

# **BHAKTA KAVI NARSINH MEHTA UNIVERSITY JUNAGADH**

(Gujarat) INDIA



**CURRICULUM FOR**  
(Bachelor of Computer Application)  
**BCA**  
(Semester - 3)  
**Effective from June - 2019**

**BHAKTA KAVLNARSINH MEHTA UNIVERSITY**  
**Bachelor of Computer Application – Semester – 3**  
[3 Years– Six Semester Full Time Program]

**Semester – 3**

<b>Code</b>	<b>Course Name</b>	<b>No. Of Lectures/ Lab (Per Week)</b>	<b>Credit</b>
CS – 13	C++ and Object Oriented Programming	5	5
CS – 14	CMS With WordPress & Magento	5	5
CS – 15	Network Technology & Administration With SEO	5	5
CS – 16	RDBMS Using Oracle (10 G)	5	5
CS – 17	Practical (Based On CS – 13, CS – 16)	5	5
CS – 18	Practical (Based On CS – 14, CS – 15)	5	5
<b>Total Credits of Semester – 3</b>			<b>30</b>

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**CS - 13****C++ and Object - Oriented Programming**

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**Unit : 1****Principles of Object - Oriented Programming Tokens, Expressions & Control Statements**

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**Procedure - Oriented Programming**

- Object oriented programming paradigm
- Basic concepts of object-oriented Programming
- Benefits of object-oriented programming
- What is c++?
- Input/output operators
- Structure of c++ program
- Introduction of namespace
- Create own header file
- Tokens :  
Keywords, identifiers, basic data types, user- defined types, derived data types, declaration of variables, dynamic initialization of variables, reference variables
- Operators in C++ :  
Scope resolution operator, member referencing operator, memory management operator, manipulators, and type cast operator.
- Expression :  
Expression and their types, special assignment operator, implicit conversions
- Control structures  
Conditional control structure:  
Simple if, if...else, nested if else, switch etc.  
Looping control structure :  
for, while, do...while

**Functions in C++**

- The main function
- Function prototype
- Call by reference
- Return by reference
- Inline function
- Default arguments
- Functions overloading
- Adding C Functions turbo C++

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**Unit : 2****Classes and Objects, Constructor & Destructor**

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**C structures revisited**

- Specifying a class
- Local Classes
- Nested Classes

- Defining member functions, nesting of Member functions, private member function, making outside function inline
- Arrays within a class
- Memory allocation for objects
- Static data member
- Arrays of objects
- Objects as function arguments
- Friendly functions
- Returning objects
- Characteristics of constructor
- Explicit constructor
- Parameterized constructor
- Multiple constructor in a class
- Constructor with default argument
- Copy constructor
- Dynamic initialization of objects
- Dynamic constructor
- Destructors

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**Unit : 3****Operator Overloading & Type Conversion, Inheritance**

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- Concept of operator overloading
- Over loading unary and binary operators
- Overloading of operators using friend Function
- Manipulation of string using operators
- Rules for operator overloading
- Type conversions.
- Comparison of different method of conversion
- Defining derived classes
- Types of inheritance (Single, Multiple, Multi-level, Hierarchical, Hybrid)
- Virtual base class
- Constructors in derived class
- Containership, Inheritance V/s Containership

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**Unit : 4****Pointer, Virtual functions & Polymorphism, RTTI Console I/O Operations**

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- Pointer to Object
- Pointer to derived class
- this pointer
- Rules for virtual function
- Virtual function and pure virtual function.
- Default argument to virtual function
- Run Time Type Identification

- C++ streams
- C++ stream classes
- Unformatted and formatted I/O operations
- Use of manipulators.

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### Unit : 5

#### Working with Files, Exception handling, Introduction to Template STL

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- File stream classes
- Opening and closing a file
- File modes
- File pointers
- Sequential I/O operations
- Updating a file (Random access)
- Command line arguments
- Overview of Exception Handling
- Need for Exception Handling
- various components of exception handling
- Introduction to templates
- Class templates
- Function templates
- Member function templates
- Overloading of template function
- Non-type Template argument
- Primary and Partial Specialization
- Introduction to STL
- Overview of iterators, containers

	Class Room	Seminar	Expert Talk	Test	Total
No. Of Lecture	60	05	05	05	75

#### Reference Books:

- 1) Complete Reference C++ by Herbert Schildt McGraw Hill Publications
- 2) Computer Science- A Structured approach using C++ by Forouzan, Gilburg, THOMSON
- 3) Object Oriented Programming in C++ - E. Balagurusamy, BPB
- 4) Object Oriented programming in C++ by Robert Lafore, Pearson Education
- 5) Mastering C++ - Venugopal
- 6) The C++ Programming Language by Bjarne Stroustrup, Pearson Education
- 7) Object Oriented Programming in C++ - Robaret Laphore
- 8) Let us C++ - Yashvant Kanitkar, BPB

