



# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title       | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|--------------------|--------------------------|----------------------|----------------|
|             |             |                    | L-P-T                    |                      |                |
| DSC         | P1S01CDCA01 | Python Programming | 4-0-0                    | 120                  | 04             |

### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Apply the basic concepts of Python programming to solve practical problems.

**CLO2:** Demonstrate the use of aggregate data types along with their operations.

**CLO3:** Utilize composite data types and its basic operations.

**CLO4:** Develop programs for robust and error-free execution.

**CLO5:** Apply advanced Python concepts including function and modules.

| Unit | Course Content                                                                                                                                                                                                                                                                                                                                                                                                                       | Learning Pedagogies*                                                                                                       | CLO(s)     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------|
| I    | <b>Introduction to Python</b> <ul style="list-style-type: none"> <li>- Brief history, key characteristics</li> <li>- Advantages &amp; Python Application Areas</li> <li>- Syntax overview, comments, naming conventions</li> <li>- Data types</li> <li>- Operators</li> <li>- Console input and output</li> <li>- Ancient Indian contributions to logic and computation</li> <li>- Relevance of IKS in modern programming</li> </ul> | Classroom Lectures, Seminars, ICT-Enabled Learning, Problem-Based Learning, Self-Directed Learning                         | CLO1       |
| II   | <b>Control Structures &amp; Aggregate Data Types</b> <ul style="list-style-type: none"> <li>- The if statement</li> <li>- Control structures</li> <li>- Break and continue statements</li> <li>- Range function</li> <li>- Sequence types: Lists, Tuple</li> <li>- Basic operations on Lists</li> <li>- Basic operations on Tuple</li> </ul>                                                                                         | Classroom Lectures, Seminars, ICT-Enabled Learning, Demonstration Method, Problem-Based Learning, Collaborative Learning   | CLO2       |
| III  | <b>Composite Data Types</b> <ul style="list-style-type: none"> <li>- Text sequence type: str</li> <li>- Basic operations on strings</li> <li>- Mapping type : dict</li> <li>- Basic operations on dict</li> <li>- Set type: set</li> <li>- Basic operations on set</li> </ul>                                                                                                                                                        | Classroom Lectures, Seminars, ICT-Enabled Learning, Problem-Based Learning, Case-Based Learning (error handling scenarios) | CLO3, CLO4 |

|    |                                                                                                                                                                                                                                      |                                                                           |            |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------|
| IV | <b>Additional Features of Python</b> <ul style="list-style-type: none"> <li>- Concept of functions and methods</li> <li>- Built-in functions</li> <li>- Exception handling (try-except)</li> <li>- Introduction of Module</li> </ul> | Classroom Lectures, Seminars, ICT-Enabled Learning, Experiential Learning | CLO4, CLO5 |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------|

• **Assessment Methodologies**

**(A) Internal Assessment**

**(a) Internal Formative assessment (20 Marks)**

- Assignment, Self-learning and Term work
- Seminar / Presentation
- Quizzes

**(b) Internal Summative Assessment (30 Marks)**

- Mid-term Test

**(B) External Examination (50 Marks)**

**(a) Term-end Examination**

**(C) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned Cos | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------|-------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|      |             |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| I    | CLO1        | 30                   | 4                                                     | 5                 | 3                                | 12          |
| II   | CLO2        | 30                   | 3                                                     | 4                 | 5                                | 12          |
| III  | CLO3, CLO4  | 30                   | 2                                                     | 4                 | 6                                | 12          |
| IV   | CLO5        | 30                   | 1                                                     | 4                 | 9                                | 14          |
|      |             | <b>120</b>           | 10                                                    | 17                | 23                               | <b>50</b>   |

• **Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation          | Component                                                           | Weightage (%) |
|---------|--------------------------------|---------------------------------------------------------------------|---------------|
| 1       | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Class Regularity, and Internal Test | 50            |
| 2       | End-Semester Examination       | Written Exam                                                        | 50            |

**(D) CLOs – PLOs Matrix**

| CLO  | PLO  |      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|------|------|-------|
|      | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| CLO1 | 3    | 2    | 2    | 1    | –    | –    | 1    | 1    | –    | 1     |
| CLO2 | 3    | 2    | 2    | 1    | 1    | –    | 1    | –    | –    | 1     |
| CLO3 | 3    | 2    | 3    | 2    | 1    | 1    | 2    | 1    | –    | 1     |
| CLO4 | 3    | 2    | 3    | 2    | 1    | 1    | 2    | 1    | –    | 2     |
| CLO5 | 3    | 3    | 3    | 3    | 2    | 2    | 2    | 2    | 1    | 2     |

