

# **SAURASHTRA UNIVERSITY**

**RAJKOT – INDIA**



**Re-Accredited  
Grade B by NAAC  
(CGPA 2.93)**

**CURRICULAM**

**FOR**

**B.C.A.**

**Bachelor of Computer Application**

**(Semester I and Semester II)**

**Effective From June – 2011**

**Bachelor of Computer Application (Semester – I & II)**  
**Saurashtra University**  
**Effective from June – 2011**

**B.C.A. (Semester – I)**

<b>SR. NO.</b>	<b>SUBJECT</b>	<b>CREDIT</b>	<b>NO. OF THEORY LECT. PER WEEK</b>	<b>NO. OF PRACTICAL PER WEEK</b>
1.	<b>CS – 01</b> COMMUNICATION SKILL	5	5	-
2.	<b>CS – 02</b> PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C	5	5	6
3.	<b>CS – 03</b> COMPUTER FUNDAMENTALS AND EMERGING TECHNOLOGY	5	5	-
4.	<b>CS – 04</b> NETWORKING & INTERNET ENVIRONMENT	5	5	3
5.	<b>CS – 05</b> PRACTICALS ( BASED ON CS-4 & PC SOFTWARE )	5	-	As mentioned above against sr.no. 4 & practicals of PC SOFTWARE
6.	<b>CS – 05</b> PRACTICALS ( BASED ON CS-2 )	5	-	as mentioned above against sr.no. 2
<b>Total Credits of Semester – I</b>				<b>30</b>

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<b>CS-01 : COMMUNICATION SKILL</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
<b>1</b>	<b>Grammar</b>	1. Determiners 2. Tenses <ul style="list-style-type: none"> <li>• Defining a Verb</li> <li>• Chief forms of a Verb</li> <li>• Tense and Time</li> <li>• Further Division of Tenses               <ul style="list-style-type: none"> <li>○ The Present Tense</li> <li>○ The Past Tense</li> <li>○ The Future Tense</li> </ul> </li> </ul> 3. Active – Passive Voice <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Defining the Voice</li> <li>• Some General rules regarding the change of voice</li> </ul> 4. Modals & Auxiliaries <ul style="list-style-type: none"> <li>• Introduction to Auxiliaries</li> <li>• The Primary Auxiliaries</li> <li>• Introduction to Modals</li> <li>• The Most Commonly used Modals</li> <li>• Important points about the Modals</li> <li>• Modals and Their Uses</li> </ul> 5. Prepositions / Prepositional Phrases	<b>20</b>	<b>10</b>
<b>2</b>	<b>Writing Comprehension</b>	1. <b>Business Letters :</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Functions of a Business Letter</li> <li>• Inward Structure / Layout of a Business Letter</li> <li>• Other Important Parts of Business Letter</li> <li>• Outward appearance of a business letter</li> <li>• Arrangement Styles</li> <li>• Salient Features of a Business Letter</li> <li>• Legal Aspects of a business Letters</li> <li>• Kinds of Business Letter               <ul style="list-style-type: none"> <li>Inquiry &amp; Reply</li> <li>Order &amp; Reply</li> <li>Cancellation of order</li> <li>Complaint / Adjustment</li> <li>Sales Letter</li> </ul> </li> </ul> 2. <b>Report Writing :</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• The Nature of a Report</li> <li>• The P's of an Effective Report</li> <li>• Functions of a Report</li> <li>• Preparing a Report</li> <li>• Types of Reports</li> <li>• Business report</li> </ul>	<b>28</b>	<b>20</b>

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		<ul style="list-style-type: none"> <li>• Press report</li> </ul> <p><b>3. Job Application / Resume Writing.</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• A Cover Letter</li> <li>• Curriculum Vitae / Resume</li> </ul> <p><b>4. Letters of Appointment &amp; Resignation.</b></p>		
<b>3</b>	<b>Conversation Skills</b>	<p>Conversations based on everyday situation / Dialogue Writing.</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Nature of Conversations</li> <li>• Purpose of conversation</li> <li>• Guidelines for Effective Conversation Skills</li> <li>• Proverbs used in Everyday Conversation with their Meanings / Explanations</li> <li>• Comparisons used in Everyday Conversation</li> <li>• Practical Conversations</li> </ul>	<b>14</b>	<b>10</b>
<b>4</b>	<b>Communication Skills</b>	<p>(1) Communication – Meaning, Features &amp; Process  (2) Verbal &amp; Non – Verbal comm.  Verbal  Oral Communication  Written Communication  Non – Verbal  Body language  Space  Para language  Others  (3) Group discussion skills</p> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Characteristic</li> <li>• Do's &amp; Don'ts</li> <li>• Relevance</li> <li>• Moderating a group discussion</li> </ul> <p>(4) Presentation skills</p> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Planning a presentation skills</li> <li>• Preparing a presentation skills</li> <li>• Delivering a presentation skills</li> <li>• Presentation skills</li> </ul> <p>(5) Public Speaking</p> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Essential of effective public speaking</li> </ul> <p>(6) Facing Interviews</p> <ul style="list-style-type: none"> <li>• Importance</li> <li>• Do's &amp; Don'ts</li> </ul>	<b>38</b>	<b>20</b>
<b>Total</b>			<b>100</b>	<b>60</b>

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Students seminar - 5 Lectures.  
Expert Talk - 5 Lectures  
Students Test - 5 Lectures.