#### Reference Website

<https://www.tutorialspoint.com/cplusplus/>

<https://www.javatpoint.com/cpp-tutorial>

<https://www.studytonight.com/cpp/>

<https://www.programiz.com/cpp-programming/examples>

**CS - 15****CMS with Word Press & Magento****Unit : 1****Introduction to OOP & WORDPRESS**

- Concept of OOP
  - Class, Property, Visibility, Constructor, Destructor, Inheritance Scope Resolution Operator (: :), Auto loading Classes, Class Constants
- MySQLi Database handling with OOP (insert, update, select, delete, search, count)
- Introduction to WordPress
- What is Content Management System (CMS)?
- Advantages & Disadvantages of WordPress
- Installation of WordPress.
- WordPress Directory & file structure.
- Dashboard overview
- How to add, edit and delete page, category, post, tag.
- Add new media file (image, pdf, doc etc.) & attach to post or page.
  - User Roles and Capabilities.
- Setting
  - General, writing, Reading, Discussion, Media, Permalinks
- Updating WordPress
  - One-click Update, Manual Update, Database Structure

**Unit : 2****Theme & Widget**

- **Theme**
  - What is theme?
  - How to install & activate theme.
  - Introduction of common WordPress theme template files.
  - Anatomy of a Theme :
    - header.php, footer.php and sidebar.php
  - Introduction of Template Files
    - style.css, index.php, page.php, home.php, archive.php, single.php, comments.php, search.php, attachment.php, 404.php, category.php, tag.php, author.php, date.php
- **Widget**
  - What is widget & widget Areas?
  - Widget Management
  - Available Widgets (Archive, Calendar, Categories, Custom Menu, Meta, Pages, Recent Comments, Recent Posts, RSS, Search, Tag Cloud, Text)
    - Inactive Sidebar (not used)
    - Inactive Widgets
- **Plugin**
  - What is plugin?
  - How to install and activate plugin.
  - Useful plugins for website.

- Seo yoast
- Contact form 7
- WooCommerce
- Page Builder

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### Unit : 3

#### Advance Template Tag with Theme Development

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- The Loop (have\_posts (), the\_post())
- Template Tags
  - General tags
    - wp\_head(), get\_footer(), get\_header(), get\_sidebar(), get\_search\_form(), bloginfo(), wp\_title(), single\_post\_title(), wp\_footer(), comments\_template(), add\_theme\_support(), get\_template\_directory\_uri(), body\_class()
  - Author tags
    - the\_author(), get\_the\_author(), the\_author\_link(), get\_the\_author\_link(), the\_author\_meta(), the\_author\_posts()
  - Category tags
    - category\_description(), single\_cat\_title(), the\_category()
  - Link tags
    - the\_permalink(), get\_permalink(), home\_url(), get\_home\_url(), site\_url(), get\_site\_url()
  - Post tags
    - the\_content(), the\_excerpt(), the\_ID(), the\_tags(), the\_title(), get\_the\_title(), the\_date(), get\_the\_date(), the\_time(), next\_post\_link(), previous\_post\_link(), posts\_nav\_link(), post\_class()
  - Post Thumbnail tags
    - has\_post\_thumbnail(), get\_post\_thumbnail\_id(), the\_post\_thumbnail(), get\_the\_post\_thumbnail()
  - Navigation Menu tags
    - wp\_nav\_menu()
  - Conditional Tags
    - is\_archive(), is\_category(), is\_front\_page(), is\_home(), is\_page(), is\_single(), is\_search(), is\_attachment(), is\_active\_sidebar()
  - functions.php file
  - Theme Development

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### Unit : 4

#### Setting up and Installing Magento

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- Introduction to Magento Basic
  - Magento Overview
  - Magento Installation
  - Magento Architecture
- Magento Store Setup
  - Magento - Product Overview
  - Magento - Setup Languages
  - Magento - Setup Contact
  - Magento - Setup Categories
  - Magento - Setup Products

**Unit : 5**  
**Setup Payment and Ordering System**

- Setup Inventory and Payment Option
  - Magento - Setup Inventory
  - Magento - Setup Taxes
  - Magento - Setup Shipping Rates
  - Magento - Setup Payment Plans
  - Magento - Setup Payment Gateway
  - Magento - Setup Payment Methods
  - Magento - Setup Currencies
  - Magento - Setup Check Out Options
  - Magento - Setup Paypal Payment
  - Magento - Setup Google Checkout
  - Magento - Setup Store Live
- Setup Ordering
  - Magento Order Processing
  - Magento - Orders Life Cycle
  - Magento - Setup Order Options
  - Magento - Setup Order Emails
  - Magento - Create Orders
  - Magento - Manage Orders

	Class Room	Seminar	Expert Talk	Test	Total
No. Of Lecture	60	05	05	05	75

**Reference Books:**

- 1) Build Your Own WordPress Website: An Ultimate Guide for Small Business Owners Paperback by WordPress Genie
- 2) Teach Yourself VISUALLY Word Press Paperback –by George Plumley 3rd Edition.
- 3) WordPress for Beginners 2017: A Visual Step-by-step Guide to Mastering Word press Paperback – by Dr. Andy Williams.
- 4) WordPress to Go: How to Build a WordPress Website on Your Own Domain, from Scratch, Even If You Are a Complete Beginner Paperback –by Sarah Mcharry (Author)