- Suggested Learning Materials Books:**

| Sr. No. | Title                                                                   | Author(s)                                              | Edition/Year      | Publisher                   |
|---------|-------------------------------------------------------------------------|--------------------------------------------------------|-------------------|-----------------------------|
| 1       | Core Python Programming                                                 | Rao, R. Nageswara                                      | 2nd Edition, 2018 | Dreamtech Press             |
| 2       | Programming in Python 3: A Complete Introduction to the Python Language | Summerfield, Mark                                      | 2nd Edition, 2018 | Pearson Education           |
| 3       | Introduction to Programming in Python                                   | Sedgewick, Robert;<br>Wayne, Kevin;<br>Dondero, Robert | 2015              | Addison-Wesley Professional |

- Online Resources (Open Source)**

| Sr. No. | Description of Resource(s)                                                                                     | Weblink                                                                                                                             |
|---------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Interactive platform for learning Python basics, syntax, data types, control structures, and functions         | <a href="https://www.learnpython.org/">https://www.learnpython.org/</a>                                                             |
| 2       | Detailed tutorials with examples on Python concepts such as lists, strings, functions, and data structures     | <a href="https://www.geeksforgeeks.org/python-programming-language/">https://www.geeksforgeeks.org/python-programming-language/</a> |
| 3       | Official Python documentation providing in-depth reference for syntax, libraries, modules, and advanced topics | <a href="https://docs.python.org/3/">https://docs.python.org/3/</a>                                                                 |
| 4       | Beginner-friendly tutorials with simple explanations and live coding examples.                                 | <a href="https://www.w3schools.com/python/">https://www.w3schools.com/python/</a>                                                   |
| 5       | IKS Division, Ministry of Education                                                                            | <a href="https://iksindia.org">https://iksindia.org</a>                                                                             |



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NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title                | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|-----------------------------|--------------------------|----------------------|----------------|
|             |             |                             | L-P-T                    |                      |                |
| DSC         | P1S01CDCA02 | Database Management Systems | 4-0-0                    | 120                  | 04             |

### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Apply basic concepts of DBMS, relational model, ER model, and normalization techniques.

**CLO2:** Analyze database design principles including data independence, integrity, security, and user roles.

**CLO3:** Apply SQL commands (DDL, DML, DCL) to create and manipulate databases.

**CLO4:** Construct complex SQL queries.

**CLO5:** Develop PL/SQL programs using control structures, database objects, cursors, procedures, functions, triggers and packages.

| Unit | Course Content                                                                                                                                                                                                                                                                                                                                                                                                            | Learning Pedagogies*                                                                                         | CLO(s)     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------|
| I    | <b>Introduction</b> <ul style="list-style-type: none"> <li>- Database Management System (DBMS) Concepts</li> <li>- Relational Database Model</li> <li>- Codd rules</li> <li>- The Entity-Relationship (ER) Model</li> <li>- Users associated with database systems and their roles</li> <li>- Normalization</li> <li>- Knowledge organization in Vedas and Puranas</li> <li>- Structured storage in scriptures</li> </ul> | Classroom Lectures, ICT-Enabled Learning, Self-Directed Learning                                             | CLO1, CLO2 |
| II   | <b>Structured Query Language (SQL)</b> <ul style="list-style-type: none"> <li>- Introduction to SQL</li> <li>- SQL sublanguages – DDL, DML, DCL</li> <li>- Basic data types</li> <li>- SQL statements: Create, Select, Insert, Delete, Update etc.</li> <li>- Database constraints</li> <li>- Built-in functions</li> </ul>                                                                                               | Classroom Lectures, ICT-Enabled Learning, Problem-Based Learning (PBL), Hands-on Practice                    | CLO3       |
| III  | <b>SQL and PL/SQL</b> <ul style="list-style-type: none"> <li>- Database objects: View, Index, Sequence, Synonym etc.</li> <li>- PL/SQL – introduction and its features</li> <li>- PL/SQL block structure</li> <li>- Control structures</li> </ul>                                                                                                                                                                         | Classroom Lectures, ICT-Enabled Learning, Problem-Based Learning (PBL), Collaborative Learning, Lab Practice | CLO4, CLO5 |

|    |                                                                                                                                                                                                                     |                                                                 |      |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|
| IV | <b>Advanced PL/SQL</b> <ul style="list-style-type: none"> <li>- Exception handling</li> <li>- Cursors</li> <li>- Stored procedures and stored functions</li> <li>- Database triggers</li> <li>- Packages</li> </ul> | Classroom Lectures, ICT-Enabled Learning, Experiential Learning | CLO5 |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|