**Total Lectures 60 + 15 = 75**

**Reference Book :**

1. Communication Skills by Bharat & Company.
2. High School English Grammar and Composition By Wren & Martin

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<b>CS-02: PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
1	Introduction of C Language	<ul style="list-style-type: none"> <li>• Introduction of Computer Languages</li> <li>• Introduction of Programming Concept</li> <li>• Introduction of C Language (History &amp; Overview)</li> <li>• Difference between traditional and modern c.</li> <li>• C character set</li> <li>• C tokens <ul style="list-style-type: none"> <li>▪ Keywords</li> <li>▪ Constants</li> <li>▪ Strings</li> <li>▪ Identifiers and variables</li> <li>▪ Operators (all 8 operators)</li> </ul> </li> <li>• Hierarchy of operators</li> <li>• Type casting</li> <li>• Data types in c</li> <li>• PRE-PROCESSORS IN C</li> </ul>	6	12
2	Introduction of Logic Development Tools	<ul style="list-style-type: none"> <li>• Introduction of Logic.</li> <li>• Necessary Instructions for Developing Logic</li> <li>• Basics of Flow Chart</li> <li>• Dry-run and its Use.</li> <li>• Other Logic development techniques</li> </ul>	4	10
3	Control Structures	<ul style="list-style-type: none"> <li>• Selective control structure <ul style="list-style-type: none"> <li>▪ If statements</li> <li>▪ Switch statement</li> </ul> </li> <li>• Conditional ternary operator</li> <li>• Iterative (looping) control statements <ul style="list-style-type: none"> <li>▪ For loop</li> <li>▪ Do...while loop</li> <li>▪ While loop</li> </ul> </li> <li>• Nesting of loops</li> <li>• Jumping statements <ul style="list-style-type: none"> <li>▪ Break statement</li> <li>▪ Continue statement</li> <li>▪ Goto statements</li> </ul> </li> </ul>	8	15
4	Functions	<ul style="list-style-type: none"> <li>• Types of functions</li> <li>Types of library functions <ul style="list-style-type: none"> <li>▪ String Function Strcpy, strncpy, strcat, strncat, strchr, strrchr, strcmp, strncmp, strstr, strspn, strcspn, strlen, strpbrk, strstr, strtok</li> <li>▪ Mathematical Functions Acos, asin, atan, ceil, cos, div, exp, fabs, floor, fmod, log, modf, pow, sin, sqrt</li> <li>▪ Date &amp; Time Functions clock, difftime, mktime, time, asctime, ctime, gmtime, localtime, strftime</li> </ul> </li> </ul>	7	15

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		<ul style="list-style-type: none"> <li>▪ I/O Formatting Functions printf, scanf, getc, getchar, gets, putc, putchar, puts, ungetc</li> <li>▪ Miscellaneous Functions delay, clrscr, clrscr, errno, isalnum, isalpha, iscntrl, isdigit, isgraph, islower, isprint, isspace, isupper, isxdigit, toupper, tolower</li> <li>▪ Standard Library functions abs , atof , atol , exit , free , labs , qsort , rand , strtoul , srand</li> <li>▪ Memory Allocation Functions malloc , realloc , calloc</li> <li>• Types of user defined functions</li> <li>• Pointers</li> <li>• Function call by value</li> <li>• Function call by reference</li> <li>• Recursion</li> <li>• Storage classes</li> <li>• Passing and returning values</li> </ul>		
5	Arrays in C	<ul style="list-style-type: none"> <li>• Types of arrays <ul style="list-style-type: none"> <li>▪ Single dimensional array</li> <li>▪ Two dimensional array</li> <li>▪ Multi-dimensional array</li> <li>▪ String arrays</li> </ul> </li> <li>• Use of Arrays in Programming</li> <li>• Arrays and Matrices</li> </ul>	9	14
6	Structures	<ul style="list-style-type: none"> <li>• What is structure</li> <li>• Initializations and declarations</li> <li>• Memory allocation functions</li> <li>• Pointers with structures</li> <li>• Array with structures</li> <li>• Udf with structures</li> <li>• Nested structures</li> <li>• Introduction to union</li> <li>• Difference between Structure &amp; Union</li> </ul>	10	10
7	Pointers in C	<ul style="list-style-type: none"> <li>• Introduction of Pointers</li> <li>• Use of pointers in Dynamic Programming</li> <li>• Pointer to Variables</li> <li>• Pointer to Array</li> <li>• Pointer within Array</li> <li>• Pointer To Structure</li> <li>• Pointers within structure</li> <li>• Pointer to Pointer</li> </ul>	11	12
8	File Handling in C	<ul style="list-style-type: none"> <li>• Concept of data files</li> <li>• File handling</li> <li>• 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,</li> </ul>	5	12

