# Uttarakhand Sanskrit University

# Haridwar

CURRICULUM

FOR

## Post Graduate Diploma in Computer Applications

## (P.G.D.C.A.)

## One-Year Full-Time Programme (Two Semesters)

## (Effective from Session 2026-27)

## Uttarakhand Sanskrit University, Haridwar

## Post Graduate Diploma in Computer Applications (PGDCA)

| | |
|---|---|
| Name of Program | Post Graduate Diploma in Computer Applications (PGDCA) |
| Duration | One (01) Year Program divided into two (02) Semesters |
| Eligibility | Graduate degree from a recognized University. |
| Program Objective: | The Post Graduate Diploma in Computer Applications (PGDCA) is designed to provide students with fundamental and applied knowledge of computer applications, programming, databases, web technologies, office automation, emerging technologies, Python programming, Artificial Intelligence and Natural Language Processing. The programme aims to develop practical skills, problem-solving abilities and digital competencies required for academic, professional and application-oriented work in the field of Information Technology. |
| Program Outcomes (POs) | On successful completion of the PGDCA programme, students will be able to:<br>**PO1.** Demonstrate fundamental knowledge of computer systems, information technology, operating systems and office automation.<br>**PO2.** Apply programming concepts and problem-solving skills using C and Python for developing basic computer applications.<br>**PO3.** Design and manage basic databases and develop web-based applications using appropriate technologies.<br>**PO4.** Explain and apply emerging technologies, including cloud computing, Internet of Things, cyber security and other contemporary IT applications.<br>**PO5.** Understand the fundamental concepts and applications of Artificial Intelligence, Machine Learning and Natural Language Processing, including their use in language and Sanskrit-related applications.<br>**PO6.** Apply acquired technical and practical skills to design and develop web applications while demonstrating responsible, ethical, and secure use of digital technologies. |
| Medium of Instruction | English / Hindi |
| Program Structure | The semester-wise distribution of courses and credits is given below. |
| Program Passing Rules | As per the applicable University norms for PG Programmes. |

# Uttarakhand Sanskrit University, Haridwar
## Post Graduate Diploma in Computer Applications (PGDCA)

| Semester – I | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Paper Code** | **Paper Name** | **External Examinations Marks** | **Internal Assessment Marks** | **Total Marks** | **Credits** |
| 1 | DSCC - 01 (PGDCA) | Computer Fundamentals & Information Technology | 75 | 25 | 100 | 4 |
| 2 | DSCC - 02 (PGDCA) | Operating Systems & Office Automation | 75 | 25 | 100 | 4 |
| 3 | DSE – 01 (PGDCA) | Emerging Technologies in Computer & IT | 75 | 25 | 100 | 4 |
| 4 | DSE- 02 (PGDCA) | Programming in C | 75 | 25 | 100 | 4 |
| 5 | IAPC-01 (PGDCA) | OS, Office Automation & C Programming Practical | | | 100 | 6 |
| | | | | | 500 | 22 |

| Semester – II | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Paper Code** | **Paper Name** | **External Examinations Marks** | **Internal Assessment Marks** | **Total Marks** | **Credits** |
| 1 | DSCC-03 (PGDCA) | Database Management System | 75 | 25 | 100 | 4 |
| 2 | DSCC-04 (PGDCA) | Web Technology | 75 | 25 | 100 | 4 |
| 3 | DSE-03 (PGDCA) | Object-Oriented Programming using Python | 75 | 25 | 100 | 4 |
| 4 | DSE-04 (PGDCA) | Artificial Intelligence and Its Applications | 75 | 25 | 100 | 4 |
| 5 | IAPC-02 (PGDCA) | DBMS, Web Technology & Python Practical | | | 100 | 6 |
| | | | | | 500 | 22 |

I Semester Credit = 22
II Semester Credit = 22
**Total Credits = 44**

# Uttarakhand Sanskrit University, Haridwar
## Post Graduate Diploma in Computer Applications (P.G.D.C.A.)
## PGDCA - I Semester
## Paper- I: DSCC-01 (PGDCA) - Computer Fundamentals & Information Technology

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**

The objective of this course is to provide students with fundamental knowledge of computer systems, their components, software, programming languages, data representation, computer networks and basic information technology. The course aims to develop the ability to understand and use computer systems effectively in academic and practical environments.