**Reference Website**

- <https://www.tutorialspoint.com/wordpress/>
- <https://www.wpbeginner.com/category/wp-tutorials/>
- <https://www.siteground.com/tutorials/wordpress/>
- <https://learn.wordpress.com/>
- [https://codex.wordpress.org/WordPress Lessons](https://codex.wordpress.org/WordPress_Lessons)
- <https://ithemes.com/tutorial/category/wordpress-101/>
- <https://www.tutorialspoint.com/magento/>
- <https://www.siteground.com/tutorials/magento/>
- <https://blog.magestore.com/magento-tutorial/>
- <https://www.cloudways.com/blog/magento/>
- <https://code.tutsplus.com/courses/magento-fundamentals>
- [https://www.youtube.com/playlist?list=PLgOUQYMnO\\_STuEpuiUHH7NXCQuw5igXnP](https://www.youtube.com/playlist?list=PLgOUQYMnO_STuEpuiUHH7NXCQuw5igXnP)
- [https://www.tutorialspoint.com/magento/magento\\_tutorial.pdf](https://www.tutorialspoint.com/magento/magento_tutorial.pdf)



**CS - 15****Network Technology & Administration with SEO****Unit : 1****Basic of Network and LAN Sharing with Transmission Media**

- Network concepts
  - What is network
  - Use of network
- Network Services
- Network Access Methods
  - csma / cd, csma / ca,
  - Token passing
  - Polling
- Advanced Network Topologies Ethernet, CDDI, FDDI
- Communication Methods
  - Unicasting
  - Multicasting
  - Broadcasting
- OSI Reference model with 7 Layers
- TCP/IP network model with 4 Layers
- File and Print sharing in LAN
- Encryption & Compression
- Transmission Media
  - Types of Transmission media
  - Guided media
    - Co - Axial Cable,
    - Twisted Pair Cable,
    - Crimping of Twisted pair cable
    - Fiber Optic Cable
  - Unguided media
    - Infrared, Laser, Radio, Microwave,
- Multiplexing & Demultiplexing
- Cable network devices
- Wireless network devices

**Unit : 2****Network Protocols, Network Routing and IP Addressing**

- Packets & Protocols
- Conn. Oriented Protocols -TCP & connection less protocols-UDP
- What is routing
- Types of Routing
  - static
  - dynamic
  - default
- What is IP address?

- How to configure IP Address in PC
  - What is DHCP ?
  - Static IP & Dynamic IP
  - Types of IP address
  - Ipv4
    - Class structure
    - subnetting, supernetting
  - Ipv6
    - Basic structure of ipv6
    - Implementation of ipv6
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**Unit : 3****Basics of Network Security, Internet connection & Sharing**

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- Fundamental of Network Security
  - Security methods
    - Encryption
    - Cryptography
    - Authentication
  - Security Principle –CIA Model
  - Basics of Internet
  - How internet is connecting with computer
  - Technology related internet
    - Dial up tech.
    - ISDN network tech.
    - Lease line tech.
  - VPN
    - Types of VPN
    - Use of VPN
    - VPN protocols (PPTP, L2TP, IPsec.)
  - Proxy server, Firewall
  - GPS, GPRS
  - CCTV tech.
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**Unit : 4****Search Engine Basics and First Stages of SEO**

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- The Mission of Search Engines
  - The Market Share of Search Engine
  - The Human Goals of Searching
  - How People Search?
  - Types of Queries
  - Eye Tracking: How Users Scan Results Pages?
  - Click Tracking: How Users Click on Result? Natural Versus Paid
  - Understanding Search Engine Results
-

- Algorithm – Based Ranking Systems: Crawling Indexing, and Ranking
- Advanced Search Techniques / Operators
- Setting SEO Goals and Objectives
- The Major Elements of Planning
- Identifying the Site Development Process and Players
- Defining Site’s Information Architecture
- Combining Business Assets and Historical Data to Conduct SEO/Website SWOT Analysis

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### Unit : 5

#### Developing an SEO – Friendly Website with Keyword Research

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- The Theory Behind Keyword Research – Long Tail & Short Tail
- Making Site Accessible to Search Engines
- Creating an Optimal Information Architecture
- Root Domains, Subdomains, and Microsites
- Keyword Targeting
- Content Optimization
- Duplicate Content Issues
- Content Delivery and Search Spider Control
- Keyword Research Tools
- XML Sitemaps
- Flat Versus Deep Architecture
- The Opportunities in Vertical Search
- The Increasing Importance of Local, Mobile, and Voice Recognition Search
- The Ongoing Evolution of Search
- Practical demo of Blog Website Using WordPress or Google Blogger

	Class Room	Seminar	Expert Talk	Test	Total
<b>No. Of Lecture</b>	<b>60</b>	<b>05</b>	<b>05</b>	<b>05</b>	<b>75</b>

#### Reference Books:

- 1) Networking Essential - Glenn Berg Tech. Media
- 2) MCSE Self-Paced Training Kit (Server 2003)
- 3) Data Communication and Networking - B A Forouzan
- 4) The Art of SEO : Mastering Search Engine Optimization By Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola, O'Reilly Media, October, 2009
- 5) Web Searching Technology and Search Engine Optimization[ISBN: 978 - 93 - 81786 - 92 - 5] by Bharat & Company
- 6) SEO: Search Engine Optimization Bible, By Jerri L. Ledford, 2nd Edition, Wiley India, April, 2009
- 7) SEO Warrior: Essential Techniques for Increasing Web Visibility By John I Jerkovic, O'Reilly Media, November, 2009

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**CS – 16**  
**RDBMS Using ORACLE (10 G)**

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**Unit : 1**  
**DBMS Overview, SQL & SQL \*Plus**

