SAURASHTRA UNIVERSITY

RAJKOT – INDIA

Accredited Grade A by NAAC (CGPA 3.05)

CURRICULAM

FOR

B.C.A.

Bachelor of Computer Application

(Semester - 1 and Semester - 2)

Effective From June – 2016

Ordinance, Regulations and Examination Scheme:
Ordinance:

O. B.C.A. – 1 : Candidate for admission to the Bachelor of Computer Application must have passed standard 12^{th} or equivalent examination from Gujarat higher secondary board or any other board.

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

O. B.C.A. – 3 : The duration of the course will be of three full time academic years. The examination for the Bachelor of Computer Application course will be divided into six semesters. No candidate will be allowed to join any other course or service simultaneously.

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

O. B.C.A. – 5 : No candidate will be admitted to any semester examination for B.C.A. 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.C.A. – 6 : Candidate desirous of appearing at any semester examination of the B.C.A. 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.C.A. – 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.C.A. – 8 : There shall be an examination at the end of each semesters 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.C.A. 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.C.A. – 10: Medium of instruction is English.

O.B.C.A. -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 then two subjects.

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

That is a candidate will be permitted to continue his/her study upto the 4th 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 5th Semester. Provided he/she should have cleared all 1 to 4 semester.

Regulations:

R.S.B.C.A. – 1. Standard Of Passing

The standard of passing the B.C.A. degree examination will be as under:

(1) To pass any semester examination of the B.C.A. 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 has obtained admission directly in Bachelor of Computer Application semester – 3 will be declared by considering his marks of semester 3 to 6 in aggregate and accordingly class will be awarded.

R.S.B.C.A. – 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.S.B.C.A. – 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 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.

R.S.B.C.A. – 4. Following is the syllabus of each course of B.C.A. Program.

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

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

		• Network card, Sound Card
2	**Input Devices**	• Introduction • Types of Input Devices o 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) o MIDI(Musical Instrument Digital Interface) Keyboard, o Wireless Devices (Keyboard, Mouse, etc) • Types of Scanners o OCR, OMR, MICR, OBR
	Data Storage	• Introduction • Types of Magnetic Storage Devices o Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks • Storage Mechanism of Magnetic Storage Devices o Tracks / Sectors / Clusters / Cylinders • Reading / Writing Data to and from Storage Devices • Seek Time / Rotational Delay - Latency / Access • Time /Response Time • Other Storage Devices o USB - Pen Drive / CD / DVD / Blu-Rav Disk etc. o 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 o Fascimile(FAX) o OLED (Organic LED) o Headphone o SGD (Speech Generating Device) o COM (Computer Output Microfilm) o 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 4.O -Lee Philips.
6. MCSE Networking Essential Training Guides.
7. Mastering In FrontPage – BPB.

CS-05 : PRACTICALS-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 : PRACTICALS-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

Bachelor of Computer Application
(Semester - 1 and Semester - 2)
Saurashtra University
Effective from June – 2016

B.C.A. (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 to be taught during the semester-2 (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

SAURASHTRA UNIVERSITY

RAJKOT – INDIA

CURRICULAM

FOR

B.C.A.

Bachelor of Computer Application

(Semester III and Semester IV)

Effective From June – 2017

B.C.A. (Semester – III)			
SR.NO	**SUBJECT**	**NO. OF LECT. PER WEEK**	**Credit**
1	**CS – 13** SAD, Software Quality Assurance and Testing	5	5
2	**CS – 14** C++ and Object Oriented Programming	5	5
3	**CS – 15** RDBMS Using Oracle	5	5
4	**CS –16** Content Management System using Word Press	5	5
5	**CS – 17** Practical (Based On CS-13, CS-14)	5	5
6	**CS – 18** Practical (Based On CS-15, CS-16,)	5	5
Total Credits			30

Note:

1. Credit of each subject is 5. Total credit of semester is 30.
2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
3. Total marks of each practical paper are 100. No internal examination marks in practical papers.

CS – 13 : SAD, Software Quality Assurance and Testing				
No.	**Topics**	**Details**	**Marks weight in %**	**Min Lect.**
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	20	13

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 Artifacts • Test case • Test Script • Test Plan • Test Harness • Test Suite ▪ Static Testing • Informal Review • Walthrough • 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 ▪ Nonfunctional Testing • Performance Testing • Stress Testing • Load Testing • Usability Testing • Security Testing	**20**	**15**

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
		▪ Theory and Practical Case-Study of Testing Tools
		  • Win runner
		  • Load runner
		  • QTP
		  • Rational Suite
			20	**12**

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	**20**	**10**

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	20	10
		TOTAL	**100**	**60**

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=75

Reference Book

1. Analysis & Design of Information System - James A. Senn.
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"
8. http://en.wikipedia.org/wiki/Software_testing
9. http://www.onestoptesting.com/
10. http://www.opensourcetesting.org/functional.php

CS - 14 : C++ and Object Oriented Programming				
No	Topics	Details	Marks weight in %	App. Lect.
1	**Principles of object oriented programming Tokens, expressions and control statements**	• Procedure – oriented programming • Object oriented programming paradigm • Basic concepts of object oriented Programming • Benefits of object oriented programming • Application of object oriented programming • What is c++? • Application of c++ • Input/output operators • Structure of c++ program • Introduction of namespace • Tokens : keywords, identifiers, basic data types, user- defined types, derived data types, symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables • Operators in C++: scope resolution operator, member referencing operator, memory management operator, manipulators, type cast operator. • Expression : Expression and their types, special assignment operator, implicit conversions, operator precedence • Control structures ♦ Conditional control structure :- simple if, if...else , nested if else, switch etc. ♦ Looping control structure:- for, while , do...while	20	15
	Functions in C++	• The main function • Function prototype • Call by reference • Return by reference • Inline function • Default arguments • Const arguments		

