PGDCA SYLLABUS 2019 BATCH ONWARDS
(UPDATED ON 24.05.2019)

Eligibility: Three Year Bachelor Degree from a University recognized by UGC, in any discipline.
Duration: 1 Year/ 2 Semesters

Mode of admission:
1. Online Counselling based on merit in qualifying examination.
2. Manual counselling for left over seats after Online Counselling.

Semester 1st		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
PGCAS1-101	Fundamentals of Information Technology	3	1	0	40	60	100	4
PGCAS1-102	Operating System	3	1	0	40	60	100	4
PGCAS1-103	Programming Fundamentals using C	3	1	0	40	60	100	4
PGCAS1-104	Computer organization and Architecture	3	1	0	40	60	100	4
PGCAS1-105	Software lab I Office Automation (Based on PGCAS1-101)	0	0	4	60	40	100	2
PGCAS1-106	Software Lab II (Based on PGCAS1-103)	0	0	4	60	40	100	2
Total		12	4	8	280	320	600	20

Semester 2nd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
PGCAS1-201	Data Structures	3	1	0	40	60	100	4
PGCAS1-202	Object Oriented programming Using C++	3	1	0	40	60	100	4
PGCAS1-203	Database Management System	3	1	0	40	60	100	4
PGCAS1-204	Fundamentals of Computer Networks, Internet and Scripting Languages	3	1	0	40	60	100	4
PGCAS1-205	Software Lab III Data Structures using C++(Based on PGCAS1-201)	0	0	4	60	40	100	2
PGCAS1-206	Software Lab IV (Based on PGCAS1-204)	0	0	4	60	40	100	2
Total		12	4	8	280	320	600	20

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Subject Code: PGCAS1-101   **L T P C**   **Durations: 60 Hrs.**
                              3 1 0 4

UNIT I (14 Hrs)

Historical Evolution of Computer: Block Diagram of computer, characterisation of computers, types of computers, the computer generations, memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM.

Input-Output Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, Desk Jet printer, Laser printer, and plotters.

UNIT II (15 Hrs)

Number System: Non-positional and positional number systems, Base conversion, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.

Binary Arithmetic: Addition, subtraction and multiplication.

Computer Codes: weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode, XS-3, Grey Codes.

UNIT III (17 Hrs)

Computer Software: Introduction, types of software, systems software, GUI, operating system, high level languages, assemblers, compilers and interpreters, system utilities, application packages, stages in the development of software, program testing and debugging, program documentation, concept of firmware.

UNIT IV (14 Hrs)

Applications of Information Technology and Trends: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

E-Commerce: Meaning, its advantages & limitations, Infrastructure for E-commerce, Types of E-Commerce Applications.

Multimedia: Concepts, Components and Application.

Recommended Books:
1. Chetan Srivastva, Fundamentals of Information Technology, Kalyani Publishers.
2. Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, 2001, John Wiley & Sons.
3. Satish Jain, Information Technology, BPB, 1999.
4. Sukhmeen Kaur, Vikram Gupta, S. S. Hatia and Navneet Kaur, "Fundamentals of Information Technology", Kalyani Publishers.
5. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, 2002, BPB.

OPERATING SYSTEMS

Subject Code: PGCAS1-102   **L T P C**   **Durations: 60 Hrs.**
                              3 1 0 4

UNIT I (14 Hrs)

Introduction to operating System: Definition, its need and Operating system services, Early systems, Introduction to various types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi-tasking operating System, distributed operating system, Network operating system, Real time operating system, Multi-processor system and parallel processing.

UNIT II (15 Hrs)

Process Management: Process concept, types of Process scheduling, and Basic concept of CPU Scheduling, Scheduling criteria, and Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms, Deadlock definition and its characterization.

UNIT III (17 Hrs)

Windows: GUI, Icon, Toolbar, working with files, closing and saving a file, Mouse Mechanics: Click, double click, Drag and drop method. Installation of a new software, Control panel, Explorer, Accessories, Network Neighbourhood, system tools, recycle bin, Files and directory management under windows, Running programs

UNIT IV (14 Hrs)

UNIX: Structure of UNIX, Kernel and shell, Commands of Unix, UNIX file system, own file system, Electronic mail, Vi Editor: Editing text, screen controls printing and spooling, Unix Administration: Super user, Booting, Backup, Creating and managing new accounts.

