

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

(Managed by SARDAR PATEL EDUCATION TRUST, ANAND)

AFFILIATED TO SARDAR PATEL UNIVERSITY, V V NAGAR

An ISO 9001 2015 Certified / An ISO 14001-2015 Certified / An ISO 21001-2018 Certified

GUJARAT INSTITUTIONAL RATING FRAMEWORK (4 STAR)

AAA Reaccredited CGPA 3.56 – GRADE **A⁺** KCG-Dept of Edu. Govt of Gujarat-April 2017

NAAC Reaccredited - CGPA 3.30 - GRADE **‘A⁺’** UGC – MHRD, Govt of India – June 2022

Syllabus as per NEP 2020 with effect from the Academic Year 2025-2026

Bachelor of Computer Applications (BCA)

PROGRAMME OUTCOME

At the end of the BCA programme the students will be able to:

- Understand the fundamental concepts of computers, software hardware and peripheral devices and evolution of computer technologies.
- Work in the IT sector as system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.
- Apply standard software engineering practices and strategies in software project development using open source programming environment to deliver a quality of product for business success.

PROGRAM SPECIFIC OUTCOMES

- Equip themselves to potentially rich & employable field of computer applications.
- Pursue higher studies in the area of Computer Science/Applications.
- Take up self-employment in Indian & global software market.
- Meet the requirements of the Industrial standards.

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Course Structure under NEP – 2020 (BCA) Semester-V

Subject		Subject Code	Subject Title	Theory/ Practical	Credits	WCH	Exam Duration	Marking Scheme		
								Int	Ext	Total
Discipline Specific Course Core (Major)	Core Course-1	US5MABCA01	Web Programming Using PHP	T	4	4	2	50/18	50/18	100/36
	Core Course-2	US5MABCA02	Python Programming	T	4	4	2	50/18	50/18	100/36
	Practical of Core Course-1 and Core Course-2	US5MABCA03	Practical Based on PHP and Python Programming	P	4	8	2	50/18	50/18	100/36
Minor	Minor Course-1	US5MIBCA04	Relational Database Management System	T/P	4	6	2	50/18	50/18	100/36
	Minor Course-2	US5MIBCA05	Operating System	T	4	4	1	50/18	50/18	100/36
Skill Enhancement Course	Skill Enhancement Course-1	US5SEBCA06	Data Mining and Data Warehousing	T	2	2	1	25/09	25/09	50/18
Minimum Qualifying Credits					22					

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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5MABCA01	Title of the Course	Web Programming using PHP
Total Credits Of the Course	4	Hours per Week	4
Course Objectives	1. To introduce students to fundamental concepts related to PHP programming.		
	2. To impart basic knowledge of working with advanced features of Web Programming using PHP and interaction with forms.		
	3. To provide basic understanding of MySQL database access.		

Course Content		
Unit	Description	Weightage (%)
1.	Basics of PHP - I <ul style="list-style-type: none">History of PHPFeatures, Advantages and Disadvantages of PHPGeneral structure of PHP, Displaying Output, Escaping Special CharactersCommentsVariables – (Declaring, Assigning, Destroying)Datatypes, Setting and Testing Datatypes, Constants, Operators (Arithmetic, Comparison, Logical, Assignment, Concatenation)Superglobal variables (\$GLOBALS, \$_SERVER, \$_REQUEST, \$_POST, \$_GET)	25 %

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2.	Basics of PHP - II <ul style="list-style-type: none">• Conditional Statements (if, if...else ,if...elseif...else, switch)• Looping structures (while, do...while, for, foreach)• 1D Array(Numeric & Associative)• Manipulation of 1D Array (Storing Data, Assigning, Accessing Array Elements, Displaying)• User-Defined Functions, Function Scope	25 %
3.	PHP Built-in Functions and Form Collaboration <ul style="list-style-type: none">• Built-in Functions (Number, String, Dates and Time)• Creating tables using PhpMyAdmin, Interaction with HTML form, Validating HTML Form• Error checking or Exiting–Introduction to Regular Expression,• File handling (fopen(),fclose(),fread(),fgets(),fgetc(),fwrite(),unlink())	25 %
4.	Implementation of DatabasewithPHP <ul style="list-style-type: none">• Introduction to MySQL: Advantages & Disadvantages• MySQL datatypes and constraints• Working with Forms PHP and MySQL Integration• Basic SQL Commands(Insert, Update, Delete, Select)• MySQLfunctions(mysql_connect,mysql_select_db,mysql_query,mysql_num_rows, mysql_fetch_array, mysql_fetch_field, mysql_close)• Insert Multipart file (Image Upload)• Generating reports using PHP and MySQL• Introduction and use of Session• Introduction and use of Cookies	25 %

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Teaching-Learning Methodology		Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.	
Evaluation Pattern			
Sr. No.	Details of the Evaluation		Weightage
1.	Internal Written/Practical Examination		50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance		
3.	External Examination		50%
Course Outcomes			
1.	Understanding of the fundamental concepts related to PHP programming.		
2.	Basic knowledge of working with advanced features of PHP and interaction with forms.		
3.	Understanding of database access in PHP.		