**Course Outcomes (COs):**

After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts, characteristics, components and types of computer systems.
**CO2.** Identify and describe different input, output, memory and storage devices and their functions.
**CO3.** Explain basic concepts of software, programming languages, number systems and data representation.
**CO4.** Describe the fundamentals of computer networks, networking devices, topologies and communication protocols.
**CO5.** Apply fundamental knowledge of computers and information technology in academic and practical environments.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | **Computer:** History of Development of Computers, Computer System Concept, Block diagram of Computer, Computer System Characteristics, Advantages and Disadvantages, Types of Computers, Basic Components of a Computer System – CPU, Control Unit, ALU, Register, Motherboard, System bus, SMPS, UPS; |
| 2 | **Input Devices:** Keyboard, Mouse, Joystick, Scanners, Digital Camera, MICR, OCR, OMR, OBR, Light pen, Touch Screen.<br>**Output Devices:** Monitors – Characteristics, Types of Monitor; Printers- Impact, Non-Impact Printer, Dot Matrix, Inkjet, Laser Printer; Sound Card and Speakers; |
| 3 | **Computer Memory:** Primary Memory: RAM, ROM, EPROM, EEPROM, Cache Memory; Primary Memory vs Secondary Memory.<br>**Storage Devices**: Magnetic Disks, Hard Disk Drives, Floppy Disks, Optical Disks, Blue-Ray Disk, Other portable storage devices, Cloud Storage(Like Google Drive etc.) |
| 4 | **Computer Programming Languages**- Machine, Assembly and High Level; Number System of Computers- Binary, Decimal, Octal, Hexadecimal; ASCII, Unicode; |

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|---|---|
| | **Computer Software:** Software and its Need, Types of Software's - Application software: Application Software Uses and Examples; System Software, Compiler, Assemblers, Interpreter, Device Drivers, Utility Programs; Virus and Antivirus; |
| 5 | **Computer Networking Fundamentals:** Basic concept of Computer Network, Need and Uses of Computer Networks, Type of Computer Network, Component of Communication: Sender, Receiver, Transmission medium and Protocols, Network Topology, Transmission Categories- Simplex, Half Duplex & Full Duplex, Networks connecting devices, Network Hardware Components, Introduction to OSI Reference and TCP/IP Model, IP Addressing; |

**Text & Reference Books:**


1. Sinha P.K., "*Computer Fundamentals",* BPB Publication.
2. Goel.A, "*Computer Fundamentals*", Reprint, Pearson Education.
3. Thareja R., "*Fundamentals of Computers*", Oxford University Press.
4. Rajaraman,V.,"*Computer Fundamentals",* PHI.
5. Srivastva C., "*Fundamentals of Information Technology*", Kalyani Publishers.
6. Data Communication and Networking – B. Forouzan – MCGrawth Hill.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - I Semester**
**Paper-II: DSCC-02 (PGDCA) - Operating Systems & Office Automation**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to provide students with fundamental knowledge of operating systems and office automation tools. The course aims to develop practical skills in document preparation, spreadsheet management, presentation development and the use of digital office and cloud-based applications.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts, functions, types and components of operating systems.
**CO2.** Describe the basic features and operations of Windows and Linux operating systems.
**CO3.** Create, format and manage documents using word-processing applications.
**CO4.** Prepare spreadsheets and presentations using office productivity applications.
**CO5.** Use digital office, cloud-based applications and basic digital document-management tools effectively.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | **Operating System:** Operating System Concepts, Needs of an operating System, Evolution of OS, Types of OS, Structure of operating System, Elements and Functions of OS, Operating system components and services, Virtual Machine, Overview of Windows OS, Basic Operations with Windows OS, Working with Windows OS, Comparison of LINUX and Windows OS.<br>**Office Package:** Introduction, Functions of Office, Introduction to Office Automation, Role of computer in Office automation and management Office Automations, MS office Features, Components of MS office; Introduction to Open office, Uses of Google Docs. |
| 2 | **MS Word**: Introduction, Area of use, Starting Word, Different Bars, Document View, Text Area, Exiting Word; Creating, Editing, Saving, Closing, Printing and Opening an Existing Document. Working with Fonts, Style, Layout, Paragraph, Cut, Copy, Paste, Undo and Redo, Spell Check, Find, Replace, Bullets, Numbering, Header, Footer, Page-Setup, Page Number. Creating Table, Modifying Table, Merging of Cells, Split Cells, Insert Pictures, Symbols and Graphics. Mail Merge, Importing and exporting to and from various formats. |

