SAURASHTRA UNIVERSITY

RAJKOT – INDIA

Accredited Grade A by NAAC (CGPA 3.05)

CURRICULAM

FOR

B.Sc. (I.T.)

Bachelor of Science (Information Technology)

(Semester - 1 and Semester - 2)

Effective From June – 2016

Ordinance, Regulations and Examination Scheme:

O. B.Sc. (I.T.) – 1: Candidate for admission to the Bachelor of Science (Information Technology) must have passed standard 12th or equivalent examination from Gujarat higher secondary board or any other board.

O. B.Sc. (I.T.) – 2: Candidate seeking admission directly in third semester of Bachelor of Science (Information Technology) must have passed Examination of Diploma in Engineering in Computer Engineering (CE) / Computer Science (CS) / Information Technology (IT).

O. B.Sc. (I.T.) – 3: The duration of the course will be of three full time academic years. The examination for the Bachelor of Science (Information Technology) course will be divided into six semesters. No candidate will be allowed to join any other course or service simultaneously.

O. B.Sc. (I.T.) – 4: Candidate who have passed an equivalent examination from any other board or examining body and is seeking admission to the B.Sc. (I.T.) course will be required to provide necessary eligibility certificate.

O. B.Sc. (I.T.) – 5: No candidate will be admitted to any semester examination for B.Sc. (I.T.) unless it is certified by the Principal that he has attended the course of study to the satisfaction of the principal of the college.

O. B.Sc. (I.T.) – 6: Candidate desirous of appearing at any semester examination of the B.Sc. (I.T.) course must forward their application in the prescribed from to the University through the principal of the college on or before the date prescribed for the purpose under the relevant ordinances.

O. B.Sc. (I.T.) – 7: No candidate will be permitted to reappear at any semester examination, which he has already passed. The marks of successfully completed paper will be carrying forwarded for the award of class.

O. B.Sc. (I.T.) – 8: There shall be an examination at the end of each semester to be known as first semester examination, second semester examination respectively. At which a student shall appear in that portion of theory papers, practical and viva – voice if any, for which he has kept the semester in accordance with the regulations in this behalf.

A candidate whose term is not granted for what so ever reason shall be required to keep attendance for that semester or term when the relevant papers are actually taken at the college.

O. B.Sc. (I.T.) – 9: After successfully passing all the subjects of semester – 1 candidate will be awarded by certificate CCC and after passing all the subjects of Semester – 1 and Semester – 2 candidate will be awarded by CCC+

O. B.Sc. (I.T.) – 10: Medium of instruction is English.

O. B.Sc. (I.T.) – 11:

Any candidate can go up to take admission in pre to pen-ultimate semester irrespective of failure in any number of subjects.

A Candidate can take admission to pen-ultimate semester if he/she is not failing to more than two subjects.

A candidate can take admission to ultimate {final} semester if he/she has cleared all semesters before pen-ultimate semester and not failing in more than two subjects of pen-ultimate semester.

That is a candidate will be permitted to continue his/her study up to the 4^{th} semester examination without passing his/her previous semester examination.

A candidate can take admission to fifth (pen-ultimate) semester if he/she is failing in NOT more than two subjects of previous (1 to 4) semesters.

A candidate can take admission to Sixth (Ultimate Final) Semester if he/she is not failing in more than two subjects of 5^{th} Semester. Provided he/she must have cleared all 1 to 4 semester.

R. B.Sc. (I.T.) – 1 Standard Of Passing

The standard of passing the B.Sc. (I.T.) degree examination will be as under:

(1) To pass any semester examination of the B.Sc. (I.T.) degree, a candidate must obtain at least 40% marks in the university examination separately in each course of theory and practical.

(2) Class will be awarded based on Earned Grade Point, SGPA and CGPA as per rules of University.

(3) A result of candidate who have obtained admission directly in B.Sc. (I.T.) semester – 3 will be declared by considering his marks of semester 3 to 4 in aggregate and accordingly class will be awarded.

R.B.Sc(I.T.) – 2 Marks and credit hours of each course

Marks of Internal examination, university examination and credit hours will be as under:

(1) Total marks of each theory course are 100 (university examination of 70 marks + internal examination of 30 marks).
(2) Marks of each unit in the course are equal (i.e. 14 Marks). Total marks of each course are 14x5=70 for university examination.
(3) Credit hours (lectures) for each unit in the course are equal (i.e. 12 hours). Total credit hours (lectures) of each course are 12x5=60.
(4) Total marks of each practical and project-viva course are 100. No internal examination of marks in practical and project-viva courses.