		• Functions overloading • Adding C Functions turbo C++		
2	**Classes and Objects, Constructor and 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 • Static member functions • Arrays of objects • Objects as function arguments • Friendly functions • Returning objects • Const member function • Pointer to members	20	12
		• Characteristics of constructor • Explicit constructor • Parameterized constructor • Multiple constructor in a class • Constructor with default argument • Copy constructor • Dynamic initialization of objects • Constructing two dimensional array • Dynamic constructor • MIL , Advantage of MIL • Destructors		

3	**Operator overloading and 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 & Abstract class • Constructors in derived class • Application of Constructor and Destructor in inheritance • Containership, Inheritance V/s Containership	20	11
4	**Pointer, Virtual functions and 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.	20	10

5	**Working with Files, Exception handling, Introduction to Template STL**	• File stream classes • Opening and closing a file • Error handling • 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 • Overview 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	20	12
		TOTAL	100	60

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=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 Programmin in C++ - Robaret Laphore
8. Let us C++ - Yashvant Kanitkar, BPB

CS – 15 : RDBMS Using Oracle				
No.	Topics	Details	Marks weight In %	Min Lect.
1	**DBMS Overview, SQL, SQL*Plus**	• Introduction to DBMS • Introduction to RDBMS • Dr.E.F.Codd Rules • Importance of E.R.Diagram in Relational DBMS. • Normalization • Introduction to SQL • SQL Commands and Datatypes • Introduction to SQL*Plus • SQL*Plus formatting commands • Operator and Expression • SQL v/s SQL*Plus	20	10
2	**Managing Tables and Data, Data Control And Transaction Control Command**	• Creating , Altering & Dropping tables • Data Manipulation Command like • Insert, update, delete • Different type of constraints and applying of constration • 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, cos, decode, exp, floor, greatest, least, log, log10, max, min, rem, round , sign, sin, sinh, sqrt, tan, trunc • Character Function chr, concat, initcap, lower, lpad, ltrim, replace, rpad, rtrim, soundex, substr, treat, trim, upper • 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	20	15

		• Grant, Revoke command • What is transaction? • Starting and Ending of Transaction Commit, Rollback, SavePoint		
3	**Other ORACLE Database Objects, Concurrency control using lock**	• View • Sequence • Synonyms, • Database Links • Index o B*Tree Indexes o Bitmap Indexes o Function-Based Indexes o Application Domain Indexes • Cluster, • Snapshot • What Are Locks? • Locking Issues o Lost Updates o Pessimistic Locking o Optimistic Locking o Blocking o Deadlocks o Lock Escalation • Lock Types o DML Locks o DDL Locks o Latches o Manual Locking and User-Defined Locks	15	10
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 • Using Cursor(Implicit, Explicit) • Exception Handling • Creating and Using Procedure, Functions, • Package, • Triggers • Creating Objects, • Object in Database-Table • PL/SQL Tables, Nested Tables, Varrays	20	15

5	**Oracle Database Structure and Storage Database, Resource Management and Task Scheduling**	• Instance Architecture o Database Processes o Memory Structure. o Data files • Creating & Altering Database • Opening & shutdown Database • Initialization Parameter • Control Files, Redo Logs files • Tablespace(Create, Alter, Drop) • Rollback Segment (Create, Alter) (System & Transaction RBS) • Oracle Blocks • Import • Export • SQL*Loader • Managing Automated Database Maintenance Tasks • Managing Resources with Oracle Database Resource Manager • Oracle Scheduler Concepts • Scheduling Jobs with Oracle Scheduler • Administering Oracle Scheduler	20	10
	Total		100	60

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures (Managing a Multitenant Environment using Oracle 12c)
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=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 Programming by McLaughlin – Oracle Press
4. SQL,PL/SQL The programming - Lang.Of Oracle Ivan Bayross - BPB

CS – 16: Content Management System using Word Press Word Press				
No.	**Topic**	**Details**	**Marks weight In %**	**Min. Lect.**
1	**OOP**	- Concept of oop • Class • Property • Visibility • Constructor • Destructor • Inheritance • Scope Resolution Operator (::) • Autoloading Classes • Class Constants - Mysql Database handling with oop (insert, update, select, delete)	10	6
2	**Introduction Installation & Configuration**	What is Content Management System (CMS)? - Introduction of Wordpress - Features of Wordpress - 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	15	9
3	**Theme**	- What is theme? - How to install & activate theme. - Introduction of common WordPress theme template files.	25	15
	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 • WP Super Cache • Regenerate Thumbnails • Advanced Custom Fields		
4	**Theme development**	- Anatomy of a Theme: header.php, footer.php and sidebar.php - 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) - The Loop (have_posts (), the_post()) - Template Tags 1. 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()) 2. Author tags (the_author(), get_the_author(), the_author_link(), get_the_author_link(), the_author_meta(), the_author_posts()) 3. Category tags (category_description(), single_cat_title(), the_category()) 4. Link tags (the_permalink(), get_permalink(), home_url(), get_home_url(), site_url(), get_site_url()) 5. 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()) 6. Post Thumbnail tags (has_post_thumbnail(), get_post_thumbnail_id(), the_post_thumbnail(), get_the_post_thumbnail())	30	18