Recommended Books:
1. Rathbone," Windows for dummies", Pustak mahal.
2. Stan Kelly-Bootley," Understanding UNIX", Sybex Tech asian edition.
3. Silverschatz," Operating system concepts", Pearson Education India.

PROGRAMMING FUNDAMENTALS THROUGH "C" LANGUAGE

Subject Code: PGCAS1-103   **L T P C**   **Durations: 60 Hrs.**
                                  3 1 0 4

UNIT I (14 Hrs)

Programming process: Problem definition, program design, coding, compilation and debugging.
Fundamentals of C: Identifiers and keywords, data types, input and output, type conversion, operators and expressions: Arithmetic, unary, logical and relational operators, assignment operator, conditional operator, and library functions.

UNIT II (15 Hrs)

Control statements: branching, looping using for, while and do-while statements, nested control structures, switch, break and continue statement.
Functions: definition, call prototype and passing arguments to a function, recursion versus iteration
Storage classes: automatic, external and static variables.

UNIT III (17 Hrs)

Arrays: Definition, accessing elements, initialization, passing to functions, multi-dimensional arrays, strings
Pointers: address and referencing operators, declaration, assignment, passing pointer to functions, pointer arrays.

UNIT IV (14 Hrs)

Structures: variables, accessing members, nested structures, pointer to structures, self-referential structures.
Files in C: Sequential files, random access files, unformatted files, Text files, binary files.

Recommended books:
1. Ram Kumar and Rakesh Aggarwal: Programming in Ansi C, TMH.
2. B.W. Kerrighan and D.M. Richie, " The C programming language", 2nd edition, PHI.
3. H.H. Tan & T.B. Dorazio," C Programming for engineers & Computer Science", Mcgraw

Hill international edition.
4. Vikram Gupts and S. S. Bhatia, "Programming Fundamentals through C Language" Kalyani Publishers.
5. Byron Gottfried, "Programming with C, Second edition, Schaum' s outline series" TMH.

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code: PGCAS1-104 **L T P C** **Durations: 60 Hrs.**
                              3 1 0 4

UNIT I (14 Hrs)
Boolean algebra: Boolean operations, Truth Tables, Boolean Laws, K-maps (2, 3 and 4 variable maps, don't care conditions).
Basic Gates: Combinational logic design**:** half-adder, full adder, parallel adder.

UNIT II (15 Hrs)
Sequential circuits: concept, flip-flops (D, RS, JK, T), counters (Ripple, Asynchronous, Synchronous). Instruction codes, Instruction formats, Instruction cycle, Addressing modes. Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit

UNIT III (17 Hrs)
Control Memory: Design of control unit, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC.
Memory Organisation: memory hierarchy, Memory types: cache, associative and other types.

UNIT IV (14 Hrs)
I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA. Block diagram-depicting architecture of 8085 machine.

Recommended books:
1. A.S. Tannenbaum, "Structured Computer Organisation". Prentice-Hall of India, 1999.
2. William Stallings, "Computer Organisation and Architecture". Sixth Edition, Pearson Education, 2002.
3. M.M. Mano, "Computer System Architecture". Third Edition, Prentice-Hall of India, 2002.

SOFTWARE LAB – I (BASED IN PGCAS1-101)

Subject Code: PGCAS1-105 **L T P C**
                              0 0 4 2

This laboratory course will comprise as exercises based on Office Automation and Productivity Tools. Students are required to practice following:

WINDOWS: Windows concepts, features, windows structure, desktop, taskbar, start menu, my computer, Recycle Bin, Windows Accessories. System Tools**,** communication, Sharing Information between Programs.

Word Processing: Introduction to Word Processing, Interface, Toolbars, Ruler, Menus, Keyboard Shortcut, editing a Document, previewing documents, Printing documents, Formatting Documents, Checking the grammar and spelling, formatting via find and replace, Using the

Thesaurus, Using Auto Correct, Auto Complete and Auto Text, word count, Hyphenating, Mail merge, mailing Labels Wizards and Templates, Handling Graphics, tables and charts, Converting a word document into various formats.

PowerPoint: Creating slides, applying transitions and sound effects, setting up slide shows, Animation.

