Kalinga University Atal Nagar (C.G.)

SCHEME OF EXAMINATION
& SYLLABUS

of

PGDCA

(POST GRADUATE DIPLOMA IN COMPUTER APPLICATION)

UNDER

Faculty of Information Technology

w.e.f. Session 2021-22

PGDCA I SEMESTER

Subject code	Subject Name	Credit 1 Cr= 10 hrs	University Exam Marks	Internal Marks	Total Marks
PGDCA101	Fundamental of Information Technology	4	70	30	100
PGDCA102	Programming in C++	4	70	30	100
PGDCA103	DBMS Concepts	4	70	30	100
PGDCA104	Business Communication	4	70	30	100
PGDCA105-P	Practical Based on Office Automation and DBMS Concepts	2	30	20	50
PGDCA106P	Practical Based on C++	2	30	20	50
	Total	**20**	**340**	**160**	**500**

PGDCA II SEMESTER

Subject code	Subject Name	Credit 1Cr=10hrs	University Exam Marks	Internal Marks	Total Marks
PGDCA201	Programming using VB .NET	4	70	30	100
PGDCA202	Programming in Python	4	70	30	100
PGDCA203	Web technology & Multimedia	4	70	30	100
PGDCA204	Data Structures	4	70	30	100
PGDCA205-P	Practical Based on VB .NET& Python	2	30	20	50
PGDCA206	Mini Project	3	30	20	50
	Total	**21**	**340**	**160**	**500**
	Grand Total (SEM I + SEM II)	**41**	**680**	**320**	**1000**

PGDCA/101
Fundamental of Information Technology

UNIT – I: Brief history of development of computers, Computer system concepts, Computer system characteristics, Capabilities and limitations, Types of computers Generations of computers, Personal Computer (PCs) – evolution of PCs, configurations of PCs- Pentium and Newer, PCs specifications and main characteristics. Basic Components of a computer system - Control unit, ALU, Input/output functions and characteristics, memory - RAM, ROM, EPROM, PROM and other types of memory, Number System.

UNIT – II: Input/output& Storage Units-:Keyboard, Mouse, Trackball, Joystick, Scanners, Digital Camera, MICR, OCR,OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Printers & types - Daisywheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers, Storage fundamentals - Primary Vs Secondary Data Storage and Retrieval methods - Sequential, Direct and Index Sequential, Various Storage Devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks(Winchester Disk), Optical Disks, CD, CD-R, CD-RW, Zip Drive, flash Physical structure of floppy & hard disk.

UNIT – III: Software and its Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Introduction to operating system for PCs-DOS Windows, Linux, File Allocation Table, files & directory structure and its naming rules, booting process, Programming languages- Machine, Assembly, High Level, 4GL, their merits and demerits, Application Software and its types - Word-processing, Spreadsheet, Presentation Graphics, Data Base Management Software, characteristics, Uses and examples and area of applications of each of them, DOS commands.
Multimedia concepts, multimedia system configuration, types of multimedia, application of Multimedia.

UNIT – IV: Use of communication and IT , Communication Process, Communication types- Simplex, Half Duplex, Full Duplex, Communication Protocols, Communication Channels - Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication, Modem - Working and characteristics, Types of network Connections - Dialup, Leased Lines, ISDN, DSL, RF, Broad band ,Types of Network - LAN, WAN, MAN ,Internet, VPN etc., Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies, Components of LAN -Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways. Internet-Evolution, World Wide Web Internet Services and E - Commerce

UNIT – V: System Planning and initial investigation: basis for planning in systems analysis, initial investigation, fact finding, fact analysis, determination of feasibility. Information Gathering: Kind of information, Information gathering tools, Structured Analysis, DFD, Data Dictionary, Decision Tree, Structured English, Decision Table. System Performance & Feasibility Study. Software Engineering Fundamentals: Software Design Life cycle The Role of System Analyst