		7. Navigation Menu tags (wp_nav_menu()) 8. 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		
5	**Advanced development**	- Advanced functions • add_action() • add_filter() • add_shortcode() • do_shortcode() • register_nav_menu() - Custom Post Types • register_post_type() • register_taxonomy() - Widget Area • register_sidebar() dynamic_sidebar()	20	12
		TOTAL:	100	60

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=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)

CS-17 : Practical Based On CS – 13 & CS – 14		
Sessions	**Topics**	**Marks**
I	• CS – 13	50
II	• CS – 14	50

Note : Each session is of 3 hours for the purpose of practical examination.

CS-18 : Practical And Viva Based On CS – 15 & CS – 16		
Sessions	**Topics**	**Marks**
I	• CS – 15	50
II	• CS – 16	50

Note : Each session is of 3 hours for the purpose of practical examination.

B.C.A. (Semester – IV)			
SR.NO	**SUBJECT**	**NO. OF LECT. PER WEEK**	**CREDIT**
1	**CS – 19** Programming with JAVA	5	5
2	**CS – 20** Programming with C#	5	5
3	**CS – 21** Network Technology and Administration	5	5
4	**CS –22** Operating Systems Concepts With Unix / Linux	5	5
5	**CS – 23** Practical (Based On CS-19, CS-22)	5	5
6	**CS – 24** Practical (Based On CS-20)	5	5
Total Credit			30

Note:

1. Credit of each subject is 5. Total credit of semester is 30.
2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
3. Total marks of each practical paper are 100. No internal examination marks in practical papers.

CS – 19 PROGRAMMING WITH JAVA				
No	**Topics**	**Details**	**Marks weight In %**	**Min Lec.**
1	**History, Introduction and 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) - Varargs	**20**	**10**

2	**Inheritance, Java Packages**	- Universal Class (Object Class)
		- Access Specifiers (public, private, protected, default, private protected)
		- Doing Inheritance
		- Constructors in inheritance
		- Method Overriding
		- Interface
		- Nested and Inner Class
		- Abstract and Final Class
		- Normal import and Static Import
		- Introduction to Java API Packages and imp. Classes
		  o java.lang
		  o java.util
		  o java.io
		  o java.net
		  o java.awt
		  o java.awt.event
		  o java.applet
		  o java.swing
		- java.lang Package Classes (Math, Wrapper Classes, String, String Buffer)
		- java.util Package Classes (Random, Date, GregorianCalendar, Vector, HashTable, StringTokenizer)
		- Creating and Using UserDefined package and sub-package
			20	**15**

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 - Stream and its types (Input, Output, Character, Byte) - File and RandomAccessFile Class - Reading and Writing through Character Stream Classes (FileReader, BufferedReader, FileWriter, BufferedWriter) - Reading and Writing through Byte Stream Classes (InputStream,	**20**	**10**

		FileInputStream, BufferedInputStream, DataInputStream, OutputStream, FileOutputStream, BufferedOutputStream, DataOutputStream) - StreamTokenizer Class - Piped Streams, Bridge Classes : InputStreamReader and OutputStreamWriter - ObjectInputStream, ObjectOutputStream		
4	**Applets**	- Introduction to Applet - Applet Life Cycle - Implement & Executing Applet with Parameters - Graphics class	**20**	**10**
	Layout Managers	- FlowLayout - BorderLayout - CardLayout - GridLayout - GridBagLayout with GridBagConstraints - Intro. to BoxLayout, SprigLayout, GroupLayout - Using NO LAYOUT Manager		

5	**GUI using SWING Event Handling**	- Introduction to AWT and Swing - Difference Between AWT and Swing Components - Swing Components o JFrame, JPanel o JLabel, JButton, JRadioButton, JCheckBox o JTextField, JPasswordField, JTextArea o JScrollBar, JComboBox, JList o Menus (JMenuBar, JMenu, JMenuItem) - Introduction to Event Handling - Event Delegation Model - Event Packages o AWT Event Package o Swing Event Package - Event Classes (ActionEvent, ItemEvent, FocusEvent, MouseEvent, MouseWheelEvent, TextEvent, WindowEvent, etc.) - Listener Interfaces (ActionListener, ItemListener, FocusListener, KeyListener, MouseListener, MoutMotionListener, TextListener, WindowListener, etc.) - Adaptor Classes (FocusAdaptor, KeyAdaptor, MouseAdaptor, MouseMotionAdaptor	**20**	**15**
		Total	**100**	**60**

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=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/

CS – 20 PROGRAMMING WITH C#				
No	**Topics**	**Details**	**Marks weight In %**	**Min Lec.**
1	**.NET Framework and 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)	**20**	**10**

2	**Class and Inheritance, Property, Indexer, 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 and using Indexer Creating and using Pointers (unsafe concept) Creating and using Delegates (Single / Multicasting) Creating and using Events with Event Delegate Collections (ArrayList, HashTable, Stack, Queue, SortedList) and their differences.	**20**	**15**
3	**Windows Programming**	Creating windows Application MessageBox class with all types of Show() method 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) - ToopStrip - Timer - Panel and GroupBox	**20**	**15**