Spreadsheet using EXCEL: Creating worksheet, entering data into worksheet, heading information, data, text, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, keyboard shortcuts, working with single and multiple workbook, working with formulas & cell referencing, Formatting of worksheet.

SOFTWARE LAB – II (BASED ON PGCAS1-103)

Subject Code: PGCAS1-106   **L T P C**
                                        0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper **PGCAS1-103**: Programming Fundamentals through "C" Language. Students are required to develop programs based upon:

1. **Input-Output Statements:** formatted and non-formatted statements.
2. **Decision Making:** switch, if-else, nested if, else-if ladder, break, continue, goto.
3. **Loops:** while, do-while, for.
4. **Functions:** definition, declaration, variable scope, parameterized functions, return statement, call by value, call by reference, recursive functions.
5. **Arrays:** Array declarations, Single and multi-dimensional, memory limits, strings and string functions.
6. **Files:** Creation and editing of various types of files, closing a file (using functions and without functions).

DATA STRUCTURES

Subject Code: PGCAS1-201   **L T P C**   **Duration: 60 Hrs.**
                                    3 1 0 4

UNIT I (14 Hrs)
Basic concept and notations, data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.
Arrays: Linear array, representation of linear array in memory, traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.

UNIT II (15 Hrs)
Stacks: Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to postfix notations, evolution of postfix notation, matching of Parenthesis, recursion, Tower of Hanoi.

UNIT III (17 Hrs)
Linked list: representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list, Introduction to doubly and circular linked lists, Application of linked lists.

UNIT IV (14 Hrs)
Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort comparison of various searching and sorting algorithms.

Recommended books:
1. Tenenbaum, Y. Lanhghsam and A. J. Augenstein, "Data Structures Using C and C++", Prentice Hall of India.
2. Seymour Lipschutz "Theory & Practice of Data Structures", McGraw Hill..

OBJECT ORIENTED PROGRAMMING WITH C++

Subject Code: PGCAS1-202   **L T P C**   **Duration: 60 Hrs.**
                                       3 1 0 4

UNIT I (14 Hrs)

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming.

Introduction to C++: Identifier, Keywords, Constants And Operators: Arithmetic, relational, logical, And conditional and assignment. Size of operator, Operator precedence and associativity. Type conversion, Variable declaration, expressions, statements, manipulators. Input and Output statements, stream I/O, Conditional and Iterative statements, breaking control statements. Storage Classes, Arrays, Arrays as Character Strings, Structures, Unions, bit fields, Enumerations and User defined types.

UNIT II (15 Hrs)

Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Multiple indirections, Pointer to functions. **Functions**: Prototyping, Definition and Call, Scope Rules.

Parameter Passing: by functions, recursion, function overloading, Default Arguments, Const arguments, Pre-processor, Type casting.

Classes and Objects: Class Declaration and Class Definition, defining member functions, making functions inline, nesting of member functions, Members access control, this pointer, Objects: Object as function arguments, array of objects, functions returning objects, Const member. Static data member and Static member functions, Friend functions and Friend classes.

UNIT III (17 Hrs)

Constructors: Properties, types of constructors, Dynamic constructors, multiple constructors in classes.

Destructors: Properties, Virtual destructors, Destroying objects, Rules for constructors and destructors. Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes, Scopes: Local, Global, namespace and Class.

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class, Types of inheritance, Types of base classes, Code Reusability.

UNIT IV (14 Hrs)

Polymorphism: Methods of achieving polymorphic behaviour. Polymorphism with pointers, virtual functions, late binding, pure virtual functions and abstract base class.

Operator overloading: over loading binary operator, overloading unary operators, rules for operator overloading, operator overloading using friend function. Function overloading: early binding. Difference between function overloading, redefining, and overriding.

Recommended Books:
1. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001.
2. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publicationsk, 1994.
3. Bjarne Strautrup, "The C++ Programming Language", Addition-Wesley Publication Co., 2001.

4. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Pearson Educaion, 2002.
5. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill, 2001.
6. Herbert Schildt. "The Complete Reference C++", Tata McGraw-Hill, 2001.

DATABASE MANAGEMENT SYSTEM

Subject Code: PGCAS1-203   **L T P C**   **Duration: 60 Hrs**
                                        3 1 0 4

UNIT I (14 Hrs)

Traditional file processing system: Characteristics, limitations, Database Definition, composition.