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|---|---|
| 3 | **MS Excel:** Introduction, Area of use, Concepts of Workbook & Worksheets, Starting MS-Excel, different Bars, Row, Column and Cell. Exiting MS-Excel. Creating a New Workbook, Working with Cells. Working with Fonts. Merging of Cells. Inserting a Row and Column, Deleting a Row and Column. Saving a Workbook, Closing a Workbook. Different Data Types and Operators used in Excel, Working with Calculation and Functions. Working with Chart. |
| 4 | **MS PowerPoint:** Starting MS-PowerPoint, different Bars, Different Types of Views and Exiting MS-PowerPoint. Creating a New Presentation, Working with Slides, Applying Design Templates, Applying Custom Animations, Applying Slide Transitions. Saving a Presentation, Running a Presentation, Closing a Presentation and Opening an Existing Presentation. Working with Notes, Handouts, Columns & Lists, Adding Graphics, Sounds and Movies to a Slide; |
| 5 | **Digital Office and Cloud Applications**<br>Digital office: concept, Email and professional email communication, Calendar and scheduling tools, Cloud storage, Online documents, spreadsheets and presentations, File sharing and collaboration, Version history, PDF management; Digital signatures: basic concept, Scanning and OCR: introduction, Digital document organization, Data backup, Basic information security and privacy. |

**Text & Reference Books:**


1. Stallings W., "Operating systems", Pearson.
2. Lambert, J., & Frye, C., Microsoft Office Step by Step (Office 2021 and Microsoft 365).
3. Kroenke D., Nilson D., "*Microsoft Office 365 in Business*", US Edition, Wiley India Pvt. Ltd.
4. Sinha P.K., "*Computer Fundamentals*", BPB Publication.
5. Goel.A, "*Computer Fundamentals*", Reprint, Pearson Education.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - I Semester**
**Paper-III: DSE-01 (PGDCA) -Emerging Technologies in Computer & IT**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to introduce students to emerging and contemporary technologies in the field of Information Technology. The course aims to develop basic understanding of digital services, cloud computing, IoT, Big Data, Blockchain, Virtual Reality and cybersecurity and their applications in education, governance, finance and society.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts and applications of Internet services, e-services and digital technologies.
**CO2.** Describe the fundamental concepts, service models and applications of cloud computing.
**CO3.** Explain the basic concepts and applications of IoT, Big Data, Virtual Reality and Blockchain technologies.
**CO4.** Identify common cybersecurity threats and apply basic practices for safe and secure use of digital technologies.
**CO5.** Describe the applications and relevance of emerging technologies in education, governance, finance and other areas of society.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | **Internet Communication:** Internet Concepts, Internet Architecture, Applications of Internet, Various Internet Services, Intranet, Extranet, ISP, Modes of Connecting Internet (Hotspot, Wi-Fi, LAN Cable, Broadband, USB Tethering), WWW, URL, HTTP & HTTPS, IP, FTP, Web Browsers, Search Engines, E-mail Concepts, Internet Chatting, Audio, Video conferencing. |
| 2 | **E-Services:** e- Commerce & Governance Services: Basics of e-Commerce, Basics of e-Governance, Basics of Mobile Commerce, Digital Locker, Social Networking; E-Learning resources;<br>Digital Financial Tools: Introduction to Online Payment Systems, OTP, QR Code, Credit Card, Debit Card, eWallet, UPI, AEPS, Online Payment Apps, Internet Banking, Online Bill Payment. |
| 3 | **Cloud Computing**: Introduction of cloud computing: Characteristics and components of cloud computing, Advantage and challenges of cloud computing, Types of Clouds, Services models, Cloud Reference Model. |

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|---|---|
| 4 | **Emerging Technologies:** Introduction to IoT, Big Data, Virtual Reality and Blockchain Technology. |
| 5 | **Overview of Cyber Security:** Introduction to Cyber Security, Cyber Security Need, Goal of Cyber Security, Securing PC, Securing Browser, Securing Email and Social Media Accounts, Securing Smart Phone. |

