BHAKTA KAVI NARSINH MEHTA UNIVERSITY JUNAGADH

(Gujarat) INDIA

CURRICULUM FOR

(Bachelor of Computer Science in IT)

B. Sc. - IT

(Semester - 3)

Effective from June – 2019

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

Bachelor of Computer Science in IT – Semester – 3

[3 Years– Six Semester Full Time Program]

Semester – 3

Code	Course Name	No. Of Lectures/ Lab (Per Week)	Credit
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**
	Total Credits of Semester – 3		**30**

CS – 13
C++ and Object – Oriented Programming

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

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++

Unit : 2
Classes and Objects, Constructor & Destructor

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

Unit : 3
Operator Overloading & Type Conversion, Inheritance

- 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

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

- 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.

Unit : 5
Working with Files, Exception handling, Introduction to Template STL

- 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

Unit : 3

Advance Template Tag with Theme Development

- 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

Unit : 4

Setting up and Installing Magento

- 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://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.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

Unit : 3
Basics of Network Security, Internet connection & Sharing

- 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.

Unit : 4
Search Engine Basics and First Stages of SEO

- 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

Unit : 5

Developing an SEO – Friendly Website with Keyword Research

- 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
- Contain 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
No. Of Lecture	**60**	**05**	**05**	**05**	**75**

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

CS – 16

RDBMS Using ORACLE (10 G)

Unit : 1
DBMS Overview, SQL & SQL *Plus

- 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

Unit : 2
Managing Tables and Data, Data Control and Transaction Control Command

- 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

Unit : 3

Other ORACLE Database Objects, Concurrency control using lock

- 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 (Date 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

Unit : 4

Introduction to PL/SQL, Advanced PL/SQL

- 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

Unit : 5

Oracle Database Structure and Storage Database, Resource Management

- 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 tablesplace (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

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

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
- 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 & 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 Science in IT

[3 Years - Six Semester Full Time Program]

Semester – 3

Paper Style

Unit : 01

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

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

Unit : 03

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

Unit : 04

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

Unit : 05

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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CURRICULUM FOR

(Bachelor of Computer Science in IT)

B. Sc. - IT

(Semester – 4)

Effective from November – 2019

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

Bachelor of Computer Science in IT – Semester – 4

[3 Years– Six Semester Full Time Program]

Semester – 4

Code	Course Name	No. Of Lectures/ Lab (Per Week)	Credit
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**
	Total Credits of Semester – 4		**30**

CS – 19
Programming with JAVA

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)

Unit: 2
Inheritance, Java Packages

- Universal Class (Object Class)
- Access Specifies (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 Introducation 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
  - BoxLayout [Only Theory]
  - SpringLayout [Only Theory]
  - GroupLayout [Only Theory]
- Using NO LAYOUT Manager

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
  - MoutMotionListener
  - TextListener
  - WindowListener, etc
- Adaptor Classes
  - FocusAdaptor
  - KeyAdaptor
  - MouseAdaptor
  - MouseMotionAdaptor

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

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 Langauge 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

CS – 20
Programming with C#

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)

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), TolpStrip, 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

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

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

CS – 21
SAD, Software Quality Assurance and Testing

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

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

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

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

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

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

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://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

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)

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

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

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

Reference Books:

1) Stalling 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

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

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BHAKTA KAVI NARSINH MEHTA UNIVERSITY

Bachelor of Computer Science in IT

[3 Years - Six Semester Full Time Program]

Semester – 4

Paper Style

Unit : 01

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

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

Unit : 03

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

Unit : 04

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

Unit : 05

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