BHAKTA KAVI NARSINH MEHTA UNIVERSITY – JUNAGADH

(Gujarat) INDIA

CURRICULAM FOR

**Bachelor of Computer Application
(BCA)**

[Semester – 2]

Effective From November – 2018

BHAKTA KAVI NARSINH MEHTA UNIVERSITY
Bachelor of Computer Application

[3 Years - Six Semester Full Time Program]

Semester – 2

Code	Course Name	No. Of Lectures/ Lab (Per Week)	Credit
CS - 07	Data Structure & File Structure using C	5	5
CS - 08	Web Programming using PHP	5	5
CS - 09	Computer Organization and Architecture	5	5
CS - 10	Foundation of Mathematics and Statistics	5	5
CS - 11	Practical – 1 (Based On CS - 07)	5	5
CS - 12	Practical – 2 (Based On CS – 08)	5	5
	Total Credits of Semester - 2		**30**

CS - 07: Data Structure & File Structure using C

Objective : To Learn and understand the concept of Data Structure, sorting, searching and File structure

Unit : 1

INTRODUCTION TO DATA STRUCTURE:

- Data Management concepts
- Foundation terms of a data structure : Interface and Implementation
- Characteristics of a Data Structure : Correctness, Time Complexity & Space Complexity
- Need for Data Structure : Data Search, Processor speed and Multiple requests
- Basic Terminology of data structure : Data, Data Item, Group Items, Elementary Items, Attribute and Entity, Entity Set, Field, Record, File
- Data types – primitive and non-primitive
- Types of Data Structures- Linear & Non Linear Data Structures.

Array :
  o Representation of arrays
  o Applications of arrays

Pointers :
  o Declaring and initializing pointers
  o Pointer arithmetic

Structure :
  o Declaring and using structure

Sorting & Searching:
  o Sorting
    ▪ Bubble Sort
    ▪ Selection Sort
    ▪ Quick Sort
    ▪ Merge Sort
  o Searching
    ▪ Linear Search
    ▪ Binary Search

Unit : 2

Stack and Queue:
- Stack:
  o Stack-Definitions & Concepts
  o Operations On Stacks
  o Applications of Stacks
  o Polish Expression
  o Reverse Polish Expression and their Compilation
- Queue:
  o Representation Of Queue
  o Operations On Queue
  o Circular Queue

- o Priority Queue
- o Array representation of Priority Queue
- o Double Ended Queue
- o Applications of Queue

Unit : 3

Dynamic Memory allocation:

- o What is Dynamic memory allocation?
- o malloc( ), calloc( ), realloc( ) and free( ) function

Linked List:

- Singly Linked List:
  - o Building a linked list
  - o Traversing a linked list
  - o Insertion in a linked list
    - As a first node
    - As a last node
    - At specific location
  - o Deletion of a node
    - First node
    - Last node
    - Specific node
  - o Searching of linked lists
  - o Sorting of linked list
  - o Merging linked list
- Doubly Linked list (traversing, insertion and deletion)
- Linked list implementation of Stack
- Linked list implementation of Queue
- Applications of linked list.

Unit : 4

NONLINEAR DATA STRUCTURE:

- Tree :
  - o Definitions and Concepts
  - o Representation of binary tree
  - o Binary tree traversal (inorder, postorder, preorder)
  - o Complete Binary tree
  - o Binary search trees
  - o Applications of Trees
- Graph
  - o Basic concepts and definitions
  - o Elementary Graph operations
    - Breadth First Search
    - Depth First Search
    - Spanning Trees
    - Shortest path

Unit : 5

FILE STRUCTURES and Hasing :

- Basic concepts of File and file systems: File system services, Disk space allocation, MS_DOS FAT file system, File allocation table, tree-structured directory system
- File Organisation :
  - o Concepts of fields, records and files
  - o Indexes
  - o Sequential Files
  - o Index-Sequential files
- Hashing :
  - o Concept
  - o Linear Hashing

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

Reference Books:

No.	Name	Author / Publication
1	Data Structures through C	Yashwant Kanetkar (BPB)
2	Expert Data Structure with C	R B Patel (Khanna Publication)
3	Data Structure through C/C++	Tennaunbuam
4	Pointer in C Author	Yashwant Kanetkar
5	Let us C	Yashwant Kanetkar

Web site References:

- https://www.tutorialspoint.com/data_structures_algorithms/data_structure_overview.htm
- https://www.geeksforgeeks.org/data-structures/
- https://www.includehelp.com/c-programming-data-structure-examples.aspx
- https://www.sitesbay.com/data-structure/c-data-structure

CS – 08 : Web programming using PHP

Objective:
- To learn web programming & Learn to develop website using PHP

Unit: 1

Web Programming

- Static and Dynamic Web
- Client side & Server side Scripting
- Introduction to other Server side languages
- Webserver (IIS & Apache)
- Web Hosting, Virtual Host, Multi-Homing
- Distributed Web Server Overview,

PHP Basic

- Introduction to PHP
- PHP configuration in IIS & Apache Web server
- Understanding of PHP.INI file
- Understanding of PHP .htaccess file
- PHP variable
- Static & Global variables
- GET & POST method
- PHP Operators
- Conditional Structure & Looping Structure
- Array

