>	<b>6.0</b>

### Credits & Hours:

For Theory 1 Credit equal to 10 Hours

For Practical 1 Credit equal to 20 Hours



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## III Semester

Nature of Course	Course Name	C	T	P
<b>Mathematics</b>	Basic Statistics and Probability	<b>6</b>	<b>6</b>	<b>0</b>
<b>Core Computer Science</b>	Computer Organization and Architecture	<b>6</b>	<b>6</b>	<b>0</b>
<b>Core Computer Science</b>	Web Programming	<b>6</b>	<b>4.5</b>	<b>1.5</b>
<b>Core Computer Science</b>	Object Oriented Programming using Java	<b>6</b>	<b>5</b>	<b>1</b>
<b>Core Computer Science</b>	Data Communication & Protocols	<b>6</b>	<b>6</b>	<b>0</b>
<b>University Mission Course</b>	Women's Rights And Law	<b>1</b>	<b>1</b>	<b>0</b>
<b>University Compulsory Course</b>	Extra Curricular Activities	<b>1*</b>	<b>0</b>	<b>1</b>
<b>University Compulsory Course</b>	Community Development Activities	<b>1*</b>	<b>0</b>	<b>1</b>
<b>Portfolio Development Activity</b>	Portfolio (Government/Corporate/Entrepreneur)	<b>0.8</b>	<b>0.8</b>	<b>0</b>
<b>Total Credits</b>		<b>33.8</b>	<b>29.3</b>	<b>4.5</b>

For Theory 1 Credit equal to 10 Hours

For Practical 1 Credit equal to 20 Hours



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Semester- IV

Nature of Course	Course Name	C	T	P
Mathematics	Numerical Methods	6	6	0
Core Computer Science	Operating Systems	6	5	1
Core Computer Science	Open Elective-I	6	6	0
Core Computer Science	Python Programming	6	45	1.5
Core Computer Science	Software Engineering	6	6	0
University Compulsory Course	EVS & DM	1	1	0
University Compulsory Course	Extra Curricular Activities	1*	0	1
University Compulsory Course	Community Development Activities	1*	0	1
Portfolio Development Activity	Portfolio (Government/Corporate/Entrepreneur)	2.2	2.2	0
University Optional Course	Professional Activity	--	--	--
<b>Total Credits</b>		<b>35.2</b>	<b>31.2</b>	<b>4.0</b>

### Credits & Hours:

For Theory 1 Credit equal to 10 Hours

For Practical 1 Credit equal to 20 Hours



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## V Semester

Nature of Course	Course Name	C	T	P
Core Computer Science	Data Warehousing using OLAP	6	5	1
Core Computer Science	Mobile Application Development	6	5	1
Core Computer Science	OOAD Using UML	6	6	0
Core Computer Science	Program Elective-I	6	6	0
Core Computer Science	Introduction to Cloud Computing	6	6	0
Professional Development Activity	Industrial Visit	1	1	0
University Mission Course	Help Aid	1	1	0
University Compulsory Course	Extra-Curricular Activities	1*	0	1
University Compulsory Course	Community Development Activities	1*	0	1
Portfolio Development Activity	Portfolio (Government/Corporate/Entrepreneur)	0.8	0.8	0
University Optional Course	Professional Activity	--	--	--
<b>Total Credits</b>		<b>34.8</b>	<b>30.8</b>	<b>4.0</b>

For Theory 1 Credit equal to 10 Hours  
For Practical 1 Credit equal to 20 Hours



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## VI Semester

Nature of Course	Course Name	C	T	P
Core Computer Science	Cryptography Fundamentals	6	6	0
Core Computer Science	Fundamentals to Machine Learning	6	4.5	1.5
Core Computer Science	Fundamentals to Mobile Computing	6	4	2
Core Computer Science	Open Elective-II	6	5	1
Professional Development Activity	Project	60 Days		
University Mission Course	Gender Sensitization	1	1	0
University Compulsory Course	Extra-Curricular Activities	1*	0	1
University Compulsory Course	Community Development Activities	1*	0	1
Portfolio Development Activity	Portfolio (Government/Corporate/Entrepreneur)	2.2	2.2	0
University Optional Course	Professional Activity	--	--	--
<b>Total Credits</b>		<b>29.2 + 60 Days</b>	<b>22.7</b>	<b>6.5</b>

### Credits & Hours:

For Theory 1 Credit equal to 10 Hours

For Practical 1 Credit equal to 20 Hours



**BCA Syllabus  
I Semester**

**Course: MATHEMATICS- I**

**(Credits: 6)**

**Course Outcomes:** The skill of selecting and applying appropriate numerical methods to obtain approximate solutions to difficult mathematical problems. Demonstrating the working of various numerical methods.

**Unit-I (Overview of Functions and Continuity)**

**(Credits: 1.5)**

**Theory**

**Function:** Definition, domain and range of function, types of functions (into, onto, one to one), composite function.

**Limit:** Definition, first principle, properties, and simple problems related to limit. Some standard limits.

**Continuity:** Definition, continuity of sum, product, difference and quotient of two continuous functions, simple problems.

**Unit-II (Overview of Differentiation)**

**(Credits: 2)**

**Theory**

**Special Functions:** Trigonometric functions and their properties, exponential functions, logarithmic functions, hyperbolic functions, inverse circular functions and related properties, simple problems. Rational functions, partial fraction and simple problems.

**Differentiation:** Definition, differentiation of simple functions using first principle, differentiation of trigonometric functions and inverse circular functions, method of substitution, differentiation of product and quotient of functions, maxima and minima of a function of single variable.

**Unit-III (Overview of Integration)**

**(Credits: 1.5)**

**Theory**

**Integration:** Definition, integration of simple functions using substitution, integration of trigonometric and inverse circular functions and related problems, integration by parts, integration of rational functions. Definite integral and their properties, simple problems. Reduction formula and simple problems.

**Reference Books:**

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Comp
4. J.P. Chauhan "BCA Mathematics Volume -1", Krishna Publications.

**Course: COMPUTER FUNDAMENTALS**



## JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

**Course Outcomes:** To understand the working of basic input and output devices. Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to incorporate some graphics such as pictures and charts.

### **Unit-I (Introduction to Computers)**

**(Credits: 2)**

#### **Theory**

Introduction: Basic Definitions, Data, information, bits, byte, software, hardware, memory, Characteristics of a computer. Block diagram of a computer. Generation of Computers, Types of Computers, Memory and its types.

### **UNIT-II (I/O Devices)**

**(Credits: 2)**

#### **Theory**

Input Devices, Output Devices, Monitors Characteristics, Digital and Analog signals. Video Standard: VGA, SVGA, Types of printer, Storage Devices: Primary Vs Secondary memory, Storage Fundamentals, Data Storage and Retrieval Methods, Various Storage Devices.

### **UNIT-III (Software and Languages)**

**(Credits: 2)**

#### **Theory**

Software: Types of software: System Software, Application Software. Operating Systems: types and functions. Programming Languages: Machine Language, Assembly language, High level language. Assembler, Compilers and Interpreter. Introduction to MS-Office.