		Dialog Boxes (ColorDialog, FontDialog, SaveFileDialog and OpenFileDialog) MDI Concept with MDI Notepad Concept of Inheriting Form		
4.	**Database Programming with ADO.NET**	Concept of Connected and Disconnected 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	**20**	**12**
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 Fiend and Summary in Report Types of Setup Projects Creating Setup Project - File System Editor - User Interface Editor - Launch Conditions Editor	**20**	**8**
		Total	**100**	**60**

Students seminar - 5 Lectures
Expert Talk - 5 Lectures
Students Test - 5 Lectures
TOTAL LECTURES 60+15=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

CS – 21 NETWORK TECHNOLOGY AND ADMINISTRATION				
No	**Topics**	**Details**	**Marks weight in %**	**Min Lec.**
1	**Basics of Network, Network Models and LAN Sharing**	• Network concepts - What is network - Use of network • Network model -peer – to – peer -client – server • Network Services - File service, - Print service, - Comm. service, - Data base service, - Security service, - Application service • Network Access Methods - csma / cd, csma / ca, - Token passing - Polling • Network Topologies - Bus, Ring, Star, Mesh,Tree,Hybrid • 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. • aping of network drive • Disk quota • Encryption • Compression • Net meeting	20	12

2	**Transmission Media Multiplexing & Switching Concepts Network devices**	• 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, Bluetooth tech. • Different Frequency Ranges • Multiplexing & Demultiplexing • Multiplexing Types - FDM, - TDM, - CDM, - WDM • Switching Tech. - Circuit Switching, - Message Switching, - Packet Switching • CABLE NETWORK DEVICES • LAYER1 DEVICES - LAN CARD, - MODEM , - DSL & ADSL - HUB(Active,Passive,Smart hub) - REPEATER • LAYER2 DEVICES - SWITCH(Manageable, nonmanagable) - BRIDGE(Source route, Transactional) • LAYER3 DEVICES - ROUTER - LAYER3 SWITCH - BROUTER - GATEWAY - Network Printer • WIRELESS NETWORK DEVICES Wireless switch Wireless router, ACCESSPOINT	20	15

3	**Network Protocols, Network Routing**	• Packets &Protocols • □Conn. Oriented protocols -TCP& connection less protocols-UDP • TCP/IP STACK - HTTP - FTP - SMTP - POP3 - SNMP - TELNET - ARP - RARP • IPX/SPX • AppleTalk, • NetBIOS Name PROTOCOL • L2CAP, RFCOMM Protocol • What is routing • Requirements of routing • Types of Routing - static - dynamic - default • Routing protocols - Exterior Routing protocol 1)BGP - Interior Routing protocol (1)Distance vector routing - RIP - IGRP - EIGRP (2)Link state routing - OSPF - IS IS	20	10

4	**IP ADDRESSING, Windows 2008 server**	• What is ip address? • Types of ip address • □ipv4 - Class structure - subneting,supernetting • ipv6 - Basic structure of ipv6 - Implementation of ipv6 • Migration from ipv4 to ipv6 • Installation of 2008 enterprise server • Various editions of windows 2008 server • Installation & Configuration of Active Directory - Domains, Trees, Forests concept • Accounts(User, Group,Computer) • Policy (Security and audit) • Logging Events • MMC(Microsoft Management console)	20	11

5	**Basics of Network Security, Internet connection & Sharing**	• Fundamental of Network Security • Requirements of network Security • Policies, Standard, Procedures, Baselines, Guide lines • 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.	20	12
		Total	100	60

Students seminar - 5 Lectures
Expert Talk - 5 Lectures
Students Test - 5 Lectures
TOTAL LECTURES 60+15=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

CS – 22 : Operating Systems Concepts With Unix / Linux				
No	**Topics**	**Details**	**Marks weight In %**	**App. Lect**
1	**Introduction, Process Management, Memory Management**	• Meaning of OS • Functions of OS • Features of OS • OS Types (User Point of View) • OS Types (Features Point of View)	20	12
		• Introduction of OS process • Process State Transition Diagram • Process Scheduling o FCFS o SJN o Round Robin o Priority Base Non Preemptive o Priority Base Preemptive		
		• Physical Memory and Virtual Memory • Memory Allocation • Contiguous Memory Allocation • Noncontiguous Memory Allocation • Virtual Memory Using Paging • Virtual Memory Using Segmentation		
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 o Ordinary Files o Directory Files o Device Files • Unix File & Directory Permissions	20	17
		• 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 o < o > o < o >> o |		

		• 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 • Tools for mathematical calculations bc,factor • Monitoring Input and Output tee,script • Tools For Displaying Date and Time cal,date • Communications telnet,wall,mtod,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		

3	**Shell Programming Getting Started with Linux, Linux Booting**	• Shell Keywords • Shell Variables • System variables PS2, PATH, HOME,LOGNAME, MAIL, IFS, SHELL, TERM, MAILCHECK • User variables set, unset and echo command with shell variables • Positional Parameters • Interactive shell script using read and echo • Decision Statements o if then fi o if then else fi o if then elif else fi o case esac • test command • Logical Operators • Looping statements o for loop o while loop o until loop o break, continue command • Arithmetic in Shell script • Various shell script examples	20	16
		• 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		
		• Linux Booting Process - LILO Configuration - GRUB Configuration • User Interfaces (GUI and CUI)		
4	**Working with X-Windows (Ubuntu)**	• Layered Structure of X - Window Manager - Desktop Environment - Start Menu - User Configuration - startx Command • Window Managers - GNOME	20	7

		- 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 • Configuring X - /etc/X11/Xorg.conf file - Tuning Xorg.conf - Choosing a Window Manager • Create, Delete, Rename, Copy files and folders • Install / Uninstall Software		
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	20	8
		Total	**100**	**60**

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=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

Hands-On (Not to be asked in the examination)

- Installation of Unix / Linux
- User and Group Creation
- Demo of Various Applications available in Unix / Linux like Star Office, Games and other productivity tools.
- Demo of GNOME, KDE Desktops in Linux.