R.B.Sc(I.T.) – 3. Structure of Question Paper

Question Paper contains 5 questions (each of 14 marks). Every question will be asked from corresponding unit as specified in the syllabus of each course. (i.e. Question-1 is from Unit No. 1 and remaining questions from their corresponding Units)

Every question is divided in four parts like (a), (b), (c) and (d). Part (a) contains four objective type questions (not MCQ) like definition, reason, answer in one line, answer in one word etc., each of one marks and no internal option. Part (b) contains two questions each of two marks and student will attempt any one out of two. Part (c) contains two questions each of three marks and student will attempt any one out of two. Part (d) contains two questions each of five marks and student will attempt any one out of two.

Bachelor of Science (Information Technology) (Semester - 1 and Semester - 2)
Saurashtra University
Effective from June – 2016

R. B.Sc. (I.T.) – 4 Following is the syllabus of each course of B.Sc.(I.T.) Program.

B.Sc. (I.T.) (Semester – 1)

SR. NO.	COURSE	No. of LECT./Lab. PER WEEK	CREDIT
1.	**CS – 01** TECHNICAL COMMUNICATION SKILL	5	5
2.	**CS – 02** PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C	5	5
3.	**CS – 03** COMPUTER FUNDAMENTALS AND EMERGING TECHNOLOGY	5	5
4.	**CS – 04** NETWORKING & INTERNET ENVIRONMENT	5	5
5.	**CS – 05** PRACTICALS-1 (BASED ON CS-04 & PC SOFTWARE)	5	5
6.	**CS – 06** PRACTICALS-2 (BASED ON CS-2)	5	5
Total Credits of Semester – 1			**30**

CS-01: TECHNICAL COMMUNICATION SKILL		
Objective: To Understand the correct use of English Language and improve the Communication Skills for technical communication		
Unit No.	**Topic**	**Detail**
1	**Concepts and Fundamentals**	Introduction to Technical Communication, meaning of communication, Importance of communication, Communication scope, types, Process of communication, Communication models and theories, Essentials of good communication The seven Cs of communication, Factors responsible for growing importance of communication, Channels of communication, Verbal and Non-Verbal communication, Formal and Informal communication, Barriers of, and aids to communication.[T1, T2, T3, T4]
2	**Written Communication**	Objectives of written communication, Media of written communication, Merits and demerits of written communication, Planning and preparing of effective business messages. Persuasive writing. **Overview of Technical Research and Report Writing :** Definition and Nature of Technical Writing, Properties/features and process of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing, The Role of Technical Writing, The Wholistic Guide of Technical Writing , End-products of Technical Writing. Writing Proposals. **Writing Letters:** Business letters, Office memorandum, Good news and bad news letters, Persuasive letters, Sales letters, Letter styles/ layout. **Report Writing:** Meaning & Definition, Types of report (Business report & Academic report), Format of report, Drafting the report, Layout of the report, Essential requirement of good report writing. **Job Application:** Types of application, Form & Content of an application, drafting the application, Preparation of resume. [T1,T2,T3,]
3	**Oral Communication-1**	Principles of effective oral communication, Media of oral communication, Advantages of oral communication, Disadvantages of oral communication, Styles of oral communication. **Interviews:** Meaning & Purpose, Art of interviewing, Types of interview, Interview styles, Essential Features, Structure, Guidelines for Interviewer, Guidelines for interviewee. Meetings: Definition, Kind of meetings, Advantages and disadvantages of meetings/ committees, Planning and

		organization of meetings. **Project Presentations:** Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, Electronic media (power-point presentation).
4	**Oral Communication-2**	**Listening Skills:** Good listening for improved communications, Art of listening, Meaning, nature, process, types and importance of listening, Principles of good listening, Barriers in listening **Negotiation Skills :** Definition of negotiation, Factors that can influence negotiation, what skills do we need to negotiate, Negotiation process (preparation, proposals, discussions, bargaining, agreement, implementation). Strategies to, improve oral, presentation, speaking and listening skills. [T1,T2, T3,T4]
5	**Soft Skills & Language Skills:**	**Soft Skills:** Non Verbal communication- kinesics & Proxemics, parlanguage, interpersonal skills, Corporate communication skills - Business Etiquettes [T1,T2,T4] **Language Skills:** Improving command in English, improving vocabulary, choice of words, Common problems with verbs, adjectives, adverbs, pronouns, tenses, conjunctions, punctuations, prefix, suffix, idiomatic use of prepositions. Sentences and paragraph construction, improve spellings, introduction to Business English. [T3, R1, R3]