**Text & Reference Books:**


1. Jain V.K.,"*O Level Module - M 1.2 - Internet& Webpage Designing*"– BPB Publications.
2. Turban, Efraim, and David King, "Electronic Commerce: A Managerial Perspective", Pearson Education Asia, Delhi.
3. Whiteley D, "*E - Commerce: Strategy, Technologies and Applications*", Tata McGraw Hill.
4. Cloud Computing, Principle and Paradigms, Edited By Raj Kumar Buyya, Jemes Broberg, A Goscinski, Pub.- Wiley.
5. Kumar Saurabh, "Cloud Computing", Wiley Pub.
6. Dr. Dheeraj Mehrotra "Basics of Artificial Intelligence and Machine Learning".
7. Cyber Crime Impact in the New Millennium, by R. C Mishra, Auther Press.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - I Semester**
**Paper-IV: DSE-02 (PGDCA) - Programming in C**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to introduce students to the fundamentals of C programming and develop basic programming and problem-solving skills. The course aims to enable students to write structured C programs using control structures, arrays, strings, functions, pointers, structures and file handling.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts, structure, data types, variables, operators and expressions of C programming.
**CO2.** Develop C programs using decision-making and looping control structures.
**CO3.** Apply arrays, strings and functions to solve basic programming problems.
**CO4.** Implement basic C programs using pointers, structures and unions.
**CO5.** Develop and execute basic file-handling programs using C programming.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | Basic definition of Pseudo Code, Algorithm, Flowchart, Program;<br>Fundamentals of C: Introduction of C language, Data Types, Variables, Identifiers, Constant, Modifier, Keywords, Assignment Statements, I/O Statements, I/O function;<br>Operators and Expressions: Expression in C, Different types of Operators: Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, sizeof operator, type casting. |
| 2 | **Decision and Control Structures**: Conditional Statement – if, if-else, Nested if-else, switch-case; Loops: while, do while, for loop; Jump Statements: break, continue, goto and return.<br>**Storage Classes:** Automatic, External, Static, Register;<br>**Arrays:** Definition, Application of Array, 1-Dimensional, Multi-dimensional array and its declaration, |
| 3 | **Functions:** Function Types, function declaration, function definition, function call (Call by value, Call by reference), Formal and Actual parameter, Recursive function.<br>**String:** Operations of Strings, String Length, Compare, Concatenate, Reverse, Copy, Character Search using array. |

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|---|---|
| 4 | **Pointers**: Declaration, Passing pointer to a Function, Operations on Pointers, Array accessing through pointers, Dynamic Memory Allocation.<br>**Structures and Unions:** Structure declarations, definitions, array of structure, Union definition and declaration. |
| 5 | **File Handling:** Introduction of File, Types of file in C, Modes of Files; File Operations: Opening, Closing, Reading and Writing; Examples of file handling programs; Command Line Arguments; |

**Text & Reference Books:**


1. Balagurusamy, E: Programming in ANSI C, Tata McGraw-Hill publication
2. Gottfried Byron S: Programming with C, Tata McGraw-Hill publication
3. Kerninghan & Ritchie: The C Programming Language, PHI.
4. Balagurusamy, "Programming in C", Tata McGraw-Hill Education.
5. Yashavant Kanetkar, "Let us C", BPB publication.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - I Semester**
**Paper-V: IAPC-01 (PGDCA) – OS, Office Automation & C Programming Practical**

**Credit: 06** **Total Marks: 100**

**Course Objective:**
The objective of this practical course is to develop hands-on skills in computer operations, office productivity applications, Internet services, basic networking, digital office tools, and C programming. The course aims to enable students to perform common academic and office-related computing tasks effectively while developing fundamental programming and problem-solving skills using C. Students will gain practical experience in basic programming concepts, control structures, arrays, strings, functions, pointers, structures, and file handling.

**Course Outcomes (COs):**
After successful completion of this practical course, students will be able to:

**CO1.** Perform basic operations in Windows and Linux environments and use common system utilities.
**CO2.** Create, format and manage documents using word-processing applications.
**CO3.** Prepare spreadsheets and presentations using office productivity applications.
**CO4.** Perform basic networking and Internet-related activities using appropriate digital tools.
**CO5.** Use online office applications and e-resources for academic and office-related activities.
**CO6.** Develop and execute basic C programs using variables, operators and expressions.
**CO7.** Implement decision-making and looping statements to solve basic programming problems.
**CO8.** Develop programs using arrays, strings and functions.
**CO9.** Implement basic programs using pointers, structures and unions.
**CO10.** Develop and execute simple file-handling programs using C.

