

**COURSE STRUCTURE, SYLLABUS AND  
SCHEME OF EXAMINATION**

**FOR**

**B.A./B.Sc./B.Com  
Computer Applications  
National Education Policy-2020  
2021-22 Onwards**



Department of Computer Applications  
**VBS PURVANCHAL UNIVERSITY, JAUNPUR**

**DEPARTMENT OF COMPUTER APPLICATIONS**  
**VBS PURVANCHAL UNIVERSITY, JAUNPUR**

**STUDY & EVALUATION SCHEME**

**B.A./B.Sc./B.Com Computer Applications**  
**Effective from session: 2021-2022**

**Semester I**

Year	Sem	Course Code	Paper Title	Theory/ Practical	Credits
1	I	CA111T	FUNDAMENTAL OF COMPUTER & PC SOFTWARE	Theory	4
1	I	CA112P	PC SOFTWARE LAB	Practical	2
1	II	CA211T	PROGRAMMING PRINCIPLES & C LANGUAGE	Theory	4
1	II	CA212P	C LANGUAGE LAB	Practical	2
2	III	CA311T	DATA AND FILE STRUCTURE	Theory	4
2	III	CA312P	DS LAB	Practical	2
2	IV	CA411T	DATA BASE MANAGEMENT SYSTEM	Theory	4
2	IV	CA412P	DBMS LAB	Practical	2
3	V	CA511T	DESIGN ANALYSIS & ALGORITHMS	Theory	4
3	V	CA512T	OPERATING SYSTEM	Theory	4
3	V	CA513P	DAA LAB	Practical	2
3	V	CA514R	PROJECT-1	Project	3
3	VI	CA611T	WEB DESIGN	Theory	4
3	VI	CA612T	SOFT COMPUTING	Theory	4
3	VI	CA613P	WEB DESIGN LAB	Practical	2
3	VI	CA614R	PROJECT-2	Project	3

# SEMESTER I

## FUNDAMENTAL OF COMPUTER & PC SOFTWARE CA 111T

### Unit – I

#### Introduction

Definition of an Electronic Digital Computer, characteristics, capabilities and limitation of computer, Generation of computers, Types of computers, Classification of computers on size, Computer Hardware components and their functions, Characteristics and Applications of Computers.

### Unit – II

#### Operating system concepts

Introduction to OS, components of OS, Types of OS, multiprogramming, multitasking & time sharing, File & Directories & their use in different OS, DOS operating system, Window operating system, Unix operating system

### Unit – III

#### Software:

Need, Types of software – System software, Application software, Utility programs, Introduction to programming languages, Assembler, Compiler and Interpreter, Programming languages – Assembly language, Machine level language, High level language. Application software.

### Unit – IV

#### Number System

Introduction, Binary, Octal & Hexadecimal number system, Conversion form decimal to binary, octal & hexadecimal ect, Representation of numbers in computer and various character codes.

### Unit – V

#### MS-Office:

**MS World:** Opening, Creating, Saving a document, Editing, Finding and Replacing Texts, Using the Interface (Toolbars and Menus)

**MS Excel:** Concept of Workbook, Opening, Creating, Saving a workbook and organization of worksheets in a workbook, Data entry in cell, Selecting/Copying/Moving data in a worksheet.

**MS Power Point:** Business presentation and their advantages. Opening, Creating, saving a presentation.

#### Books:

1. Office 2000
2. Sanjay Saxena : A first course in Computers

# SEMESTER II

## PROGRAMMING PRINCIPLES AND C LANGUAGE CA 211T

### Unit – I

#### Introduction

Algorithm, Flowcharts, Introduction of programming languages, History of C, Basic structure of C Programming, Executing C Program

#### Data Types

Constant, variables, Identifiers, Keywords, Tokens, Declaration of Variables, Assigning values to variables.

#### Operators

Arithmetic, Relational, Logical, Assignment, Increment, Decrement operators, Condition, Bit wise operators, Arithmetic expressions.

### Unit – II

#### Branching & Looping

Decision making with if, If-else, Switch Statement, GOTO statement, While loop, Do While loop, FOR Loop, Break and Continue statements.

#### Array

One dimensional array, Two dimensional array, Multidimensional array, Initializing array.

### Unit – III

#### Function

Function declaration, calling a function, The form of C function, Return values and their type, No arguments, no return value, arguments but no return, recursion, Nesting of function.

#### Pointers

Accessing address of a variable, declaring and initializing pointers, pointer expression, pointer and array, pointer and function, pointer and structure, pointer to pointer

### Unit – IV

#### Structure & Union

Structure definition, giving values to members, structure initialization, Array of structure, structure within structure, Size of structure, Union definition

### Unit – V

#### File Handling

Defining and opening file, closing a file, I/O operations on file. Random access to file, Error handling in file.