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Text Books:

[T1] Kavita Tyagi and Padma Misra , “Advanced Technical Communication”, PHI, 2011
[T2] P.D.Chaturvedi and Mukesh Chaturvedi, “Business Communication – Concepts, Cases and Applications”, Pearson, second edition.
[T3] Rayudu, “C.S- Communication”, Himalaya Publishing House, 1994.
[T4] Asha Kaul , “Business Communication”, PHI, second edition.

Reference Books:

[R1] Raymond Murphy, “Essential English Grammar- A self study reference and practice book for elementary students of English” , Cambridge University Press, second edition.
[R2] Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.
[R3] Kavita Tyagi and Padma Misra , “Basic Technical Communication”, PHI, 2011.
[R4] Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, “Effective Business

Communication", McGraw Hill, seventh edition.

CS-02: PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C		
Objective: To develop basic programming skill, concept of memory management and file handling.		
Unit No.	**Topic**	**Detail**
1	**Introduction of C Language**	• Introduction of Computer Languages • Introduction of Programming Concept • Introduction of C Language (History & Overview) • Difference between traditional and modern c. • C character set • C tokens ▪ Keywords ▪ Constants ▪ Strings ▪ Identifiers and variables ▪ Operators (all 8 operators) • Hierarchy of operators • Type casting • Data types in c • PRE-PROCESSORS IN C
	Introduction of Logic Development Tools	• Introduction of Logic. • Necessary Instructions for Developing Logic • Basics of Flow Chart • Dry-run and its Use. • Other Logic development techniques
2	**Control Structures**	• Selective control structure ▪ If statements ▪ Switch statement • Conditional ternary operator • Iterative (looping) control statements ▪ For loop ▪ Do…while loop ▪ While loop • Nesting of loops • Jumping statements ▪ Break statement ▪ Continue statement ▪ Goto statements
3	**Library Functions**	• Types of library functions ▪ String Function: Strcpy, strncpy, strcat, strncat, strchr, strrchr, strcmp, strncmp, strspn, strcspn, strlen, strpbrk, strstr, strtok

		▪ Mathematical Functions: Acos, asin, atan, ceil, cos, div, exp, fabs, floor, fmod, log, modf, pow, sin, sqrt ▪ Date & Time Functions: clock, difftime, mktime, time, asctime, ctime, gmtime, localtime, strftime ▪ I/O Formatting Functions: printf, scanf, getc, getchar, gets, putc, putchar, puts, ungetc ▪ Miscellaneous Functions: delay, clrscr, clearer, errno, isalnum, isalpha, iscntrl, isdigit, isgraph, islower, isprint, isspace, isupper, isxdigit, toupper, tolower ▪ Standard Library functions: abs , atof , atol , exit , free, labs , qsort , rand , strtoul , srand ▪ Memory Allocation Functions: malloc , realloc , calloc • Types of user defined functions • Pointers • Function call by value • Function call by reference • Recursion • Storage classes • Passing and returning values
4	**Array**	• Types of arrays ▪ Single dimensional array ▪ Two dimensional array ▪ Multi-dimensional array ▪ String arrays • Use of Arrays in Programming • Arrays and Matrices
	Structures	• What is structure • Initializations and declarations • Memory allocation functions • Pointers with structures • Array with structures • Udf with structures • Nested structures • Introduction to union • Difference between Structure & Union
5	**Pointers**	• Introduction of Pointers • Use of pointers in Dynamic Programming • Pointer to Variables • Pointer to Array • Pointer within Array • Pointer To Structure • Pointers within structure • Pointer to Pointer
	File Handling	• Concept of data files

		• File handling • Use of file handling functions fopen, fclose, fprintf, fscanf, getw, putw, fseek, ftell, rewind ,freopen, remove, rename, feof, ferror, fflush, fgetpos, sprintf, snprintf, vsprintf, vsnprintf, fscanf, vfscanf, setbuf, setvbuf • I/O operations • Command line arguments

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

1. Programming in ANSI C Author : E. Balaguruswami.
2. Let Us C Author : Yashwant Kanetkar.
3. Working withC Author: Yashwant Kanetkar.
4. Programming in C Schaum Series publication.