#### **Reference Books:**

1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3. Computer Today- By Suresh Basandra
4. MS-Office 2000(For Windows) – By Steve Sagman



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Fundamentals of Digital Systems

**Course Outcomes:** Digital system design and analysis. Computer arithmetic and data representation. Digital logic switch and gate design. Synchronous sequential logic design and analysis, finite-state machines.

### UNIT I – (Introduction of Number System and Boolean algebra) (Credits: 1.5)

#### Theory

Introduction: Number system, Boolean algebra, De-Morgan's law, simplification of Boolean algebra, Logic Gates: basic and universal gates.

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Study of BASIC Gates
2	Study of Universal Gates

### UNIT II- (Combination Circuit) (Credits: 1.5)

#### Theory

Simplification method: K-map and tabulation method. Combination circuit: introduction to combinational circuit, half adder circuit, full adder circuit, half subtracted, full subtracted, binary parallel adder, carry propagation, magnitude comparator, decoder, encoder, multiplexer, demultiplexer circuit, design of code converter, parity bit generator and checker

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Study of Half Adder
2	Study of Full Adder and Sub Tractor using Gates
3	Study of Magnitude Comparator.
4	Study of Multiplexer.
5	Study of Demultiplexer.

### UNIT III (Sequential Circuit Design) (Credits: 1.5)

#### Theory

Sequential Circuit Design: Introduction to flip flop. Types of flip flop: S-R, D, J-K, T, Clocked flip flop. S-R latch, Master-Slave flip flop, realization of one flip flop using other flip flop. Counter and shift registers: Synchronous counters, asynchronous counter, ring counter, serial-in-parallel out, parallel-in-serial out, parallel-in-parallel out, bidirectional shift registers.

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Implementation of flip flops using NAND
2	Study of Shift Register
3	Design of Counter
4	Study of IC 7490
5	Vi Characteristic of TTL and CMOS

#### Reference Books:

1. M. Mano, Digital Logic and Computer Design, (1e), Pearson Education India, 2017.
2. R. P. Jain, Modern Digital Electronics, (3e), Tata McGraw-Hill Education, 2003.
3. R.L. Tokheim, Digital Electronics: Principles and Applications, (6e), Tata McGraw Hill, 2007.
4. H. W. Gothman, Digital electronics, (2e), PHI Publications, 2009.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: C PROGRAMMING

**Course Outcomes:** Developing C programming skills and learning advanced structured and procedural programming. being able to create computer program, analyze and explain pointer principles, initialization, declarations, operations, and their applications.

### UNIT – I (Basics of C Programming)

(Credits: 1.5)

#### Theory

C Fundamentals: C program structure, Simple I/O operations, Operators and Expressions: Operator precedence and associativity, bitwise operators, arithmetic expressions, evaluation of expressions, Flow of Control: Statements and blocks, switch case statement, looping constructs.

#### Practical (0.5Credit)

S.No.	Name of Practical
1	Introduction to MS-Office, Excel & PowerPoint
2	Simple C Programs (expression oriented operations).
3	Programs to illustrate various operators in C.
4	Programs using branching constructs (if, if-else-if, switch case).

### UNIT – II (Arrays and Strings) (Credits: 1)

#### Theory

Arrays: Declaration and Initialization, sorting. Strings: String - operations on strings, built-in string handling functions, programs on strings.

#### Practical (0.5Credit)

S.No.	Name of Practical
1	Programs on 1D Arrays
2	Programs on 2D Arrays
3	Programs on strings.

### UNIT – III (Functions and Loop) (Credits: 1.5)

#### Theory

Functions: Modular programming, function declaration, definition and function call, Types of functions, function returning more values, function with operators, function and decision statements, function and loop operators, function with Arrays.

#### Practical (0.5Credit)

S.No.	Name of Practical
1	Programs using functions (with and without recursion).
2	Programs on passing parameters by value and reference.

#### Reference Books :

1. The C Programming Language (Ansi C Version), Brian W. Kernighan, PHI
2. Let Us C, Yashwant Kanetkar, BPB Publications.
3. Kumar R. et.al., "Programming in ANSI C", Tata McGraw Hill Publ.,
4. Johnsonbaugh, R and Jakin. M., "Application Programming in C", Prentice Hall of India.
5. Balagurusamy, E., "Programming in ANSI C", Tata McGraw Hill Pub.



## **Course: TECHNICAL COMMUNICATION**

**Course Outcomes:** The purpose of technical communication is to make information clear and understandable to make business more productive and consumer goods more convenient. Technological communication helps our economy forward by ensuring sustainable research and development.

### **Unit –I -(Introduction to Communication)**

**(Credits: 2)**

#### **Theory**

Introduction to communication: Types of communication, Process of communication, Principles of communication, Channels of communication, Verbal and non-verbal communication, Formal and informal communication, Barriers to communication.

### **Unit –II–(Vocabulary and Grammar)**

**(Credits: 2)**

#### **Theory**

Vocabulary: Word formation, Affixes, Compound words, Synonyms, Antonyms, Homophones and Homonyms, Miss pelt words. Grammar: Punctuations, Parts of speech, Active and passive voice, Direct and indirect speech, Concord, Common errors. Techniques of effective sentence constructions.

### **Unit –III–(Writing and Speaking)**

**(Credits: 2)**

#### **Theory**

Structure and format of letter writing: Précis writing, Letter of Enquiry, Quotations, Orders, Tenders, Complaint/adjustment letters, Job application letter, Resume, Group discussion. Art of Public Speaking: Tips for effective presentations.

#### **References Book:**

1. A. Koneru, Professional Communication, (1e), Tata McGraw Hill, 2008.
2. L. C. Bovee, J. V. Thill, B. E. Schatzman, Business Communication Today, (7e), Pearson Education, 2004.
3. L. Sen, Communication Skills, (2e), Prentice Hall, 2007.
4. M. Raman, S. Sharma, Technical Communication: Principles and Practice, (2e), Oxford University Press, 2013.



**II Semester**

**Course: MATHEMATICS –II**

**(Credits: 6)**

**Course Outcomes:** Making information plain and understandable is the goal of technical communication in order to increase company productivity and improve the convenience of consumer goods. The advancement of our economy is aided by technological communication, which promotes sustainable research and development.

**Unit-I (Differential Calculus)**

**(Credits:2)**

**Theory**

Differential Calculus: Successive differentiation, Leibnitz's theorem, polar curve, angle between radius vector and tangent, angle of intersection between two curves, derivative of arc (Cartesian and polar), curvature, radius of curvature, evolutes, related problems.

Rolle's Theorem, mean value theorem (Cauchy's and Lagrange's), in determinant form, partial derivatives, Euler's theorem, maxima and minima of functions of two variables.