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- Introduction to DBMS
- Introduction to RDBMS
- Dr. E. F. Codd Rules
- Instruction of E.R. Diagram
- Importance of E.R. Diagram in Relational DBMS.
- Relations between Entities
- Normalization
- Introduction to SQL
- SQL Commands and Datatypes
- Introduction to SQL\*Plus
- Operator and their types
- Expression
- SQL v/s SQL\*Plus

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**Unit : 2**

**Managing Tables and Data, Data Control and Transaction Control Command**

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- Creating, Altering & Dropping tables
- Data Manipulation Command like Insert, update, delete etc...
- Integrity Constraints, their type and applying of constraints
- SELECT statement with WHERE, GROUP BY and HAVING, ROLLUP AND CUBE, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL, BETWEEN, EXISTS, LIKE
- Join (Inner join, outer join, self-join)
- subquery, minus, intersect, union

**Built in functions**

- **Numeric Function**  
abs, ceil, exp, floor, greatest, least, log, max, min, rem, round , sign, sqrt
- **Character Function**  
chr, concat, initcap, lower, upper, lpad, rpad, ltrim, rtrim, trim, replace, substr, treat
- **Date Function**  
add\_months, last\_day, months\_between, next\_day, round (date), sysdate, systimestamp, trunc (date), to\_date, to\_char
- **Aggregate function**  
Sum, Count, Avg, Max, Min
- **General Functions**  
Coalesce, Case, When, Decode
- Creating user & role
- Grant, Revoke command
- What is transaction?

- Starting and Ending of Transaction
- Commit, Rollback, Save Point

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**Unit : 3****Other ORACLE Database Objects, Concurrency control using lock**

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- View and their types
- Sequence
- Synonyms
- Database Links
- Index & their types (simple index, composite index, unique index, bitmap, function base index, B-tree index)
- Cluster
- Snapshot
- Types of Files (Data file, Redo log file, Control File, Archive File)
- What Are Locks? Types of Locks (shared lock, exclusive lock, DML lock, DDL lock, latch)
- Levels of Locks (Row level, Page level, Table level)
- Lost Updates
- Deadlocks
- Blocking

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**Unit : 4****Introduction to PL/SQL, Advanced PL/SQL**

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- SQL v/s PL/SQL
- PL/SQL Block Structure
- Language construct of PL/SQL  
(Variables, Basic and Composite Data type, Conditions looping etc.)
- %TYPE and %ROWTYPE
- Cursor, their types (Implicit, Explicit), steps, Attributes
- Exception Handling
- Creating and Using Procedure and Functions
- Package
- Triggers, parts of trigger and types of trigger
- Tables, Nested Tables, Varrays
- Creating Objects and use of this object

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**Unit : 5****Oracle Database Structure and Storage Database, Resource Management**

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- Instance Architecture (Database Processes, Memory Structure)
- Creating & Altering Database
- Opening & shutdown Database
- Data dictionary
- Control Files, Redo Logs files

- Tablespace (Create, Alter, Drop), types of tablespace (system, read only, temporary, tool, user, data and index, rollback)
- Rollback Segment (Create, Alter) (System & Transaction RBS)
- Oracle Blocks
- Import
- Export
- SQL\*Loader
- Oracle Scheduler Concepts
- Managing Resources with Oracle Database Resource Manager

	<b>Class Room</b>	<b>Seminar</b>	<b>Expert Talk</b>	<b>Test</b>	<b>Total</b>
<b>No. Of Lecture</b>	<b>60</b>	<b>05</b>	<b>05</b>	<b>05</b>	<b>75</b>

### Reference Books :

- 1) Oracle Database 12c The Complete Reference (Oracle Press)by Bob Bryla , Kevin Loney –Oracle Press
- 2) Oracle Database 12c SQL –Jason Price –Oracle Press
- 3) Oracle Database 12c PL/SQL Programmingby McLaughlin–Oracle Press
- 4) QL,PL/SQL The programming -Lang.Of Oracle Ivan Bayross -BPB

### Web site References:

- <https://www.tutorialspoint.com/sql/index.htm>
- <https://www.tutorialspoint.com/plsql/index.htm>
- <https://www.oreilly.com/library/view/oracle-sqlplus-the/0596007469/ch01s01.html>
- [https://docs.oracle.com/cd/B19306\\_01/server.102/b14357/qstart.htm](https://docs.oracle.com/cd/B19306_01/server.102/b14357/qstart.htm)
- <http://www.sql-plus.com/differences-between-sql-plus-and-sql.php>
- <http://www.oracle.com/us/corporate/features/database-12c/index.html>

**CS - 17****100 Marks****PRACTICAL - 1 (Based on CS - 13 & CS - 16)**

CS - 13 - C++ and Object - Oriented Programming [50 Marks]

CS - 16 - RDBMS Using Oracle (10 G) [50 Marks]

- Each session is of 3 hours for the purpose of practical Examination.
- Practical examination may be arranged before or after theory exam

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**CS - 18****100 Marks****PRACTICAL - 2 (Based on CS - 14 & CS - 15)**

CS - 14 - CMS With WordPress &amp; Magento [50 Marks]

CS - 15 - Network Technology & Administration With SEO  
[50 Marks]

- Each session is of 3 hours for the purpose of practical Examination.
  - Practical examination may be arranged before or after theory exam
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**BHAKTA KAVI NARSINH MEHTA UNIVERSITY****Bachelor of Computer Application**

[3 Years - Six Semester Full Time Program]