CS-03: COMPUTER FUNDAMENTALS AND EMERGING TECHNOLOGY

Objective: To aware basics of computer and emerging technology

Unit No.	Topics	Details

1	**Introduction to Computers**	• Basics of Computers
		  ○ What is Computer?
		  ○ Characteristics of Computer
		  ○ Data Processing Cycle (Data → Process →information)
		• Classification of Computer by Data Processed
		  ○ Analog, Digital and Hybrid Computers
		• History and Generations of Computers
		  ○ First to Fifth Generation Computers
		• Classification of Computer by Processing Capabilities
		  ○ Micro, Mini, Mainframe and Super Computers
		• History and Generations of Computers .
		  ○ First to Fifth Generation Computers
		• Simple Model of Computer
		  ○ Input Devices
		  ○ CPU (Central Processing Unit)
		  ○ Arithmetic & Logic Unit
		  ○ Control Unit
		  ○ Internal Memory
		• Output Devices
		• Secondary Storage Devices

	Internal/External parts used with Computer Cabinet	• Introduction to Mother board
		• Types of Processors .
		  ○ Dual Core, Core 2 Duo, i2, i3, etc ....
		• Memory structure and Types of Memory
		  ○ RAM (SRAM, DRAM, SO, DDR, etc.)
		  ○ ROM (ROM, PROM, EPROM, EEPROM, etc.)
		• Slots
		  ○ ISA Slots / PCI Slots / Memory Slots
		• Sockets
		• Cables
		  ○ Serial Cable / Parallel Cable / USB Cable
		• Ports
		  ○ USB / Serial / Parellel / PS2
		• Power Devices :UPS
		• Graphic Cards

		• Network card, Sound Card

2	**Input Devices**	• Introduction
		• Types of Input Devices
		  ○ Keyboard / Mouse / Trackball / Glide - Pad / Game Devices Joystick, etc.) / Light Pen / Touch Screen / Digitizers and Graphic Tablet / Mic (Sound Input) / Camera (Photo and Video Input) / POS (Point of Sale) Terminal (Scanners, etc)
		  ○ MIDI(Musical Instrument Digital Interface) Keyboard,
		  ○ Wireless Devices (Keyboard, Mouse, etc)
		• Types of Scanners
		  ○ OCR, OMR, MICR, OBR

	Data Storage	• Introduction
		• Types of Magnetic Storage Devices
		  ○ Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks
		• Storage Mechanism of Magnetic Storage Devices
		  ○ Tracks / Sectors / Clusters / Cylinders
		• Reading / Writing Data to and from Storage Devices
		• Seek Time / Rotational Delay - Latency / Access
		• Time /Response Time
		• Other Storage Devices
		  ○ USB - Pen Drive / CD / DVD / Blu-Rav Disk etc.
		  ○ Flash Memory, Cloud Storage(Like Google Drive, OneDrive etc.)

3	**Output Devices**	• Types of Output Devices
		• CRT Display Units
		• Monitor
		• Non CRT display Units
		• LCD / LED / Plasma Displays
		• Types of Printers Impact and Non Impact Printers
		• Plotters
		• Other Devices
		  ○ Fascimile(FAX)
		  ○ OLED (Organic LED)
		  ○ Headphone
		  ○ SGD (Speech Generating Device)
		  ○ COM (Computer Output Microfilm)
		  ○ Google Glass

4	**Numbering System and Codes**	• Introduction to Binary Codes /
		  o Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit
		  o KB / MB / GB / TB / HB (etc ....
		• Types of Numbering System
		  o Binary / Octal/Decimal / Hex-Decimal
		• Conversion
		  o Binary to Octal, Decimal and Hexa-Decimal
		  o Decimal to Binary, Octal and Hexa-Decimal
		  o Octal to Binary, Decimal and Hexa-Decimal
		  o Hexa-Decimal to Binary, Octal and Decimal
		• Binary Arithmetic
		  o Addition
		  o Subtraction (1's Compliment and 2's Compliment)
		  o Division .
		  o Multiplication
		• Types of Codes
		  o ASCII/BCD / EBCDIC / UniCode
		• Parity Check
		  o Event Parity System / Odd Parity System