TEXT & REFERENCE BOOKS:
- Anurag Seetha, "Introduction to Computers and Information Technology", Ram Prasad & Sons, Bhopal.
- S.K.Basandra, "Computers Today ", Galgotia Publications.
- Chetan Shrivastav "Fundamental of IT"
- P.K. Sinha," Fundamental of Computers"
- System Analysis and Design - Elias M. Awad.
- System Analysis and Design - Alan Dennis & Barbara Haley Wixo
- Introduction to Data communication & Networking - Behrouz &Forouzan
- Computer Networking - Andres & Tanenbaum

Programming in C++

UNIT– I: Idea of Algorithm: Representation of Algorithm, Flowchart, Pseudo code with examples, Fromalgorithms to programs, source code.Programming Language, high level and low level languages, Procedural Vs Object oriented language, Object oriented programming Concepts, Advantages, Usage, object oriented language features, Introduction to various C++ compilers, C++ standard libraries, Data types, comments, main function in C++, function prototyping, default arguments and argument matching. User defined data types: enumerated types.

Classes & Objects : Classes, Structure & Classes, Union & Classes, functions , System define and library function, Inline Function, Scope Resolution operator, Static Class Members: Static Data Member, Static Member Function, Passing Objects to Function, Returning Objects, Object Assignment, Friend Function, Friend Classes.

UNIT– II: Array, Pointers References & The Dynamic Allocation Operators: Array of Objects, Pointers to Object, Type Checking C++ Pointers, The This Pointer, Pointer to Derived Types, Pointer to Class Members, References: Reference Parameter, call by reference and return by reference Passing References to Objects, Returning Reference, Independent Reference, C++ Dynamic Memory Allocation, Allocating Array, Allocating Objects, Constructor & Destructor : Introduction, Constructor, access specifiers for constructors, and instantiation, Parameterized Constructor, Multiple Constructor in A Class, Constructor with Default Argument, Copy Constructor, Destructor.

UNIT– III: Overloading as polymorphism: Function & Operator Overloading: Function Overloading, Overloading Constructor Function Finding the Address of an Overloaded Function, Operator Overloading: Creating A Member Operator Function, Creating Prefix & Postfix Forms of the Increment & Decrement Operation, Overloading The Shorthand Operation (I.E. +=,-= Etc), Operator Overloading Restrictions, Operator Overloading Using Friend Function, Overloading New & Delete, Overloading Some Special Operators, Overloading [ ], ( ), -, Comma Operator, Overloading << and concepts of namespaces

UNIT– IV: Inheritance : Base Class Access Control, Inheritance & Protected Members, Protected Base Class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors & Inheritance, When Constructor & Destructor Function are Executed, Passing Parameters to Base Class Constructors, Granting Access, Virtual Base Classes ,Virtual Functions & Polymorphism: Virtual Function, Pure Virtual Functions, Early Vs. Late Binding.

UNIT– V: File I/O, use of File functions, reading and writing from File Templates and Exception Handling: Exception handling in C++, try, throw, catch sequence, multiple catch blocks, uncaught exceptions, catch-all exception handler Templates: Reason for templates compactness and flexibility, function template examples explicit specialization, class templates, out of class definition of member functions, The C++ I/O System Basics : C++ Streams, The Basic Stream Classes, C++ Predefined Streams, Formatted I/O: Formatting Using the IOS Members, Setting The Formal Flags, Clearing Format Flags, An Overloaded Form Of Setf ( ), Using Width() Precision() and Fill(), Using Manipulators to Format I/O, Creating Your own Manipulators.

TEXT & REFERENCE BOOKS:
- Herbert Schildt, "C++ The complete reference " - TMH Publication ISBN 0-07-463880-7
- E. Balguruswamy, "C++ ", TMH Publication ISBN 0-07-462038-x
- M Kumar "Programming in C++", TMH Publications
- Mastering C++, "Venugopal"

1. **PGDCA/103**

DBMS Concepts

UNIT – I: Traditional file processing system: Characteristics, limitations, Database: Definition, composition., Database Management system: Definition, Characteristics, advantages over traditional file processing system, Implication of Database approach, User of database, DBA and its responsibilities, Database schema ,Database languages: DDL, DML, DCL,Database utilities, Data Models, Keys: Super, candidate, primary, unique, foreign.