**Unit-II (Linear Algebra)**

**(Credits: 2)**

**Theory**

Linear Algebra: Basic concepts, matrix addition, scalar multiplication, matrix multiplication, linear system of equations, Gauss elimination, rank of a matrix, Solution of Linear Systems: Existence, uniqueness, determinants, Cramer's rule, inverse of a matrix, Gauss-Jordan elimination.

**Unit-III (Infinite Series)**

**(Credits:2)**

**Theory**

Infinite Series: Convergence, divergence, comparison test, ratio test, Cauchy's root test, Cauchy's integral test, alternating series, Leibnitz's theorem, absolute and conditional convergence, expansion of functions into Taylor's and Maclaurin's series.

**Reference Books:**

1. S. Narayan, P.K. Mittal, *Differential calculus*, S. Chand & Co, Delhi, 2012.
2. S. Narayan, P.K. Mittal, *Integral calculus*, S. Chand & Co, Delhi, 2012.
3. M.D. Raisinghania, *Differential calculus*, S. Chand & Co, Delhi, 2010.
4. B. N. Mukherjee, *Integral Calculus*, U.N. Dhur, 1977. Publications.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: FINANCIAL AND ACCOUNTING MANAGEMENT

(Credits: 6)

**Course Outcomes:** Financial statements and/or financial schedules also through the analysis and synthesis of information in accordance with generally accepted accounting principles.

### Unit-I (Basic of Accounts)

(Credits: 2)

#### Theory

General Purpose Cost Statement: Evolution of Cost Accounting, Cost Accounting Concepts, Generally Accepted Cost Accounting Principles and Cost Accounting Standards, Cost Accounting Standards, Business Process Analysis: Materials, Employee Costs, Direct Expenses, Overheads, Treatment of Special Items, Cost Sheet.

### Unit-II (Financial Management)

(Credits: 2)

#### Theory

Overview of Financial Management: Objective of Financial Management, Key Decisions of Financial Management, Planning Environment, Functions of Financial Management, Sources of Finance, International Sources, Emerging Role of Finance Manager, Securities and Exchange Board of India Act. 1992, Future Value, Present Value, Tools for Financial Analysis and Planning: Funds Flow Statement Cash Flow Statement, Ratio Analysis, Identification of Information Required to Assess Financial Performance.

### Unit-III (Capital Management and Leverage Analysis)

(Credits:2)

#### Theory

Working Capital Management and Leverage Analysis: Working Capital - Meaning and Definition, Kinds of Working Capital, Adequacies and Inadequacies of Working Capital, Danger of too high amount of Working Capital, Danger of inadequacies or low amount of Working Capital, Working Capital Cycle, Working Capital Financing, Inventory Management, Management of Receivable, Determinants of Credit Policy, Cash Management, Leverages, EBIT-EPS Indifference Point Level, Calculation of Indifference Point, Cost of Capital: Cost of Capital, Capital Structure, Dividend Decisions

#### Reference Books:

1. J. Pratt, *Financial Accounting in an Economic Context*, (5e), John Wiley & Sons, 2010.
2. Management Accounting & Financial Analysis by Kishore, R. M. Edit: 4th ed, Publisher: Taxmann Allied Services.
3. Management & Cost Accounting by Drury, Colin Edition: 6th Publisher: Thompson Books



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: DATA STRUCTURES

**Course Outcomes:** To impart knowledge of basic data structures and their implementation. Understanding the importance of data structures in the context of writing efficient programs. Understanding basic algorithmic complexity.

### UNIT I – (Introduction to Data Structures)

(Credits: 1.5)

#### Theory

Introduction: Definitions, Concept of Data Structures, Overview of Data Structures. Arrays: Definitions, terminologies, 1D Array: Memory allocation, Operations on array, Application of Arrays, 2D and 3D Array representation, Linked Lists: Definition, Single Linked List: Representation in memory, operations (insertion, deletion, modify etc.), Circular Linked List, Double Linked List.

#### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Programs based on Array and its operation insertion, deletion etc.
2	Programs based on Linked Lists Operations
3	Program 2D and Matrix Array
4	Program based on Circular Linked list.

### UNIT II- (Stack and Queue)

(Credits: 1.5)

#### Theory

Stacks: Definition, Array and linked-list representation of stack, Operations on Stack: Push, Pop, application of stack: infix to postfix, evaluation of arithmetic expression, tower of Hanoi. Queues: Definition, Array and linked-list representation of Queue. Operations on Queue: Insertion, Deletion. Various Queue Structure: Circular Queue, Priority Queue. Insertion, Deletion operations on a Circular Queue and Priority Queue

#### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Program Based on Stack Operations (Push and pop)
2	Program Based on Queue Operations
3	Program on Stack using Array .
4	Program on Stack using Link List
5	Program on Queue using Array and Link List.

### UNIT III (Sorting, Searching and Tree)

(Credits: 1.5)

#### Theory

Sorting and Searching: Insertion Sort, Selection Sort, Merge Sort, Linear Search, Binary Search. Tree: Definitions and Concepts, Representation of binary tree, Binary tree traversal (In order, post order, preorder), Threaded binary tree, insertion and deletion, Binary search trees, Applications of Trees- Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance, B Tree, B+ Tree, Graph-Matrix Representation of Graphs, Elementary Graph operations.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Programs based on Sorting and Searching algorithms: Bubble Sort and Insertion Sort
2	Selection Sort
3	Merge Sort
4	Binary Search Tree Operations
5	Implementation of Graph: Directed and Weighted Directed Graph.

## Reference Books:

1. A. M. Tenenbaum, Data Structures Using C, (1e), Pearson Education, 2008.
2. R. Thareja, Data Structures Using C, (2e), Oxford University Press, 2014.
3. Fundamentals of Data Structures in C by Horowitz, Sahni and Anderson-Freed.
4. Data Structures Through C in Depth by S.K Srivastava, Deepali Srivastava.

## Course: DATABASE MANAGEMENT SYSTEM

**Course Outcomes:** In the context of DBMS, students comprehend client-server computing. Recognize additionally how the SQL environment interacts with the host programming language environment. In order to create relational table schemas, students can transform data models (DDL).

## UNIT I – (Overview of DBMS and Models)

(Credits: 1.5)

### Theory

Introduction: Introduction to Database management system, some examples, characteristics of the database approach, Relational Model. ER Models: Database modeling using the entity-relationship model, entity types, entity sets attributes and keys, relationships.

### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Relational Model
2	ER Models Operations
3	Create E-R Diagram and convert entities and relationships to relation table.

## UNIT II (Database Design and SQL)

(Credits: 1.5)

### Theory

Database Design: Functional dependencies and normalization for relational databases. SQL the Relational Database Standard: Data definition, constraints, Basic Queries in SQL, More complex SQL queries, Insert, Update and Delete Statements in SQL.

### Practical:

(Credit: 1)

S.No.	Name of Practical
1	MySQL setup: correlated sub-queries
2	Data migration from MySQL to portable file as well as uploading data from portable file to MySQL.
3	SQL: Creating, Altering, and Dropping tables with Constraints, Insert Table.
4	SQL detailed SELECT with sub-queries
5	EQUI-JOINS
6	GROUPING, SET, UPDATE, DELETE, VIEWS. PL/SQL:
7	Program Development: Iterative PL/SQL Blocks.