**Semester - 3****Paper Style****Unit : 01**

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Question : 1 (A)	Answer The Following Question	(Only Three)	03
Question : 1 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 1 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 02**

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Question : 2 (A)	Answer The Following Question	(Only Three)	03
Question : 2 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 2 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 03**

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Question : 3 (A)	Answer The Following Question	(Only Three)	03
Question : 3 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 3 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 04**

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Question : 4 (A)	Answer The Following Question	(Only Three)	03
Question : 4 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 4 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 05**

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Question : 5 (A)	Answer The Following Question	(Only Three)	03
Question : 5 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 5 (C)	Answer The Following Question	(Any One out of Two)	05

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(Gujarat) INDIA



**CURRICULUM FOR**  
(Bachelor of Computer Application)  
**BCA**  
(Semester - 4)  
**Effective from November - 2019**

**BHAKTA KAVLNARSINH MEHTA UNIVERSITY**  
**Bachelor of Computer Application – Semester – 4**  
[3 Years– Six Semester Full Time Program]

**Semester – 4**

<b>Code</b>	<b>Course Name</b>	<b>No. Of Lectures/ Lab (Per Week)</b>	<b>Credit</b>
CS – 19	Programming with JAVA	5	5
CS – 20	Programming with C#	5	5
CS – 21	SAD, Software Quality Assurance and Testing	5	5
CS – 22	Operating Systems Concepts with Unix / Linux	5	5
CS – 23	Practical (Based On CS – 19)	5	5
CS – 24	Practical (Based On CS – 20, CS – 22)	5	5
<b>Total Credits of Semester – 4</b>			<b>30</b>

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## CS – 19

### Programming with JAVA

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#### Unit : 1

#### History, Introduction & Language, Basics Classes and Objects

- History and Features of Java
- Java Editions
- JDK, JVM and JRE
- JDK Tools
- Compiling and Executing basic Java Program
- Java IDE (NetBeans and Eclipse)
- Data Type (Integer, Float, Character, Boolean)
- Java Tokens (Keyword, Literal, Identifier, Whitespace, Separators, Comments, Operators)
- Operators (Arithmetic, Relational, Boolean Logical, Bitwise Logical, Assignment, Unary, Shift, Special operators)
- Type Casting
- Decision Statements (if, switch)
- Looping Statements (for, while, Do-While)
- Jumping Statements (break, continue, return)
- Array (One Dim., Rectangular, Jagged)
- Command Line Argument Array
- OOP Concepts (Class, Object, Encapsulation, Inheritance, Polymorphism)
- Creating and using Class with members
- Constructor
- finalize () method
- Static and Non-Static Members
- Overloading (Constructor & Method)

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#### Unit: 2

#### Inheritance, Java Packages

- Universal Class (Object Class)
- Access Specifiers (public, private, protected, default, private protected)
- Doing Inheritance
- Constructors in inheritance
- Method Overriding
- Interface
  - Defining Multiple Interface in a single program
  - Execution of interface in simple application
  - Perform the Hybrid Inheritance program using Interface.
- Nested and Inner Class
- Abstract and Final Class
- Normal import and Static Import

- Introduction to Java API Packages and imp. Classes
    - java.lang
    - java.util
    - java.io
    - java.net
    - java.awt
    - java.awt.event
    - java.applet
    - java.swing
  - java.lang Package Classes
    - Math
    - Wrapper Classes
    - String
    - String Buffer
    - Number
    - Package
  - java.util Package Classes
    - Random
    - Date
    - GregorianCalendar
    - Vector
    - HashTable
    - StringTokenizer
    - SimpleTimeZone
    - Stack
    - Scanner
  - Creating and Using User Defined package and sub-package
- 

**Unit: 3****Exception Handling, Threading and Streams (Input and Output)**

- Introduction to exception handling
  - try, catch, finally, throw, throws
  - Creating user defined Exception class
  - Thread and its Life Cycle (Thread States)
  - Thread Class and its methods
  - Synchronization in Multiple Threads (Multithreading)
  - Deamon Thread, Non-Deamon Thread
  - Introduction of Stream and its types
    - Input
    - Output
    - Character
    - Byte
  - File and RandomAccessFile Class [Theory Concept only]
  - StreamTokenizer Class
  - Piped Streams Introduction only
  - Bridge Classes :
    - InputStreamReader
    - OutputStreamWriter
    - Implementation of Text file handling program using Reader Class and Writer Class.
- 

**Unit: 4****Applets & Layout Managers****Applets**

- Introduction to Applet
- Applet Life Cycle
- Implement & Executing Applet with Parameters
  - Playing Audio Example
- Graphics class

**Layout Managers**

- FlowLayout
  - BorderLayout
-

- CardLayout
- GridLayout
- GridBagLayout
- Introduction of
  - BorderLayout [Only Theory]
  - SpringLayout [Only Theory]
  - GroupLayout [Only Theory]
- Using NO LAYOUT Manager