**Course Content / Syllabus**

| **Operating Systems & Office Automation Practical Work** |
|---|
| ➢ Computer Hardware<br>➢ OS & Computer Software<br>➢ Basic Windows operations<br>➢ MS Office package (Word processing, Spreadsheet and Presentation)<br>➢ Working with Google Docs.<br>➢ Basics of Computer Network<br>➢ Internet Concepts and uses of internet in different fields.<br>➢ Use of e-Resources, Applications, Tools. |

| C Programming Practical Work |
|---|
| ➢ Algorithm and Flowchart.<br>➢ Fundamental of C Programs.<br>➢ Programs to implement different types of Operators.<br>➢ Programs using Control Statements and Loop Control Structures.<br>➢ Programs to implement concepts of Array.<br>➢ Programs to implement concepts of String.<br>➢ Programs to implement concepts of Functions.<br>➢ Programs to implement concepts of Pointers.<br>➢ Programs using Structures.<br>➢ Programs using Files. |

**Reference Books**

1. E. Balagurusamy, Programming in ANSI C, McGraw Hill Education.
2. Yashavant Kanetkar, Let Us C, BPB Publications.
3. Herbert Schildt, C: The Complete Reference, McGraw Hill.
4. P. K. Sinha and P. Sinha, Computer Fundamentals, BPB Publications.
5. R. K. Taxali, PC Software for Windows Made Simple, McGraw Hill Education.
6. Official documentation/help resources for commonly used office applications.

## Uttarakhand Sanskrit University, Haridwar

## Post Graduate Diploma in Computer Applications

### PGDCA – II Semester

| Semester – II | | | | | | |
|---|---|---|---|---|---|---|
| **S.No.** | **Paper Code** | **Paper Name** | **External Examinations Marks** | **Internal Assessment Marks** | **Total Marks** | **Credits** |
| 1 | DSCC-03 (PGDCA) | Database Management System | 75 | 25 | 100 | 4 |
| 2 | DSCC-04 (PGDCA) | Web Technology | 75 | 25 | 100 | 4 |
| 3 | DSE-03 (PGDCA) | Object-Oriented Programming using Python | 75 | 25 | 100 | 4 |
| 4 | DSE-04 (PGDCA) | Artificial Intelligence and Its Applications | 75 | 25 | 100 | 4 |
| 5 | IAPC-02 (PGDCA) | DBMS, Web Technology & Python Practical | | | 100 | 6 |
| | | | | | 500 | 22 |

**II Semester Credit = 22**

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - II Semester**
**Paper-VI: DSCC-03 (PGDCA) - Database Management System**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to introduce students to the fundamental concepts of database management systems, database models, relational database design, keys, normalization and SQL. The course aims to develop basic skills for designing, managing and retrieving data from relational databases.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts, architecture, components and advantages of Database Management Systems.
**CO2.** Describe database models and design basic databases using Entity-Relationship and relational concepts.
**CO3.** Apply primary keys, foreign keys and basic normalization techniques to organize relational data.
**CO4.** Create and modify database tables and perform basic data manipulation using SQL commands.
**CO5.** Retrieve and manage database information using SQL operators, functions, sub queries and joins.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | Definition of DBMS, Database System Architecture, File Processing System Vs DBMS. Advantages and Disadvantages of DBMS, Users of DBMS, DBA and DBA Responsibilities, RDBMS, RDBMS vs DBMS; |
| 2 | Data Models: Relational Model, Network Model, Hierarchical Model, Entity Relationship Model, Entity Relationship Diagram (ERD), Relational Databases, Relational data model concept, Terms: Tuple, Attribute, Relationship and its Type; |
| 3 | Keys: Super Key, Candidate Key, Primary Key, unique, Foreign Key; Introduction to Normalization, Data Anomalies in NF, Normal Form: 1NF, 2NF, 3 NF; Introduction to Relational Algebra and Joins. |
| 4 | Introduction of SQL, Characteristics of SQL, Basic Structure, SQL Commands: DDL, DML, DCL Commands; Create and Use Database, Data types in SQL, Create Table, Insertion of data into the tables, SELECT Statement, SQL Clause, WHERE Clause, |

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| | Viewing of data into the tables, Deletion operations, Updating the contents of the table, Modifying the structure of the table, Renaming table, Destroying tables; Data Constraints, Type of Data Constraint. |
| 5 | Viewing The Data: SQL Operator: Arithmetic Operators, Logical Operators, Relational Operators, Comparison Operators; SQL Searching: Range Searching, Pattern Searching; SQL Functions: Aggregate Functions, Number Functions, Group Functions, Scalar Functions, Data Conversion Functions, Character Functions; Manipulating Dates in SQL, SQL Sub queries Joins. |