**UNIT III (Transaction Processing)**

**(Credits: 1.5)**

**Theory**

Transaction Processing: Transaction processing concepts: Introduction to transaction processing, transaction and system concepts, desirable properties of transactions, schedules and recoverability. Introduction to Cursors and Triggers.

**Reference Books:**

1. R. Ehmasri, S. Navathe, Fundamentals of Database Systems, (6e), Addison-Wesley, 2011.
2. A. Silberschatz, H. F. Korth, S. Sudarshan, Database System Concepts, (6e), McGraw-Hill, 2013.
3. C.J. Date, Introduction to Database Systems, (8e), Pearson Education, 2003.

**Course: PRINCIPLES OF PROGRAMMING LANGUAGES**

**(Credits: 6)**

**Course Outcomes:** To comprehend how differential equations are created from the supplied physical issues and to solve the first order ordinary differential equation using a variety of techniques. to be able to evaluate definite integrals and derivatives of integrals with variable integration limits using the calculus fundamental theorem.

**Unit-I (Programming language)**

**(Credits:2)**

**Theory**

Introduction: Programming language - design, spectrum and the study motivation, Compilation and interpretation. Programming environments. Names, Scope, and Bindings: Concept of binding time, Object lifetime and storage management, Scope rules and implementing scope, the binding of reference environments, Binding within a scope, Separate compilation; Control Flow: Expression evaluation, Structured and unstructured flow, Sequencing, Selection, Iteration, Recursion, No determinacy.

**Unit-II (Linear Algebra)**

**(Credits: 2)**

**Theory**

Data Types: Type systems and checking, Records and variants, Arrays, Strings, Sets, Pointers and recursive types, Lists, Files and Input/output, Equality testing and assignment. Subroutines and Control Abstraction: Stack layout, calling sequences, Parameter passing, Generic subroutines and modules, Exception handling, Co-routines. Data Abstraction.

**Unit-III (Infinite Series)**

**(Credits: 2)**

**Theory**

Infinite Series: Convergence, divergence, comparison test, ratio test, Cauchy's root test, Cauchy's integral test, alternating series, Leibnitz's theorem, absolute and conditional convergence, expansion of functions into Taylor's and Maclaurin's series.

**Reference Books:**

1. S. Narayan, P.K. Mittal, *Differential calculus*, S. Chand & Co, Delhi, 2012.
2. S. Narayan, P.K. Mittal, *Integral calculus*, S. Chand & Co, Delhi, 2012.
3. M.D. Raisinghania, *Differential calculus*, S. Chand & Co, Delhi, 2010.
4. B. N. Mukherjee, *Integral Calculus*, U.N. Dhur, 1977. Publications.



### III Semester

**Course: BASIC STATISTICS AND PROBABILITY**

**(Credits: 6)**

**Course Outcomes:** In probability theory, is a possible result of an experiment or trial. Each possible outcome of a particular experiment is unique, and different outcomes are mutually exclusive.

**Unit-I (Overview of Statistics)**

**(Credits: 2)**

**Theory**

**Basic Statistics:** Population, sample and data condensation, definition and scope of statistics, concept of population and simple with illustration, raw data, attributes and variables, classification, frequency distribution, cumulative frequency distribution.

**Measures of Central Tendency:** Concept of central tendency, requirements of a good measure of central tendency, arithmetic mean, median, mode, harmonic mean, geometric mean for grouped and ungrouped data.

**Unit-II (Overview of Permutations and Combinations)**

**(Credits: 2)**

**Theory**

**Measures of Dispersion:** Concept of dispersion, absolute and relative measure of dispersion, range variance, standard deviation, coefficient of variation.

**Permutations and Combinations:** Permutations of 'n' dissimilar objects taken 'r' at a time (with or without repetitions),  $nPr = n!/(n-r)!$  (without proof). Combinations of 'r' objects taken from 'n' objects,  $nCr = n!/(r!(n-r)!)$  (Without proof). Simple examples, applications.

**Unit-III (Probability)**

**(Credits: 2)**

**Theory**

**Probability:** Sample space, events and probability, experiments and random experiments, ideas of deterministic and non-deterministic experiments, definition of sample space, discrete sample space, events, types of events, union and intersections of two or more events, mutually exclusive events, complementary event, exhaustive event, simple examples. Classical definition of probability, addition & multiplication theorems of probability without proof (up to three events are expected).

**Definition of conditional probability.** Definition of independence of two events, total probability theorem and Baye's theorem, simple numerical problems. Multiple correlation and regression (for the three variables only).

**Reference Books:**

1. S. C. Gupta, Fundamentals of statistics, (7e), Himalaya Publishing House, 2016.
2. A.M.Gun, M.K.Gupta, D. Gupta, Fundamentals of statistics, (1e), World Press, 2016.
3. V.K.Rohtagi, An Introduction to Probability and Mathematical Statistics, (1e), Wiley, 1976.
4. S.P. Gupta, Statistical Methods, (1e), S.Chand, 2012.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: COMPUTER ORGANIZATION AND ARCHITECTURE

**Course Outcomes:** To understand the structure, function and characteristics of computer systems. Students understand the design of the various functional units and components of computers. This subject identifies the elements of modern instruction sets and their impact on processor design.

### Unit-I (Introduction to Computer Architecture and Design)

(Credits: 2)

#### Theory

**General Computer Architecture:** Block Diagram of typical Computer, Memory Section, Input/output Section, CPU, Registers, Arithmetic Unit, Instruction handling Areas, Stacks.

**Micro operations:** Register Transfer, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

**Basic Computer Organization and Design:** Instruction Codes, Operation code, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input Output Instructions and Interrupts.

### UNIT-II (Memory)

(Credits: 2)

#### Theory

**Control Memory:** Control Word, Microinstruction, Microprogramming, Control Memory, Hardwired Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, RISC, CISC Pipelining and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Vector Processing.

### UNIT-III (Languages)

(Credits: 2)

#### Theory

Array Processors Input Output Organization: I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA, IOP, Serial Communication. Memory Organization: Associative Memory, Cache Memory, And Virtual Memory Introduction to Microprocessor: Machine Language, Assembly Language, Assembler, High Level Language, Compiler, Interpreter, And Internal Architecture 8085.

#### Reference Books:

1. C. Hamacher, Computer Organization, (5e), Tata McGraw-Hill, 2011.
2. M.M. Mano, Computer System Architecture, (3e), Pearson, 2007.
3. B.Govindarajalu, Computer Architecture and Organization, (2e), Tata McGraw-Hill, 2017.

## Course: WEB PROGRAMMING

**Course Outcomes:** Become familiar with graphic design principles related to web design and learn how to apply the principles in practice. To develop skills in analyzing the usability of a web site.