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### Unit: 5

#### GUI using SWING Event Handling

- Introduction to AWT and Swing
- Difference Between AWT and Swing Components
- Swing Components
  - JFrame
  - JPanel
  - JLabel
  - JButton
  - JRadioButton
  - JCheckBox
  - JTextField
  - JPasswordField
  - JTextArea
  - JScrollBar
  - JComboBox
  - JList
  - JToggleButton
  - JTabbedPane
  - JSlider
  - JProgressBar
  - JTextPane
- Menus
  - JMenuBar
  - JMenu
  - JMenuItem
- Introduction to Event Handling
- Event Delegation Model
- Event Packages
  - AWT Event Package
  - Swing Event Package
- Event Classes
  - ActionEvent
  - ItemEvent
  - FocusEvent
  - MouseEvent
  - MouseWheelEvent
  - TextEvent
  - WindowEvent
- Listener Interfaces
  - ActionListener
  - ItemListener
  - FocusListener
  - KeyListener
  - MouseListener
  - MouseMotionListener
  - TextListener
  - WindowListener, etc
- Adaptor Classes
  - FocusAdaptor
  - KeyAdaptor
  - MouseAdaptor
  - MouseMotionAdaptor

	<b>Class Room</b>	<b>Seminar</b>	<b>Expert Talk</b>	<b>Test</b>	<b>Total</b>
<b>No. Of Lecture</b>	<b>60</b>	<b>05</b>	<b>05</b>	<b>05</b>	<b>75</b>

**Reference Books:**

- 1) Java: A Beginner's Guide – Jul 2014 by Herbert Schildt
- 2) Java Programming (Oracle Press) by Poornachandra Sarang
- 3) Java The Complete Reference, 8th Edition –by Herbert Schildt
- 4) Ivor Horton's "Beginning Java 2" JDK 5 Edition, Wiley Computer Publishing.
- 5) Ken Arnold, James Gosling, David Holmes, "The Java Programming Language", Addison-Wesley Pearson Education.
- 6) Cay Horstmann, "Big Java", Wiley Computer publishing (2nd edition – 2006).
- 7) James Gosling, Bill Joy, Guy Steele, Gilad Bracha, "The Java Language Specifications", Addison-Wesley Pearson Education (3rd edition) Download at <http://docs.oracle.com/javase/specs/>

**Reference Website**

- <https://www.tutorialspoint.com/java/>
- <https://www.w3schools.com/java/>
- <https://www.javatpoint.com/java-tutorial>
- <https://www.guru99.com/java-tutorial.html>

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**CS – 20**  
**Programming with C#**

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**Unit : 1**

**.NET Framework & Visual Studio IDE, Language Basics**

- Introduction to .NET Framework
- Features / Advantages
- CLR, CTS and CLS
- BCL / FCL / Namespaces
- Assembly and Metadata
- JIT and types
- Managed Code and Unmanaged Code
- Introduction to .NET Framework and IDE versions
- Different components (windows) of IDE
- Types of Projects in IDE (Console, Windows, Web, Setup, etc.)
- Data Types (Value Type & Reference Type)
- Boxing and UnBoxing
- Operators (Arithmetic, Relational, Bitwise, etc.)
- Arrays (One Dimensional, Rectangular, Jagged)
- Decisions (If types and switch case)
- Loops (for, while, do..while, foreach)

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**Unit : 2**

**Class and Inheritance, Property, Pointers, Delegates, Event, Collections**

- Concept of Class, Object, Encapsulation, Inheritance, Polymorphism
- Creating Class and Objects
- Methods with “ref” and “out” parameters
- Static and Non-Static Members
- Constructors
- Overloading Constructor, Method and Operator
- Inheritance
- Sealed Class & Abstract Class
- Overriding Methods
- Interface inheritance
- Creating and using Property
- Creating Pointer (Unsafe Code)
- Creating and using Delegates (Single / Multicasting)
- Creating and using Events with Event Delegate
- Collections (ArrayList, HashTable, Stack, Queue, SortedList) and their differences.

**Unit : 3**  
**Windows Programming**

- Creating windows Application
  - MessageBox With DialogResult class
  - Basic Introduction to Form and properties
  - Concept of adding various Events with event parameters
  - Different Windows Controls  
    Button, Label, TextBox, RadioButton, CheckBox, ComboBox, ListBox, PictureBox, ScrollBar, TreeView, Menu (MenuStrip, ContextMenuStrip), ToolStrip, Timer, Panel and GroupBox
  - Dialog Boxes (ColorDialog, FontDialog, SaveFileDialog and OpenFileDialog)
  - MDI Concept with MDI Notepad (RichTextBox)
- 

**Unit: 4**  
**Database Programming with ADO.NET**

- Concept of Connected and Disconnected Architecture
  - ADO.NET Architecture
  - Data Providers in ADO.NET
  - Connection Object
  - Connected Architecture  
    Command, DataReader
  - Disconnected Architecture  
    DataAdapter , DataSet , DataTable , DataRow , DataColumn , DataRelation , DataView
  - Data Binding
  - GridView Programming
- 

**Unit: 5**  
**User Controls (Components), Crystal Reports, Setup Project**

- Creating User Control with  
    Property, Method, Event
  - Using User Control in Windows, Projects as component,
  - Creating Crystal Reports
  - Types of Reports
  - Report Sections
  - Formula, Special Field and Summary in Report
  - Types of Setup Projects  
    Creating Setup Project  
    File System Editor  
    User Interface Editor  
    Launch Conditions Editor
-



	<b>Class Room</b>	<b>Seminar</b>	<b>Expert Talk</b>	<b>Test</b>	<b>Total</b>
<b>No. Of Lecture</b>	<b>60</b>	<b>05</b>	<b>05</b>	<b>05</b>	<b>75</b>