**Text & Reference Books:**


1. Elmasri R, Navathe S.B., "*Fundamentals of Database Systems*", Benjamin Cummings Publishing Company.
2. JD Ullman, Garcia-Molina, "Database System: The Complete Book", Pearson Education India.
3. S.K Singh, "Database Systems: Concepts, Design and Applications", Pearson Education India.
4. Ramakrishnan R., Gehrke J., "*Database Management System*", McGraw-Hill (IE).
5. Ivan Bayross, "Database Concepts & Systems for Students", Shroff Publishers & Distributors Pvt Limited.
6. Silberschats, Kroth and Sudershan, "*Principles of Database Systems*", McGraw Hill Publication.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - II Semester**
**Paper-VII: DSCC-04 (PGDCA) - Web Technology**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to introduce students to the fundamental concepts of web technologies and web application development. The course aims to develop basic skills in creating web pages using HTML, designing web content using CSS, adding interactivity using JavaScript and developing basic server-side applications using PHP and MySQL.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic concepts, components and architecture of web technologies and web applications.
**CO2.** Create static web pages using HTML elements, hyperlinks, tables, forms and multimedia.
**CO3.** Apply basic CSS and JavaScript concepts to improve the presentation and interactivity of web pages.
**CO4.** Develop basic server-side web applications using PHP.
**CO5.** Connect PHP applications with MySQL databases and perform basic database operations through web applications.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | **Introduction to Web Technologies**: Application of Web Technologies, Components of Web Technologies (Web Page, Web Server, Mail Server, Cookies, etc), Static and Dynamic Websites, Web Publishing Concepts, Domain Name Registration, Web Space Registration, Management and uploading (utilities like FTP), Client-Server Architecture. |
| 2 | **HTML:**, Introduction To HTML, Elements of HTML Syntax, HTML Tags, Title, Head & Body Sections, Building HTML Documents, Formatting Tags, Inserting Texts, Images, Hyperlinks, Backgrounds and Colour Controls, List, Table, Use of Font Size & Attributes, |
| 3 | **Forms and Controls**: Text, Radio, Checkbox, Combo Box, Select, Button. HTML 5 & Syntax, HTML5 Document Structure (section, article, aside, header, footer, nav, dialog, figure), Attributes of HTML 5, Web Form ( datetime, date, month, week, time, number, range, email, url), Audio / Video, Introduction to CSS and Java Script. |

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| 4 | **PHP**: Introduction to PHP, PHP Variable, Static & global variable, GET & POST method, PHP Operator, Conditional Structure & Looping Structure, Array, User Defined Functions, Math Function, Date Function. |
| 5 | Handling form with GET & POST, Session, Server variable, PHP Components; Working with MySQL using PhpMyAdmin, SQL DML Statement (Insert, Update, Select, Delete), Command, PHP-MySQL Connectivity, PHP-MySQL Functions; |

**Text & Reference Books:**


1. Internet for Everyone - Alexis Leon and Mathews Leon, Vikas Publications.
2. HTML A Beginner's Guide, Tata McGraw-Hill Education.
3. Internet for Every One: Alexis Leon, Leon Techworld, Publication.
4. Greenlaw R; HeppE, "Fundamentals of Internet and WWW", Tata McGraw-Hill.
5. Raj Kamal, "Internet& Web Technologies", Tata McGraw-Hill Education, Publication.
6. Welling & Thomson's *PHP and MySQL Web Development.*

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - II Semester**
**Paper-VIII: DSE-03 (PGDCA) - Object-Oriented Programming using Python**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**
The objective of this course is to introduce students to Python programming and object-oriented programming concepts. The course aims to develop programming and problem-solving skills through Python syntax, data types, control structures, functions, modules, exception handling, file handling and basic object-oriented programming.