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		vfscanf, setbuf, setvbuf • I/O operations • Command line arguments		
Total			60	100

Student Seminar – 5 Lectures

Expert Talk – 5 Lectures

Student Test – 5 Lectures

**Total Lectures 60 + 15 = 75**

**Reference book :**

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



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<b>CS-03 : Computer Fundamentals And Emerging Technology</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
1.	Introduction to Computers	<ul style="list-style-type: none"> <li>• Basics of Computers               <ul style="list-style-type: none"> <li>▪ What is Computer ?</li> <li>▪ Characteristics of Computer</li> <li>▪ Data Processing Cycle (Data → Process → Information)</li> </ul> </li> <li>• Classification of Computer by Data Processed Analog, Digital and Hybrid Computers</li> <li>• History and Generations of Computers First to Fifth Generation Computers</li> <li>• Classification of Computer by Processing Capabilities Micro, Mini, Mainframe and Super Computers</li> <li>• History and Generations of Computers               <ul style="list-style-type: none"> <li>▪ First to Fifth Generation Computers</li> </ul> </li> <li>• Simple Model of Computer               <ul style="list-style-type: none"> <li>▪ Input Devices</li> <li>▪ CPU (Central Processing Unit)                   <ul style="list-style-type: none"> <li>○ Arithmetic &amp; Logic Unit</li> <li>○ Control Unit</li> <li>○ Internal Memory</li> </ul> </li> </ul> </li> </ul> <p>Output Devices Secondary Storage Devices</p>	10	6
2.	Input Devices	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Types of Input Devices               <ul style="list-style-type: none"> <li>▪ Keyboard / Mouse / Trackball / Glide – Pad / Game Devices Joystick, etc.) / Light Pen / Touch Screen / Digitizers and Graphic Table / Mic (Sound Input) / Camera (Photo and Video Input) / POS (Point of Sale) Terminal (Scanners, etc)</li> </ul> </li> <li>• Types of Scanners OCR, OMR, MICR, OBR</li> </ul>	12	7
3.	Output Devices	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Types of Output Devices               <ul style="list-style-type: none"> <li>▪ CRT Display Units                   <ul style="list-style-type: none"> <li>○ Monitor</li> </ul> </li> <li>Non CRT display Units                   <ul style="list-style-type: none"> <li>○ LCD / LED / Plasma Displays</li> </ul> </li> <li>▪ Other output Devices                   <ul style="list-style-type: none"> <li>○ LCD Projectors / OHP / Speaker</li> </ul> </li> </ul> </li> <li>Types of Printers               <ul style="list-style-type: none"> <li>○ Impact Printers and types (Dot Matrix Printer, Daisy Wheel Printer, Chain Printer, Drum Printer, Band Printer, etc.)</li> <li>○ Non Impact Printers and types (Ink Jet Printer, Laser Printer, etc.)</li> </ul> </li> <li>▪ Plotters               <ul style="list-style-type: none"> <li>○ Types of Plotters</li> </ul> </li> </ul>	12	7

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4.	Internal / External parts used with Computer Cabinet	<ul style="list-style-type: none"> <li>• Introduction to Mother board</li> <li>• Types of Processors Dual Core, Core 2 Duo, i2, i3, etc....</li> <li>• Memory structure and Types of Memory <ul style="list-style-type: none"> <li>▪ RAM (SRAM, DRAM, SD, DDR, etc.)</li> <li>▪ ROM (ROM, PROM, EPROM, EEPROM, etc.)</li> </ul> </li> <li>• Slots ISA Slots / PCI Slots / Memory Slots</li> <li>• Sockets</li> <li>• Cables <ul style="list-style-type: none"> <li>▪ Serial Cable / Parallel Cable / USB Cable</li> </ul> </li> <li>• Ports USB / Serial / Parellel / PS2</li> <li>• Graphic Cards</li> </ul>	5	3
5.	Data Storage	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Types of Magnetic Storage Devices <ul style="list-style-type: none"> <li>▪ Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks</li> </ul> </li> <li>• Storage Mechanism of Magnetic Storage Devices Tracks / Sectors / Clusters / Cylinders</li> <li>• Reading / Writing Data to and from Storage Devices <ul style="list-style-type: none"> <li>▪ Seek Time / Rotational Delay – Latency / Access Time /Response Time</li> </ul> </li> <li>• Other Storage Devices USB - Pen Drive / CD / DVD / Blu-Ray Disk etc.</li> </ul>	10	6
6.	Numbering System and Codes	<ul style="list-style-type: none"> <li>• Introduction to Binary Codes <ul style="list-style-type: none"> <li>▪ Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit</li> <li>▪ KB / MB / GB / TB / HB / etc....</li> </ul> </li> <li>• Types of Numbering System Binary / Octal / Decimal / Hex-Decimal</li> <li>• Conversion <ul style="list-style-type: none"> <li>▪ Binary to Octal, Decimal and Hexa-Decimal</li> <li>▪ Decimal to Binary, Octal and Hexa-Decimal</li> <li>▪ Octal to Binary, Decimal and Hexa-Decimal</li> <li>▪ Hexa-Decimal to Binary, Octal and Decimal</li> </ul> </li> <li>• Binary Arithmetic Addition Subtraction (1's Compliment and 2's Compliment) Division Multiplication</li> <li>• Binary Arithmetic <ul style="list-style-type: none"> <li>▪ Addition</li> </ul> </li> <li>• Types of Codes ASCII / BCD / EBCDIC / UniCode</li> <li>• Parity Check <ul style="list-style-type: none"> <li>▪ Event Parity System / Odd Parity System</li> </ul> </li> </ul>	15	9
7.	Languages, Operating Systems and Software Packages	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Types of Languages (Assembler / Compiler / Interpreter)</li> </ul>	20	12