**Reference Books:**

- 1) Pro C# 5.0 and .NET 4.5 Framework (By: Andrew Troelsen )
- 2) Head First C# - (By: Jennifer Greene, Andrew Stellman )
- 3) C# 5.0 Unleashed - (By: Bart De Smet )
- 4) Adaptive Code Via C# (By: Gary McLean Hall )
- 5) C#.NET Programming Black Book - steven holzner –dreamtech publications
- 6) Introduction to .NET framework - Wrox publication
- 7) Microsoft ADO. Net - Rebecca M. Riordan, Microsoft Press

**Reference Website**

<https://www.tutorialspoint.com/csharp>

<https://www.tutorialsteacher.com/csharp/csharp-tutorials>

<https://www.javatpoint.com/c-sharp-tutorial>

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**CS – 21****SAD, Software Quality Assurance and Testing**

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**Unit : 1****System Analysis & Design AND Software Engineering, Concepts of Quality Assurance**

- Definitions:  
System, Subsystem, Business System, Information System (Definitions only)
- Systems Analyst  
(Role: Information Analyst, Systems Designer & Programmer Analyst)
- SDLC
- Fact – finding techniques  
(Interview, Questionnaire, Record review and observation)
- Tools for Documenting Procedures and Decisions  
Decision Trees and Decision Tables
- Data Flow analysis Tool  
DFD (context and zero level) and Data Dictionary
- Software Engineering  
(Brief introduction)
- Introduction to QA
- Quality Control (QC)
- Difference between QA and Q
- Quality Assurance activities

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**Unit : 2****Basics of Software Testing, Types of Software Testing, Verification and Validation**

- Introduction to software Testing
- Software faults and failures  
Bug/Error/Defect/Faults/Failures
- Testing Artefacts  
Test case  
Test Script  
Test Plan  
Test Harness  
Test Suite
- Static Testing  
Informal Review  
Walkthrough  
Technical Review  
Inspection
- Dynamic Testing
- Test levels  
Unit Testing  
Integration Testing

System Testing  
Acceptance Testing

Techniques of software Testing

- Black Box Testing
  - Equivalence Partitioning
  - Boundary Data Analysis
  - Decision Table Testing
  - State Transition Testing
- White Box Testing
  - Statement testing and coverage
  - Decision testing and coverage
- Grey Box Testing
- Non-functional Testing
  - Performance Testing
  - Stress Testing
  - Load Testing
  - Usability Testing
  - Security Testing

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**Unit : 3****Software Development Life Cycle Models, Automated Testing**

- Waterfall Model
- Iterative Model
- V-Model
- Spiral Model
- Big Bang Model
- Prototyping Model
- Introduction
  - Concept of Freeware, Shareware, licensed tools
- Testing Tools
  - Win runner
  - Load runner
  - QTP
  - Rational Suite

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**Unit : 4****Project Economics, Project scheduling and Tracking**

- Concepts of Project Management
- Project Costing based on metrics
- Empirical Project Estimation Techniques.
- Decomposition Techniques.
- Algorithmic methods.
- Automated Estimation Tools
- Concepts of project scheduling and tracking

- Effort estimation techniques
- Task network and scheduling methods
- Timeline chart
- Pert Chart
- Monitoring and control progress
- Graphical reporting Tools

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### Unit : 5

#### CAD Project Management Tool, UML

- MS – VISIO for designing & Documentation
- MS – Project for controlling and Project Management
- UML designing and skill-based tools
- Overview of
  - Class Diagram
  - Use Case Diagram
  - Activity Diagram

	<b>Class Room</b>	<b>Seminar</b>	<b>Expert Talk</b>	<b>Test</b>	<b>Total</b>
<b>No. Of Lecture</b>	<b>60</b>	<b>05</b>	<b>05</b>	<b>05</b>	<b>75</b>

#### Reference Books:

- 1) Analysis & Design of Information System - James A. Sen.
- 2) Pankaj Jalote, "Software Engineering – A Precise Approach", Wiley India
- 3) UML Distilled by Martin Fowler, Pearson Edition, 3rd Edition
- 4) Fundamentals of Software Engineering – RajibMall (PHP)
- 5) Software Engineering – A Practitioner's Approach – Pressman
- 6) UML – A Beginner's Guide –Jasson Roff – TMH
- 7) Roger Pressman , "Software Engineering"

#### Reference Website

- [http://en.wikipedia.org/wiki/Software\\_testing](http://en.wikipedia.org/wiki/Software_testing)  
<http://www.onestoptesting.com/>  
<http://www.opensourcetesting.org/functional.php>

## CS - 22

**Operating Systems Concepts with Unix / Linux****Unit : 1****Introduction, Process Management, Memory Management**

Meaning of OS

Functions of OS

Features of OS

OS Types (Features Point of View)

Introduction of OS process

- Process State Transition Diagram
- Process Scheduling
  - FCFS
  - SJN
  - Round Robin
  - Priority Base Non Preemptive
  - Priority Base Preemptive

Physical Memory and Virtual Memory

- Memory Allocation
- Contiguous Memory Allocation
- Noncontiguous Memory Allocation
- Virtual Memory Using Paging
- Virtual Memory Using Segmen

**Unit : 2****Getting Started with Unix, Unix Shell Command, Text Editing With vi Editor,**

Unix Architecture

- Unix Features
- Types Of Shell ( C, Bourn, Korn )
- Unix File System
  - Types Of Files
  - Ordinary Files
  - Directory Files
  - Device Files
- Unix File & Directory Permissions