	Languages, Operating Systems and Software Packages	• Introduction
		• Translator (Assembler / Compiler / Interpreter)
		• Types of Languages
		  o Machine Level Language
		  o Assembly Level Language
		  o High Level Language (3GL, 4GL, 5GL, etc.)
		• Types of Operating Systems
		  o Batch Operating System
		  o Multi Processing Operating System
		  o Time Sharing Operating System
		  o Online and Real Time Operating System
		• Uses and applications of Software Packages
		  o Word Processing Packages
		  o Spread Sheet Packages
		  o Graphical Packages
		  o Database Packages I
		  o Presentation Packages
		  o Animation / Video / Sound Packages

5	**Emerging Technologies and Virus**	• Different Communication methods
		  o GIS / GPS / COMA / GSM
		• Communication Devices I
		  o Cell Phones / Modem / Infrared / Bluetooth / WiFi/LiFi/SLM(Spatial Light Modulator)
		• Virus

		○ Introduction to Virus and related terms ○ Origin and History ○ Types of Virus ○ Problems and Protection from Virus • Cloud Computing ○ What is Cloud Computing? ○ Characteristic & Service Models(Iaas, Paas, Saas) ○ Architecture ○ Security & Privacy
	Important Terms and Acronyms	• ATM • Backup / Restore • Hard Copy / Soft Copy • Bus / Data Bus • Buffer and types / Spooling • Cursor / Pointer / Icon • E-Mail I Attachment • CLiI GUI • Compiler and its types • Drive I Directory (Folder) / File / Path • Menu / Popup Menu / Toolbar • Shutdown / Reboot / Restart • Syntax / Wild Card Characters • Optical Fiber (Fiber Optic) . • Net meeting • UPS • Printing Speed (CPS, CPM, LPM, DPI, PPM) • Peripherals

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

2. Computer Fundamentals – By P.K.Sinha.
3. Fundamental of IT for BCA – By S.Jaiswal.
4. Engineering Physics – By V.K.Gaur.
5. Teach Yourself Assembler – By Goodwin.

CS-04: NETWORKING & INTERNET ENVIRONMENT		
Objective: To understand basic terms of computer networks and Internet , to give knowledge of Scripting languages like HTML, CSS and Java Script		
Unit No.	**Topic**	**Detail**
1	**Introduction to Computer Network**	• Computer Network • Type of Computer Network • Network Topology • OSI Reference Model (Introduction) • TCP/IP • Internet Terminology • ISP (Internet Service Provider) • Intranet • VSAT (very small aperture terminal) URL • Portal • Domain Name Server
2	**Application of Internet**	• World Wide Web (WWW) • Search Engine • Remote Login • Telnet • Electronic Mail (Email) • E-Commerce and E· Business • E-Governance • Mobile Commerce • Website Basics (WebPages; Hyper Text Transfer Protocol, File Transfer Protocol, Domain Names; URL; Protocol Address; Website[Static, Dynamic, Responsive etc], Web browser, Web Servers; Web Hosting. • Network Security Concepts: Cyber Law, Firewall, Cookies, Hackers and Crackers; • Types of Payment System (Digital Cash, Electronic Cheque, Smart Card, Debit/Credit Card etc)
3	**Basic of HTML & Advance HTML 5**	• Fundamental of HTML • Basic Tag and Attribute • The Formatting Tags • The List Tags • Link Tag • inserting special characters, • adding images and Sound,

		• lists types of lists • Table in HTML • Frame in HTML • Forms • HTML 5 & Syntax - HTML5 Document Structure (section, article, aside, header, footer, nav, dialog, figure) - Attributes of HTML 5 - Web Form (datetime, date, month, week, time, number, range, email, url) - Audio / Video - Canvas
4	**Cascading Style Sheet & CSS 3**	• Introduction to CSS • Types of Style Sheets • Class & ID Selector • CSS Font Properties • CSS Text Properties • CSS Background Properties • CSS List Properties • CSS Margin Properties • CSS Comments • CSS 3 - Border Property - Background & Gradient Property - Drop Shadow Property - 2D & 3D Transform Property - Transition Property - Box Sizing Property - Position Property • Media Query
5	**Java Script**	• Introduction to JavaScript • Variables • JavaScript Operators • Conditional Statements • JavaScript Loops • JavaScript Break and Continue Statements • Dialog Boxes

		• JavaScript Arrays • JavaScript User Define Function • Built in Function (string, Maths, Array, Date) • Events (onclick, ondblclick, onmouseover, onmouseout, onkeypress, onkeyup, onfocus, onblur, onload, onchange, onsubmit, onreset) • DOM & History Object • Form Validation & E-mail Validation