• **Assessment Methodologies**

**(E) Internal Assessment**

**(a) Internal Formative assessment (20 Marks)**

- Assignment, Self-learning and Term work
- Seminar / Presentation
- Quizzes

**(b) Internal Summative Assessment (30 Marks)**

- Mid-term Test

**(F) External Examination (50 Marks)**

**(a) Term-end Examination**

**(G) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned COs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------|-------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|      |             |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| I    | CLO1, CLO2  | 32                   | 4                                                     | 5                 | 3                                | 12          |
| II   | CLO3        | 28                   | 3                                                     | 4                 | 5                                | 12          |
| III  | CLO4, CLO5  | 28                   | 2                                                     | 4                 | 6                                | 12          |
| IV   | CLO5        | 32                   | 3                                                     | 3                 | 8                                | 14          |
|      |             | <b>120</b>           | <b>12</b>                                             | <b>16</b>         | <b>22</b>                        | <b>50</b>   |

• **Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation          | Component                                                           | Weightage (%) |
|---------|--------------------------------|---------------------------------------------------------------------|---------------|
| 1       | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Class Regularity, and Internal Test | 50            |
| 2       | End-Semester Examination       | Written Exam                                                        | 50            |

**(H) CLOs – PLOs Matrix**

| CLO  | PLO  |      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|------|------|-------|
|      | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| CLO1 | 3    | 2    | –    | –    | –    | –    | 1    | –    | –    | –     |
| CLO2 | 3    | 3    | 1    | 1    | –    | 1    | 1    | –    | 2    | –     |
| CLO3 | 3    | 2    | 3    | 1    | –    | –    | 1    | 1    | 1    | 1     |
| CLO4 | 3    | 3    | 3    | 2    | 1    | –    | 1    | 1    | –    | –     |
| CLO5 | 3    | 3    | 3    | 3    | 1    | 2    | 2    | 2    | 2    | 1     |

- Suggested Learning Materials Books:**

| Sr. No. | Title                                           | Author(s)                      | Edition/Year      | Publisher                      |
|---------|-------------------------------------------------|--------------------------------|-------------------|--------------------------------|
| 1       | SQL, PL/SQL: The Programming Language of Oracle | Ivan Bayross                   | 4th Edition, 2023 | BPB Publications               |
| 2       | Oracle 9i: A Beginner's Guide                   | Oracle Press                   | 1st Edition, 2002 | Tata McGraw Hill (TMH)         |
| 3       | Fundamentals of Database Systems                | Elmasri; Navathe               | 7th Edition, 2016 | Pearson Education              |
| 4       | An Introduction to Database Systems             | Desai, Bipin C.                | 1st Ed., 2012     | Galgotia Publication Pvt. Ltd. |
| 5       | The Complete Reference SQL                      | Groff; Weinberg                | 3rd Edition, 2010 | Tata McGraw Hill               |
| 6       | Oracle PL/SQL Programming                       | Feuerstein; Pribyl             | 5th Edition, 2009 | O'Reilly                       |
| 7       | An Introduction to Database Systems             | Date, C. J.                    | 8th Edition, 2004 | Pearson Education              |
| 8       | Database System Concepts                        | Silberschatz; Korth; Sudarshan | 6th Edition, 2010 | McGraw Hill International      |
| 9       | Beginning Oracle Programming                    | Dillon; Beck; Kyte             | 2004              | Apress                         |

- Online Resources (Open Source)**

| Sr. No. | Description of Resource(s)                                                                  | Weblink                                                                                 |
|---------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1       | Interactive tutorials for SQL and DBMS concepts including queries, joins, and normalization | <a href="https://www.w3schools.com/sql/">https://www.w3schools.com/sql/</a>             |
| 2       | Comprehensive DBMS and SQL tutorials with examples and practice problems                    | <a href="https://www.geeksforgeeks.org/dbms/">https://www.geeksforgeeks.org/dbms/</a>   |
| 3       | Official Oracle documentation for SQL and PL/SQL concepts, syntax, and advanced features    | <a href="https://docs.oracle.com/en/database/">https://docs.oracle.com/en/database/</a> |
| 4       | Free interactive SQL practice platform with real-time query execution                       | <a href="https://www.sqlzoo.net/">https://www.sqlzoo.net/</a>                           |
| 5       | Hands-on SQL learning platform with exercises and quizzes                                   | <a href="https://www.sqlcourse.com/">https://www.sqlcourse.com/</a>                     |
| 6       | Video-based and practical DBMS/SQL learning resources                                       | <a href="https://www.freecodecamp.org/learn/">https://www.freecodecamp.org/learn/</a>   |
| 7       | IKS Division, Ministry of Education                                                         | <a href="https://iksindia.org">https://iksindia.org</a>                                 |



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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

### Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title          | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|-----------------------|--------------------------|----------------------|----------------|
|             |             |                       | L-P-T                    |                      |                |
| DSC         | P1S01CDCA03 | Computer Fundamentals | 4-0-0                    | 120                  | 04             |

#### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Explain and classify different types of data structures and their applications.