Database Management System: Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance. DBMS architecture, data independence, mapping between different levels.

UNIT II (15 Hrs)

Database languages: DDL, DML, DCL.

Database utilities, Data Models, Keys: Super, candidate, primary, unique, foreign.

Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak Entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables. Overview of Network and Hierarchical model.

UNIT III (17 Hrs)

Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

Database Design: Functional dependency, decomposition, problems arising out of bad database design, normalization, multi-valued dependency, Database design process, data base protection, database integrity.

Database concurrency: Definition and problems arising out of concurrency.

UNIT IV (14 Hrs)

Database security: Authentication, authorization, methods of implementing security.

MS-ACCESS: Introduction to MS-ACCESS, working with database and tables, queries in Access, Appling integrity constraints, Introduction to forms, sorting and filtering, Controls, Reports and Macro: creating reports, using Macros.

Recommended books:
1. C.J. Date, "An Introduction to Data Base Systems", 3rd Ed., Narosa Publishers, 1997.
2. Jeffrey D. Ullman, "Principles of Database Systems", second Ed., Galgotia Pub., 1984.
3. D. Kroenke., "Database Processing", Galgotia Publications, 1987.
4. Henry F. Korth, "Database System Concepts", McGraw Hill. Inc., 1997.
5. Naveen Prakash, "Introduction to Database Management", TMH, 1993.
6. Ivan Bayross, "Oracle 7 The complete reference", BPB Publications.
7. Bobrowsky, "Client server architecture and Introduction to Oracle 7", 1996.
8. Elmisry Nawathy, "Introduction to database System", Pearson Education India.
9. Content Development Group "Working with MS-OFFICE 2000", TMH.

FUNDAMENTALS OF COMPUTER NETWORKS, INTERNET AND SCRIPTING

Subject Code: PGCAS1-204   **L T P C**   **Duration: 60 Hrs**
                                                    3 1 0 4

UNIT I (14 Hrs)

Computer Networks: Introduction, Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture - point to point, multicast, broadcast, Classification of networks-LAN, MAN and WAN. Reference models - the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.

UNIT II (15 Hrs)

Internet: Introduction, Relays, Repeaters, Bridges, Routers, Gateways.
Internet working: How networks differ, concatenated virtual circuits, connectionless internetworking, tunnelling, internetwork Routing, fragmentation, Firewalls, internet architecture.

UNIT III (17 Hrs)

Application layer: The DNS Name Space, Electronic Mail, The World Wide Web, FTP: Introduction, data transfer and distributed computation, Generalised File Transfer, The File Transfer Protocol.
Network security: Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles.

UNIT IV (14 Hrs)

Scripting languages: HTML: Introduction to HTML, HTML and the World Wide Web, HTML elements, basic structure elements of HTML, the two categories of body elements – block level and text level, creating HTML pages, viewing pages in different browsers, rule for nesting.
HTML tags, colours and fonts, formatting the body section, creating links, creating external links, creating internal links.

Recommended Books:
1. Douglas E. Comer, "Computer Networks and Internets" second Editon, Addison Wesley.
2. D. Bertsellas and R. Gallager, "Data Networks", second Edition, Prentice Hall, 1992.
3. Andrew S. Tanenbaum, "Computer Networks", Third Edition, PHI Publications, 1997.
4. B Forousan, Introduction to data communication and networking.

SOFTWARE LAB III (BASED ON PGCAS1-201)

Subject code: PGCAS1-205   **L T P C**
                                              0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper **PGCAS1-201:** Data Structures & object Oriented Programming with C++. Students are required to develop programs

1. Based upon various constructs in the C++ language.

2. Searching and sorting algorithms in C++ language.

3. Data structures like stack, queues and linked lists in C++ language.

SOFTWARE LAB – IV (BASED ON PGCAS1-204)

Subject code: PGCAS1-206

L T P C

0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper **PGCAS1-203**: Database Management System with MS ACCESS and PGDCA-204: Fundamentals of Computer Networks, Internet and Scripting Languages. Dents are required to practices:

MS ACCESS: Creating tables, queries in MS Access, Appling integrity constraints, creating forms, sorting and filtering, creating reports.
HTML: Tables, Forms, Frames and other text formatting tags
DHTML: Cascading style sheets and Document object model
JavaScript: Introduction to JavaScript.