Seminar – 5 Lectures
Expert Talk – 5 Lectures
Test – 5 Lectures
Total Lectures: 60 + 15 = 75

Reference Books:

1. HTML in 10 steps or less - Laurie Ann Ulrich, Robert G. Fuller
2. Internet: The Complete Reference –Young.
3. World Wide Web Design with Html -C Xavier.
4. Internet for Every One –Leon.
5. Practical Html 5.O -Lee Philips.
6. MCSE Networking Essential Training Guides.
7. Mastering In FrontPage – BPB.

CS-05 : PRACTICAL-1 (based on CS – 04 & PC Software)	
Topics	**Marks**
HTML-5, CSS-3, MS – Word, MS – Excel, MS – Power Point, MS-Access and Macromedia Dream weaver	**100**

CS-06 : PRACTICAL-2 (based on CS – 02)	
Topics	**Marks**
Programming in C Language	**100**

Note :

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

Additional Topics (Not to be asked in examination):

Student should be aware of followings

- To Format Hard Disk
- Installation of OS, multi-OS and other packages
- Use of DOS commands
- Operating of Accounting Software

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B.Sc.(I.T.) (Semester – 2)

SR. NO.	COURSE	No. OF LECT./Lab. PER WEEK	CREDIT
1.	**CS – 07** DATA STRUCTURE USING C LANGUAGE	5	5
2.	**CS – 08** WEB PROGRAMMING	5	5
3.	**CS – 09** COMPUTER ORGANIZATION & ARCHITECTURE	5	5
4.	**CS – 10** MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE	5	5
5.	**CS – 11** PRACTICALS-1 (BASED ON CS-07)	5	5
6.	**CS – 12** PRACTICALS-2 (BASED ON CS-08)	5	5
Total Credits of Semester – 2			**30**

CS-07: DATA STRUCTURE USING C LANGUAGE		
Objective: To learn algorithm analysis, data structures, sorting and searching techniques.		
Sr. No.	**Topic**	**Detail**
1	**Algorithm Analysis**	• The analysis of algorithm. • Time and space complexities. • Asymptotic notation. • Classes of algorithm. • Big-Oh Notation • Big-Omega Notation

	Advanced Concepts of C and Introduction To data Structures	• Data types
		• Arrays
		• Handling arrays
		  ▪ Initializing the arrays
		• Multidimensional arrays
		  ▪ Initialization of two dimensional array
		• Pointers
		  ▪ Advantages and disadvantages of pointers
		  ▪ Declaring and initializing pointers
		  ▪ Pointer arithmetic
		• Array of pointers
		• Passing parameters to the functions
		• Relation between pointers and arrays
		• Scope rules and storage classes
		  ▪ Automatic variables
		  ▪ Static variables
		  ▪ External variables
		  ▪ Register variable
		• Dynamic allocation and de-allocation of memory
		  ▪ function malloc(size)
		  ▪ function calloc(n,size)
		  ▪ function free(block)
		• Dangling pointer problem.
		• Structures.
		• Enumerated constants
		• Unions

2	**Sorting and Searching**	• Bubble sorting • Insertion sorting • Quick sorting • Bucket sorting • Merge sorting • Selection sorting

		• Shell sorting • Basic searching technique • Index searching • Sequential searching • Binary searching
	Graph	Adjacency matrix and adjacency lists Graph traversal Depth first search (dfs) Implementation Breadth first search (bfs) Implementation • Shortest path problem • Minimal spanning tree
3	**Introduction To data Structure**	Primitive and simple structures Linear and nonlinear structures file organization.
	Elementary Data Structure	Stack Definition Operations on stack Implementation of stacks using arrays Function to insert an element into the stack Function to delete an element from the stack Function to display the items Recursion and stacks Evaluation of expressions using stacks Postfix expressions Prefix expression Queue Introduction Array implementation of queues Function to insert an element into the queue Function to delete an element from the queue Circular queue Function to insert an element into the queue Function for deletion from circular queue Circular queue with array implementation Deques Priority queues
4	**Link List**	Singly linked lists. Implementation of linked list Insertion of a node at the beginning Insertion of a node at the end Insertion of a node after a specified node Traversing the entire linked list Deletion of a node from linked list