#### Books:

1. Programming in C: Gottfried
2. Programming in ANSI C: E. Balaguruswamy
3. Let us C : Y. Kanetkar

# SEMESTER III

## DATA & FILE STRUCTURE CA 311T

### Unit – I

#### Introduction

Basic Technology, Elementary data organization, Data structure operations, Algorithm Complexity.

### Unit – II

#### Array:

Array Definition, Representation and analysis, Single and Multidimensional arrays, Address calculation, Application arrays, Character string in C, Character string operation, Array as parameters, Ordered list, sparse matrix and vectors.

### Unit – III

#### Stack and Queue and Link List:

Static & Dynamic data structure, definition, concepts, algorithms and application of stack & queues, linked stack & queue, linked list operation, doubly linked list.

### Unit – IV

#### Tree and Graph:

Definition & concept of tree, binary tree, conversion of general tree to binary tree, tree-traversal, rotation of tree, balanced tree, graphs, traversal, connected components & spanning tree, shortest path & transitive closure.

### Unit – V

#### Searching & sorting

Sequential search, binary search, searching algorithms & their analysis, bubble sort, insertion sort, selection sort, analysis of sorting algorithms, quick sort.

#### Books:

- E. Horowitz & Sahini, "Data Structure", Galgotia
- Tenebaum, "Data Structure & program design in C" PHI
- Lipschutz, "Data Structure" TMH

## DATABASE MANAGEMENT SYSTEM

CA 411T

### Unit- I

#### Introduction:

An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

### Unit- II

#### Data Modeling using the Entity Relationship Model:

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model.

### Unit- III

**Relational data Model and Language:** Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.

### Unit- IV

**Introduction to SQL:** Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus.

### Unit- V

#### Data Base Design & Normalization:

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions.

#### Text Books

- 1 Date C J, "An Introduction To Database System", Addison Wesley
- 2 Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
- 3 Elmasri, Navathe, "Fundamentals Of Database Systems", Addison Wesley
- 4 Leon & Leon, "Database Management System", Vikas Publishing House.

# SEMESTER V

## DESIGN & ANALYSIS OF ALGORITHMS CA 511T

### Unit – I

#### Introduction:

Algorithm, Analysis of algorithm, Designing Algorithm, Mathematical Foundations, Growth of functions, Summation, Recurrence, Sets, Counting & Probability.

### Unit – II

#### Divide & Conquer:

Searching: Binary search, Sorting: Counting Sort, Radix Sort, Bucket Sort, Selection Sort, Heap Sort, Merge sort, Quick sort, Greedy Methods – Minimum spanning tree, Dijkstra's Algorithm for shortest paths from a single source, Fractional Knapsack problem, Optimal storage on tapes.

### Unit – III

#### Dynamic Programming:

0-1 Knapsack problem, Matrix chain multiplication problem, Optimal binary search tree.

### Unit – IV

#### Back Tracking:

8 Queen Problem, Chromatic number, Graph coloring, Coloring of tree.

### Unit – V

#### Branch & Bound

Traveling salesman problem

#### Books:

1. Introduction to Algorithms: Cormen, Leiserson, Rivest
2. Fundamental of Computer Algorithms: Horowitz & Sahani

# SEMESTER V

## OPERATING SYSTEM CA 512T

### Unit – I

#### Introduction

Operating system and functions, evaluation of operating system, batch, interactive, time-sharing & real time systems, System protection, system components, system structure, operating system services.

### Unit – II

#### Concurrent process

Process, state transition, interrupts, process control block, principle of concurrency, producer-consumer problem, critical section,

### Unit – III

#### CPU scheduling

Scheduling concept, performance criteria, scheduling algorithms such as FCFS, SJF, Round-Robin.

#### Deadlock

System model, deadlock characterization, prevention.

### Unit – IV

#### Memory Management

Real storage, resident monitor, multiprogramming with fixed partition, multiprogramming with variable partition, multiple base register, paging, segmentation, paged segmentation, virtual memory concept, demand paging, page replacement algorithms, allocation of frames, thrashing, cache memory organization, impact on performance

### Unit – V

#### UNIX/LINUX

Unix system kernel & Utilities, File & Directories, Single & compound statement, basic commands, Bourn shell, korn shell & C shell, shell meta characteristics, shell variables & scripts, environment, integer arithmetic & string manipulation, decision making.

#### Books:

1. Operating system : Paterson
2. Operating system: Andrew S. Tannebaum
3. Operating System: W. Stalling



# SEMESTER VI

## WEB DESIGN CA 611T

### Unit – I

#### Overview of Internet:

Introduction to Internet and WWW, Internet protocols like TCP/IP, http, telnet and ftp, url, email, domain name, Web Browsers, Search Engines, Counters, Chat & Bulletin Board Services.

### Unit – II

**Principles of Web Design:** Key issues to be considered in web site design.

#### Structure of a Web Page:

Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, ordered and unordered lists, content layout & presentation.