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		<p>Machine Level Language  Assembly Level Language  High Level Language (3GL, 4GL, 5GL, etc.)</p> <ul style="list-style-type: none"> <li>• Types of Operating Systems <ul style="list-style-type: none"> <li>▪ Batch Operating System</li> <li>▪ Multi Processing Operating System</li> <li>▪ Time Sharing Operating System</li> <li>▪ Online and Real Time Operating System</li> </ul> </li> <li>• Types of Software Packages  Word Processing Packages  Spread Sheet Packages  Graphical Packages  Database Packages  Presentation Packages  Animation / Vedio / Sound Packages</li> </ul>		
8.	Emerging Technologies and Virus	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Different Communication methods <ul style="list-style-type: none"> <li>▪ GIS / GPS / CDMA / GSM</li> </ul> </li> <li>• Communication Devices  Cell Phones / Modem / Infrared / Bluetooth / WiFi</li> <li>• Virus <ul style="list-style-type: none"> <li>▪ Introduction to Virus and related terms</li> <li>▪ Origin and History</li> <li>▪ Types of Virus</li> <li>▪ Problems and Protection from Virus</li> </ul> </li> </ul>	8	5
9.	Imporant Terms and Acronyms	ATM Backup / Restore Hard Copy / Soft Copy Bus / Data Bus Buffer and types / Spooling Cursor / Pointer / Icon E-Mail / Attachment CLI / GUI Compiler and its types Drive / 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	8	5
<b>Total</b>			100	60

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

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**Reference Books:**

1. Computer Fundamentals And Emerging Technology by Bharat & Company.
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.

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<b>CS-04: NETWORKING &amp; INTERNET ENVIRONMENT</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
<b>1</b>	Introduction to Internet	Computer Network Type of Computer Network Network Topology OSI Reference Model TCP/IP Internet Terminology ISP (Internet Service Provider) Intranet VSAT (very small aperture terminal) URL Portal Domain Name Server	15	8
<b>2</b>	Application of Internet	World Wide Web (WWW) Search Engine Remote Login Telnet FTP Electronic Mail (Email) E-Commerce and E-Business E-Governance	15	10
<b>3</b>	Basic of HTML & Advance HTML	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	15	10
<b>4</b>	Cascading Style Sheet	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	15	8
<b>5</b>	Macromedia Dream weaver	Getting Started With Dreamweaver MX Opening Dreamweaver MX Different Views Program Layout Change Workspace Panels Managing Panels	15	9

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		<p>The Insert Bar</p> <p>Making a Page</p> <ul style="list-style-type: none"> <li>▪ Web Pages and Their Relation to Each Other</li> <li>▪ Multiple Pages With Similar Style</li> </ul> <p>Page Properties</p> <p>Text and Text Properties</p> <p>Links</p> <p>Link Properties</p> <p>Creating a Link to Another Site</p> <p>Creating a Link to a Page in Your Site</p> <p>Making an Image a Link</p> <p>Linking to Other Media</p> <p>Making Anchors</p> <p>Publishing</p> <p>Managing Your Workspace</p> <p>Creating a New Site</p> <p>Defining a New Site in Basic Mode</p> <p>Defining a New Site in Advanced Mode</p> <p>Uploading Your Files to the Web</p> <p>Edit Sites</p> <p>Templates</p> <ul style="list-style-type: none"> <li>▪ Creating a New Template</li> <li>▪ Uneditable &amp; Editable Regions</li> <li>▪ Saving Your Template</li> <li>▪ Creating a New Page From a Template</li> <li>▪ Changes to a Template</li> </ul>		
<b>6</b>	Java Script	<p>Introduction to JavaScript</p> <p>Variables</p> <p>JavaScript Operators</p> <p>Conditional Statements</p> <p>JavaScript Loops</p> <p>JavaScript Break and Continue Statements</p> <p>Dialog Boxes</p> <p>JavaScript Arrays</p> <p>JavaScript User Define Function</p> <p>Built in Function</p>	25	15
<b>Total</b>			100	60

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

**Reference Books:**

1. NETWORKING & INTERNET ENVIRONMENT by Bharat & Company.
2. Internet The Complete Reference –Young.
3. World Wide Web Design With Html -C Xavier.
4. Internet For Every One –Leon.
5. Practical Html 4.0 -Lee Philips.
6. MCSE Networking Essential Training Guides.
7. Mastering In FrontPage – BPB.

