



C P PATEL AND F H SHAH COMMERCE COLLEGE, ANAND
(AUTONOMOUS)

(Managed by Sardar Patel Education Trust, Anand)
(Affiliated to Sardar Patel University, Vallabh Vidyanagar)
NAAC Reaccredited CGPA – 3.30 – Grade A+



Revised Syllabus as per NEP 2020 with effect from the Academic Year 2026-2027

Post Graduate Diploma in Computer Application (PGDCA)
Semester – I

Course Code	PGDCAN1C05	Title of the Course	Foundation of Software Development
Total Credits	04	Hours per Week	04 Hours / Week

Course Learning Outcomes (CLOs)

CLO 1	Explain the basics of data structures and their applications.
CLO 2	Describe operating system concepts, process scheduling, and memory management.
CLO 3	Explain SDLC, prototype model, and structured system analysis tools.
CLO 4	Explain software engineering concepts, development models, and software testing.

Course Content

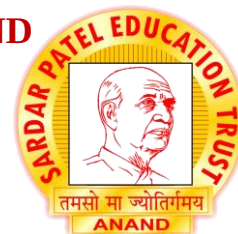
Unit No.	Description	Weightage (%)
1.	Basics of Data Structures • Introduction to Data Structures, Applications, Operations • Primitive and Non- primitive Data Structures • Linear and Non-linear Structures • Introduction to Array, Stack, Queue, Linked List, Trees and Graphs	25%
2.	Fundamentals of Operating Systems • Operating System- definition, examples • Services provided by an Operating System • The concept of a process, process scheduling • Queuing diagram representation of process scheduling • Memory management: Paging, Virtual Memory	25%
3.	System Analysis and Design • The concept of a System, Basic Components • Phases of the Classical Systems Development Life Cycle (SDLC) Method • The Prototype methods • The structured development approach using Functional Decomposition Diagram (FDD), Data Flow Diagram (DFD)	25%



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4.	Software Engineering • Software– meaning, general characteristics and applications • Software Engineering– meaning, goal and needs • Software Development Process Models–Waterfall, Iterative, Spiral. • Software Testing– introduction, needs and levels	25%
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Teaching – Learning Methodology

The course would be taught / learnt through ICT (e.g. Power Point Presentation, Audio-Visual Presentation), Lectures, Quizzes, Assignments, Case Study and Browsing E- Resources & Practical Learning.

Examination Evaluation Pattern

Sr. No.	Particulars	Weightage (%)
01	Continuous and Comprehensive Evaluation (CCE) (Formative Assessment)	50%
02	Semester End Evaluation (SEE) (Summative Assessment)	50%
	TOTAL	100%

Specifications for CCE and SEE

Sr. No.	Details of the Evaluation Pattern	Marks
01	Continuous and Comprehensive Evaluation (CCE) (Formative Assessment)	
	A Assignments	10
	B Multiple Choice Questions	05
	C Attendance	05
	D Written Examination (01 Hour)	30
	(Formative Assessment) (A + B + C + D)	50 Marks
02	Semester End Evaluation (SEE) (Summative Assessment)	
	E Written Examination (02 Hours)	50 Marks
	TOTAL(For 04 Credit Courses)	100 Marks

Rubrics – Based Assessment for Assignments (10 Marks)

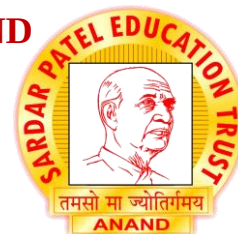
Excellent	09 – 10 Marks	Demonstrates excellent understanding of concepts with accurate explanations, complete answers, proper use of terminology, and well-organized presentation.
Good	07 – 08 Marks	Shows good conceptual understanding with minor errors, mostly complete answers, and clear presentation.
Average	05 – 06 Marks	Demonstrates basic understanding of concepts with some inaccuracies or incomplete explanations.



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Basic	03 – 04 Marks	Shows limited understanding with noticeable conceptual errors and incomplete responses.
Poor	01 – 02 Marks	Demonstrates inadequate understanding with major errors and insufficient content.
Below Poor	Zero Marks / NA	Irrelevant answer or not attempted

Note:

- Assignments may be taken in forms of written project, computerized and online suggested courses / certificates as per the decision made by the respective faculties of the courses.

Rubrics – Based Assessment for Multiple Choice Questions (05 Marks)

05 Multiple Choice Questions – 01 Mark Each (05 Marks)

Excellent	01 Mark	The chosen option is correct, no errors in response
Below Poor	Zero Marks / NA	Chosen option is incorrect, completely irrelevant, multiple options chosen / Not Attempted

Rubrics – Based Assessment for Attendance (05 Marks)

As per the Rules and Regulations provided by the Academic Section of Sardar Patel University, Vallabh Vidyanagar, for the students studying in all departments and colleges.

Reference No.: E – 3 / 3127; dated: 07-03-2024.

<https://www.spuvvn.edu/orbit-cdn/uploads/circulars/Circular-NEP-InternalExamMarks-March-April24.pdf>

Excellent	05 Marks	More than 90% (Minimum 54 Hours for 04 Credits Courses)
Good	04 Marks	80% - 89% (48 to 53 Hours for 04 Credit Courses)
Average	03 Marks	70% - 79% (42 to 47 Hours for 04 Credit Courses)
Poor	Zero / NA	Less than 70% (Less than 42 Hours) (NOT ELIGIBLE TO APPEAR FOR EXAM)

Note:

- Students with below 70% of attendance must submit their written application to their respective class coordinators with genuine reasons and evidence (in case of working or medical emergencies). Students must **not** pursue dual degree programmes that clash with the college's timings.