**HTML Tags:** Use of Different HTML tags in web pages.

**Table Handling :** Table layout & presentation, constructing tables in a web page, developing a web page in a table.

### Unit – III

**HTML Editors & Tools:** Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc.

**Graphical and Animation Techniques:** Use of Different graphical and animation tools like Abode Photoshop, Gif Animator etc.

### Unit – IV

**Interactivity:** Client Server Model, Static & Dynamic Web pages, Creating forms, CGI, Role of Databases in web applications.

### Unit – V

#### Web Technologies:

Overview of various web technologies and their applications like Java Script, active server pages, Macromedia flash, embedding java applets in a web page etc.

#### Books:

1. C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
2. Joel Sklar, "Principles of Web Design", Web Warrior series.
3. Rick Dranell, "HTML4 unleashed", Techmedia Publication.
4. Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
5. Don Gosselin, "JavaScript", Vikas Publication
6. Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

# SEMESTER VI

## SOFT COMPUTING CA 612T

### Unit – I

#### Introduction To Neural Networks:

Neural Networks Neuron, Nerve Structure And Synapse, Artificial Neuron And Its Model, Activation Functions. Neural Network Architecture: - Single Layer And Multilayer Feed Forward Networks, Recurrent Networks. Perception And Convergence Rule. Supervised Learning Network & Unsupervised Learning Network.

### Unit – II

#### Back Propagation Networks-:

Perceptron Model, Solution, Single Layer, Multilayer Perception Model; Back Propagation Learning Methods, Effect Of Learning Rule Co-Efficient ; Back Propagation Algorithm, Applications.

### Unit – III

#### Fuzzy Logic Introduction-:

Basic Concepts Of Fuzzy Logic, Fuzzy Sets And Crisp Sets, Fuzzy Set Theory And Operations, Properties Of Fuzzy Sets Fuzzy And Crisp Relations, Fuzzy To Crisp Conversion, Membership Functions, Inference In Fuzzy Logic, Fuzzy If-Then Rules, Fuzzifications & Defuzzifications.

### Unit – IV

#### Genetic Algorithm-I:

Basic Concepts, Working Principle, Procedures Of GA, Flow Chart Of GA 7

### Unit – V

#### Genetic Algorithm-II:

Genetic Representations, (Encoding), Genetic Operators, Mutation, Generational Cycle.

#### Books:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications" Prentice Hall of India, 2003
2. Anderson, James, "Introduction to Neural Networks", PHI Publication, Delhi, India
3. N.P. Padhy, "Artificial Intelligence and Intelligent Systems" Oxford University Press, USA, 2005.
4. Simon Haykin, "Neural Networks and Learning Machines" Prentice Hall of India, 2005, Third Edition.

## **Research Project Guidelines for V and VI Semester**

### **1. Objectives of the Project**

- To facilitate the student to independently formulate and solve a social, philosophical, commercial, or technological problem and present the results in written and oral form.
- To render students to the real life problems.
- To provide opportunities to students to interact with people and present them confidently.

### **2. Types of Project**

The students are expected to work on:

- (1) Application Oriented Project or
- (2) Research Oriented Project.

However, it is not mandatory for a student to work on a real-life project. The student can formulate a project problem with the help of his Guide and submit the project proposal of the same. **Approval of the project proposal is mandatory.** If approved, the student can commence working on it, and complete it. It is upon the student to carry the same project of V semester to VI semester OR choose a new project for VI semester. Use the latest versions of the software packages for the development of the project.

### **3. Software and Broad Ideas of Application**

Programming Language/ Application Software/Operating System etc could be any latest technology prevailing / being used as per the will of the student with the consent of the guide.

**Languages** - C, C++, Java, VC++, C#, R,Python

**Scripting Languages** - PHP,JSP, SHELL Scripts (Unix), Tcl/Tk

**.NET Platform** - F#,C#. Net, Visual C#. Net, ASP.Net

**Middle Ware(Component) Technologies** - COM/DCOM, Active-X, EJB

**Front-End/GUI Tools** - .Net Technologies, Java

**Back-End/DBMS** - Oracle, SQL Plus, MY SQL, SQL Server

**UNIX Internals** - Device Drivers, RPC, Threads, Socket programming

**Real time Operating Systems/Embedded Skills** - LINUX, Raspberry Pi, Arduino.

**Application and Research Areas** - Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication Software development/ E-

Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming

#### **4. Eligibility of the Guide**

Guide should be a regular teacher of the University/College/Higher Education Institute. Student can also do the project under the guidance of regular teacher of Institute of National Importance with the consent of the enrolled college/institute where the student is studying.

#### **5. Introduction to the Project**

The student should include the details in the project diary, in which they will record the progress of their project throughout the course. The project report should be documented with scientific approach to the solution of the problem that the students have sought to address. The project report should be prepared in order to solve the problem in a methodical and professional manner, making due references to appropriate techniques, technologies and professional standards. The project report should contain enough details to enable examiners to evaluate the work. The important points should be highlighted in the body of the report, with details often referred to appendices.