UNIT – II: 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, Relational Data model: concepts, constraints. Relational algebra: Basic operations, additional operations

UNIT – III: Database design: Functional dependency, decomposition, problems arising out of bad database design, normalization, multi-valued dependency. Database design process, database protection, database integrity, database concurrency: Problems arising out of concurrency, methods of handling concurrency. Data recovery, database security: Authentication, authorization, methods of implementing security

UNIT – IV: Introduction to SQL ,Data Types ,Character, Char, Varchar/Varchar2,Long, Number - Column-name number, column-name number(p) - fixed point, column-name number (p,s) - floating point ,Date data type, Raw data type, Long raw data type ,LOB data type - CLOB, BLOB, BFILE, Table - Constraint definition, Domain, Entity, Referential ,Create table - Alter table, Drop table, Normalization (Applied) Commands and clause - Insert, update, delete, with where clause ,Queries and SQL functions ,Select with all options ,Operations and operators - Arithmatic, Comparison, Logical (in, out, between, like, all, %, any, exists, not exists, is null, is not null, and, or, not) Query Expression Operators - Union, intersect, minus SQL functions ,Date - Sys_date, new_time, next_day, add_month, last_day, months_between Numeric - round, trunc, abs, ceil, cos, exp, floor Character - initcap, lower, upper, trim, translate, length, char Conversion - to_char, to_date, to_number Miscellaneous - Uid, User, nvl, vsize

UNIT – V: Group function Avg, max, min, sum, count, Group by clause, having clauseExpression (Set operations : join) Set Operations - union, union all, intersect, minus, Relating data through join concept - Join theory, Simple join, Equi join ,Non equi join - Self join, Outer join ,Table aliases Query and sub-queries ,Introduction to object oriented database - Concept ,Object binding in Oracle - Class, Attribute, Methods, Object type, Definition, Declaring and initializing, Methods , Alter and Drop type, Views and synonyms ,Synonym - Introduction ,Object type - User definition with example , Create, synonyms as alias for table and view, drop, Sequence - Introduction, creates with option, alter sequence, drop ,View - into, creates, update, drop ,Index - Introduction, create ,Primary introduction to DBA, User create, granting ,Privileges - Object, System, User (GRANT, REVOKE, COMMIT, ROLLBACK, SAVEPOINT) ,Report writer using SQL.

TEXT & REFERENCE BOOKS:
- Understanding ORACLE by Perry J. and Later J.SQL by Scott Urman ORACLE PL/SQL Programming by Scott Urman
- Expert One on One : Oracle by WroxPL/SQL by Ivan Bayross
- Database system concept - H. Korth and A. Silberschatz, TMH
- Data Base Management System - Alexies& Mathews [Vikas publication]
- Data Base Management System - C. J. Date [Narosha Pub.]
- Data Base Management System - James Matin
- Principles of Database System - Ullman

- An Introduction to database systems - Bipin Desai, Galgotia Publication.

Business Communication

Unit-I

Fundamental of Grammar and their Usage: How to Improve Command over Spoken and Written English with Stress on Noun, Verb, Tense and Adjective. Sentence Errors, Punctuation, Vocabulary Building to Encourage the Individual to Communicate Effectively, Common Errors in Business Writing.

Unit-II

Introduction to Business Communication: Basic Forms of Communication, Process of Communication, Principles of Effective Business Communication, 7Cs; Media of Communication: Types of Communication: Barriers of Communication (Practical exercise in communication)

Unit-III

Business letter writing: Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments; Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion. Letters, Resignation Letters, News Letters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release.

Unit-IV

Business Etiquettes and Public Speaking: Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

Reference Books

1. Boove, C.L., Thill, J.V., and Chaturvedi, M., (2009) Business Communication Today, Pearson Education.
2. Murphy and Hildebrandt, (2008) Effective Business Communication, McGraw Hill Education.
3. Krizan, A. C. Buddy, and Merrier, Patricia (2008) Effective Business Communication, 7th Edition, Cengage Learning.
4. Lesikar, (2009), Business Communication: Making Connections in a Digital World, McGraw Hill Education.
5. McGraw, S. J., (2008) Basic Managerial Skills for All, 8th edition, Prentice Hall of India.
6. Wren & Martin, (2008), English Grammar and Composition, Sultan chand & Sons.