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<b>CS-05 : Practical And Viva Based On PC Software &amp; CS – 4</b>	
<b>Topics</b>	<b>Marks</b>
MS – Word, MS – Excel, MS – Power Point and Macromedia Dream weaver	<b>50</b>

<b>CS-06 : Practical And Viva Based On CS – 2</b>	
<b>Topics</b>	<b>Marks</b>
Programming in C Language	<b>50</b>

**Note :**

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

**Additional Topics ( Not to be asked in exam ) :**

Student should be aware of followings

- o To Write CD
- o To Format Hard Disk
- o Installation of OS and other packages
- o Use of DOS commands

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**BCA (Semester – II)**

SR. NO.	SUBJECT	CREDIT	NO. OF THEORY LECT. PER WEEK	NO. OF PRACTICAL PER WEEK
1.	<b>CS – 07</b> DATA STRUCTURE USING C LANGUAGE	5	5	6
2.	<b>CS – 08</b> DEVELOPING APPLICATIONS USING VISUAL BASIC 6.0	5	5	6
3.	<b>CS – 09</b> COMPUTER ORGANIZATION & ARCHITECTURE	5	5	-
4.	<b>CS – 10</b> MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE	5	5	-
5.	<b>CS – 11</b> PRACTICALS ( BASED ON CS-07 )	5	-	As mentioned against Sr. No. 1
6.	<b>CS – 12</b> PRACTICALS ( BASED ON CS-08 )	5	-	As mentioned against Sr. No. 2
<b>Total Credits of Semester – II</b>				<b>30</b>



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<b>CS-07: Data structure Using C Language</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
1	Algorithm Analysis	<ul style="list-style-type: none"> <li>• The analysis of algorithm.</li> <li>• Time and space complexities.</li> <li>• Asymptotic notation.</li> <li>• Classes of algorithm.</li> <li>• Big-Oh Notation</li> <li>• Big-Omega Notation</li> </ul>	5	5
2	Advanced Concepts of C and Introduction To data Structures	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Data types</li> <li>• Arrays <ul style="list-style-type: none"> <li>▪ Handling arrays <ul style="list-style-type: none"> <li>▪ Initializing the arrays</li> </ul> </li> </ul> </li> <li>• Multidimensional arrays <ul style="list-style-type: none"> <li>▪ Initialization of two dimensional array</li> </ul> </li> <li>• Pointers <ul style="list-style-type: none"> <li>▪ Advantages and disadvantages of pointers</li> <li>▪ Declaring and initializing pointers</li> <li>▪ Pointer arithmetic</li> </ul> </li> <li>• Array of pointers</li> <li>• Passing parameters to the functions</li> <li>• Relation between pointers and arrays</li> <li>• Scope rules and storage classes <ul style="list-style-type: none"> <li>▪ Automatic variables</li> <li>▪ Static variables</li> <li>▪ External variables</li> <li>▪ Register variable</li> </ul> </li> <li>• Dynamic allocation and de-allocation of memory <ul style="list-style-type: none"> <li>▪ function malloc(size)</li> <li>▪ function calloc(n,size)</li> <li>▪ function free(block)</li> </ul> </li> <li>• Dangling pointer problem.</li> <li>• Structures.</li> <li>• Enumerated constants</li> <li>• Unions</li> </ul>	10	5
3	Sorting and Searching	<ul style="list-style-type: none"> <li>• Bubble sorting</li> <li>• Insertion sorting</li> <li>• Quick sorting</li> <li>• Bucket sorting</li> <li>• Merge sorting</li> <li>• Selection sorting</li> <li>• Shell sorting</li> <li>• Basic searching technique</li> <li>• Index searching</li> <li>• Sequential searching</li> <li>• Binary searching</li> </ul>	10	10
4	Introduction	Introduction	5	5

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	To data Structure	Primitive and simple structures Linear and nonlinear structures file organization.		
5	Elementary Data Structure	<p>Introduction</p> <p>Stack</p> <ul style="list-style-type: none"> <li>Definition</li> <li>Operations on stack</li> <li>Implementation of stacks using arrays</li> <li>Function to insert an element into the stack</li> <li>Function to delete an element from the stack</li> <li>Function to display the items</li> </ul> <p>Recursion and stacks</p> <p>Evaluation of expressions using stacks</p> <ul style="list-style-type: none"> <li>Postfix expressions</li> <li>Prefix expression</li> </ul> <p>Queue</p> <ul style="list-style-type: none"> <li>Introduction</li> <li>Array implementation of queues</li> <li>Function to insert an element into the queue</li> <li>Function to delete an element from the queue</li> </ul> <p>Circular queue</p> <ul style="list-style-type: none"> <li>Function to insert an element into the queue</li> <li>Function for deletion from circular queue</li> <li>Circular queue with array implementation</li> </ul> <p>Deque</p> <p>Priority queues</p>	20	10
6	Link List	<p>Introduction</p> <p>Singly linked lists.</p> <ul style="list-style-type: none"> <li>Implementation of linked list</li> <li>Insertion of a node at the beginning</li> <li>Insertion of a node at the end</li> <li>Insertion of a node after a specified node</li> <li>Traversing the entire linked list</li> <li>Deletion of a node from linked list</li> </ul> <p>Concatenation of linked lists</p> <p>Merging of linked lists</p> <p>Reversing of linked list</p> <p>Doubly linked list.</p> <ul style="list-style-type: none"> <li>Implementation of doubly linked list</li> </ul> <p>Circular linked list</p> <p>Applications of the linked lists</p>	20	10
7	Tree	<p>Introduction</p> <ul style="list-style-type: none"> <li>Objectives</li> <li>Basic terminology</li> <li>Properties of a tree</li> </ul> <p>Binary trees</p> <ul style="list-style-type: none"> <li>Properties of binary trees</li> <li>Implementation</li> <li>Traversals of a binary tree</li> <ul style="list-style-type: none"> <li>In order traversal</li> <li>Post order traversal</li> <li>Preorder traversal</li> </ul> </ul>	20	10

