

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 2024-2025

Bachelor of Computer Applications (BCA)Sem-III

PROGRAMME OUTCOME

At the end of the BCA program 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, Mobile application developer, Python 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.
- At the end of the program students get internship as well as job opportunity at software industry.

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With Effective from June 2024**Course Structure under NEP – 2020(BCA) Semester-III**

Subject		Subject Code	Subject Title	Theory / Practical	Credits	WCH	Exam Duration	Marking Scheme		
								Int	Ext	Total
Discipline Specific Course Core (Major)	Core Course-1	US3MABCA01	Database Management Systems	T	4	4	2	50/18	50/18	100/36
	Core Course-2	US3MABCA02	Object Oriented Programming - I	T	4	4	2	50/18	50/18	100/36
	Practical of Core Course-1 and Core Course-2	US3MABCA03	Practical Based On Database Management Systems and Object Oriented Programming - I	P	4	4	2	50/18	50/18	100/36
Inter disciplinary	Inter disciplinary Course-1	US3MDBCA04	Digital Electronics	T	4	4	2	50/18	50/18	100/36
Ability Enhancement Course	Ability Enhancement Course-1	US3AEBCA05	Cloud Computing	T	2	2	1	25/09	25/09	50/18
Skill Enhancement Course	Skill Enhancement Course-1	US3SEBCA06	Data Communication and Computer Networks	T	2	2	1	25/09	25/09	50/18
IKS/Value Added Course (Any One)		US3IKBCA07	IKS II-DHARMASHASTRA	T	2	2	1	25/09	25/09	50/18
Minimum Qualifying Credits :						22				

BCA (Bachelor of Computer Applications)

(Semester–III)

Course Code	US3MABCA01	Title of the Course	Database Management System
Total Credits of the Course	04	Hours per Week	04

Course Objectives	<ul style="list-style-type: none">• Basic concepts of DBMS, Data Models and Relational Data Model terminologies.• SQL data types, SQL statements and concepts like DML, DDL, DCL, and TCL.• Working with tables, applying and modifying constraints, functions and queries.• To study the basics of Relational database design.• To study the basics of PL/SQL
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction to DBMS <ul style="list-style-type: none">– Database and DBMS. – Basics of databases (Data, Information, field, record, file)– Database Management System advantages and disadvantages– Components of a DBMS– Data Models concepts: Hierarchical, Network and Relational– Relation data models concept– Terminologies: tuple, attribute, domain, relation– Relationships and relationship types– Dr. E.F.Codd Rules– Keys: super key, candidate key, primary key, foreign key	25%

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2.	Basics of SQL <ul style="list-style-type: none">- SQL : introduction, advantages and disadvantages- Data types- Types of SQL Statements : DDL, DML ,DCL, TCL- Working with SQL*Plus overview and basic commands of commands- Tables: creation, removal and alteration- Null values, tab table, dual table- Table data: insertion, selection, updation, deletion	25%
3.	SQL Constraints and Functions <ul style="list-style-type: none">- Data constraints introduction, types (table level column level)- Primary Key, Foreign Key and Check constraints- Operators – Arithmetic, Relational, Logical- Range Searching, Pattern Matching- Filtering data using WHERE clause ordering using order by- Pseudo columns – Rowid, Rownum, User, Uid, Sysdate- Modifying constraints and use of user constraints- Functions – Introduction, Types of Function (scalar and aggregate)	25%
4.	Advance SQL and Basics of PL/SQL <ul style="list-style-type: none">- Grouping data using group by and having- Query and subquery, types of subquery (IN, ANY, ALL)- Introduction to SQL Join (Inner ,Outer, Cross)- Creation and manipulation of database objects- Index- PL/SQL - Introduction and advantages- Understanding PL/SQL Block structure- Fundamentals of PL/SQL Language- Data types (BOOLEAN, CHAR, NUMBER, DATE, VARCHAR2), variables, constants and expressions- Select into Statement- Examples of Simple PL/SQL Block	25%