### UNIT I – (Introduction of HTML and CSS)

(Credits: 1.5)

#### Theory

Introduction: HTML, features, uses & versions Using various HTML syntax, Head & Body Sections, , Inserting texts, Text alignment, Using images in pages, Hyperlinks – text and images, bookmarks, Backgrounds and Color controls, creating and using Tables in HTML, and presentation, Use of font size & Attributes, List types and its tags. Cascading Style sheets – defining and using simple CSS. Use of Frames and Forms in web pages, Image editors, Issues in Web site creations & Maintenance.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Simple HTML document using basic elements like: <HTML>, <body>, <head>, <title>,  , <hr>.
2	Text formatting tag: center, sup, em, ins, sub, font, h1 to h6
3	Computer output tag: code, kbd, samp, tt, var, pre.
4	Programming based on HTML, HTML with CSS.

## UNIT II- (Web Hosting Concepts)

(Credits: 1.5)

### Theory

Website Creation and maintenance, Web Hosting and Publishing Concepts; Client-Side Programming: The JavaScript Language, History and Versions; Introduction to JavaScript in Perspective: Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers; Representing Web Data: XML- Documents and Vocabularies Versions and Declaration- Namespaces, Displaying

### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	DHTML with JavaScript, Servlet.
2	JSP and Database Connectivity Web pages.
3	Classes and Objects, Display records by using database.
4	Data list link control & Data binding using dropdown list control.
5	Inserting record into a database & Deleting record into a database.

## UNIT III (XML Documents)

(Credits: 1.5)

### Theory

XML Documents in Browsers; Server-Side Programming: Java Servlets- Architecture , Overview- Servlet, Generating Dynamic Content, Life Cycle, Parameter Data, Sessions, Cookies; Electronic commerce: E - Business model, E – Marketing, Online payments and security. Database and Connectivity: ADO.Net. Distributed Application in C#, Visual programming interface with C#. Web controls, Web Forms.

### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Data binding using data list control & Data list control templates.
2	Data binding using data grid & Data grid control template.
3	Data grid hyperlink & Data grid button column.
4	Creating own table format using data grid.
5	Web Form application.



## Reference Books:

1. S. Powers, Dynamic Web Publishing, (2e), Sams, 1997.
2. K. Jamsa, K. King, HTML & Web Design, (1e), McGraw-Hill, 2002.
3. M. Michaelis, Essential C# 3.0: For .NET Framework, (2e), Pearson, 2010.
4. S. Johnson, Using Active Server Pages, (1e) Que, 2000.

## Course: OBJECT ORIENTED PROGRAMMING USING JAVA

**Course Outcomes:** It emphasizes the fundamentals of structured design with classes including programming development, testing, implementation and documentation. Object-oriented programming techniques include classes and objects. The Java programming language is used as the teaching vehicle for this course.

### UNIT – I (Basics of OOPs)

(Credits: 1.5)

#### Theory

Introduction to OOP: Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, and operators. Inheritance: Multilevel hierarchy, method overriding, abstract classes, Final classes, String Class. Packages and Interfaces: Defining, Implementing and Importing Packages.

#### Practical

(0.5Credit)

S.No.	Name of Practical
1	Data structures such as arrays, structures and functions.
2	Programs related to Interfaces & Packages.
3	Programs related to Abstract classes.

### UNIT – II (Exceptions and Threading)

(Credits: 1.5)

#### Theory

Exceptions: Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception. Multithreading: Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads. String: String Constructors, Various Types of String Operations.

### UNIT – III (JAVA)

(Credits: 2)

#### Theory

Basic Packages of Java: Java.lang, Java.util, Java.i.o. Event Handling: Event Model, Event Classes, Sources of Events, Event Listener Interfaces AWT: Working with Windows, AWT Controls, Layout Managers Applet Class, Architecture, Skeleton, Display Methods. Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes. Introduction to JSP.

#### Practical (0.5Credit)

S.No.	Name of Practical
1	Java programs using classes & objects and various control constructs such as loops etc
2	Java programs for creating Applets for display of images and texts.
3	Input/output and random files programs in Java
4	Java programs using Event driven concept
5	Programs related to network programming.



## Reference Books :

1. H. Schildt, Java The Complete Reference, (10e), Tata McGraw-Hill, 2017.
2. E. Balaguruswamy, Programming with JAVA, (5e,) McGraw-Hill, 2014.
3. D. Liang, Introduction to JAVA Programming, (7e), Pearson, 2009.
4. R.Elmasri ,S. Navathe, D. V. L. N. Somayajulu, S.K. Gupta, Fundamentals of Database Systems, (6e), Pearson, 2011 .

## Course:DATA COMMUNICATION & PROTOCOLS

**Course Outcomes:**It allows businesses to reduce expenses and improve efficiency by sharing data and common equipment among many different computers. Networks can be connected through cables, telephone lines, and infrared beams.

### Unit –I - (Introduction to Data Transmission)

(Credits: 2)

#### Theory

Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity. Transmission Media: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission. Signal Encoding Techniques: Analog and Digital Signals.

### Unit –II– (Data Communication Techniques)

(Credits: 2)

#### Theory

Digital-To-Digital Conversion: Line Coding Schemes, Block Coding, Scrambling, Analog-To-Digital Conversion: Pulse Code Modulation, Delta Modulation, Digital-To-Analog Conversion: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying. Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations.

### Unit –III–(Data Link Control Protocols)

(Credits: 2)

#### Theory

Data Link Control Protocols: Flow Control, Error Control, High-Level Data Link Control (HDLC). Multiplexing: Frequency-Division Multiplexing (FDM), Time-Division Multiplexing (TDM), Code-Division Multiple Access (CDMA). Spread Spectrum: The Concept of Spread Spectrum, Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS). Cellular Wireless Communication Techniques: Introduction, Generations: 1G, 2G, 3G, 4G, and 5G.

## References Book:

1. W.Stallings., Data and Computer Communications, (8e), Pearson Education, 2007.
2. B. Forouzan, Data Communications & Networking, (5e), McGraw Hill, 2012.
3. T. Bertsekas, K. Dimitri, G. Gallager, T. Robert, Data Networks, (2e), Prentice Hall of India, 2011.



## IV Semester

**Course: NUMERICAL METHODS**

**(Credits: 6)**

**Course Outcomes:** Making information plain and understandable is the goal of technical communication in order to increase company productivity and improve the convenience of consumer goods. The advancement of our economy is aided by technological communication, which promotes sustainable research and development.

**Unit-I (Finite Differences)**

**(Credits: 2)**

### **Theory**

Finite Differences: Definition of operators and derivation of inter-relations among them, properties of  $\Delta$  and  $E$  (without proof), factorial notation for positive and negative exponent, representation of polynomial in factorial notations.

**Unit-II (Numerical Integration)**

**(Credits: 2)**

### **Theory**

Interpolation With Equal Intervals: Newton's forward difference formula, Newton's backward difference formula. Interpolation with unequal intervals. Central Difference Interpolation Formula: Gauss forward, Gauss backward, Stirling's formula. Numerical Integration: Trapezoidal rule and its geometrical significance, Simpson's one-third rule, Simpson's three-eighth rule.