PGDCA/201
Programming Using VB .NET

UNITI: **Introduction to .NET:** - NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The environment: Editor tab, format tab, general tab, docking tab. visual development & event drive Programming -Methods and events.

UNIT II: **The VB.NET Language:** - Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function. Control flow statements, conditional statement, loop statement. Msgbox&Inputbox
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UNIT III: **Object oriented Programming:** - Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers, Public Private, Projected. Overloading, Friend, Overloading Vs Overriding, Interfaces, Polymorphism, My Base & My class keywords. Overview of OLE, Accessing the WIN32 API from VB.NET & Interfacing with office 97, COM technology, advantages of COM+, COM & .NET, Create User control, register User Control, access com components in .net application.

UNIT IV: **Working with Forms:** - Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar.There Properties, Methods and events. OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menus, ContextMenu, access &shorcut keys, System.io Namespace, Reading and Writing data from and into files,File class and related Methods,Stream Reader, Stream Writer , Binary Reader, Binary Writer class, File and Directory Classes,

UNIT V: **Databases in VB .NET:** - Database : Connections, Data adapters, and datasets, Data Reader, Connection to database with server explorer, Multiple Table Connection, Creating Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on Data grid. Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source, Data Grid View, Data form wizard, Data validation, Connection Objects, Command Objects, Data Adapters, Dataset Class, Overview of ADO, from ADO to ADO.NET, Generate Reports Using Crystal Report Viewer. Crystal Report : Connection to Database, Table, Queries Building, Report, Modifying Report, Formatting Fields and Object, Header, Footer, Details, Group Header, Group footer, Working with formula fields, Parameter fields, Group, Special fields, Working with Multiple Tables, SQL in Crystal Report, Report Temples

Text & Reference Books:
1. VB.NET Programming Black Book by Steven Holzner – Dreamtech publications.
2. Mastering VB.NET by EvangelosPetroutsos- BPB publications.
3. Introduction to .NET framework-Wrox Publication.

Programming in "Python"

UNIT – I

Introduction: History, Features, Setting up path, working with Python.
Basic Syntax: Variable and Data Types, Operator.
Conditional Statements: If, If- else, Nested if-else
Looping: For, While, Nested loopsControl Statements: Break, Continue, And Pass.
String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods.
Lists: Introduction, Accessing list, Operations, Working with lists, Function and Methods.
Tuple: Introduction, Accessing tuples, Operations, Working, Functions and Methods

UNIT – II

Dictionaries: Introduction, Accessing values in dictionaries, working with dictionaries, Properties Functions
Functions: Defining a function calling a function Types of functions Function Arguments Anonymous functions Global and local variables
Modules: Importing module Math module Random module Packages Composition
Input-Output: Printing on screen Reading data from keyboard Opening and closing file Reading and writing files Functions

UNIT – III

Exception Handling: Exception, Exception Handling Except clause Try? Finally clause User Defined Exceptions
OOPs concept: Class and object Attributes Inheritance Overloading Overriding Data hiding
Regular expressions: Match function Search function Matching VS Searching Modifiers Patterns

UNIT – IV

Data structures: arrays, set, stacks and queues. Searching and sorting: linear and binary search, bubble, selection and insertion sorting.

UNIT – V

Thread: Starting a thread threading module Synchronizing threads Multithreaded Priority Queue
GUI Programming: Introduction Tkinter programming Tkinter widgets

Text Books:
1. Think Python: The most basic of this list, Think Python provides a comprehensive Python reference.
2. Fluent Python: While Python's simplicity lets you quickly start coding, this book teaches you how to write idiomatic Python code, while going into several deep topics of the language.
3. Effective Python: 59 Ways to Write Better Python: This relatively short book is a collection of 59 articles that, similarly to Fluent Python, focus on teaching you how to write truly Pythonic code.
4. Python Cookbook: As a cookbook, this will be a good reference on how to use Python to complete tasks you have done in another language.

Reference Books:
Head-First Python, 2nd edition Paul Barry (O'Reilly, 2016).