Teaching-Learning Methodology	Multiple teaching approaches: lecture and discussion, exploration and cooperative group work, demonstrations, and presentations.
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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	<ul style="list-style-type: none">• Understand the basic concepts of DBMS, Data Models, Relational Data model and terminologies.• Understand SQL data type, SQL statements and concepts like DML, DDL, DCL, and TCL.• Work with tables, apply and modify constraints, Implement functions and work join queries.• Understand relational database design and Work with PL/SQL,
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Suggested References

Sr. No.	References
1	An introduction to Database Systems: Bipin C. Desai, Galgotia Publications Pvt.Ltd.
2	Ivan Bayross : SQL, PL/SQL The programming language of Oracle, 4th edition, BPB Publications.
3	Understanding Database Management Systems : S. Parthasarthy and B.W.Khalkar, First edition – 2007, Master Academy.
4	Kevin Loney, George Koch, Oracle9i The Complete Reference , Oracle Press.
5	Buluksu Lakshman : Oracle9i PL/SQL : A developer's guide, Apress, edition 2003.
6	P. S. Deshpande : SQL/PLSQL for Oracle9i, dreamtech press, reprint edition 2009.

Online Resources

- <https://www.w3schools.com/>
- <https://www.geeksforgeeks.org/>

BCA (Bachelor of Computer Applications) (Semester–III)

Course Code	US3MABCA02	Title of the Course	Object Oriented Programming – I
Total Credits of the Course	04	Hours per Week	04

Course Objectives	<p>To study the fundamentals of</p> <ul style="list-style-type: none">• Input / Output, arrays and working with classes.• Functions, function overloading and inheritance.• Operator overloading, pointers and files.• To introduce basic programming concepts and necessary constructs of the Java programming language.• To understand the fundamental concepts of object-oriented programming using Java.
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Course Content		
Unit	Description	Weightage (%)
1.	<p>Input/Output, Arrays, Strings, Pointers and Constructors in C++</p> <ul style="list-style-type: none">- Basic I/O in C++- Arrays in C++ : introduction, declaration, initialization of one , two and multi-dimensional arrays, operations on arrays- Working with strings : introduction, declaration, string manipulation and arrays of strings- Basic overview of pointer in C++ Dynamic memory allocation- Constructors: default, parameterized, copy, constructor overloading and destructors- Access specifiers, implementing and accessing class members- Constant objects, nameless objects, live objects, arrays of objects	25%

2.	Functions, Inheritance, Overloading and Overriding <ul style="list-style-type: none">- Introduction to functions, library and user-defined functions, parameters passing, default arguments- Inheritance: Introduction, derived class declaration, types of inheritance and member access ability, constructor and destructor in derived class, construction invocation and data member initialization.- Functions overloading, inline functions, friend functions, virtual functions- Operator overloading: Introduction, overloaded operators, unary operator overloading, operator keyword, operator return values, binary operators overloading, overloading with friend function	25%
3.	Introduction to Java <ul style="list-style-type: none">- History of Java, features, the Java environment (JRE), the Java Virtual Machine (JVM)- Structure of a Java program, a simple Java program, implementing a Java program- Tokens, comments, constants, variables and data types- Scope of variables, type casting- Arrays: one, two dimensional, Dynamic arrays	25%
4.	Classes, Objects, Interfaces and Inheritance <ul style="list-style-type: none">- Defining a class, members of a class: variables and methods, creating objects, constructors, accessing class members- Introduction to inheritance, super keyword- Interfaces: introduction- Final variables, methods and classes, abstract methods and classes- Introduction to method overloading and overriding	25%

Teaching-Learning Methodology	Multiple teaching approaches: lecture and discussion, exploration and cooperative group work, demonstrations, and presentations.
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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	<ul style="list-style-type: none">• Input/output, arrays, string, pointers and working with Constructors.• Functions, function, operator overloading, and inheritance.• Understanding of the basic programming concepts and necessary constructs of the Java programming language.• Understanding of the fundamental concepts of object-oriented programming using Java.	
Suggested References		
Sr. No.	References	
1	E Balagurusamy : Object Oriented Programming in C++, Tata McGraw-Hill Publishing Co. Ltd.	
2	Robert Lafore: Object Oriented Programming in Turbo C++, Guide, Galgotia Pub. (P).	
3	Barkakati N.: Object Oriented Programming in C++, PHI.	
4	OOP's using C++ for Dummies.	
5	John R. Hubbard: Programming with C++ (Schaum's Outlines), McGraw Hill, Second Edition, 2000.	
6	The Complete Reference – JAVA Herbert Schildt.	