Unit: 2

PHP Function

- **User Defined Functions:**
  - argument function
  - default argument function
  - variable function
  - return function
- **Variable Length Argument Functions:**
  func_num_args, func_get_arg, func_get_args
- **Variable Functions:**
  gettype, settype, isset, unset, strval, floatval, intval, print_r
- **String Functions:**
  chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim trim, substr, strcmp, strcasecmp, strpos, strrpos, strstr, stristr, str_replace, strrev, echo, print, explode, implode, join, md5, str_split, str_shuffle, ucfirst, ucwords.
- **Math Functions:**
  abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand, bindec, decbin, hexdec, dechex, is_finite, is_infinite
- **Date Functions:**
  date, getdate, setdate, checkdate, time, mktime, date_add, date_create, date_format, gmdate, localtime, strftime

- **Array Functions:**
  count, list, in_array, current, next, previous, end, each, sort, rsort, assort, arsort, array_merge, array_reverse, array_diff, array_unique, array_key_exists, array_push, array_pop, array_search
- **Miscellaneous Functions:**
  define, constant, include, require, header, die, exit
- **File Handling Functions:**
  fopen, fread, fwrite, fclose, file_exists, is_readable, is_writable, fgets, fgetc, file, file_get_contents, fputs, file_put_contents, ftell, fseek, rewind, copy, unlink, rename, move_uploaded_file.

Unit: 3

Handling Form, Session Tracking & PHP Components

- Handling form with GET & POST
- Cookie
- Session
- Server Variable
- PHP Components:
  o PHP GD Library
  o PHP Regular expression
  o Uploading file
  o Sending mail using mail()
  o Sending mail using smtp()

AJAX

- What is AJAX
- PHP with AJAX
- How AJAX works with PHP
- Working with AJAX as background process
- Using JQuery with PHP
- JQuery AJAX with PHP

Unit : 4

Introduction of SQL, MySQL Functions

- Working with MySQL using PhpMyAdmin
- SQL DML Statement (Insert, Update, Select, Delete) Command
- MySQLi Functions:
  mysqli_connect, mysqli_select_db, mysqli_query, mysqli_affected_rows, mysqli_num_rows, mysqli_autocommit, mysqli_commit, mysqli_fetch_array, mysqli_fetch_assoc, mysqli_fetch_object, mysqli_fetch_row, mysqli_prepare

Unit : 5

Web Services

- XML and JSON
- Introduction to JSON
- Installation & Configuration
- Resource Types
- JsonSerializable
- JSON Functions: json_decode, json_encode

jQuery

- What is jQuery?
- jQuery Syntax
- jQuery Selector:
  - Element Selector
  - Class Selector
  - ID Selector
- jQuery Events:
  click, dbclick, keypress, keydown, keyup, submit, change, focus, blur, load, resize, scroll, unload
- jQuery Effects:
  hide show, fade, slide

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

Reference Books:

No.	Name	Author / Publication
1	Modern PHP: New Features and Good Practices	Josh Lockhart (ORELLY)
2	PHP Cookbook: Solutions & Examples for PHP Programmers	David Skylar and Adam Trachtenberg (ORELLY)
3	Programming PHP	Kevin Tatroe and Peter MacIntyre ORELLY)
4	PHP for the Web: Visual QuickStart Guide (4th Edition)	Larry Ullman (Peachpit Press)

Web site References:

- http://php.net/manual/en/book.mysqli.php
- https://www.w3schools.com/php/php_ref_mysqli.asp
- https://www.tutorialspoint.com/index.htm

CS – 09 : Computer Organization & Architecture

Objective: To understand hardware of computer and working of its peripherals.

Unit : 1

Digital Logic Circuits:

- Block diagram of Digital Computers
- Logic Gates :
  - AND
  - OR
  - INVERTER
  - BUFFER
  - NAND
  - NOR
  - XOR
  - XNOR
  - Above gates with graphic symbol, algebraic function and truth table
- Boolean Algebra:

  Boolean Function, truth table, logic diagram, Boolean expression, Basic identities of Boolean algebra, DeMorgans Theorem, Complement of a function, simplification of Boolean expression using Boolean algebra.

- Map Simplification :

  minterms, adjacent squares, two, three and four variable function simplification, product of sum simplification, NAND and NOR implementation, Don't care conditions, example of map simplification using two, three and four variable, sum of product concept.