**CLO2:** Study various operating systems services and analyse process scheduling and memory management techniques (paging and virtual memory) to evaluate system performance and efficiency.

**CLO3:** Apply system analysis and design techniques such as SDLC, prototyping, Functional Decomposition Diagrams (FDD), and Data Flow Diagrams (DFD) to model real-world systems.

**CLO4:** Evaluate various software development process models (Waterfall, Iterative, Spiral, etc.) based on project requirements and constraints.

**CLO5:** Understand the design of basic software solutions by integrating principles of data structures, operating systems, system design, and software engineering.

| Unit | Course Content                                                                                                                                                                                                                                                                                                                                                  | Learning Pedagogies*                               | CLO(s)     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------|
| I    | <b>Basics of Data Structures</b> <ul style="list-style-type: none"><li>– Introduction to Data Structures, Applications, Operations</li><li>– Primitive and Non-primitive Data Structures</li><li>– Linear and Non-linear Structures</li><li>– Introduction to Array, Stack, Queue, Linked List, Trees and Graphs</li></ul>                                      | Classroom Lectures, Seminars, ICT-Enabled Learning | CLO1, CLO5 |
| II   | <b>Fundamentals of Operating Systems</b> <ul style="list-style-type: none"><li>– Operating System - definition, examples</li><li>– Services provided by an Operating System</li><li>– The concept of a process, process scheduling</li><li>– Queuing diagram representation of process scheduling</li><li>– Memory Management: Paging, Virtual Memory</li></ul> | Classroom Lectures, Seminars, ICT-Enabled Learning | CLO2, CLO5 |

|     |                                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |            |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------|
| III | <b>System Analysis and Design</b> <ul style="list-style-type: none"> <li>– The concept of a System, Basic Components</li> <li>– Phases of the Classical Systems Development Life Cycle (SDLC) Method</li> <li>– The Prototype methods</li> <li>– The structured development approach using Functional Decomposition Diagram (FDD), Data Flow Diagram (DFD)</li> </ul> | Classroom Lectures, Seminars, ICT-Enabled Learning                                    | CLO3, CLO5 |
| IV  | <b>Software Engineering</b> <ul style="list-style-type: none"> <li>– Software – meaning, general characteristics and applications</li> <li>– Software Engineering – meaning, goal and needs</li> <li>– Software Development Process Models – Waterfall, Iterative, Spiral, etc.</li> </ul>                                                                            | Classroom Lectures, Seminars, ICT-Enabled Learning, Demonstration, Real-life Examples | CLO4, CLO5 |

• **Assessment Methodologies**

**(I) Internal Assessment**

**(a) Internal Formative assessment (20 Marks)**

- i. Assignment, Self-learning and Term work
- ii. Seminar / Presentation
- iii. Quizzes

**(b) Internal Summative Assessment (30 Marks)**

- i. Mid-term Test

**(J) External Examination (50 Marks)**

**(a) Term-end Examination**

**(K) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned COs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------|-------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|      |             |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| I    | CLO1, CLO5  | 30                   | 4                                                     | 5                 | 3                                | 12          |
| II   | CLO2, CLO5  | 32                   | 3                                                     | 5                 | 4                                | 12          |
| III  | CLO3, CLO5  | 28                   | 4                                                     | 4                 | 5                                | 13          |
| IV   | CLO4, CLO5  | 30                   | 4                                                     | 4                 | 5                                | 13          |
|      |             | <b>120</b>           | <b>15</b>                                             | <b>18</b>         | <b>17</b>                        | <b>50</b>   |

• **Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation          | Component                                                          | Weightage (%) |
|---------|--------------------------------|--------------------------------------------------------------------|---------------|
| 1       | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Class Regularity and Internal Test | 50            |
| 2       | End-Semester Examination       | Written Exam                                                       | 50            |



**(L) CLOs – PLOs Matrix**

| CLO  | PLO  |      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|------|------|-------|
|      | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| CLO1 | 3    | 3    | 2    | 1    | –    | –    | 1    | –    | –    | –     |
| CLO2 | 3    | 3    | 2    | 2    | –    | 1    | 1    | –    | 2    | –     |
| CLO3 | 3    | 3    | 3    | 1    | –    | –    | 1    | 1    | –    | –     |
| CLO4 | 3    | 2    | –    | 2    | –    | –    | 1    | –    | –    | –     |
| CLO5 | 3    | 3    | 3    | 2    | 1    | 2    | 2    | 1    | 3    | 1     |