		Concatenation of linked lists Merging of linked lists Reversing of linked list Doubly linked list. Implementation of doubly linked list Circular linked list Applications of the linked lists
5	**Tree**	Objectives Properties of a tree Binary trees Properties of binary trees Implementation Traversals of a binary tree In order traversal Post order traversal Preorder traversal Binary search trees (bst) Insertion in bst Deletion of a node Search for a key in bst • Height balanced tree • b-tree Insertion Deletion

Seminar - 5 Lectures
Expert Talk - 5 LectureS
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

1. Data Structure through C/C++ Author : Tennaunbuam.
2. Let us C Author : Kanitkar.
3. Pointer in C Author : Kanitkar.
4. Data and File Structure Author : Trembley & Sorrenson.

CS-08: WEB PROGRAMMING

Objective:

- To learn web programming
- Learn to develop web site using PHP

Unit No.	Topic	Detail
1	**Web Programming**	• Static and Dynamic Web • Client side & Server Side Scripting • Introduction to other server side languages • Webserver (IIS & Apache) • HTTP & HTTPS protocol • FTP • Web Hosting, Virtual Host, Multi-Homing • Distributed Web Server Overview, • Document Root
	Web Services	XML and JSON • Introduction to JSON • Installation & Configuration • Resource Types • JsonSerializable • JSON Functions : json_decode, json_encode
2	**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 variable • GET & POST method • PHP Operator • Conditional Structure & Looping Structure • Array • User Defined Functions: ▪ argument function ▪ default argument ▪ variable function ▪ return function • Variable Length Argument Function ▪ func_num_args ▪ func_get_arg, func_get_args • Variable Functions (Gettype, settype, isset, unset,strval, floatval, intval, print_r) • String Function(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(), strcspn(), strpbrk(), substr_compare(), substr_count(), ucfirst(), ucwords()) • Math Function(Abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand, cos(), acos(), sin(), asin(), tan(), atan(), bindec(), decbin(), hexdec(), dechex(), is_finite(), is_infinite(), log(), base_convert(), deg2rad()) • Date Function (Date, getdate, setdate, Checkdate, time, mktime, date_add(), date_create(), date_format(), gmdate(), localtime(), strftime(), strptime(), strtotime(), gettimeofday()) • Array Function (Count, list, in_array, current, next, previous, end, each, sort, rsort, assort, arsort, array_merge, array_reverse, array_diff(), array_merge_recursive(), array_shift(), array_slice(), array_unique(), array_unshift(), array_keys(), array_key_exists(), array_push(), array_pop(), array_multisort(), array_search()) • Miscellaneous Function (define, constant, include, require, header, die, exit) • File handling Function (fopen, fread, fwrite, fclose, file_exists, is_readable, is_writable, fgets, fgetc, file, file_get_contents, fputcsv, fputs, file_putcontents, ftell, fseek, rewind, copy, unlink, rename, move_uploaded_file)
3	**Handling Form, Session Tracking & PHP Components**	• Handling form with GET & POST • Cookies • Session • Server variable • PHP Components - PHP GD Library - PHP Regular expression - Uploading file - Sending mail using mail() - 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

4	**Introduction of SQL**	• Working with MySQL using PhpMyAdmin • SQL DML Statement (Insert, Update, Select, Delete) Command • PHP-MySQL Connectivity • PHP-MySQL Functions • mysql_connect, mysql_close,mysql_error, msyql_errno, mysql_select_db, mysql_query, mysql_fetch_array, mysql_num_Rows, mysql_affe cted_Rows, mysql_fetch_assoc, mysql_fetch_field , ysql_fetch_object,mysql_fetch_row, mysql_insert_id, mysql_num_fields,mysql_result, mysql_tablename, mysql_list_tables, mysql_list_fields, mysql_field_type, mysql_db_name, mysql_db_query, mysql_data_seek
5	**jQuery**	• What IsjQuery? • jQuery Syntax • jQuery Selector - Element Selector - Class Selector - id Selector • jQuery Events Click, dbclick, keypress, keydown, keyup, submit, change, focus, blur, load, resize, scroll, unlode • jQuery Effects hide show, fade, slide

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures
Total Lectures: 60+15=75

Reference Books:

1. Modern PHP: New Features and Good Practices by Josh Lockhart (ORELLY)
2. PHP Cookbook: Solutions & Examples for PHP Programmers by David Sklar and Adam Trachtenberg (ORELLY)
3. Programming PHP by Kevin Tatroe and Peter MacIntyre ORELLY)
4. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman (Peachpit Press)