PGDCA/203
Web technology and Multimedia

UNIT I: WebPages; Hyper Text Transfer Protocol (HTTP); File Transfer Protocol (FTP) Domain Names; URL, Website, Web browser, Web Servers; Basic Tags of HTML: HTML, HEAD, TITLE, BODY, Heading tag (H1 to H6) and attributes,FONT tag and Attributes, P, BR, Comment in HTML (<! >), Formatting Text (B, I, U, EM, BLOCKQUOTE, PREFORMATTED, SUB, SUP, STRIKE), Ordered List- OL Unordered List, ADDRESS Tag;Creating Links: Link to other HTML documents or data objects, Links to other places in the same HTML documents, Links to places in other HTML documents; Anchor Tag <A HREF> and <A NAME>, Inserting Images Image Link, Horizontal Rules <HR ALIGN, WIDTH, SIZE, NOSHADE>;

UNIT II: Tables: Creating Tables, Border, TH, TR, TD, CELLSPACING, CELLPADDING, WIDTH,COLSPAN, CAPTION, ALIGN, CENTER;Frames: Percentage dimensions, Relative dimensions, Frame – Src, Frameborder, height and width, Creating two or more rows Frames <FRAMESET ROWS >, Creating two or more Page 3 Columns Frames <FRAMESET COLS >, <FRAME NAME SRC MARGINHEIGHT MARGINWIDTH SCROLLING AUTO NORESIZE>, <NOFRAMES>, </NOFRAMES>; Forms: Definition, Form Tags: FORM, <SELECT NAME, SIZE, MULTIPLE / SINGLE><OPTION></SELECT>, <TEXTAREA NAME ROWS COLS > , </TEXTAREA>, METHOD,CHECKBOX, HIDDEN, IMAGE, RADIO, RESET, SUBMIT, INPUT <VALUE, SRC,CHECKED, SIZE, MAXLENGTH, ALIGN>;

UNIT III: JavaScript Introduction, Variable declaration, Operators, Control, Statements, Error Handling, Understanding arrays, Function Declaration, Built In Functions, Standard Date and Time Functions, Working with Objects, Call method in JavaScript, Inheritance in JavaScript using prototype.

UNIT IV: Introduction to Multimedia: types of Multimedia, hardware and software requirement,Multimedia Operating System , Applications, MIDI Basic Concepts, MIDI Devices, MIDI Messages, Video and Animation, Computer Based Animation,Animation principles, Methods of controlling Animation, Display of Animation, Transmission of Animation

UNIT V: Learn the basic of flash animation, creating a new movie, animate text, drawing and painting tools , creating layers motion twinning, shape twining, mask layers, importing sound, the photoshop workspace use of menus palettes and toolbox, creating new images, using selecting tools, lasso tool Direct select lasso, convert point tool, image adjustment through Photoshop.

Text Books:
1. FLASH MX Bible – Robert Reinhart
2. Sams Teach Yourself Macromedia Flash 8 in 24 hrs – Phillip Kerman
3. Photoshop Bible – Willey Publication
4. Multimedia Making it works – Tay Vaughan Tata Mcgraw Hills
5. Introduction to HTML- Kamlesh N agrawal
6. Introduction to web and DHTML – Ivan Bayross

PGDCA/204
Data Structures

UNIT-I

Arrays: Representation of single and multidimensional arrays; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices.

UNIT-II

Stacks and Queues: Introduction and primitive operations on stack; Stack application: Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion from infix to postfix. Introduction and primitive operation on queues, D-queues and priority queues.

UNIT-III

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, two way lists and Use of headers.

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion;

UNIT-IV

Multilevel indexing and B-Trees: Introduction: The invention of the B-tree; Statement of the problem; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; B-trees: working up from the bottom; Example for creating a B-tree.

UNIT-V

Sorting Techniques: Insertion sort, selection sort, merge sort, heap sort.
Searching Techniques: linear search, binary search and hashing

Text Books:
1. E. Horowitz and S. Sahani, "Fundamentals of Data Structures", GalgotiaBooksource Pvt. Ltd, 2003.
2. R. S. Salaria, "Data Structure & Algorithms", Khanna Book Publishing Co. (P) Ltd., 2002.