**Course Outcomes (COs):**
After successful completion of this course, students will be able to:

**CO1.** Explain the basic features, syntax, data types, operators and control structures of Python programming.
**CO2.** Develop Python programs using strings, lists, tuples, sets, dictionaries and other built-in data structures.
**CO3.** Apply functions, recursion, modules, packages and file handling to develop basic Python applications.
**CO4.** Implement exception handling and object-oriented programming concepts such as classes, objects, inheritance and polymorphism in Python.
**CO5.** Develop simple Python-based applications using GUI and basic data-processing libraries.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | Object-Oriented Programming: Introduction to Object-Oriented Programming, Need and benefits of OOP, Basic concepts of OOP, Classes and Objects, Attributes and Methods, Constructors, Encapsulation, Inheritance, Polymorphism and Applications of OOP. |
| 2 | Introduction to Python, History of Python and versions, Features of Python programming, Application of Python, Variables, Expressions and Statements: Values and types, Variables, keywords, Operators and operands, Expressions and statements; Control Structures: Selection Structure (if... else), Iteration structures (while, for and Nested loops), break, continue and pass Statements. |
| 3 | Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Array; Strings: Introduction, Strings in Python, String Operations, String methods; |

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| | Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files. |
| 4 | Python Functions: Introduction, Advantages of Functions, Function definition in Python, Flow of execution, Calling Function, Functions with arguments, Recursion, Functions with return statements, Built-in functions, Type Conversion functions, Math functions. |
| 5 | Python Modules: Module definition, need of modules, creating a module, importing module; Python Packages; Exception Handling: Except clause, Try, finally clause; GUI Programming, Introduction to Tkinter Programming, Introduction to Numpy. |

**Text & Reference Books:**


1. Sheetal Taneja & Naveen kumar, Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications, Pearson.
2. Martin C. Brown, Python: The Complete Reference, Osborne/McHraw Hill.
3. Wesley J. Chun, "Core Python Programming", Pearson Education.
4. PYTHON Programming (for beginners) – By Adam Stewart.
5. NPTEL & MOOC courses titled Python programming
6. http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English
7. http://docs.python.org/3/tutorial/index.html
8. http://interactivepython.org/courselib/static/pythonds

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - II Semester**
**Paper-IX: DSE-04 (PGDCA) – Artificial Intelligence and Its Applications**

**Credit: 04**
**Type: Theory**

**Total Marks: 100**
**External Marks: 75**
**Internal Marks: 25**

**Course Objective:**

The objective of this course is to introduce students to the fundamental concepts and applications of Artificial Intelligence, Machine Learning, Generative AI and Natural Language Processing. The course also aims to provide basic understanding of AI and NLP applications in different languages, along with awareness of ethical and responsible use of AI.

**Course Outcomes (COs):**

After successful completion of this course, students will be able to:

**CO1.** Explain the fundamental concepts, types and applications of Artificial Intelligence.
**CO2.** Describe the basic concepts of Machine Learning, including supervised and unsupervised learning, classification and regression.
**CO3.** Explain Generative AI, Large Language Models, AI chatbots and basic prompt-engineering techniques.
**CO4.** Explain basic Natural Language Processing techniques such as text preprocessing, tokenization, language identification and text classification.
**CO5.** Explain the applications of AI and NLP in education, research and society, and understand the basic ethical and responsible use of AI.

**Course Content / Syllabus**

| Unit | Description |
|---|---|
| 1 | Introduction to Artificial Intelligence: Artificial Intelligence: concept and objectives, Types and applications of AI, Intelligent agents: basic concept, AI problem solving: basic concept, AI applications in education and society. |
| 2 | Machine Learning: Machine Learning: concept, AI, ML and Deep Learning: basic relationship, Supervised and Unsupervised Learning, Classification and Regression: basic concept, Applications of Machine Learning. |
| 3 | Generative AI: concept and applications, Large Language Models (LLMs): basic concept, AI Chatbots and Virtual Assistants, Prompt Engineering, AI-assisted content creation and problem solving: basic concept, Limitations and AI hallucinations. |
| 4 | Natural Language Processing (NLP): concept and applications, Text preprocessing: basic concept, Tokenization, Language identification, Text classification: basic concept, Chatbots and Machine Translation: basic concept. |
| 5 | Applications of AI: Applications of AI in education, research and society, Applications of NLP in different languages, AI-based translation and text analysis, AI in |

| | |
|---|---|
| | communication and information services, Ethical issues in AI, Privacy and data security, Copyright and responsible use of AI. |

**Text/Reference Books**


1. Khemani, D., *A First Course in Artificial Intelligence*, McGraw Hill Education.
2. Bharati, A., Chaitanya, V. & Sangal, R., *Natural Language Processing: A Paninian Perspective*, PHI Learning.
3. Padhy, N. P., Simon, S. P. & Senthil Kumar, M., *Artificial Intelligence*, Oxford University Press India.
4. Russell, S. & Norvig, P., *Artificial Intelligence: A Modern Approach*, 4th Edition, Pearson.
5. Nidhya, R. et al., *Generative Artificial Intelligence: Concepts and Applications*, Scrivener Publishing, 2025.