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On-line resources to be used if available as reference material

- C++ Tutorial (geeksforgeeks.org)
- <https://www.w3schools.com/>
- Java Tutorial (geeksforgeeks.org)
- <https://www.javatpoint.com/>

Bachelor of Computer Applications (BCA)

(Semester –III)

Course Code	US3MABCA03	Title of the Course	Practical Based On Database Management Systems and Object Oriented Programming - I
Total Credits Of the Course	4	Hours per Week	4

Course Objectives:	To understand <ul style="list-style-type: none">• Concept of table creation and data insertion• Updation and deletion of data from table• To implementation of Constraints and functions• To implement basics of PL/SQL.• To study the Object Oriented Programming concepts using C++.• To learn advanced concepts of C++.• To solve problems using Java programming language.
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Course Content		
	Description	Weightage (%)
	Practical Based on Problem	100%
Teaching-Learning Methodology	Hands on training through required 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%

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Course Outcomes	<p>Having completed this course, the learner will be able to</p> <ul style="list-style-type: none">• Gain knowledge of database management with table creation and data inserting• Work with tables, apply and modify constraints, Implement functions• Creation of PL/SQL Block• Gain knowledge of Object Oriented Programming concepts using C++.• Gain knowledge of advanced concepts of C++.• Gain knowledge to solve problems using Java programming language.
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BCA (Bachelor of Computer Applications) (Semester–III)

Course Code	US3MDBCA04	Title of the Course	Digital Electronics
Total Credits of the Course	04	Hours per Week	04

Course Objectives	<ul style="list-style-type: none">• To gain understanding of logic circuits for building memory elements.• To impart knowledge on fundamental concepts of Digital Electronics such as Logical Gates, Encoder, Decoder, Multiplexer and Flip flops,
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Course Content		
Unit	Description	Weightage (%)
1.	<p><u>Gates and Boolean laws:</u></p> <ul style="list-style-type: none">- Logic gates:- AND, OR, NOT & their Symbol, Truth tables- Universal building blocks:- NAND and NOR- X-OR, X-NOR gates- Boolean laws- De Morgan's theorems- Reduction of Boolean expressions using Boolean laws.	25%
2.	<p><u>Basic Digital Logic Circuits-I:</u></p> <ul style="list-style-type: none">- Encoders- Decoders- Comparators- Parity bit generator- Karnaugh maps up to 3 variables.	25%

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3.	<u>Basic Digital Logic Circuits-II:</u> - Half adder - Full adder - Binary adder - Multiplexers & Demultiplexers.	25%
4.	<u>Memory elements & Registers:</u> - Latches - Flip flops – D (clocked and unclocked) and RS (clocked and unclocked) - Registers – controlled buffer, shift-left, shift-right.	25%

Teaching-Learning Methodology	In order to achieve the course objectives, students will be introduced to digital technologies. Various digital modules used to create digital computer devices like gates, flip flops, decoder, encoder etc.
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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	<ul style="list-style-type: none">• To get the idea about digital systems.• To study logic gates for digital circuit designing.
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Suggested References	
Sr. No.	References
1	Malvino A. P.: Digital Computer Electronics, 2nd Edition, Tata McGraw, Hill Pub. Co. Ltd., New Delhi, 1990.
2	Gothmann, William H. : Digital Electronics - An Introduction to Theory and Practice, 2nd Edition, PHI, 1982.
3	Hall Douglas V. : Microprocessors and Interfacing - Programming and Hardware, McGraw Hill Book Company, 1986.
4	M.M. Mano : Computer System Architecture, 3rd Edition, Pearson Education, 2000.