Connecting Unix Shell : Telnet

- Login Commands passwd, logout, who, who am i, clear
- File / Directory Related Command
  - ls, cat, cd, pwd, mv, cp, ln, rm, rmdir,
  - mkdir, umask, chmod, chown, chgrp,
  - find,pg,more,less,head,tail,wc,touch
- Operators in Redirection & Piping

<

>  
<<  
>>  
|

#### Advance Tools

- Finding Patterns in Files
- grep,fgrep,egrep
- Working with columns and fields
- cut,paste,join
- Tools for sorting
- sort,uniq
- Comparing files : cmp,comm.,diff
- Changing Information in Files : tr,sed,
- Examining File Contents : od
- Monitoring Input and Output tee,script
- Tools For Displaying Date and Time cal,date
- Communications telnet,wall, write,mail,news,finger
- Process Related Commands :
- ps, command to run process in background,
- nice,kill,at,batch,cron, crontab,wait,sleep
- Concept of Mounting a File System
- mount command
- Concept of DeMounting a File System
- umount command
- Introduction of vi editor
- Modes in vi
- Switching mode in vi
- Cursor movement
- Screen control commands
- Entering text, cut, copy, paste in vi editor

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### Unit : 3

#### Shell Programming Getting Started with Linux, Linux Booting

- Shell Keywords
- Shell Variables
- System variables
- PS2, PATH, HOME,LOGNAME,
- MAIL, IFS, SHELL
- User variables
- set, unset and echo command with shell
- variables
- Interactive shell script using read and echo
- Decision Statements

- if then fi
- if then else fi
- if then elif else fi
- case esac
- test command
- Logical Operators
- Looping statements
  - for loop
  - while loop
  - until loop
  - break, continue command
- Arithmetic in Shell script
  - Various shell script examples
- History of Linux
- GNU, GPL Concept
- Open Source & Freeware
- Structure and Features of Linux
- Installation and Configuration of Linux
  - Using with Ubuntu
- Startup, Shutdown and boot loaders of Linux
- User Interfaces (GUI and CUI)

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#### Unit : 4

#### Working with X-Windows (Ubuntu)

##### Layered Structure of X

- Window Manager
- Desktop Environment
- Start Menu
- User Configuration
- startx Command
- Window Managers
  - GNOME
  - KDE
  - Purpose of window manager
- The KDE Desktop
  - KDE Panel
  - Desktop Icons
  - Managing Windows
  - The KDE Control Panel
- The GNOME Desktop
  - The GNOME Panel
  - Desktop Icons
  - Managing Windows
  - The GNOME Control Panel
- Create, Delete, Rename, Copy files and folders

- Install / Uninstall Software

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**Unit : 5**

**Linux Admin (UBUNTU)**

- Creating Linux User Account and Password
- Installing and Managing Samba Server
- Installing and Managing Apache Server
- Optimizing LDAP Services
- Optimizing DNS Services
- Optimizing FTP Services
- Optimizing Web Services
- Configure Ubuntu's Built-In Firewall
- Working with WINE

	<b>Class Room</b>	<b>Seminar</b>	<b>Expert Talk</b>	<b>Test</b>	<b>Total</b>
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**Reference Books:**

- 1) Stallings W, "Operating Systems", 7th edition, Prentice Hall India.
- 2) Silberschatz, A., Peter B. Galvin and Greg Gagne, "Operating System Principles", Wiley-Indian Edition, 8th Edition
- 3) Unix Shell Programming - Y. Kanetkar- BPB Publications
- 4) Unix concepts and applications- Sumitabha Das



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**CS – 23****100 Marks****PRACTICAL – 1 (Based on CS – 13 & CS – 14)**

CS – 19 – Programming With Java [100 Marks]

- Each session is of 3 hours for the purpose of practical Examination.
- Practical examination may be arranged before or after theory exam

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**CS – 24****100 Marks****PRACTICAL – 2 (Based on CS – 20 & CS – 22)**

CS – 20 – Programming With C# [50 Marks]

CS – 22 – Operating Systems Concepts with Unix/Linux [50 Marks]

- Each session is of 3 hours for the purpose of practical Examination.
  - Practical examination may be arranged before or after theory exam
-

**BHAKTA KAVI NARSINH MEHTA UNIVERSITY****Bachelor of Computer Application**

[3 Years - Six Semester Full Time Program]

**Semester – 4****Paper Style****Unit : 01**

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Question : 1 (A)	Answer The Following Question	(Only Three)	03
Question : 1 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 1 (C)	Answer The Following Question	(Any One out of Two)	05

---

**Unit : 02**

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Question : 2 (A)	Answer The Following Question	(Only Three)	03
Question : 2 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 2 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 03**

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Question : 3 (A)	Answer The Following Question	(Only Three)	03
Question : 3 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 3 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 04**

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Question : 4 (A)	Answer The Following Question	(Only Three)	03
Question : 4 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 4 (C)	Answer The Following Question	(Any One out of Two)	05

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**Unit : 05**

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Question : 5 (A)	Answer The Following Question	(Only Three)	03
Question : 5 (B)	Answer The Following Question	(Any Two out of Four)	06
Question : 5 (C)	Answer The Following Question	(Any One out of Two)	05

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