- Suggested Learning Materials Books:**

| Sr. No. | Title                                                       | Author(s)                  | Edition/ Year | Publisher                                     |
|---------|-------------------------------------------------------------|----------------------------|---------------|-----------------------------------------------|
| 1       | Introduction to Data Structures                             | Singh Bhagat & Naps Thomas | 1985          | Tata McGraw-Hill Publishing Co. Ltd.          |
| 2       | Modern Operating Systems                                    | Tanenbaum A. S.            | 2008          | 3rd edition, Prentice-Hall.                   |
| 3       | Essence of Systems Analysis and Design: A Workbook Approach | Sajja, P.S                 | 2017          | Springer International Publishing, Singapore. |
| 4       | Integrated Approach to Software Engineering                 | Jalote Pankaj              | 2005          | Narosa Publishing House                       |

- Online Resources (Open Source)**

| Sr. No. | Description of Resource(s)          | Weblink                                                 |
|---------|-------------------------------------|---------------------------------------------------------|
| 1       | IKS Division, Ministry of Education | <a href="https://iksindia.org">https://iksindia.org</a> |



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## Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title             | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|--------------------------|--------------------------|----------------------|----------------|
|             |             |                          | L-P-T                    |                      |                |
| DSC         | P1S01CDCA04 | Modern Office Automation | 4-0-0                    | 120                  | 04             |

### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Apply word processing and presentation tools for document creation and formatting.

**CLO2:** Use spreadsheet tools for calculations, data management, and visualization.

**CLO3:** Apply advanced spreadsheet techniques such as data analysis and automation.

**CLO4:** Utilize modern automation tools like ChatGPT, Canva, Figma, and NotebookLM.

**CLO5:** Integrate multiple office and automation tools to improve productivity.

| Unit | Course Content                                                                                                                                                                                                                                                                                                                                                                                                               | Learning Pedagogies*                                           | CLO(s)     |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------|
| I    | <b>Word Processing &amp; Presentation Tools</b> <ul style="list-style-type: none"> <li>- Introduction to word processing software and its benefits</li> <li>- Document creation, editing, formatting text and paragraphs</li> <li>- Tables, shapes, and image insertion</li> <li>- Mail merge</li> <li>- Presentation tools: slide creation, formatting, animations, transitions</li> <li>- Printing presentation</li> </ul> | Classroom Lectures, ICT Tools, Hands-on Practice, Lab Practice | CLO1       |
| II   | <b>Spreadsheet – I</b> <ul style="list-style-type: none"> <li>- Introduction to spreadsheets</li> <li>- Formulas and conditional calculations</li> <li>- Built-in functions</li> <li>- Data handling: sorting, filtering</li> <li>- Charts creation</li> </ul>                                                                                                                                                               | Classroom Lectures, ICT Tools, Hands-on Practice, Lab Practice | CLO2       |
| III  | <b>Spreadsheet – II</b> <ul style="list-style-type: none"> <li>- External data handling</li> <li>- Data analysis: What-if analysis, Goal Seek, Scenario</li> <li>- Pivot tables and Pivot charts</li> <li>- Macros and automation</li> </ul>                                                                                                                                                                                 | Classroom Lectures, ICT Tools, Hands-on Practice, Lab Practice | CLO3       |
| IV   | <b>Advanced Automation Tools &amp; Techniques</b> <ul style="list-style-type: none"> <li>- Introduction to automation and AI tools</li> <li>- Prompt Engineering techniques</li> <li>- Applications of ChatGPT</li> <li>- Design automation using Canva</li> <li>- Research and note automation using NotebookLM</li> <li>- UI/UX basics using Figma</li> </ul>                                                              | Classroom Lectures, ICT Tools, Hands-on Practice, Lab Practice | CLO4, CLO5 |

- **Assessment Methodologies**

(M) **Internal Assessment**

(a) **Internal Formative assessment (20 Marks)**

- Assignment, Self-learning and Term work
- Seminar / Presentation
- Quizzes

(b) **Internal Summative Assessment (30 Marks)**

- Mid-term Test

(N) **External Examination (50 Marks)**

(a) **Term-end Examination**

(O) **Weightage of Learning Efforts for External Assessment**

| Unit       | Aligned COs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------------|-------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|            |             |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| <b>I</b>   | CLO1        | 30                   | 4                                                     | 5                 | 3                                | 12          |
| <b>II</b>  | CLO2        | 30                   | 3                                                     | 4                 | 5                                | 12          |
| <b>III</b> | CLO3        | 30                   | 2                                                     | 4                 | 6                                | 12          |
| <b>IV</b>  | CLO4, CL05  | 30                   | 3                                                     | 3                 | 8                                | 14          |
|            |             | <b>120</b>           | <b>12</b>                                             | <b>16</b>         | <b>22</b>                        | <b>50</b>   |