**Bachelor of Computer Applications (BCA)
Semester –III**

Course Code	US3AEBCA05	Title of the Course	Cloud Computing
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ul style="list-style-type: none">• To study cloud computing concepts, technologies, architecture and applications.• To understand issues in application deployment and implementations in cloud environment.• To learn recent trends in cloud computing.
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction to Cloud Computing <ul style="list-style-type: none">– Overview, Layers and Types of Cloud– Desired Features of a Cloud– Benefits and Disadvantages of Cloud Computing– Cloud Infrastructure Management– Infrastructure as a Service Abstraction and Virtualization <ul style="list-style-type: none">– Using Virtualization Technology– Load Balancing and Virtualization – The Google Cloud– Understanding Hypervisors – Virtual Machine types– Exploring SaaS – salesforce.com– Exploring PaaS- force.com, Exploring IaaS – Amazon EC2	50%

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2.	Programming Environment <ul style="list-style-type: none">– Features of Cloud and Grid Platforms,– Programming Support of Google App Engine Deploying Applications and cloud services <ul style="list-style-type: none">– Moving application to cloud– Microsoft Cloud Services– Google Cloud Applications– Amazon Cloud Services– Cloud Applications. Emerging trends in cloud computing <ul style="list-style-type: none">– Multi-Cloud Vs Omni-Cloud– Integrated Block chain technology– Kubernetes– Cloud AI	50 %
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Teaching-Learning Methodology	Material for this course will be presented using multiple teaching approach: lecture and discussion, exploration and inquiry, cooperative group work, demonstrations, and presentations
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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	<ul style="list-style-type: none">• Explain the core issues in cloud computing such as security, privacy, and interoperability.• Choose the appropriate technologies, algorithms, and approaches for the given application.• Compare and contrast various cloud services
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Suggested References:

Sr.No.	References
1	Cloud Computing: Principles and Paradigms, Editors, Raj kumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011.
2	Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010.
3	Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010.
4	Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center, Brian J. S. Chee and Curtis Franklin.
On-line resources to be used if available as reference material	
<ul style="list-style-type: none">• https://openlibrary.org/• https://nlist.inflibnet.ac.in/• https://books.google.co.in/	

Bachelor of Computer Applications (BCA)**Semester – 3**

Course Code	US3SEBCA06	Title of the Course	Data Communication & Networking
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ul style="list-style-type: none"> • To understand the basic concepts of computer networks and data communication. • To acquire knowledge of basic concepts related to network protocols and standards. • To learn fundamentals of wireless networking.
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Course Content

Unit	Description	Weightage (%)
1.	Introduction to Networking <ul style="list-style-type: none"> – Computer Network: Definition, Advantages and Disadvantages – Categories of Computer Network (LAN, WAN, MAN) – Modes of communication, simplex, duplex, full duplex – Network Topologies – Types of Network communication: Serial and Parallel Transmission – Networking Devices 	50%
2.	Transmission media and OSI Reference Model <ul style="list-style-type: none"> – Guided and Unguided Media – Transmission media (Twisted Pair Cable, Coaxial Cable and Fiber Optics Cable) – OSI Reference Model – TCP/IP Model – Concept of CSMA with CSMA/CD and CSMA/CA 	50%

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Teaching-Learning Methodology	Material for this course will be presented using multiple teaching approach: lecture and discussion, exploration and inquiry, cooperative group work, demonstrations, and presentations
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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	<ul style="list-style-type: none">• Ability to describe the significance and functioning of computer networks.• Understanding of the fundamental concepts related to data communication.• Knowledge of various network protocols and standards.• Knowledge of basic concepts related to wireless networking
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Suggested References:	
S r .No.	References
1	Tanenbaum, Andrew, Computer Network, PHI
2	Norton Peter : Complete guide to Networking.
3	Computer Network: James F.Kurose

Online References:	
	<ul style="list-style-type: none">• TutorialsPoint• W3School• JavaTpoint.