**Unit-III (Differential Equations)**

**(Credits: 2)**

### **Theory**

Solution of Algebraic and Transcendental Equations: Secant, Regula-Falsi method, Newton-Raphson Method, Iterative method. Solution of Ordinary differential equations: Picard method, Taylor series method, Euler methods, Euler's modified method, Runge-Kutta methods.

### **Reference Books:**

1. R. K. Jain, S.R.K.Iyengar, Numerical Methods,(1e), New Age International Publishers,2013 .
2. B. S. Grewal, Numerical Methods, Khanna publications, (1e), 2013.
3. J.H.Mathews, K.D. Fink, Numerical Methods using MATLAB, (4e), Pearson, 2015.
4. C.F.Gerald ,P.O. Wheatly, Applied Numerical Analysis,(7e), Pearson, 2007.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: OPERATING SYSTEMS

(Credits: 6)

**Course Outcomes:** To make aware of different types of Operating System and their services. And different process scheduling algorithms and synchronization techniques to achieve better Performance of a computer system.

### Unit-I (Basic of OS)

(Credits: 1.5)

#### Theory

Introduction: Basic concepts, Simple Batch Systems, Multi-programmed Batched Systems, TimeSharing Systems, Protection; Processes and CPU scheduling: Process Concept, Process scheduling.

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Unix Commands: date, clear, chmod, man, mail, passwd, pwd, cat, ls, mv, mkdir, cd, rm, rmdir, wc etc.
2	Program Based on introduction to Vi editor ; UNIX shell : wild cards, redirection, pipes.
3	Program on sequencing, grouping, background processing.

### Unit-II (Process Synchronization)

(Credits: 1.5)

#### Theory

Operation on Processes, Cooperating Processes, Inter-process Communication. Scheduling Criteria, Scheduling algorithms; Process Synchronization: The Critical-Section problem, Synchronization Hardware, Basics of Semaphores.

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	command substitution, sub shells; Shell programming
2	Program Based on loops (for, while), and conditional statements (if else, case), Shell variables.
3	Program on arguments to shell procedure, test command, arithmetic with EXPR command
4	Page Replacement : FIFO,Optimal, LRU



## Unit-III (Deadlocks) (Credits: 2)

### Theory

Deadlocks: Deadlock characterization, Methods of Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection & Recovery from Deadlock; Memory Management: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging. Virtual Memory: Demand paging, Page replacement, Page-replacement algorithms.

### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	interactive shell procedures with read
2	CPU scheduling Algorithms: FCFS,SJF,RR
3	Semaphores: Readers Writers Problem
4	Producer-Consumer Problem
5	Bankers Algorithm

### Reference Books:

1. Operating systems by William Stallings
2. A.Silberschatz, P.B Galvin,G.Gagne ,Operating system concepts,(9e), Wiley, 2016 .
3. H.M.Deitel, An introduction to operating system,(1e) ,Wiley, 1983.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: PYTHON PROGRAMMING

**Course Outcomes:** This is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

### UNIT I – (Introduction to Python Programming)

(Credits: 1.5)

#### Theory

Python concepts: Expressions, values, types, variables, programs & algorithms, control flow, file I/O, the Python execution model.

#### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Programs based on Implement a sequential search, create a calculator.
2	Programs based on Explore string functions.
3	Program Implement on Selection Sort.
4	Program Implement on Stack, Read and write into a file.
5	Demonstrate usage of basic regular expression.

### UNIT II- (Data Structure)

(Credits: 1.5)

#### Theory

Data structures: List, set, dictionary (mapping), tuple, graph (from a third-party library), List slicing (sub list), list comprehension (shorthand for a loop), Mutable and immutable data structures, Distinction between identity and (abstract) value.

#### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Write script to work like a SQL SELECT statement for internal Data Structure made in earlier exercise
2	Write script to work like a SQL Inner Join for an internal Data Structure made in earlier exercise.
3	Program on Load CSV files into internal Data Structure.

### UNIT III (Functions)

(Credits: 1.5)

#### Theory

Functions: Procedural abstraction, functions as values, recursion, function design methodology. The Python Library: String and Text Handling, Data Structures and Algorithms, Threading, Networking, Web Programming, Graphical Programming, Database Access.

#### Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Programs based on Demonstrate use of advanced regular expressions for data validation.
2	Demonstrate use of List.
3	Demonstrate use of Dictionaries.
4	Create Comma Separate Files (CSV).

**Reference Books:**

1. D. M. Beazley, Python Essential Reference, (1e) Amazon Books, 2010.
2. M. Lutz, Programming Python, (4e), O'Reilly Media, 2010.
3. Automate the Boring Stuff with Python, 2nd Edition.

**Course: SOFTWARE ENGINEERING**

**Course Outcomes:**In The Context of SE, demonstrate agility in solving software and systems challenges with a broad set of skills appropriate to the needs of a dynamic global computing-based society.

**UNIT I – (Introduction to System Concepts)****(Credits: 2)****Theory**

Introduction to System Concepts: Definition, Elements of System, Characteristics of System, Types of System, System Concepts. Introduction to Software Engineering: Definition, Need for software Engineering, Software Characteristics, Software Qualities (McCall's Quality Factors) Requirement.

Analysis: Definition of System Analysis, Requirement Anticipation, Knowledge and Qualities of System Analyst, Role of a System Analyst, Feasibility Study and It's Types, User Transaction Requirement, User design Requirements.

**UNIT II(Database Design and SQL)****(Credits: 2)****Theory**

Software Development Methodologies: SDLC (System Development Life Cycle), System Requirement Specification (SRS), Waterfall Model, Spiral Model, Prototyping Model, Introduction to Agile Model. Analysis and Design Tools: Entity Relationship Diagrams, Data Flow Diagrams (DFD), Data Dictionary & Elements of Data Dictionary, Pseudo code, Input and Output Design.

**UNIT III(Structured System Design)****(Credits: 2)****Theory**

Structured System Design: Modules Concepts and Types of Modules, Structured Chart, Qualities of Good Design, Coupling, Types of Coupling, Cohesion, and Types of Cohesion. Software Testing: Definition, Test characteristics, Types of testing - Black Box Testing, White-Box Testing, Stress Testing, Performance Testing.

**Reference Books:**

1. R. S. Pressman, Software Engineering, (5e), Tata McGraw Hills, 2009.
2. I. Sommerville, Software Engineering, (6e), Pearson Education Asia, 2005.
3. P.Jalote, An Integrated Approach to Software Engineering, (3e) , Narosa , 2010.



**V Semester**

**Course: DATA WAREHOUSING USING OLAP**

**(Credits: 6)**

**Course Outcomes:**Data Warehousing helps to pre-store and pre-compute the information available in the collection. The biggest advantage OLAP provides is its multidisciplinary approach in data organization and analysis.