Suggested References	
Sr.No.	References
1.	PHP–ABeginner’s guide,VikramVaswani,TMH,2012.
2.	The Complete Reference mysql, VikramVaswani,McGraw-Hill,2010
3.	Web enabled commercial application development using HTML, Javascript, DHTML and PHP by Ivan Bayross, BPB Publication, 2010.
4.	BeginningPHP5ByDaveMercer,AllanKent,StevenNowicki,DavidMercer, DanSquier, Wanky Choi, Wrox Publication, 2004.
5.	Head First PHP & MySQL – by Lynn Beighley& Michael Morrison,2009
On-line resources to be used if available as reference material	
1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5MABCA02	Title of the Course	Python Programming
Total Credits of the Course	04	Hours per Week	04

Course Objectives	1. To gain understanding of python programming and their application.
	2. To impart knowledge on fundamental concepts of Python concepts such as list, tuple, dictionary, set, OOP and exception handling.

Course Content		
Unit	Description	Weightage (%)
1.	Introduction to Python and Basic Concepts <ul style="list-style-type: none">• Introduction to Python: History of Python, Features and applications, Installing Python and setting up the environment• Python Basics: Python syntax, comments, casting and indentation, Variables and data types (int, float, str, bool), Input and output functions (print(), input())• Operators: Arithmetic, comparison, logical, assignment, bitwise, and membership operators• Control Structures: Conditional statements (if, if-else, if-elif-else), Loops (for, while), Loop control statements (break, continue, pass)	25 %

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2.	Data Structures in Python <ul style="list-style-type: none">• Strings: operations and methods• Lists: Introduction, Creating, initializing, accessing elements, Basic operations(indexing, slicing, and length) and methods, Introduction to list comprehension.• Tuples: Characteristics, Creating, Accessing elements, operations and methods.• Dictionaries: Key-value pairs, operations and dictionary methods• Sets: Uniqueness, set operations	25 %
3.	Functions, Exception and Object-Oriented Programming (OOP) <ul style="list-style-type: none">• Functions in Python: Defining and calling functions, Function arguments (default, keyword, variable-length), Return statements, Lambda functions.• Built-in functions(range(),type(),len(),float(), int(), str(), input() and print(), max(), min() and sum()).• Exception: Python Error with its Types, Exception handling in Python, Try-finally, raising exceptions, user-defined exceptions.• OOP: Classes and objects, Constructors (__init__) and destructors, Instance and class variables, Inheritance.	25 %
4.	File Handling and Databases Connectivity <ul style="list-style-type: none">• File Handling: Introduction, Basic operation on simple text file like Create, Read, Write and Delete File.• Database Connectivity: Introduction to MYSQL, Connecting Python with a database (MYSQL), Performing CRUD operations.	25 %
Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools	

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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written	50%
2.	Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%
Course Outcomes		
1.	To get the idea about Python Programming Concepts such as list, tuple, dictionary and set OOP and exception handling	
2.	Understanding of the fundamentals of looping statement, branching statement, core data types of Python.	
Suggested References		
Sr. No.	References	
1.	John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India, 2 nd Edition, 2016.	
2.	Learning Python: By Mark Lutz, David Ascher, 5 th Edition, 2013.	
3.	Introducing Python-Modern Computing in Simple Packages –Bill Lubanovic, O’Reilly Publication, 2 nd Edition, 2019.	
4.	Wesley J. Chun. “Core Python Programming -Second Edition”, Prentice Hall, 2 nd Edition, 2007.	
5.	On-line Resources https://www.w3schools.com/python https://www.tutorialspoint.com/python	

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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5MABCA03	Title of the Course	Practical Based on PHP and Python Programming
Total Credits of the Course	04	Hours per Week	08

Course Objectives	1. To provide practical knowledge on usage of the PHP.
	2. To provide practical knowledge of Python Programming.

