

SAURASHTRA UNIVERSITY

RAJKOT – INDIA



Accredited Grade A by NAAC (CGPA 3.05)

CURRICULAM

FOR

P.G.D.C.A.

(1 Years Full Time: 2 Semester Program)

Post Graduate Diploma in Computer Science and Application

(Semester - 1 and Semester - 2)

Effective From June – 2016

P.G.D.C.A. (Semester – 1 and Semester -2)
SAURASHTRA UNIVERSITY
Effective From June – 2016
POST GRADUATE DIPLOMA IN COMPUTER SCIENCE AND APPLICATIONS
(PGDCA)
(1 year full time: 2 Semester Programme)

Ordinance:

- O.P.G.D.C.A. 1** Candidate seeking admission to the Post Graduate Diploma in Computer Science and Application must have a Bachelor degree of minimum three years duration or equivalent from any recognized university.
- O.P.G.D.C.A. 2** The duration of the course will be full time one academic year. The examination for the post graduate diploma in computer science and applications will be conducted under the semester system. For this purpose, the academic year will be divided into two semesters. No candidate will allowed joining any other course simultaneously.
- O.P.G.D.C.A. 3** No candidates will be admitted to any semester examination for PGDCA unless it is certified by the head, computer center that he has attended courses of study to the satisfaction of the head of the institute recognized for teaching courses of study in post graduate diploma in computer science and applications.
- O.P.G.D.C.A. 4** Candidate desirous of appearing at any semester examination of the post graduate diploma in computer science and applications must forward their applications in the prescribed form to the controller of examination, through the head of institute on or before the date prescribed for the purposes under the relevant ordinance.
- O.P.G.D.C.A. 5** After successful passing semester - 1 candidate awarded CCC certificate, after passing semester - 1 and semester - 2 candidates will be awarded CCC+ certificate.

Regulations:

R.P.G.D.C.A. 1 A candidate fails in any number of subjects in the first semester examination will be permitted to continue his studies at a subsequent semester

R.P.G.D.C.A. 2

The standard of passing the P.G.D.C.A. degree examination will be as under:

- (1) To pass any semester examination of the P.G.D.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.

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 $14 \times 5 = 70$ 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 $12 \times 5 = 60$.

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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.P.G.D.C.A. 4

The following is the syllabus of various courses to be studied for the Post-graduate Diploma in Computer Science and Applications.

P.G.D.C.A. (Semester – 1)

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

CS-01: COMPUTER FUNDAMENTALS AND EMERGING TECHNOLOGY		
Objective: To aware basics of computer and emerging technology		
Unit No.	Topics	Details
1	Introduction to Computers	<ul style="list-style-type: none"> • Basics of Computers <ul style="list-style-type: none"> ○ What is Computer? ○ Characteristics of Computer ○ Data Processing Cycle (Data → Process → information) • Classification of Computer by Data Processed <ul style="list-style-type: none"> ○ Analog, Digital and Hybrid Computers • History and Generations of Computers <ul style="list-style-type: none"> ○ First to Fifth Generation Computers • Classification of Computer by Processing Capabilities <ul style="list-style-type: none"> ○ Micro, Mini, Mainframe and Super Computers • History and Generations of Computers . <ul style="list-style-type: none"> ○ First to Fifth Generation Computers • Simple Model of Computer <ul style="list-style-type: none"> ○ Input Devices ○ CPU (Central Processing Unit) ○ Arithmetic & Logic Unit ○ Control Unit ○ Internal Memory • Output Devices • Secondary Storage Devices
	Internal/External parts used with Computer Cabinet	<ul style="list-style-type: none"> • Introduction to Mother board • Types of Processors . <ul style="list-style-type: none"> ○ Dual Core, Core 2 Duo, i2, i3, etc • Memory structure and Types of Memory <ul style="list-style-type: none"> ○ RAM (SRAM, DRAM, SO, DDR, etc.) ○ ROM (ROM, PROM, EPROM, EEPROM, etc.) • Slots <ul style="list-style-type: none"> ○ ISA Slots / PCI Slots / Memory Slots • Sockets • Cables <ul style="list-style-type: none"> ○ Serial Cable / Parallel Cable / USB Cable • Ports <ul style="list-style-type: none"> ○ USB / Serial / Parellel / PS2 • Power Devices :UPS • Graphic Cards • Network card, Sound Card