Unit : 2

Combinational circuits, Flip flop and Sequential circuits:

- Combinational Circuit:
  - Block diagram of Combinational Circuit
  - analysis and design of combinational circuit like Half Adder and Full Adder
- Flip Flops :
  - Concept of Clock pulse
  - SR Flip-flop
  - D Flip-flop
  - JK Flip-flop
  - T Flip-flop
  - Edge-Triggered
  - Master-slave Flip-flop
  - Excitation table of Flip-flop
- Sequential Circuit:
  - Concept and meaning of Sequential circuit
  - Flip-flop Input equation
  - State table
  - State diagram
  - example of Designing of different sequential circuit

Unit : 3

Digital Components:

- Integrated circuits:
  Concept of IC, SSI, MSI, LSI, VLSI, TTL, ECL, MOS, CMOS
- Decoders:
  Concept of decoder, 2 to 4 line decoder, 3 to 8 line decoder, decoder with enable input, NAND gate decoder, Decoder expansion
- Encoders:
  Concept of encoder, Octal to binary encoder
- Multiplexer:
  Concept of Multiplexer, 2 to 1 line multiplexer, 4 to 1 line multiplexer, quadruple 2 to 1 line multiplexer
- De-multiplexer:
  Concept of De-Multiplexer: 1 to 4 line de-multiplexer
- Register:
  Concept of Register, loading of register, 4-bit register, register with parallel load, shift register, bidirectional shift register with parallel load,
- Counter:
  Concept of Binary counter, 4-bit synchronous binary counter, 4-bit binary counter with parallel load

Unit: 4

Central Processing Unit:

- Introduction of CPU
- Major components of CPU
- Concept of different Computer register
- Registers for the Basic Computer (DR, AR, AC, IR, PC, TR, INPR, OUTR)
- Register symbol, name, number of bits and function is brief
- General Register Organization
  - Control word
- Stack Organization:
  - Register stack
  - Memory stack
  - Polish Notation
- Reverse Polish Notation

Unit: 5

Input-Output Organization and Memory Organization:

Input-Output Organization:

- IO INTERFACE
  - Concept of I/O interface
  - I/O Bus and Interface modules
- I/O versus Memory Bus, example of I/O interface unit
- DMA

- o Concept of DMA
  - § bus request
  - § bus grant
  - § burst transfer
  - § cycle stealing
- o DMA Controller
- o DMA transfer
§ IOP
  - o Concept of IOP
  - o I/O processing
  - o block diagram of computer with I/O processor

Memory Organization:

§ Memory Hierarchy
  - o Memory hierarchy in a computer system
§ Only brief concept of
  - o Auxiliary memory
  - o cache memory
  - o Main Memory
  - o Bootstrap loader
  - o computer start-up
§ RAM and Rom Chips
§ Typical RAM chip block diagram and function table
§ Typical ROM chip block diagram

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

Reference Books:

No.	Name	Author / Publication
1	Computer System Architecture	By M. Morris Mano
2	Digital Logic And Computer Design	By M. Morris Mano
3	Digital Computer Electronics	By Malvino And Leach

Website References:
- § https://www.tutorialspoint.com/computer_organization/index.asp
- § https://www.techtud.com/computer-science-and-information-technology/computer-organization-and-architecture
- § https://www.studytonight.com/computer-architecture/architecture-of-computer-system

CS – 10 : Foundation of Mathematics & Statistics

Objective:
- To Aware about basic Mathematics and Statistics
- To perform mathematical & statistical operations and manipulations with confidence, speed and accuracy.

Unit : 1

Determinants:
- Introduction
- 2 × 2 , 3×3 order determinant
- Cramer's method for solving linear equation(Two and Three Variables)
- Properties of Determinants
- Examples

Unit : 2

Matrices
- Introduction
- Different types of matrix(square matrix, column matrix, row matrix, Diagonal matrix. Unit matrix, null matrix),
- Transpose of matrix
- Addition, subtraction & multiplication of two matrices
- Adjoint of a square matrix
- Inverse of matrix

Unit : 3

Co-ordinate Geometry
- Introduction
- Quadrants & Axes
- Distance between two points in R2(without proof)
- Section formula(without proof)
- Area of triangle(without proof)
- Typical examples

Set Theory
- Introduction
- Method of representation of a set
- Operation on sets & its properties(with only Logical proof)
- De'Morgan laws with Logical proof
- Difference of two sets
- Cartesian products(up to two sets)
- Typical examples

Unit : 4

Measures of Central Tendency & Dispersion

- Mean(ungroup data, group data)
- Median(ungroup data, group data)
- Mode(ungroup data, group data)
- Range
- Quartiles
- Standard Deviation
- Typical examples

Unit : 5

Arithmetic & Geometric progression

- Sequence
- Series
- Arithmetic progression(Definition & Nth term, sum of n terms)
- Geometric progression (Definition & Nth term, sum of n terms)
- Harmonic Progression
- Relation Between AM GM HM (Two Numbers)
- Typical examples

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

Reference Books:

No.	Name	Author / Publication
1	Business Mathematics	Sancheti & Kapoor Sultan & Chand
2	Statistical Method	Gupta Sultan & Chand
3	Discrete Mathematical Structures with Applications to Computer Science	J.P. Tremblay & R. Manohar TMH
4	Business Mathematics	V.K. Kapoor
5	Fundamentals of Statistics	S. C. Gupta

CS – 11   100 Marks

PRACTICAL – 1 (Based on CS – 07)

Data Structure & File Structure using C

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

CS – 12   100 Marks

PRACTICAL – 2 (Based on CS – 08)

CS – 08 – Web Programming Using PHP

- 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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Bachelor of Computer Application

[3 Years - Six Semester Full Time Program]

Semester – 2

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