CS - 23 : Practical based on CS – 19 & CS – 22		
Sessions	**Topics**	**Marks**
I	♦ CS – 19	50
II	♦ CS – 22	50

Note : Each session is of 3 hours for the purpose of practical examination.

CS - 24 : Practical Based on CS –20		
Sessions	**Topics**	**Marks**
I	♦ CS – 20	100

Note : Each session is of 3 hours for the purpose of practical examination.

SAURASHTRA UNIVERSITY

RAJKOT – INDIA

Grade 'A' by NAAC

CURRICULAM

FOR

B.C.A.

Bachelor of Computer Application

(Semester V and Semester VI)

Effective from June – 2018

Bachelor of Computer Application
(Semester – V and Semester - VI)
Saurashtra University
Effective from June - 2018

B.C.A. (Semester – V)			
SR.NO	**SUBJECT**	**NO. OF THEORY LECT. PER WEEK**	**NO. OF PRACTICAL PER WEEK**
1	**CS – 25** Advance Java Programming (J2EE)	5	6
2	**CS – 26** Programming with ASP.NET	5	6
3	**CS – 27** Web Searching Technology and Search Engine Optimization	5	3
4	**CS –28** Practical - 1 (based on CS-25)	-	6
5	**CS – 29** Practical – 2 (based On CS-26 and CS-27)	-	6
6	**CS – 30** Project Viva	-	6

Note:

1. Credit of each subject is 5. Total credit of semester is 36.
2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
3. Total marks of each practical and project-viva paper are 100. No internal examination marks in practical and project-viva papers.

CS-25 Advanced Java Programming (J2EE)				
Sr. No	**Topics**	**Details**	**Weightage in %**	**Approx Lectures**

1	**The J2EE Platform, JDBC (Java Database Connectivity)**	• Introduction to J2EE
		• Enterprise Architecture Styles:
		  ▪ Two-Tier Architecture
		  ▪ Three-Tier Architecture
		  ▪ N-Tier Architecture
		• Enterprise Architecture
		• The J2EE Platform
		• Introduction to J2EE APIs (Servlet, JSP, EJB, JMS, JavaMail, JSF, JNDI)
		• Introduction to Containers
		• Tomcat as a Web Container
		• Introduction of JDBC
		• JDBC Architecture
		• Data types in JDBC
		• Processing Queries
		• Database Exception Handling
		• Discuss types of drivers
		• JDBC Introduction and Need for JDBC
		• JDBC Architecture
		• Types of JDBC Drivers
		• JDBC API for Database Connectivity (java.sql package)
		• Statement, PreparedStatement
		• CallableStatement
		• ResultSetMetaData
		• DatabaseMetaData
		• Other JDBC APIs
		• Connecting with Databases (MySQL, Access, Oracle)
			20	**12**

2	**RMI** **Servlet**	• RMI overview • RMI architecture • Stub and Skeleton • Developing and Executing RMI application • Servlet Introduction • Architecture of a Servlet • Servlet API (Javax.servlet and avax.servlet.http) • Servlet Life Cycle • Developing and Deploying Servlets • Handling Servlet Requests and Responses • Reading Initialization Parameters • Session Tracking Approaches (URL Rewriting, Hidden Form Fields, Cookies, Session API) • Servlet Collaboration • Servlet with JDBC	**20**	**12**
3	**JSP,** **Java Beans**	• Introduction to JSP and JSP Basics • JSP vs. Servlet • JSP Architecture • Life cycle of JSP • JSP Elements: Directive Elements, Scripting Elements, Action Elements ▪ Directives Elements (page, include, taglib) ▪ Scripting Elements (Declaration, scriptlet, expression) ▪ Action Elements (JSP:param, JSP:include, JSP:Forward, JSP:plugin) • JSP Implicit Objects • JSP Scope • Including and Forwarding from JSP Pages • include Action • forward Action • Working with Session & Cookie in JSP • Error Handling and Exception Handling with JSP • JDBC with JSP • JavaBean Properties • JavaBean Methods • Common JavaBean packaging	**20**	**12**

4	**MVC Architecture, EJB, Hibernate**	• Introduction to MVC • Implementation of MVC Architecture • Introduction • Benefits of EJB • Restriction on EJB • Types of EJB • Session Beans • Entity Beans • Message-driven beans • Timer service • Introduction to Hibernate • Need for hibernate • Features of hibernate • Disadvantages of Hibernate • Exploring Hibernate Architecture • Downloading and Configuring and necessary files to Hibernate in Eclipse • Jars files of hibernate. • Hibernate Configuration file • Hibernate Mapping file • Basic Example of Hibernate • Annotation • Hibernate Inheritance • Inheritance Annotations • Hibernate Sessions	**20**	**12**
5	**Spring, Struts**	• Introduction of Spring Framework • Spring Architecture • Spring Framework definition • Spring & MVC • Spring Context definition • Inversion of Control (IoC) in Spring • Aspect Oriented programming in Spring (AOP) • Understanding Struts Framework • Comparision with MVC using RequestDispatcher and the EL • Struts Flow of Control • Processing Requests with Action Objects • Handling Request Parameters with FormBeans • Prepopulating and Redisplaying Input Forms • Using Properties Files	**20**	**12**
		Total	**100**	**60**