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		Binary search trees (bst) Insertion in bst Deletion of a node Search for a key in bst <ul style="list-style-type: none"> <li>• Height balanced tree</li> <li>• b-tree</li> </ul> Insertion Deletion		
8	Graph	Introduction Adjacency matrix and adjacency lists Graph traversal Depth first search (dfs) Implementation Breadth first search (bfs) Implementation <ul style="list-style-type: none"> <li>• Shortest path problem</li> <li>• Minimal spanning tree</li> </ul>	10	5
<b>Total</b>			<b>100</b>	<b>60</b>

Students seminar - 5 Lectures.

Expert Talk - 5 Lectures

Students Test - 5 Lectures.

**Total Lectures 60 + 15 = 75**

**Reference Books:**

1. Data Structure and Algorithms by Bharat & Company.
2. Data Structure through C/C++ Author : Tennaunbuam.
3. Data Structure Author : R. B. Patel.
4. Let us C Author : Kanitkar.
5. Pointer in C Author : Kanitkar.
6. Data and File Structure Author : Trembley & Sorrenson.

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<b>CS-08 : Developing Application in Visual Basic 6.0</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
<b>1.</b>	<b>Introduction</b>	<ul style="list-style-type: none"> <li>• OOPS Concepts</li> <li>• GUI Concept</li> <li>• VB as Event Driven Programming</li> <li>• Property, Event and Method</li> <li>• VB as IDE</li> <li>• Different Types of Application</li> <li>• Different Types of Files</li> </ul>	<b>5</b>	<b>3</b>
<b>2</b>	<b>Working with Forms &amp; Graphics</b>	<ul style="list-style-type: none"> <li>• Properties of Form</li> <li>• Life Cycle Events of Form</li> <li>• Setting Startup Form</li> <li>• Handling Multiple Form</li> <li>• Loading, Showing, Hiding &amp; Unloading Form</li> <li>• Graphics</li> <li>• Drawing Text ,Drawing Lines, Drawing Box, Drawing Circle, Drawing Ellipses, Drawing Arcs, Drawing Freehand with Mouse, Drawing Mode, Drawing Scale, Clearing Graphics, Printing Forms</li> </ul>	<b>7</b>	<b>6</b>
<b>3</b>	<b>Variable, Operators, Constants, Decision Making, Looping and Array</b>	Data Types Declaration of Variables Scope & Life Time of Variables (Local Variable, Form Variable Module Variable, Global Variable) Arithmetic & Relations Operators Decision Making using If & Select Case Loops using For, While..Wend, While Loop...End Loop, Do Loop..While, Do Until ...Loop Defining Array 1D, 2D, 3D Static & Dynamic Array Control Array Creating Procedures & Functions Concept of ByRef & ByVal	<b>10</b>	<b>6</b>
<b>4</b>	<b>Basic Controls</b>	<ul style="list-style-type: none"> <li>• Text Box, Label</li> <li>• Command Button, Option Button</li> <li>• Check Box, Frame</li> <li>• Horizontal-Vertical Scroll Bar,</li> <li>• Combo Box</li> <li>• List Box, Timer, Shape</li> <li>• Line, Drive List Box</li> <li>• Directory List Box, File List Box</li> <li>• Picture Box, Image Box</li> </ul>	<b>15</b>	<b>10</b>