2	Input Devices	<ul style="list-style-type: none"> • Introduction • Types of Input Devices <ul style="list-style-type: none"> ○ Keyboard / Mouse / Trackball / Glide - Pad / Game Devices Joystick, etc.) / Light Pen / Touch Screen / Digitizers and Graphic Tablet / Mic (Sound Input) / Camera (Photo and Video Input) / POS (Point of Sale) Terminal (Scanners, etc) ○ MIDI(Musical Instrument Digital Interface) Keyboard, ○ Wireless Devices (Keyboard, Mouse, etc) • Types of Scanners <ul style="list-style-type: none"> ○ OCR, OMR, MICR, OBR
	Data Storage	<ul style="list-style-type: none"> • Introduction • Types of Magnetic Storage Devices <ul style="list-style-type: none"> ○ Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks • Storage Mechanism of Magnetic Storage Devices <ul style="list-style-type: none"> ○ Tracks / Sectors / Clusters / Cylinders • Reading / Writing Data to and from Storage Devices • Seek Time / Rotational Delay - Latency / Access • Time /Response Time • Other Storage Devices <ul style="list-style-type: none"> ○ USB - Pen Drive / CD / DVD / Blu-Ray Disk etc. ○ Flash Memory, Cloud Storage(Like Google Drive, OneDrive etc.)
3	Output Devices	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ○ Fascimile(FAX) ○ OLED (Organic LED) ○ Headphone ○ SGD (Speech Generating Device) ○ COM (Computer Output Microfilm) ○ Google Glass
4	Numbering System and Codes	<ul style="list-style-type: none"> • Introduction to Binary Codes / <ul style="list-style-type: none"> ○ Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit ○ KB / MB / GB / TB / HB (etc

		<ul style="list-style-type: none"> • Types of Numbering System <ul style="list-style-type: none"> ○ Binary / Octal/Decimal / Hex-Decimal • Conversion <ul style="list-style-type: none"> ○ Binary to Octal, Decimal and Hexa-Decimal ○ Decimal to Binary, Octal and Hexa-Decimal ○ Octal to Binary, Decimal and Hexa-Decimal ○ Hexa-Decimal to Binary, Octal and Decimal • Binary Arithmetic <ul style="list-style-type: none"> ○ Addition ○ Subtraction (1's Compliment and 2's Compliment) ○ Division . ○ Multiplication • Types of Codes <ul style="list-style-type: none"> ○ ASCII/BCD / EBCDIC / UniCode • Parity Check <ul style="list-style-type: none"> ○ Event Parity System / Odd Parity System
	<p>Languages, Operating Systems and Software Packages</p>	<ul style="list-style-type: none"> • Introduction • Translator (Assembler / Compiler / Interpreter) • Types of Languages <ul style="list-style-type: none"> ○ Machine Level Language ○ Assembly Level Language ○ High Level Language (3GL, 4GL, 5GL, etc.) • Types of Operating Systems <ul style="list-style-type: none"> ○ Batch Operating System ○ Multi Processing Operating System ○ Time Sharing Operating System ○ Online and Real Time Operating System • Uses and applications of Software Packages <ul style="list-style-type: none"> ○ Word Processing Packages ○ Spread Sheet Packages ○ Graphical Packages ○ Database Packages I ○ Presentation Packages ○ Animation / Video / Sound Packages
<p>5</p>	<p>Emerging Technologies and Virus</p>	<ul style="list-style-type: none"> • Different Communication methods <ul style="list-style-type: none"> ○ GIS / GPS / COMA / GSM • Communication Devices I <ul style="list-style-type: none"> ○ Cell Phones / Modem / Infrared / Bluetooth / WiFi/LiFi/SLM(Spatial Light Modulator) • Virus <ul style="list-style-type: none"> ○ Introduction to Virus and related terms ○ Origin and History ○ Types of Virus ○ Problems and Protection from Virus

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	<ul style="list-style-type: none"> ● Cloud Computing <ul style="list-style-type: none"> ○ What is Cloud Computing? ○ Characteristic & Service Models(IaaS, PaaS, SaaS) ○ Architecture ○ Security & Privacy
Important Terms and Acronyms	<ul style="list-style-type: none"> ● 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