Reference Books:

(1) The Complete Reference Java 2 - Herbert Schildt and Patrick Naughton
(2) Java Server Programming For Professionals, Ivan Bayross, Sharanam Shah – Shroff publication
(3) Advanced Java Programming [ISBN: 978 - 93 - 81786 - 91 – 8] by Bharat & Company
(4) Developing Java Servlets – Techmedia
(5) JSP Beginner's Guide – Tata McGraw Hill by Gary Bolling, Bharathi Nataragan
(6) Spring and Hibernate, K. Santosh Kumar, - Tata McGraw-Hill
(7) Hibernate Made Easy: Simplified Data Persistence with Hibernate and JPA (Java Persistence API) Annotations by Cameron Wallace McKenzie, Kerri Sheehan
(8) Spring Framework: A Step by Step Approach for Learning Spring Framework - CreateSpace Independent Publishing Platform
(9) Beginning Hibernate Second Edition By Jeff Linwood, Dave Minte - APress

CS-26 Programming With ASP.NET				
Sr. No	**Topic**	**Detail**	**Weightage In %**	**Approx. Lectures**
1	**Framework And Web Contents Validation Controls**	• Overview of Asp.NET Framework • Client Server Architecture • Application Web Servers • Installation of IIS server • Types of Files in Asp.NET • Types of controls in Asp.NET • Page Architecture, Adding Controls to a Webpage • The Page Class • Webfor • Introduction to standard Controls (Buttons, Textbox, Checkbox, Lable, Panel, Listbox, Dropdownlist etc.) • Running an Asp.Net Application, File Upload Control • What is Validation? • Client Side Validation • Server Side Validation • Types (RequieredField Validator, Range Validator, CompareField Validator, RegularExpression Validator, Custom Validator, ValidationSummery Control)	**20**	**12**
2	**State Management**	• What is State? • Why is it Required in Asp.Net? • Client Side State Management • Server Side State Management • Various State Management Techniques (View State, Query String, Cookie, Session State, Application State)	**20**	**12**
3	**ADO.NET And Database**	• Architecture of ADO.NET • Connected Architecture • DisConnected Architecture • ADO.NET Classes (Connection, Command, • DataReader, DataAdapter, DataSet, DataColumn, DataRow, DataConstraints, DataView etc.) • The Gridview Control, The Repeater Control • Binding Data to DataBound Controls, • Diplaying Data in a webpage using SQLDataSource Control	**20**	**12**

		• DataBinding Expressions		
4	**Master Pages and Theme Caching, Application Pages And Data**	• What is Master Page ? • Requirement Of a Master Page in an Asp.NET application • Designing Website with Master Page, Theme and CSS • Overview • Page Output Caching • Partial Page Caching, Absolute Cache Expiration • Sliding Cache Expiration • Data Caching	**20**	**12**
5	**Working With XML Asp.NET Application Configuration and Deployment of Application**	• Reading Datasets From XML • Writing DataSets With XML • WebServices (Introduction, HTTP, SOAP, UDDI,XML, Creating a Web Servic, Consuming a Web Service) • Introduction To Web.Config • Common Configuration Sections • AppSettings • Tracing • Custom Errors • Authentication And Authorization • Deployment of Application in web server	**20**	**12**
		Total	**100**	**60**

Reference Books :

(1) Asp.Net – Unleashed
(2) Asp.Net – Wrox Publication
(3) Programming With ASP.NET [ISBN: 978 - 81 - 909634 - 7 – 3] by Bharat & Company
(4) Beginning.ASP.NET.3.5.in.C.Sharp.2008.From.Novice.to.Professional - Apress

CS-27 Web Searching Technology and Search Engine Optimization				
Sr. No	**Topic**	**Detail**	**Weightage In %**	**Approx. Lectures**
1	**The Search Engines: Reflecting Consciousness and Connecting Commerce Search Engine Basics**	• The Mission of Search Engines • The Market Share of Search Engines • The Human Goals of Searching • Determining Searcher Intent: A Challenge for Both Marketers and Search Engines • How People Search? • How Search Engines Drive Commerce on the Web? • Eye Tracking: How Users Scan Results Pages? • Click Tracking: How Users Click on Results? Natural Versus Paid • Understanding Search Engine Results • Algorithm-Based Ranking Systems: Crawling, Indexing, and Ranking • Determining Searcher Intent and Delivering Relevant • Fresh Content • Analyzing Ranking Factors • Using Advanced Search Techniques • Vertical Search Engines • Country-Specific Search Engines	**20**	**12**

2	**Determining SEO Objectives and Defining Site's Audience First Stages of SEO**	• Setting SEO Goals and Objectives • Developing an SEO Plan Prior to Site Development • Understanding Audience and Finding Niche • SEO for Raw Traffic • SEO for E-Commerce Sales • SEO for Mindshare/Branding • SEO for Lead Generation and Direct Marketing • SEO for Reputation Management • SEO for Ideological Influence • The Major Elements of Planning • Identifying the Site Development Process and Players • Defining Site's Information Architecture • Auditing an Existing Site to Identify SEO Problems • Identifying Current Server Statistics Software and Gaining Access • Determining Top Competitors • Assessing Historical Progress • Benchmarking Current Indexing Status • Benchmarking Current Rankings • Benchmarking Current Traffic Sources and Volume • Leveraging Business Assets for SEO • Combining Business Assets and Historical Data to Conduct SEO/Website SWOT Analysis	**20**	**12**