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<b>5</b>	<b>Advance Control</b>	Common Dialog Control Rich Text Box , MSFlex Grid Treeview, List View Image List, Toolbar, Statusbar Progressbar, Slider, TabStrip	<b>15</b>	<b>8</b>
<b>6</b>	<b>MDI Form , Menu &amp; Module</b>	Model Form & Modeless Form Parent & Child Form Concept using MDI Form Difference of MDI & SDI Use of Menu Editor Module Concept of Standard Module Concept of Class Module Standard Module vs Class Module Defining Class module Private and Friend member Creating Object of Class module	<b>10</b>	<b>4</b>
<b>7</b>	<b>Library Functions</b>	<ul style="list-style-type: none"> <li>• Functions <ul style="list-style-type: none"> <li>▪ Abs(),Array(),Asc()</li> <li>▪ Choose(), Chr()</li> <li>▪ Date(),DateAdd(),DateDiff(), DatePart(),DateSerial(),Day() Format(),FormatCurrency() FormatDateTime(), FormatNumber(), FormatPercent()</li> <li>▪ IIf(),InStr(),InStrRev(), IsArray(),IsDate(),IsNull(), IsNumeric()</li> <li>▪ Join()</li> <li>▪ LCase(),Left(),Len(), LoadPicture(),LTrim(),RTrim(), Trim() Mid(),Month(),MonthName(), Now(), QBColor() Replace(),RGB(),Right(),Rnd() Space(),Split(),Sqr(),Str(), StrComp(),String(),StrReverse() Time(), UCase(), Val() WeekDay(),WeekDayName() Year()</li> </ul> </li> </ul>	<b>8</b>	<b>5</b>
<b>8</b>	<b>File Handling &amp; Exception Handling</b>	<ul style="list-style-type: none"> <li>• Sequential File Handling in VB</li> <li>• Random Access File Handling</li> <li>• Types of Error</li> <li>• Exception Handling using on error statement</li> <li>• Err Objects</li> </ul>	<b>5</b>	<b>3</b>
<b>9</b>	<b>DataBase Programming &amp; Reporting</b>	<ul style="list-style-type: none"> <li>• Introduction to ADO Control</li> <li>• Bounded Connectivity &amp; Unbounded Connectivity</li> <li>• Create Projects with facilities like Add, Delete, Edit, Search</li> </ul>	<b>15</b>	<b>10</b>

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		<ul style="list-style-type: none"> <li>• Using DataList, DataCombo and DataGrid Controls</li> <li>• Data Report</li> <li>• Section of Data Report</li> <li>• Controls of Data Report</li> </ul>		
<b>10</b>	<b>ActiveX &amp; WindowsAPI</b>	<ul style="list-style-type: none"> <li>• ActiveX <ul style="list-style-type: none"> <li>▪ What is ActivexX ?</li> <li>▪ Types of ActiveX</li> <li>▪ InProcess &amp; Out of Process Server Concept</li> <li>▪ Creating ActiveX Control</li> </ul> </li> <li>• Window API <ul style="list-style-type: none"> <li>▪ Basic Conept</li> <li>▪ Using Window API in VB</li> <li>▪ GetDriveType(), GetDiskFreeSpace()</li> </ul> </li> <li>• OLE</li> </ul>	<b>10</b>	<b>5</b>
<b>Total</b>			<b>100</b>	<b>60</b>

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

**Reference Books :**

1. Developing Application in Visual Basic 6.0 by Bharat & Company.
2. Pure V.B. Dan Fox Tech Media.
3. Mastering VB 6 Evagelous Petrouross BPB.
4. VB Black Book.
5. Programming in Visual Basic 6.0 Julia Bradley TMH Pub.

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<b>CS-09: Computer Organization And Architecture</b>				
<b>Sr. No.</b>	<b>Topic</b>	<b>Detail</b>	<b>Marks</b>	<b>Min. Lect.</b>
1	Digital Logic Circuits	<ul style="list-style-type: none"> <li>• <b>Logic Gates</b> <ul style="list-style-type: none"> <li>▪ AND,OR,NOT,NAND,NOR,XOR, Exclusive NOR gates</li> </ul> </li> <li>• <b>Boolean Algebra</b> <ul style="list-style-type: none"> <li>▪ What is Boolean algebra?</li> <li>▪ Explanation about Boolean variable and Boolean function (Analog and Digital Signals)</li> <li>▪ Describe truth table</li> <li>▪ Discuss postulates</li> <li>▪ Discuss Theorem related to postulates</li> <li>▪ Simplified Boolean function using postulates and draw logical diagram of simplified function</li> <li>▪ Simplified Boolean function using karnaugh map method and discuss</li> <li>▪ DON'T CARE condition</li> </ul> </li> <li>• <b>Sequential And Combinational Circuits</b> <ul style="list-style-type: none"> <li>▪ What are Clock pulses?</li> <li>▪ What is combinational circuit and sequential circuit after discussion of adders and flip flops</li> </ul> </li> <li>• <b>Flip Flops</b> <ul style="list-style-type: none"> <li>▪ SR, Clocked SR, D, JK, JK – Master Slave, T</li> </ul> </li> <li>• <b>Universal Gate</b> <ul style="list-style-type: none"> <li>▪ Why it is called universal gate- Explain</li> </ul> </li> </ul>	20	15
2	Digital Component	<ul style="list-style-type: none"> <li>• <b>Integrated Circuits</b> <ul style="list-style-type: none"> <li>▪ Decoders (2 X 4, 3 X 8)</li> <li>▪ Encoders (Octal to Binary – 8 X 3)</li> <li>▪ Multiplexer (4 X 1)</li> <li>▪ Demultiplexer (1 X 4)</li> </ul> </li> <li>• <b>Register</b> <ul style="list-style-type: none"> <li>▪ Block diagram of register</li> <li>▪ How it works?</li> <li>▪ Parallel register and shift register</li> <li>▪ How it transfer data?</li> <li>▪ Asynchronous 4-bits Binary Counter</li> </ul> </li> </ul>	25	15
3	Data Representation	<ul style="list-style-type: none"> <li>• Multiplication and division of two binary numbers</li> <li>• Floating point representation</li> <li>• Fixed point representation</li> </ul>	10	8