Course Content		
Unit	Description	Weightage (%)
1.	PART-A : Practical based on US05MABCA01	50%
2.	PART-B : Practical based on US05MABCA02	50%

Teaching-Learning Methodology	Practical-based learning in small groups and hands-on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical	50%
2.	External Examination	50%
Course Outcomes		
1.	Gain practical knowledge on PHP.	
2.	Gain practical knowledge on Python Programming.	

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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5MIBCA04	Title of the Course	Relational Database Management Systems (T/P)
Total Credits of the Course	04	Hours per Week	04

Course Objectives	1. To study the basics of Relational database design and normalization.
	2. To study the basics of PL/SQL, cursors, stored procedures and functions.

Course Content		
Unit	Description	Weightage (%)
1.	RDBMS Basics - I <ul style="list-style-type: none">Consequences of poor database designFunctional dependencies overviewCreation and manipulation of database objectsIndexes , views, sequences, synonymE-R modelling (different types of entities, attributes, relationships and their representation in the E-R diagram)Case studies: Library (Book issue and return), Bank (Opening saving bank account)	25 %
2.	RDBMS Basics - II <ul style="list-style-type: none">The process of database normalization1st Normal Form, 2nd Normal Form, 3rd Normal Form, Boyce-Codd Normal FormExamples of normalizationUnderstanding PL/SQL Block structure	25 %

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	<ul style="list-style-type: none">Fundamentals of PL/SQL Language - data types (BOOLEAN, CHAR, NUMBER, DATE, VARCHAR2), variables, constants and expressionsConditional statements (IF and CASE statements)Controlling loop iterations (LOOP, EXIT, EXITWHEN, WHILE, FOR)Sequential control statement (GOTO and CONTINUE)	
3.	Cursors and Exception Handling <ul style="list-style-type: none">SELECT..INTO statementWorking with cursor : introduction, types, attributes and processing (i.e. declaring, opening, fetching and closing),using parameterized cursorUsing cursor FOR loopError Handling : introduction, advantages of exceptions, types of exceptions Working with user-defined exceptionsdeclaration, Raise_Application_Error,Pragma Exception_InitSQLCODE and SQLERRM	25 %
4.	Stored Subprograms and Database Triggers <ul style="list-style-type: none">Stored procedures – introduction, creating, modifying, executing and dropping proceduresStored functions – introduction, creating, modifying, executing and dropping functionsDatabase triggers – introduction, creating, modifying and dropping triggers, types of triggers	25 %

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written	50%
2.	Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%
Course Outcomes		
1.	Understand relational database with normalization	
2.	Work with PL/SQL, cursors, stored procedures and functions.	
Suggested References		
Sr. No.	References	
1.	An introduction to Database Systems : Bipin C. Desai, Galgotia Publications Pvt. Ltd,2010.	
2.	Ivan Bayross : SQL, PL/SQL The programming language of Oracle, 4th edition, BPB Publications,2010.	
3.	Kevin Loney, George Koch, Oracle9i The Complete Reference , Oracle Press,2002.	
4.	Buluksu Lakshman : Oracle9i PL/SQL : A developer's guide, Apress, edition 2003.	
5.	Understanding Database Management Systems : S. Parthsarthy and B.W.Khalkar, First edition 2007, Master Academy.	
6.	P. S. Deshpande : SQL/PLSQL for Oracle9i, dreamtech press, reprint edition 2009.	
On-line resources to be used if available as reference material		
1. https://www.tutorialspoint.com/		
2. https://www.w3schools.com/		
3. https://www.javatpoint.com/		

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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5MIBCA05	Title of the Course	Operating System
Total Credits of the Course	4	Hours per Week	4
Course Objectives:	1. To provide basic understanding of the role and functioning of an operating system.		
	2. To introduce the basic concepts related to processor management, memory management, process synchronization and deadlocks.		
	3. To impart fundamental knowledge on Linux shell environment and programming.		

Course Content		
Unit	Description	Weightage (%)
1.	Introduction to OS and CPU Scheduling <ul style="list-style-type: none">• Introduction to Operating System, Operating System Services• Different types of Operating Systems: Real time, Time sharing, Distributed and Multiprogramming and Mobile Operating System• OS Structure – Simple Structure, Layered Approach, Microkernel• CPU Scheduling: Introduction to process, process control block, process scheduling, FCFS Scheduling, SJF scheduling, Priority scheduling, Round Robin scheduling	25 %
2.	Memory Management <ul style="list-style-type: none">• Memory Management: Concept, Basic memory management techniques• Swapping, Paging, The concept of a Page Fault• Page Replacement Algorithms: FIFO,LRU,OPT• The concept of virtual memory• Demand Paging	25 %