**Unit-I (Data Warehousing Introduction)**

**(Credits: 2)**

**Theory**

Data Warehousing Introduction: Data Warehouse, Data Warehouse Architecture, Implementation, Data Warehousing to Data Mining, Data warehousing components, building a data warehouse, mapping the data warehouse to architecture, data extraction.

**Practical:**

**(Credit: 0.5)**

S.No.	Name of Practical
1	Reading data from files and working with datasets
2	Study of Graphs.
3	Classifiers: Lazy, Decision Trees

**Unit-II (Data Marts)**

**(Credits: 2)**

**Theory**

Transform and Load, cleanup transformation tools, metadata, Data Warehouse characteristics and definition; the purpose of Data Warehouse; Data Marts: Data Warehouse Cost-Benefit Analysis / Return on Investment.

**Practical:**

**(Credit: 0.5)**

S.No.	Name of Practical
1	Clustering: K-Means.
2	Study of Partitioning Method.
3	Implement classification using K nearest neighbor.
4	Hierarchical Method

**Unit-III (OLAP) (Credits: 1)**

**Theory**

OLAP: Patterns and models – Data visualization principles, Data Mining functionalities, Major issues in Data Mining.

**Reference Books:**

1. J.Han, M. Kamber, Data Mining Concepts and Techniques, (3e), Elsevier, 2011.
2. M. Berry, G. Linoff, Data Mining Techniques, (3e), Wiley, 2011.
3. T.H. Davenport, J.G.Shankar, Competing on Analytics, (1e), Harvard Business Review, 2007.
4. R.N Prasad, S. Acharya, Fundamentals of Business Analytics, (2e), Wiley, 2011.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: MOBILE APPLICATION DEVELOPMENT

**Course Outcomes:** MAD is using for Analysis, design, implementation and evaluation of a computer based system, process, component or program to meet the desired needs. Identify problems and create solutions for systems and organizations.

### Unit-I (Introduction to Android)

(Credits: 2)

#### Theory

Introduction: Android, Android versions and its feature set The various Android devices on the market, The Android Market application store, Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE). An Overview of Threads, The Application Main Thread. Multimedia: Audio, Video, Camera Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures. Android Architecture Overview: The Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework.

#### Practical:

(Credit: 0.5)

S.No.	Name of Practical
1	Develop an application that uses GUI components, Font and Colors.
2	Develop an application that uses layout managers and event listeners.
3	Develop a native calculator application to calculate the arithmetic operations.
4	Write an application that draws basic graphical primitives on the screen
5	Develop an application that makes use of database for add the info, and show the search result.

### UNIT-II (Android Software Development Platform)

(Credits: 2)

#### Theory

Android Software Development Platform: Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project , Common Default Resources Folders. Android Framework Overview: Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components Android Manifest XML: Declaring Your Components. Understanding Android Views, View Groups and Layouts Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Practical: (Credit: 0.5)

S.No.	Name of Practical
1	Implement an application that implements multi-threading.
2	Develop a native application that uses GPS location information.
3	Implement an application that writes data to the SD card.
4	Implement an application that creates an alert upon receiving a message.
5	Write a mobile application that creates alarm clock.

## UNIT-III (Graphical User Interface)

(Credits: 1)

### Theory

Graphical User Interface Screen with views: Displaying Text with Text View, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users. Displaying Pictures: Gallery, Image Switcher, Grid View, and Image View views to display images, Creating Animation. Files, Content Providers, and Databases: Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers.

### Reference Books:

1. B. Phillip , C. Stewart, B. Hardy, K. Marsicano, Android Programming, The Big Nerd Ranch Guide, (3e), 2017.
2. R. Meier, Professional Android 4 Application Development, (3e), Wiley India (Wrox), 2012.
3. J. C. Sheusi, Android Application Development for Java Programmers, (1e), Cengage Learning, 2013.
4. W.M.Lee, Beginning Android 4 Application Development, (1e), Wiley India (Wrox), 2013.



## Course: OOAD USING UML

**Course Outcomes:**UML is used for non-software systems, with an emphasis on modeling OO software applications. Most of the UML diagrams discussed so far are used to model various aspects like static, dynamic.

### UNIT I – (Introduction of UML Classes and Objects)

(Credits: 2)

#### Theory

Complexity The inherent complexity of software, The Structure of complex systems, Bringing order to chaos, on designing complex systems, Categories of analysis and Design methods. The Object Model: The evolution of object model, Elements of object model. Classes and Objects: The Nature of an Object, Relationship among objects, nature of a class, Relationship among classes.

### UNIT II- (Introduction to Modeling)

(Credits: 2)

#### Theory

Introduction to Modeling and UML: Importance of modeling, principles of modeling, object oriented modeling, overview of UML conceptual model of the UML, Architecture. Basic Structural Modeling: Common Mechanism: Terms and Concepts, Common modeling techniques. Diagrams, Class Diagrams. Advanced Structural Modeling: Interfaces, Types and Roles, Packages, Object Diagrams.

### UNIT III(Deployment Diagram and Case Study)

(Credits: 2)

#### Theory

Basic Behavioral Modeling: Interaction, Interaction Diagram, Use case, Use case diagram. Advanced Behavioral Modeling: State Machines, State Diagrams. Case Study: Any application can be discussed with help of an open tool. Architectural Modeling: Deployment, Deployment Diagram, Collaboration

#### Reference Books:

1. G.Booch, R.A.Makimchul, M.W.Eagel, J.Conallen, K.A.Houston, Object Oriented Analysis and Design with Applications, (3e), Addison-Wesley Professional, 2013.
2. G.Booch, J.Rumbaugh, I.Jacobson, The Unified Modeling Language User Guide, (2e).
3. M.Blaho, J.Rumbaugh, Object Oriented Modeling and Design with UML, (2e), Pearson, 2010.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: INTRODUCTION TO CLOUD COMPUTING

**Course Outcomes:** Cloud computing aims to provide easy, scalable access to computing resources and IT services. Cloud infrastructure consists of the hardware and software components required for the proper implementation of the cloud computing model.

### UNIT – I (Introduction to Cloud Computing)

(Credits: 2)

#### Theory

Introduction to Cloud Computing, Evolution, Benefits and Barriers, Cloud SPI models, Cloud Computing Vs Cluster Computing, Technology Involved in Cloud Computing, NIST Cloud architecture, Modern Cloud architecture, Cloud Characteristics, Service Model and Deployment Model, Types of hypervisor. Data and Network Management- Introduction- Objectives, Classic datacenters (CDCs) technologies, Virtualized Data Centers (VDCs), Storage Virtualization, Virtual Machine Storage Options, Block & File level Storage Virtualization.