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		<ul style="list-style-type: none"> <li>• Error Detection code – (Parity Bit)</li> </ul>		
4	Central Processing Unit	<ul style="list-style-type: none"> <li>• Introduction Of CPU</li> <li>• Major component of CPU</li> <li>• <b>General Register Organization</b> <ul style="list-style-type: none"> <li>▪ What is control word?</li> <li>▪ Accumulator Register</li> </ul> </li> <li>• <b>Stack Organization</b> <ul style="list-style-type: none"> <li>▪ What is register stack?</li> <li>▪ What is memory stack?</li> <li>▪ What is polish notation and reverse polish notation?</li> <li>▪ Why we use polish notation? – explain with an example</li> </ul> </li> <li>• <b>Arithmetic And Logic Unit</b> <ul style="list-style-type: none"> <li>▪ Block diagram of ALU</li> <li>▪ Explain how it works</li> </ul> </li> <li>• <b>Interrupts</b> <ul style="list-style-type: none"> <li>▪ What is interruption?</li> <li>▪ How it useful and work?</li> </ul> </li> </ul>	25	7
5	Input-Output Organization	<ul style="list-style-type: none"> <li>• Memory buses</li> <li>• Explain with block diagram</li> <li>• How it works?</li> <li>• Data Bus, Address Bus and Control lines</li> <li>• Input Output Buses</li> <li>• Concept of input output interface</li> <li>• Input Out Processor (IOP)</li> <li>• Direct Memory Access</li> <li>• Introduction</li> <li>• How DMA works?</li> <li>• Explain DMA controller</li> <li>• How DMA transfer data in computer system</li> </ul>	20	15
			<b>100</b>	<b>60</b>

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

**Reference Books:**

1. Computer Organization And Architecture by Bharat & Company.
2. Computer System Architecture – By Morris Mano (PHI).
3. Digital Logic And Computer Design – By Morris Mano.
4. Digital Computer Electronics – By Malvino And Leach.

**Hands On (Not to be asked in examination):**

- Instruction Formats - Simulator Base Program



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<b>CS – 10 : MATHEMATICAL &amp; STATISTICAL FOUNDATION OF COMPUTER SCIENCE</b>				
<b>Sr. No.</b>	<b>Topics</b>	<b>Detail</b>	<b>Mark</b>	<b>Min. Lect.</b>
1	Set Theory	Introduction to Set Theory Methods of representation of a Set Operations on Set and its Properties (With logical and Venn diagrammatic proofs) De'Morgans Laws with logical proof Cartesian Product (Up to Two Sets) Typical Examples	<b>14</b>	<b>8</b>
2	Measure of central tendency and dispersion	Mean ( Ungroup and group data) Median ( Ungroup and group data) Mode ( Ungroup and group data) Meaning of Dispersion Range , quartiles , Standard Deviation for ungroup and group data Examples	<b>14</b>	<b>10</b>
3	Co-ordinate Geometric	Introduction to Co-ordinates Quadrants And Lines Distance between two points in R <sup>2</sup> (Without Proof) Section Formula (Without Proof) Area of Triangles (Without Proof) Typical Examples	<b>14</b>	<b>7</b>
4	Matrix	Introduction Types of matrices ( Row, Column, square, diagonal, transpose, unit, null matrix Operation on matrices ( Addition subtraction multiplication) Properties of transpose Adjoint of square matrix Inverse of square matrix Typical Examples	<b>14</b>	<b>10</b>
5	Arithmic, Geometric, Progression	Sequence, Series Arithmetic Progression Definition N <sup>th</sup> Term, Sum of n terms Geometric Progression Definition N <sup>th</sup> Term, Sum of n terms Typical Examples	<b>14</b>	<b>10</b>
<b>Total:</b>			<b>70</b>	<b>45</b>

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

**Reference Books:**

1. MATHEMATICAL & STATISTICAL FOUNDATION OF COMPUTER SCIENCE by Bharat & Company.
2. Business Mathematics By Sancheti & Kapoor Sultan & Chand
3. Statistical Method By Gupta Sultan & Chand
4. Discrete Mathematical Structures with Applications to Computer Science By J.P. Tremblay & R.Manohar TMH

<b>CS-11 : Practical And Viva Based On CS – 7</b>	
<b>Topics</b>	<b>Marks</b>
DATA STRUCTURE USING C LANGUGAE	<b>50</b>

<b>CS-12 : Practical And Viva Based On CS – 8</b>	
<b>Topics</b>	<b>Marks</b>
DEVELOPING APPLICATIONS USING VISUAL BASIC 6.0	<b>50</b>

**Note :**

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

**Additional Topics ( Not to be asked in exam ) :**

- Following tools should be used to train students.
- o Simulator 8051
  - o Using Trainer kit
  - o Case studies of DBMS
  - o Case studies of data structure