3	**Developing an SEO-Friendly Website**	• Making Site Accessible to Search Engines • Creating an Optimal Information Architecture • Root Domains, Subdomains, and Microsites • Optimization of Domain Names/URLs • Keyword Targeting • Content Optimization • Duplicate Content Issues Controlling Content with Cookies and Session IDs • Content Delivery and Search Spider Control • Redirects, Content Management System (CMS) Issues • Optimizing Flash • Best Practices for Multilanguage/Country Targeting	**20**	**12**
4	**Keyword Research, Optimizing for Vertical Search**	• The Theory Behind Keyword Research • Traditional Approaches: Domain Expertise • Site Content Analysis • Keyword Research Tools • Determining Keyword Value/Potential ROI, Leveraging the Long Tail of Keyword Demand, Trending, Seasonality, and Seasonal Fluctuations in Keyword Demand • The Opportunities in Vertical Search • Optimizing for Local Search • Optimizing for Image Search • Optimizing for Product Search • Optimizing for News, Blog, and Feed Search • Others: Mobile, Video/Multimedia Search	**20**	**12**

5	**Tracking Results and Measuring Success An Evolving Art Form: The Future of SEO**	• Why Measuring Success Is Essential to the SEO Process • Measuring Search Traffic • Tying SEO to Conversion and ROI • Competitive and Diagnostic Search Metrics Key Performance • Indicators for Long Tail SEO • The Ongoing Evolution of Search • More Searchable Content and Content Types, Search becoming More Personalized and User-Influenced • Increasing Importance of Local, Mobile, and Voice • Recognition Search • Increased Market Saturation and Competition • SEO As an Enduring Art Form •	**20**	**12**
		Total	**100**	**60**

Reference Books:

(1) The Art of SEO : Mastering Search Engine Optimization By Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola, O'Reilly Media, October, 2009
(2) Web Searching Technology and Search Engine Optimization[ISBN: 978 - 93 - 81786 - 92 - 5] by Bharat & Company
(3) SEO: Search Engine Optimization Bible, By Jerri L. Ledford, 2nd Edition, Wiley India, April, 2009
(4) SEO Warrior: Essential Techniques for Increasing Web Visibility By John I Jerkovic, O'Reilly Media, November, 2009

CS-28 : Practical And Viva Based On CS – 25	
Topics	Marks
CS – 25	100

CS-29 : Practical And Viva Based On CS – 26 and CS-27	
Topics	Marks
CS – 26 and CS - 27	100

Note :

- Practical examination may be arranged before or after theory exam.

CS-30 : Project Viva	**Total Marks: 100**
Project must be developed **in** the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of previous semester or current semester. **(At the time of Project-Viva examination student must show all the Workouts, SDLC, Documentation, Program codes and project in running mode)**	

Note :

- Project must be submitted before two week of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.

Bachelor of Computer Application
(Semester – V and Semester - VI)
Saurashtra University
Effective from June - 2018

B.C.A. (Semester – VI)			
SR.NO	**SUBJECT**	**NO. OF THEORY LECT. PER WEEK**	**NO. OF PRACTICAL PER WEEK**
1	**CS – 31** Mobile Computing using Android and iPhone	5	-
2	**CS – 32** Data Warehousing with SQL Server 2012	5	-
3	**CS – 33** Programming in Python	5	-
4	**CS –34** Practical - 1 (based on CS-31)	-	6
5	**CS – 35** Practical – 2 (based On CS-32 and CS-33)	-	6
6	**CS – 36** Project Viva	-	6

Note:

(1) Credit of each subject is 5. Total credit of semester is 36.
(2) Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
(3) Total marks of each practical and project-viva paper are 100. No internal examination marks in practical and project-viva papers.

CS-31 Mobile Computing using Android and iPhone				
Sr. No	**Topic**	**Detail**	**Weightage In %**	**Approx. Lectures**
1	**Introduction to Android Android Application Design**	• The Open Handset Alliance • The Android Platform, Android SDK • Building a sample Android application • Anatomy of an Android applications • Android terminologies • Application Context, Activities, Services, Intents • Receiving and Broadcasting Intents • Android Manifest File and its common settings • Using Intent Filter, Permissions • Managing Application resources in a hierarchy • Working with different types of resources	**20**	**12**
2	**Android User Interface Design**	• User Interface Screen elements o Button, EditText, TextView, DatePicker, TimePicker, ProgressBar, ListView, GridView, RadioGroup, ImageButton, Fragement • Designing User Interfaces with Layouts o Relative Layout, Linear Layout, Table Layout etc • Dialogs • Drawing and Working with Animation o Frame By Frame Animation o Twined Animation	**20**	**12**
3	**Database Connectivity Using SQLite and Content Provider**	• Using Android Data and Storage APIs • Managing data using SQLite • Sharing Data Between Applications with Content Providers	**20**	**12**

4	**Location Based Services (LBS), Common Android API, Notifications, Services, Deployment of applications**	• Using Global Positioning Services (GPS) • Geocoding Locations • Mapping Locations • Many more with location based services • Android networking API • Android web API • Android telephony API • Notifying the user, Notifying with the status bar • Vibrating the phone • Blinking the lights • Customizing the notifications Services • Application development using JSON in MySQL • Publish android application	**20**	**12**
5	**Introduction To iPhone**	• Introduction To X-Code (IDE) • Framework, Design User Interface for button, text view, text field, etc. • Creating And Building Simple Application • Cocoa Touch And MVC	**20**	**12**
		TOTAL	**100**	**60**

Notes: Android application must be developed using ANDROID STUDIO.