### UNIT – II (Virtualization of Cloud Computing)

(Credits: 2)

#### Theory

Virtual Provisioning, Compute Virtualization, Virtual Machine Components, Compute Virtualization Techniques, Converting Physical Machines to Virtual Machines, Desktop and Application Virtualization. Virtualized Data Center– Networking- Network virtualization in VDC, VDC network infrastructure and components, Virtual LAN (VLAN) and Virtual SAN (VSAN), Components of VDC Network Infrastructure, Virtual Network Component, VLAN and VSAN Technologies, Network traffic management techniques in VDC Service. Management in Cloud Computing, Service Level Agreements (SLAs), Quality of Service (QoS),

### UNIT – III (Cloud Services)

(Credits: 2)

#### Theory

Billing and Accounting, Scaling Cloud Hardware, Managing Data, Cloud Security and Privacy, Infrastructure security, Data security and Storage, Data privacy, access management, Cloud computing standards and Interoperability, technical considerations for migration to the cloud. Migrating to the Cloud- Introduction- Objectives, Cloud Services for individuals- Available Services - Skytap Solution, Cloud Services Aimed at the mid – market, Live Migration. Case Studies.

#### Reference Books :

1. R. K. Buyya, J. Broberg, A. M. Goscinski, Cloud Computing: Principles and Paradigms, (1e) Wiley Publications, 2013.
2. S. Barrie, Cloud computing bible, (1e), John Wiley & Sons, 2010.
3. N. Antonopoulos, L. Gillam, Cloud Computing: Principles, Systems and Applications, (1e), Springer, 2012.
4. T. Mather, S. Kumaraswamy, S. Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, (1e), O'Reilly, 2009.



## VI Semester

**Course: CRYPTOGRAPHY FUNDAMENTALS**

**(Credits: 6)**

**Course Outcomes:** The purpose of cryptography is to hide information from observation. To "encrypt" the data so that it can be transmitted to another competent party for decryption and observation, without allowing any encrypted data to do so.

**Unit-I (Fundamentals of Cryptography)**

**(Credits: 2)**

### Theory

Elements of Number Theory: Euclid Algorithm, Prime Number Theorem, Euler's, Fermat's Little theorems, Entropy; Classical Cipher Techniques: Caesar, Affine, Mono-alphabetic, And Transposition.

**Unit-II (Security Attacks)**

**(Credits: 2)**

### Theory

Polyalphabetic Ciphers; Security Attacks: Active V/S Passive, Security Services; Symmetric Encryption: Fiestel Cipher, Confusion and Diffusion, DES Algorithm; Asymmetric Encryption: Principles of Public Key

**Unit-III (Digital Signatures)**

**(Credits:2)**

### Theory

Cryptosystems, RSA Algorithm; Message Authentication & Hashing; Digital Signatures: RSA Based, ElGamal Signatures; Key distribution; User Authentication Protocols; E-Mail Security: PGP, S/MIME; IPsec: AH & ESP; SSL; TLS.

### Reference Books:

1. S. Williams, Cryptography and Network Security: Principles and Practices, (7e) Pearson Education, 2017.
2. A. Kahate, Cryptography and Network Security, (2e), TataMc-Graw Hill, 2009.
3. C. Kaufman, R. Perlman, M. Speciner, Network Security: Private Communication in a Public World, (2e), Prentice Hall, 2008.
4. V.S. Bagad, I.A. Dhotre, Cryptography and Network Security, (1e) Technical Publications.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: FUNDAMENTALS TO MACHINE LEARNING

(Credits: 6)

**Course Outcomes:** Machine learning aims to discover patterns in user data and then make predictions based on these and generate complex patterns to answer business questions and solve business problems.

### Unit-I (Introduction to Machine Learning)

(Credits: 1.5)

#### Theory

Introduction to Machine Learning: Basics of Machine Learning, Supervised Machine Learning, K-Nearest Neighbors, Naïve Bayes, Decision tree, Support Vector Machines, Unsupervised Machine.

#### Practical: (Credit: 0.5)

1. Introduction to R Programming, History of R, and R packages, CRAN, R community, R-bloggers.
2. Stack Overflow, Coursera, and DataCamp.R Syntax Basics: Constants, operators, functions, variables.
3. Random numbers, Vectors and vector indexing, simple descriptive stats, Loops, Conditional expressions.

### Unit-II (Analysis)

(Credits: 1.5)

#### Theory

Learning: Cluster analysis, K means, Association Rule Mining, Apriori algorithms, Regression Analysis: Linear Regression, Nonlinear Regression, and Problem Solving: State Space Search.

#### Practical:

(Credit: 0.5)

1. Data Types: Levels of measurement (nominal, ordinal, interval, ratio scale) Vector types, data. Frame objects, rows and columns, indexing, Characteristics of tidy data.
2. Basic Data Transformations: Create new variables in a data. Frame, Filter rows and columns, merging datasets.
3. Introduction to Complex Data Transformations: Filtering and ordering data, Summaries and aggregates, new variables, Relational data, Joins on Keys.

### Unit-III (Capital Management and Leverage Analysis)

(Credits: 1.5)

#### Theory

Production System, Depth First Search, Breadth First Search, Heuristic Search (Hill Climbing, Best First Search and Problem Reduction).

#### Practical:

(Credit: 0.5)

1. Introduction into fuzzy joins, transforming wide and long tables, Converting Numeric Variables into Factors, Date Operations, String Parsing, Geocoding.
2. Data Visualization using R. Dirty Data Problems, Data Sources: sqlite examples for relational databases,.
3. Loading SPSS and SAS files, Reading from Excel and Google Spreadsheets, API and web scraping examples.

#### Reference Books:

1. G.Grolemund, Handbook of programming with R, (1e), O'REILLY, 2014.
2. 1. T.M.Mitchell, Machine Learning, (1e), McGraw- Hill Education, 2017.
3. 2. E.Alpaydin, Introduction to Machine Learning, (3e), PHI, 2015.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: FUNDAMENTALS TO MOBILE COMPUTING

**Course Outcomes:** This computing includes mobile communications, mobile hardware and mobile software. It includes ad hoc networks and communication properties, protocols, data formats and concrete technologies.

### UNIT I – (Introduction to Mobile Communication)

(Credits: 2)

#### Theory

Introduction: Mobile Communication and Overall View of the Syllabus and Lesson Plan, Introduction to Wireless Communication: Evolution of Mobile communications, Wireless and Mobile Radio-The First 150+ Years.

### UNIT II- (Transmission Fundamentals)

(Credits: 2)

#### Theory

Transmission fundamentals: Basics of Propagation, Propagation Models, Free-Space Propagation Model, Large-Scale Path Loss, Small Scale Multipath Propagation, Modulation Techniques for Mobile Radio: Modulation Criteria, Modulation Techniques, Linear Modulation Techniques - ASK, PSK, FSK, MSK.

### UNIT III (SSMC)

(Credits: 2)

#### Theory

Spread spectrum modulation Cellular concepts: Frequency reuse, Channel assignment strategies, Handoff strategies; Mobile Computing: Mobile IP, ubiquitous and nomadic computing WWW & Mobile Agent wireless World Wide Web; Mobile agent technology and standards.

#### Reference Books:

1. T.S. Rappaport, Wireless Communications - Principle and Practice, (2e), PHI, 2005.
2. W. Stallings, Wireless Communication and Network, (2e), PHI, 2004.
3. K. Garg, Mobile Computing, (1e), Pearson Education India, 2010.