- **Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation          | Component                                                       | Weightage (%) |
|---------|--------------------------------|-----------------------------------------------------------------|---------------|
| 1       | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Class Regularity, Internal test | 50            |
| 2       | End-Semester Examination       | Written Exam                                                    | 50            |

(P) **CLOs – PLOs Matrix**

| CLO         | PLO  |      |      |      |      |      |      |      |      |       |
|-------------|------|------|------|------|------|------|------|------|------|-------|
|             | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| <b>CLO1</b> | 3    | 2    | 2    | –    | –    | 3    | 1    | –    | –    | –     |
| <b>CLO2</b> | 3    | 3    | 2    | –    | 2    | 3    | 1    | –    | –    | –     |
| <b>CLO3</b> | 3    | 3    | 3    | –    | 3    | 3    | 1    | 1    | –    | –     |
| <b>CLO4</b> | 2    | 2    | 2    | 2    | –    | 3    | 2    | 1    | 1    | 1     |
| <b>CLO5</b> | 3    | 3    | 3    | 2    | 2    | 3    | 2    | 2    | 1    | 1     |

- **Suggested Learning Materials Books:**

| Sr. No. | Title                                                                                                                   | Author(s)     | Edition/Year | Publisher                           |
|---------|-------------------------------------------------------------------------------------------------------------------------|---------------|--------------|-------------------------------------|
| 1       | PC Software made simple for Windows 2000.                                                                               | Taxali R K    | II / 2000    | Tata McGraw-Hill Publishing Co. Ltd |
| 2       | MS Office 2007 in a Nutshell Kindle Edition                                                                             | Sanjay Saxena | I / 2011     | Vikas                               |
| 3       | Prompt Engineering for UX - Mastering Generative AI for Design Excellence: Elevate Your UX Design Skills to New Heights | Medavi        | I / 2024     | Atlantic Publishers & Distributors  |

|   |                                                                                                |              |          |                |
|---|------------------------------------------------------------------------------------------------|--------------|----------|----------------|
| 4 | Canva for Beginners: An Easy Guide to Creating Stunning Videos and Graphic Designs with Canva! | Scott Denver | I / 2023 | Kindle Edition |
|---|------------------------------------------------------------------------------------------------|--------------|----------|----------------|

• **Online Resources (Open Source)**

| Sr. No. | Description of Resource(s) | Weblink                                                                                                     |
|---------|----------------------------|-------------------------------------------------------------------------------------------------------------|
| 1       | <b>Microsoft Office</b>    | • <a href="https://www.microsoft.com/office">https://www.microsoft.com/office</a>                           |
| 2       | <b>Microsoft Excel</b>     | • <a href="https://www.w3schools.com/excel/">https://www.w3schools.com/excel/</a>                           |
| 3       | <b>Microsoft Excel</b>     | • <a href="https://www.geeksforgeeks.org/excel/">https://www.geeksforgeeks.org/excel/</a>                   |
| 4       | <b>Canva</b>               | • <a href="https://www.canva.com/learn/">https://www.canva.com/learn/</a>                                   |
| 5       | <b>FIGMA</b>               | • <a href="https://www.figma.com/resources/learn-design/">https://www.figma.com/resources/learn-design/</a> |



# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title          | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|-----------------------|--------------------------|----------------------|----------------|
|             |             |                       | L-P-T                    |                      |                |
| DSC         | P1S01CDCA05 | Computer Organization | 2-0-0                    | 60                   | 02             |

### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Understand and apply the basic concepts of computer organization and number systems.

**CLO2:** Develop an understanding of the Boolean algebra and analyze various digital logic circuits.

**CLO3:** Apply basic knowledge of digital electronics to understand the functioning of various logic circuits.

| Unit | Course Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Learning Pedagogies*                                               | CLO(s)     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------|
| I    | <b>Fundamentals of Computer Organization</b> <ul style="list-style-type: none"> <li>- Block diagram of a simple computer and its different functional units</li> <li>- Number systems and conversion</li> <li>- Concept of zero (Shunya)</li> <li>- Representation of information: integer &amp; floating-point number representation, character codes</li> <li>- Error detection and correction codes</li> <li>- CPU organization</li> <li>- Instruction execution</li> <li>- Origin in India - Decimal number system</li> <li>- Binary-like representations in Pingala's Chandashastra</li> <li>- Early computation methods (Vedic mathematics basics)</li> </ul> | Interactive Lectures, ICT – based learning, Problem-Based Learning | CLO1       |
| II   | <b>Gates and Basic Logic Circuits</b> <ul style="list-style-type: none"> <li>- Gates, Boolean algebra, Truth tables</li> <li>- Circuit equivalence, De Morgan's theorems</li> <li>- Combinational circuits</li> <li>- Arithmetic circuits</li> <li>- Introduction to Latches, Flip flops and Registers</li> </ul>                                                                                                                                                                                                                                                                                                                                                   | Interactive Lectures, ICT – based learning, Problem-Based Learning | CLO2, CLO3 |