Reference Books:

(1) Android Wireless Application Development By Lauren Darcey and Shane Conder, Pearson Education, 2nd ed. (2011)
(2) Beginning iOS 6 Development By David Mark , Jack Nutting , Jeff LaMarche , Fredrik Olsson Apress Publication.
(3) Using SQLite By Jay A. Kreibich, Publisher: O'Reilly Media
(4) Mobile Computing using Android and iPhone [ISBN: 978-93-81786-93–2] by Bharat & Company
(5) Professional Android 2 Application Development Reto Meier, Wiley India Pvt Ltd (2011)
(6) Beginning Android Mark L Murphy, Wiley India Pvt Ltd

CS –32 Data Warehousing with SQL Server 2012				
No.	**Topic**	**Detail**	**Weightage in %**	**Min. Lect.**
1	Introduction to Data Warehousing	• What Is a Data Warehouse? • Data Warehousing Today • Future Trends in Data Warehousing. • Data Warehouse Architecture • Data Flow Architecture	20	12
2	Designing and Implementation of Data Warehousing	• Logical Design for data warehouse • Physical Design for data warehouse • Design dimension table, fact table for data warehouse • Design and implement effective physical data structure for data warehouse	20	12
3	Creating ETL Solutions with SSIS, Implementing Control Flow in SSIS	• Introduction to ETL with SSIS • Exploring data sources • Implementing data flow using SSIS • Introduction to Control Flow • Creating Dynamic Packages • Using Containers	20	12
4	Enforcing Data Quality, Extending SQL Server Integration Services	• Introduction to Data Quality • Using Data Quality Service to Cleanse data • Using Data Quality Service to match data • Using Scripts in SSIS • Using Custom components in SSIS	20	12
5	Deploying and Configuring SSIS Packages, Consuming	• Overview of SSIS Development • Deploying SSIS Projects • Planning SSIS Package	20	12

	Data in Data Warehouse	Execution • Introduction to Business Intelligence • Introduction to Reporting • Introduction to Data Analysis		
			100	**60**

Notes: For Lab Practice : Microsoft SQL Server 2012 or Higher version

Reference Books:

(1) Implementing a Data Warehouse with Microsoft® SQL Server® 2012 Dejan Sarka Matija Lah Grega Jerkič
(2) Building a Data Warehouse: With Examples in SQL Server – Vincent Rainardi-Apress (2014)
(3) Data mining Explained A manager's guide to customer centric business intelligence by
(4) Data mining by Pieter Adriaans, Dolf Zantinge
(5) Data warehousing in the real world A practical guide for business DSS by Sam Anahory,

CS-33: Programming in Python				
Sr. No.	**Topic**	**Detail**	**Weightage In %**	**Approx. Lectures**
1	**Introduction to Python**	The basic elements of Python, Branching programs, Strings and Input, Iteration, Functions and Scoping, Specifications, Recursion, Global variables, Modules, Files, Tuples, Lists and Mutability, Functions as Objects, Strings, Tuples and Lists, Dictionaries	20	12
2	**OOP using Python**	Handling exceptions, Exceptions as a control flow mechanism, Assertions, Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding, Search Algorithms, Sorting Algorithms, Hashtables	20	12
3	**Plotting using PyLab**	Plotting using PyLab, Plotting mortgages and extended examples, Fibonacci sequence revisited, Dynamic programming and the 0/1 Knapsack algorithm, Dynamic programming and divide and conquer	20	12
4	**Regular Expressions**	Special Symbols and Characters, Regexes and Python, A Longer Regex example (like Data Generators, matching a string etc.) Text Processing: Comma Sepearated values,JavaScript Object Notation (JSON),Python and XML Case Study: Create Regular expressions (Custom), Process telephone numbers, Generate log data, HTML Generators, Tweet Scrub, Amazone ScreenScrapper, Mailmerge	20	12
5	**Python and Data Analytics**	Understand the problem By Understanding the Data Predictive Model Building: Balancing Performance, Complexity, and the Big Data	20	12
		Total	**100**	**60**

Reference Books:

1) John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India
2) Wesley J Chun, Core Python Applications Programming, 3rd Edition.Pearson
3) Michael Bowles, Machine Leaning in Python, Esssential techniques for predictive analysis, Wiley
4) Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press
5) Alex Martelli, Python Cookbook, O’REILLY

CS-34 : Practical And Viva Based On CS – 31	
Topics	Marks
CS – 31	100

CS-35 : Practical And Viva Based On CS – 32 and CS-33	
Topics	Marks
CS – 32 and CS – 33	100

Note :

- Practical examination may be arranged before or after theory exam.

CS-36: Project Viva	**Total Marks: 100**
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of semester-V or semester-VI. **(At the time of Project-Viva examination student must show all the Workouts, SDLC, Documentation, Program codes and project in running mode)**	

Note :

- Project must be submitted before two week of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.