Additional Topics (Not to be asked in examination) :

Student should be aware of followings

- Uses and Advantages of CMS
- Wordpress [Introduction & Installation]
- Joomla [Introduction & Installation]
- Magento [Introduction & Installation]

CS-09: COMPUTER ORGANIZATION AND ARCHITECTURE		
Objective: To learn how hardware of computer system works		
Unit No.	**Topic**	**Detail**
1	**Digital Logic Circuits**	• **Logic Gates** ▪ AND,OR,NOT,NAND,NOR,XOR, Exclusive NOR gates • **Boolean Algebra** ▪ Boolean algebra? ▪ Boolean variable and Boolean function (Analog and Digital Signals) ▪ Truth table ▪ Postulates ▪ Theorem related to postulates ▪ Simplified Boolean function using postulates and draw logical diagram of simplified function ▪ Simplified Boolean function using Karnaugh map method with DON'T CARE condition • **Sequential And Combinational Circuits** ▪ Clock pulses ▪ Combinational circuit, sequential circuit and adder • **Flip Flops** ▪ SR, Clocked SR, D, JK, JK – Master Slave, T • **Universal Gate**
2	**Digital Component**	• Integrated Circuits ▪ Decoders (2 X 4, 3 X 8) ▪ Encoders (Octal to Binary – 8 X 3) ▪ Multiplexer (4 X 1) ▪ Demultiplexer (1 X 4) • **Register** ▪ Block diagram of register ▪ Parallel register and shift register ▪ Asynchronous 4-bits Binary Counter
3	**Data Representation**	• Multiplication and division of two binary numbers • Floating point representation • Fixed point representation • Error Detection code – (Parity Bit)
4	**Central Processing Unit**	• Introduction Of CPU • Major component of CPU • **General Register Organization**

		▪ control word ▪ Accumulator Register • **Stack Organization** ▪ Register stack ▪ Memory stack ▪ Polish notation and reverse polish notation • **Arithmetic And Logic Unit** ▪ Block diagram of ALU • **Interrupts**
5	**Input-Output Organization**	• Memory buses • Block diagram and function • Data Bus, Address Bus and Control lines • Input Output Buses • Concept of input output interface • Input Out Processor (IOP) • Direct Memory Access • DMA controller

Students seminar - 5 Lectures
Expert Talk - 5 Lectures
Students Test - 5 Lectures
Total Lectures 60 + 15 = 75

Reference Books:

1. Computer System Architecture – By Morris Mano (PHI).
2. Digital Logic And Computer Design – By Morris Mano.
3. Digital Computer Electronics – By Malvino And Leach.

Hands On (Not to be asked in examination):

- Instruction Formats **-** Simulator Base Program

CS-10: MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE

Objective:

- To Aware about basic Mathematics and Statistics
- To develop Reasoning ability and Logical ability
- To develop Arithmetic's ability
- To develop a positive attitude towards learning Mathematics & statistics
- To perform mathematical & statistical operations and manipulations with confidence, speed and accuracy.

Unit No.	Topic	Details
1	Determinants	• Introduction • 2 × 2 , 3×3 order determinant • Cramer's method for solving linear equation(Two and Three Variables) • Properties of Determinants • Examples
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
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
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

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

Student Seminar – 5 Lectures
Expert Talk – 5 Lectures
Student Test – 5 Lectures
Total Lectures 60 + 15 = 75

Reference Books:

1. Business Mathematics By Sancheti & Kapoor Sultan & Chand
2. Statistical Method By Gupta Sultan & Chand
3. Discrete Mathematical Structures with Applications to Computer Science By J.P. Tremblay & R. Manohar TMH
4. Business Mathematics : V.K. Kapoor
5. Business Mathematics : Dr Kachot
6. Fundamentals of Statistics : S. C. Gupta

CS-11 : PRACTICAL-1 (based on CS – 07)	
Topics	**Marks**
DATA STRUCTURE USING C LANGUGAE	**100**

CS-12 : PRACTICAL-2 (based on CS – 08)	
Topics	**Marks**
WEB PROGRAMMING	**100**

Note:

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

Additional Topics should be taught during the semester (Not to be asked in examination):
Following tools should be used to train students.

- Simulator 8051
- Using Trainer kit
- Case studies of DBMS
- Case studies of data structure