### • Assessment Methodologies

#### (Q) Internal Assessment

##### (a) Internal Formative assessment (20 Marks)

- Assignment, Self-learning and Term work
- Seminar / Presentation
- Quizzes

**(b) Internal Summative Assessment (30 Marks)****i. Mid-term Test****(R) External Examination (50 Marks)****(a) Term-end Examination****(S) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------|--------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|      |              |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| I    | CLO1         | 30                   | 4                                                     | 5                 | 4                                | 13          |
| II   | CLO2, CLO3   | 30                   | 4                                                     | 4                 | 4                                | 12          |
|      |              | 60                   | 8                                                     | 9                 | 8                                | 25          |

- Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation          | Component                                     | Weightage (%) |
|---------|--------------------------------|-----------------------------------------------|---------------|
| 1       | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Internal test | 50            |
| 2       | End-Semester Examination       | Written Exam                                  | 50            |

**(T) CLOs – PLOs Matrix**

| CLO  | PLO  |      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|------|------|-------|
|      | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| CLO1 | 3    | 3    | 1    | –    | –    | –    | –    | 2    | –    | 1     |
| CLO2 | 2    | 3    | 3    | 1    | –    | –    | –    | –    | –    | –     |
| CLO3 | 2    | 2    | 3    | –    | –    | –    | –    | –    | –    | 1     |

- Suggested Learning Materials Books:**

| Sr.No. | Title                                                        | Author(s)                   | Edition/Year                   | Publisher                      |
|--------|--------------------------------------------------------------|-----------------------------|--------------------------------|--------------------------------|
| 1      | Structured Computer Organization                             | Tanenbaum A. S and T Austin | 6 <sup>th</sup> Edition / 2016 | Pearson                        |
| 2      | Digital Computer Electronics                                 | Malvino A. P                | 3 <sup>rd</sup> Edition / 2017 | Tata McGraw Hill Pub. Co. Ltd. |
| 3      | Microprocessors and Interfacing - Programming and Hardware   | Hall Douglas V.             | 3 <sup>rd</sup> Edition / 2017 | McGraw Hill                    |
| 4      | Digital Electronics - An Introduction to Theory and Practice | Gothmann, William H.        | 2 <sup>nd</sup> Edition/1982.  | PHI                            |
| 5      | Computer System Architecture                                 | M.M. Mano                   | 3 <sup>rd</sup> Edition / 2000 | Pearson Education              |

- Online Resources (Open Source)**

| Sr. No. | Description of Resource(s)          | Weblink                                                 |
|---------|-------------------------------------|---------------------------------------------------------|
| 1       | IKS Division, Ministry of Education | <a href="https://iksindia.org">https://iksindia.org</a> |



# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## Post Graduate Diploma in Computer Applications (PGDCA) Semester-I

| Course Type | Course Code | Course Title   | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|-------------|-------------|----------------|--------------------------|----------------------|----------------|
|             |             |                | L-P-T                    |                      |                |
| DSC         | P1S01CDCA06 | PRACTICALS - I | 0-8-0                    | 120                  | 04             |

### • Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

**CLO1:** Apply basic spreadsheet concepts, programming constructs and aggregate data types to solve practical problems.

**CLO2:** Utilize composite data types and implement functions for modular programming.

**CLO3:** Apply advanced Python concepts including exception handling, object-oriented programming, file handling, modules, and basic GUI/database applications.

**CLO4:** Apply SQL commands (DDL, DML, DCL) to create and manipulate databases and construct complex SQL queries.

**CLO5:** Develop PL/SQL programs using control structures, database objects, cursors, procedures, functions, triggers and packages.

| Unit | Course Content                                          | Learning Pedagogies*                           | CLO(s)           |
|------|---------------------------------------------------------|------------------------------------------------|------------------|
| I    | Practical training and hands-on sessions on Python      | Problem-Based Learning, Self-Directed Learning | CLO1, CLO2, CLO3 |
| II   | Practical training and hands-on sessions on DBMS        | Problem-Based Learning, Self-Directed Learning | CLO4, CLO5       |
| III  | Practical training and hands-on sessions on Spreadsheet | Problem-Based Learning, Self-Directed Learning | CLO1             |