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-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	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> • Introduction of Logic. • Necessary Instructions for Developing Logic • Basics of Flow Chart • Dry-run and its Use. • Other Logic development techniques
2	Control Structures	<ul style="list-style-type: none"> • Selective control structure <ul style="list-style-type: none"> ▪ If statements ▪ Switch statement • Conditional ternary operator • Iterative (looping) control statements <ul style="list-style-type: none"> ▪ For loop ▪ Do...while loop ▪ While loop • Nesting of loops • Jumping statements <ul style="list-style-type: none"> ▪ Break statement ▪ Continue statement ▪ Goto statements
3	Library Functions	<ul style="list-style-type: none"> • Types of library functions <ul style="list-style-type: none"> ▪ String Function: Strcpy, strncpy, strcat, strncat, strchr, strrchr, strcmp, strncmp, strstr, strlen, strpbrk, strstr, strtok ▪ Mathematical Functions: Acos, asin, atan, ceil, cos, div, exp, fabs, floor, fmod, log, modf, pow, sin, sqrt

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		<ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> • Types of user defined functions • Pointers • Function call by value • Function call by reference • Recursion • Storage classes • Passing and returning values
4	Array	<ul style="list-style-type: none"> • Types of arrays <ul style="list-style-type: none"> ▪ Single dimensional array ▪ Two dimensional array ▪ Multi-dimensional array ▪ String arrays • Use of Arrays in Programming • Arrays and Matrices
	Structures	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Concept of data files • File handling

		<ul style="list-style-type: none">• 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
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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 with C Author: Yashwant Kanetkar.
4. Programming in C Schaum Series publication.

CS-03: 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

		<ul style="list-style-type: none"> ● Frame in HTML ● Forms ● HTML 5 & Syntax <ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> - Border Property - Background & Gradient Property - Drop Shadow Property - 2D & 3D Transform Property - Transition Property - Box Sizing Property - Position Property ● Media Query
5	Java Script	<ul style="list-style-type: none"> ● 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,

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		onchange, onsubmit, onreset) • DOM & History Object • Form Validation & E-mail Validation
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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 4.0 -Lee Philips.
6. MCSE Networking Essential Training Guides.
7. Mastering In FrontPage – BPB.

CS-04: WEB PROGRAMMING		
Objective:		
<ul style="list-style-type: none"> • To learn web programming • Learn to develop web site using PHP 		
Unit No.	Topic	Detail
1	Web Programming	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Introduction to JSON • Installation & Configuration • Resource Types • JsonSerializerizable • JSON Functions : json_decode, json_encode
2	PHP Basic	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ▪ argument function ▪ default argument ▪ variable function ▪ return function • Variable Length Argument Function <ul style="list-style-type: none"> ▪ 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, strpos, str_replace, strrev, echo, print, explode(), implode(), join(), md5(), str_split(),

		<p>str_shuffle(), strpos(), strpbrk(), substr_compare(), substr_count(), ucfirst(), ucwords())</p> <ul style="list-style-type: none"> • 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(), strtotime(), 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_get_contents, fputcsv, fputs, file_putcontents, ftell, fseek, rewind, copy, unlink, rename, move_uploaded_file)
3	Handling Form, Session Tracking & PHP Components	<ul style="list-style-type: none"> • Handling form with GET & POST • Cookies • Session • Server variable • PHP Components <ul style="list-style-type: none"> - PHP GD Library - PHP Regular expression - Uploading file - Sending mail using mail() - Sending mail using smtp()
	AJAX	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Working with MySQL using PhpMyAdmin • SQL DML Statement (Insert, Update, Select, Delete) Command • PHP-MySQL Connectivity • PHP-MySQL Functions

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		<ul style="list-style-type: none"> • mysql_connect, mysql_close,mysql_error, msyql_errno, mysql_select_db, mysql_query, mysql_fetch_array, mysql_num_Rows, mysql_affected_Rows, mysql_fetch_assoc, mysql_fetch_field , mysql_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	<ul style="list-style-type: none"> • What IsjQuery? • jQuery Syntax • jQuery Selector <ul style="list-style-type: none"> - Element Selector - Class Selector - id Selector • jQuery Events Click, dblclick, keypress, keydown, keyup, submit, change, focus, blur, load, resize, scroll, unhide • 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 – 05: PRACTICALS-1 (BASED ON CS-02 & PC SOFTWARE)	
Topics	Marks
C Language, MS – Word, MS – Excel, MS – Power Point, MS-Access	100

CS – 06: PRACTICALS-2 (BASED ON CS-03 & CS-04)	
Topics	Marks
HTML-5, CSS-3.0, PHP and Macromedia Dreamweaver	100

Note :

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

Additional Topics should be taught during the semester-1 (Not to be asked in examination):

Student should be aware of followings

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