Rubrics – Based Assessment for Mid-Semester Examination (30 Marks)

Any Two Unit or 50% of The Syllabus - 15 Marks Each Question

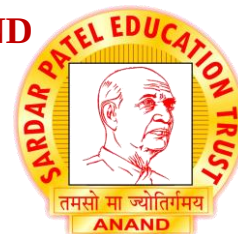
Excellent	13 – 15 Marks	Accurate, error-free, logically presented, timely submission
Good	10 – 12 Marks	Minor errors and good conceptual clarity
Average	07 – 09 Marks	Basic understanding or partially correct
Basic	04 – 06 Marks	Limited clarity, noticeable mistakes, incomplete content



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Poor	01 – 03 Marks	Inadequate conceptual clarity, incorrect content
Below Poor	Zero Marks / NA	Content is irrelevant / Not Attempted / Not Submitted
Note:		
• Written Examination questions will be based on various levels of Revised Bloom's Taxonomy.		

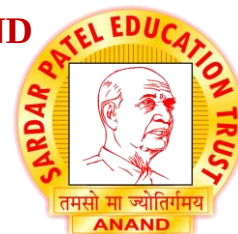
Rubrics – Based Evaluation Pattern for End-Semester Examination (50 Marks)		
06 Multiple Choice Questions – 01 Mark Each (06 Marks)		
Excellent	01 Mark	The chosen option is correct, no errors in response
Below Poor	Zero Marks / NA	Chosen option is incorrect, completely irrelevant, multiple options chosen / Not Attempted
Short Question (12 Marks) – 6 Question from all Units		
Excellent	02 Marks	Demonstrates accurate understanding of concepts related to questions. Provides correct calculations, appropriate formulas, and clear explanations with complete answers.
Good	01 Mark	Shows partial understanding of concepts with some correct steps or explanations. Minor errors or incomplete answers may be present.
Poor	00 Mark	Incorrect, irrelevant, or no response provided.
UNIT I - 08 Marks Each Question		
Excellent	06 – 08 Marks	Complete and accurate explanation of data structures, classifications, operations, and applications with appropriate examples.
Good	04 – 06 Marks	Mostly correct explanation with minor conceptual errors.
Average	03 – 04 Marks	Basic understanding with partially correct explanations.
Basic	02 – 03 Marks	Limited understanding and incomplete answers.
Poor	01 – 02 Marks	Very little knowledge of data structures.
Below Poor	Zero Marks / NA	No attempt or irrelevant answer.
UNIT II - 08 Marks Each Question		
Excellent	06 – 08 Marks	Complete and accurate explanation of operating system concepts, services, process scheduling, and memory management with suitable examples.
Good	04 – 06 Marks	Mostly correct explanation with minor errors.
Average	03 – 04 Marks	Basic understanding with partially correct explanations.



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Basic	02 – 03 Marks	Limited understanding and incomplete answers.
Poor	01 – 02 Marks	Very little knowledge of operating system concepts.
Below Poor	Zero Marks / NA	No attempt or irrelevant answer.
UNIT III - 08 Marks Each Question		
Excellent	06 – 08 Marks	Complete and accurate explanation of SDLC, prototype model, FDD, and DFD with appropriate diagrams/examples.
Good	04 – 06 Marks	Mostly correct explanation with minor conceptual errors.
Average	03 – 04 Marks	Basic understanding with partially correct explanations.
Basic	02 – 03 Marks	Limited understanding and incomplete answers.
Poor	01 – 02 Marks	Very little knowledge of system analysis concepts.
Below Poor	Zero Marks / NA	No attempt or irrelevant answer.
UNIT IV - 08 Marks Each Question		
Excellent	06 – 08 Marks	Complete and accurate explanation of software engineering concepts, process models, and software testing with suitable examples.
Good	04 – 06 Marks	Mostly correct explanation with minor conceptual errors.
Average	03 – 04 Marks	Basic understanding with partially correct explanations.
Basic	02 – 03 Marks	Limited understanding and incomplete answers.
Poor	01 – 02 Marks	Very little knowledge of software engineering concepts.
Below Poor	Zero Marks / NA	No attempt or irrelevant answer.
Note: - Multiple Choice Questions of 10 Marks will be based on various levels of Revised Bloom's Taxonomy. - Written Examination questions will be based on various levels of Revised Bloom's Taxonomy.		

PLO – CLO Mapping								
Foundation of Software Development								
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
CLO 1	03	02	02	00	00	00	00	00
CLO 2	03	03	02	01	00	00	00	00



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CLO 3	02	03	03	02	01	00	00	00
CLO 4	02	03	03	02	01	01	01	01

Note:

High: **03**; Moderate: **02**; Low: **01**; No Mapping: **00**

Suggested References and E-Resources for Further Reading

- Singh Bhagat & Naps Thomas: Introduction to Data Structures, Tata McGraw-Hill Publishing Co.Ltd., 1985.
- Tanenbaum A.S.: Modern Operating Systems, 3rd edition, Prentice-Hall, 2008.
- Sajja, P.S. “Essence of Systems Analysis and Design: A Workbook Approach”, Springer International Publishing, Singapore, 2017.
- Jalote Pankaj: Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, 2005 (ISBN978-81-7319-702-4).
- [GeeksforGeeks – Data Structures and Algorithms](#)
- [TutorialsPoint – Operating System Tutorial](#)
- Javatpoint – System Analysis and Design
- [TutorialsPoint – Software Engineering Tutorial](#)
- [NPTEL Courses](#)
- [SWAYAM](#)
- [MIT OpenCourseWare](#)
- [IBM SkillsBuild](#)