### • Assessment Methodologies

#### (U) Internal Assessment

##### (a) Internal Formative assessment (20 Marks)

- Assignment
- Quizzes

##### (b) Internal Summative Assessment (30 Marks)

- Mid-term Test

#### (V) External Examination (50 Marks)

##### (a) Term-end Examination

#### (w) Weightage of Learning Efforts for External Assessment

| Unit | Aligned COs      | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) |                   |                                  | Total Marks |
|------|------------------|----------------------|-------------------------------------------------------|-------------------|----------------------------------|-------------|
|      |                  |                      | Remember (R)                                          | Understanding (U) | Application/ Analyse & above (A) |             |
| I    | CLO1, CLO2, CLO3 | 50                   | 4                                                     | 7                 | 9                                | 20          |

|            |               |            |           |           |           |           |
|------------|---------------|------------|-----------|-----------|-----------|-----------|
| <b>II</b>  | CLO4,<br>CLO5 | <b>50</b>  | <b>4</b>  | <b>7</b>  | <b>9</b>  | <b>20</b> |
| <b>III</b> | CLO1          | <b>20</b>  | <b>2</b>  | <b>3</b>  | <b>5</b>  | <b>10</b> |
|            |               | <b>120</b> | <b>10</b> | <b>17</b> | <b>23</b> | <b>50</b> |

#### Assessment and Evaluation

| Sr.No. | Assessment/Evaluation          | Component                                                  | Weightage (%) |
|--------|--------------------------------|------------------------------------------------------------|---------------|
| 1      | Continuous Internal Evaluation | Assignments, Quizzes, Laboratory Regularity, Internal test | 50            |
| 2      | End-Semester Examination       | Practical Examinations                                     | 50            |

#### (X) CLOs – PLOs Matrix

| CLO         | PLO  |      |      |      |      |      |      |      |      |       |
|-------------|------|------|------|------|------|------|------|------|------|-------|
|             | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
| <b>CLO1</b> | 3    | 1    | 3    | 1    | –    | –    | 1    | –    | –    | 1     |
| <b>CLO2</b> | 3    | 2    | 3    | 2    | –    | –    | 1    | –    | –    | 1     |
| <b>CLO3</b> | 3    | 3    | 3    | 3    | 2    | 1    | 2    | 1    | 1    | 2     |
| <b>CLO4</b> | 3    | 2    | 3    | 1    | 2    | –    | 1    | –    | –    | 1     |
| <b>CLO5</b> | 3    | 3    | 3    | 3    | 3    | 2    | 2    | 2    | 1    | 2     |

#### • Suggested Learning Materials Books:

| Sr.No. | Title                                           | Author(s)                                     | Edition/Year      | Publisher        |
|--------|-------------------------------------------------|-----------------------------------------------|-------------------|------------------|
| 1      | Core Python Programming                         | Rao, R. Nageswara                             | 2nd Edition, 2018 | Dreamtech Press  |
| 2      | Learning Python                                 | Lutz, Mark                                    | 5th Edition, 2013 | O'Reilly         |
| 3      | Database System Concepts                        | Silberschatz, A., Korth, H. F., Sudarshan, S. | 7th Edition, 2019 | McGraw Hill      |
| 4      | Fundamentals of Database Systems                | Elmasri, Ramez; Navathe, Shamkant B.          | 7th Edition, 2015 | Pearson          |
| 5      | Oracle PL/SQL Programming                       | Feuerstein, Steven; Pribyl, Bill              | 6th Edition, 2014 | O'Reilly Media   |
| 6      | SQL: The Complete Reference                     | Groff, James; Weinberg, Paul; Oppel, Andy     | 3rd Edition, 2009 | McGraw Hill      |
| 7      | SQL, PL/SQL: The Programming Language of Oracle | Ivan Bayross                                  | 4th Edition, 2023 | BPB Publications |

#### • Online Resources (Open Source)

| Sr. No. | Description of Resource(s)                                        | Weblink                                                                                     |
|---------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1       | Official Python documentation                                     | <a href="https://docs.python.org/3/">https://docs.python.org/3/</a>                         |
| 2       | Interactive platform for practicing Python programming and basics | <a href="https://www.learnpython.org/">https://www.learnpython.org/</a>                     |
| 3       | Tutorials with live coding examples for Python and SQL            | <a href="https://www.w3schools.com/">https://www.w3schools.com/</a>                         |
| 4       | Oracle Live SQL for SQL and PL/SQL scripts online                 | <a href="https://livesql.oracle.com/">https://livesql.oracle.com/</a>                       |
| 5       | Interactive SQL tutorial                                          | <a href="https://sqlzoo.net/">https://sqlzoo.net/</a>                                       |
| 6       | Platform for practicing database queries and SQL problem-solving  | <a href="https://www.hackerrank.com/domains/sql">https://www.hackerrank.com/domains/sql</a> |