**Uttarakhand Sanskrit University, Haridwar**
**Post Graduate Diploma in Computer Applications (P.G.D.C.A.)**
**PGDCA - II Semester**
**Paper-X: IAPC-02 (PGDCA) – DBMS, Web Technology & Python**

**Credit: 06** **Total Marks: 100**

**Course Objective:**
The course aims to provide students with practical knowledge of fundamental web technologies, including HTML, CSS, JavaScript, and PHP, and develop their skills in designing and developing interactive web pages and simple web-based applications. It also provides hands-on experience in database management and Python programming. Students will learn to create and manage databases, perform basic SQL operations, integrate PHP with databases to develop dynamic web applications, and develop simple Python programs using fundamental programming concepts.

**Course Outcomes (COs):**
After successful completion of this practical course, students will be able to:

**CO1.** Create databases and tables using SQL and perform basic database management operations.
**CO2.** Execute SQL commands to insert, retrieve, update, and delete records in database tables.
**CO3.** Apply SQL clauses and aggregate functions to filter, sort, and analyze data from database tables.
**CO4.** Develop simple Python programs using variables, data types, operators, conditional statements, and loops.
**CO5.** Develop Python programs using strings, lists, tuples, dictionaries, functions, and basic input/output operations.
**CO6.** Create basic web pages using HTML elements, hyperlinks, tables, and forms.
**CO7.** Apply CSS and JavaScript to design web pages, implement interactive features, and perform basic client-side form validation.
**CO8.** Develop dynamic web pages, process HTML form data using PHP, and perform basic database operations through PHP.
**CO9.** Design, develop, document, and present a simple dynamic web-based application using HTML, CSS, JavaScript, PHP, and MySQL.

**Practical:**

| DBMS, Web Technology & Python Practical |
|---|
| **Description** |
| **DBMS Practical**<br>➢ Create databases and tables using SQL commands.<br>➢ Define appropriate fields and data types while creating tables.<br>➢ Create primary keys and establish basic relationships between tables using foreign keys.<br>➢ Insert records into tables using INSERT commands.<br>➢ Retrieve records from tables using SELECT queries. |

- Apply WHERE clauses to filter records based on specified conditions.
- Update existing records and delete records using SQL commands.
- Use the ORDER BY clause to sort records in ascending and descending order.
- Apply aggregate functions such as COUNT(), SUM(), AVG(), MIN(), and MAX() to perform basic data analysis.

**Web Technology Practical**

- Create a basic HTML document using headings, paragraphs, lists, hyperlinks, and images.
- Create tables using HTML to organize and display tabular data.
- Create HTML forms using appropriate form elements such as text fields, radio buttons, checkboxes, dropdown lists, and buttons.
- Create hyperlinks and navigation menus to navigate between multiple web pages.
- Design and develop a simple multi-page website using HTML.
- Apply CSS to style web pages and JavaScript to add basic interactive features and form validation.
- Write basic PHP scripts to display output, declare variables, and perform arithmetic operations.
- Develop PHP programs using conditional statements, loops, and functions.
- Develop PHP programs to process HTML form data using GET and POST methods.
- Connect PHP with a MySQL database and perform basic database operations.
- Develop a simple dynamic web application using HTML, CSS, PHP, and MySQL.

**Basic Python Practical**

- Write simple Python programs using variables and different data types.
- Perform input and output operations.
- Use arithmetic, relational, and logical operators.
- Write programs using if, if-else, and nested conditional statements.
- Write programs using for and while loops.
- Perform basic string operations.
- Create and manipulate lists and tuples.
- Create and use dictionaries.
- Define and use simple functions.
- Develop simple problem-solving programs using basic Python concepts.

**Reference Resources:**

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson.
2. R. Nageswara Rao, Core Python Programming, Dreamtech Press.
3. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press.
4. E. Balagurusamy, Introduction to Computing and Problem Solving Using Python, McGraw Hill Education.
5. Luke Welling and Laura Thomson, PHP and MySQL Web Development, Addison-Wesley.
6. Ivan Bayross, Web Technologies, BPB Publications.
7. Official documentation and learning resources for MySQL, PHP and HTML.