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3.	Process Synchronization, Deadlocks and Introduction to Linux <ul style="list-style-type: none">• Introduction to Cooperating processes• Process Synchronization• Introduction to Critical Section Problem• Two process solution• The concept of a Deadlock and characterization• Introduction to Linux Operating System• Features of Linux	25 %
4.	Storage Management <ul style="list-style-type: none">• Feature, Advantages, Limitations• File System in operating system• File Allocation methods• (Contiguous Allocation, Linked Allocation, Indexed Allocation)• Free Space Management in Operating System• Disk Scheduling Algorithms• RAID Structure	25 %

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%
Course Outcomes		
1.	Ability to describe the role and functioning of an operating system.	

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2.	Understanding of fundamental concepts related to memory management, process synchronization and deadlocks.
3.	Understanding of fundamental concept of storage management and file management techniques.

Suggested References	
Sr.No.	References
1.	Andrew S. Tanenbaum: Operating System design & Implementation, Prentice Hall International-1997
2.	Silberschatz, Abraham. Galvin, Peter B., Gagne, Greg. Operating System Concepts. India: Wiley, 2014.
3.	Pfaffenberger, Bryan. Linux Command - Instant Reference. India: BPB Publications, 2001.
4.	Samuel, Alex. Advanced Linux Programming. India: BPB Publications, 2001.
5.	Flynn, Ida M., McHoes, Ann McIver. Understanding Operating Systems. United Kingdom: Brooks/Cole Thomson Learning, 2001.
6.	Principles of Modern Operating Systems. United States: Jones & Bartlett Learning, 2011.
7.	Elmasri, Ramez., Carrick, A. Gil., Levine, David. Operating Systems: A Spiral Approach. United Kingdom: Mcgraw Hill Higher Education, 2010.

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1.	https://www.tutorialspoint.com/
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BCA (Bachelor of Computer Applications) (Semester-V)

Course Code	US5SEBCA06	Title of the Course	Data Mining and Data Warehousing
Total Credits of the Course	2	Hours per Week	2

Course Objectives	1. To understand the need of Data Warehouses, and the difference between usage of operational and historical data stores.
	2. To be able to differentiate between query tools & Data Mining tools.
	3. To understand the architecture of a Data Warehouse and the need for preprocessing.

Course Content		
Unit	Description	Weightage (%)
1.	Data Mining and Data Warehousing – Introduction <ul style="list-style-type: none">• Data mining introduction• Introduction and comparison of OLTP and OLAP• Basics of Data Mining• Data mining Vs Query tools• Data Learning• Benefits of data mining• Data warehouse introduction• Characteristics of data warehouse• Operating Data Warehouse• Data warehouse delivery method• Three Data Warehouse Models:<ul style="list-style-type: none">- Enterprise Warehouse- Data Mart- Virtual Warehouse	50 %

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GUJARAT INSTITUTIONAL RATING FRAMEWORK (4 STAR)

AAA Reaccredited CGPA 3.56 – GRADE **A⁺** KCG-Dept of Edu. Govt of Gujarat-April 2017NAAC Reaccredited - CGPA 3.30 - GRADE **'A⁺'** UGC – MHRD, Govt of India – June 2022

Syllabus as per NEP 2020 with effect from the Academic Year 2025-2026

2.	Data Warehouse Architecture <ul style="list-style-type: none">System Process - Process flow within an data warehouse<ul style="list-style-type: none">Extract and Load ProcessClean and Transform dataBackup and Archive ProcessQuery Management ProcessProcess Architecture<ul style="list-style-type: none">Load and Warehouse ManagerQuery ManagerDetailed and Summary InformationMetadata	50 %
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Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching as well as online / ICT-based teaching practices
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written	50%
2.	Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%

Course Outcomes	
1.	Create a Starflake schema for a given Data Warehousing requirements.
2.	Apply pre-processing on existing operational & historical data for creation of Data Warehouse
3.	Perform data mining

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Suggested References	
Sr. No.	References
1.	S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley, 1997.
2.	R. Kinball: Data Warehouse Toolkit – John Wiley & Sons, 2013.
3.	Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1996.
4.	G.K. Gupta , “ Introduction to Data Mining with Case Studies”, PHI, 2014.
5.	Paulraj Ponniah, “Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals”, Wiley-India, 2010.
6.	A B M Shawkat Ali, Saleh A. Wasimi, “ Data Mining : Methods and Techniques”, Cengage Learning, 2009.
7.	Daniel T. Larose, “Data Mining Methods & Models”, Wiley-India, 2005.
