



RANI CHANNAMMA UNIVERSITY

BELAGAVI

THE COURSE STRUCTURE & SYLLABUS OF UNDER GRADUATE

BACHELOR OF SCIENCE

COMPUTER SCIENCE

1ST TO 6TH Semesters

w.e.f.

**Academic Year 2020-21 and Onwards
Under**

CHOICE BASED CREDIT SYSTEM (CBCS)

CHOICE BASED CREDIT SYSTEM [CBCS]

B.Sc. Program with Optional Subject: Computer Science Optional

BSc.: Computer Science as one of the optional subject revised syllabus as per CBCS (w.e.f. 2020-21 onwards)								
Sem	Part	Paper Code	Title of Paper	Hours/Week	Marks			Subject Credits
					IA	Exam	Total	
I	Part – 1 DSC	CPSDSCT1.1	Digital Logic & Comp. Design	4	20	80	100	3
		CPSDSCP1.1	Digital Logic & Comp. Design – Lab	3	10	40	50	1
	Total : Hours / Credits				7			150
II	Part – 1 DSC	CPSDSCT2.1	Programming in C	4	20	80	100	3
		CPSDSCP2.1	Programming in C - Lab	3	10	40	50	1
	Total : Hours / Credits				7			150

BSc.: Computer Science as one of the optional subject revised syllabus as per CBCS (w.e.f. 2021-22 onwards)								
Sem	Part	Paper Code	Title of Paper	Hours/Week	Marks			Subject Credits
					IA	Exam	Total	
III	Part – 1 DSC	CPSDSCT3.1	Data-Structures using C	4	20	80	100	3
		CPSDSCP3.1	Data-Structures using C – Lab	3	10	40	50	1
	Part – 2 SEC	CPSSECP3.2	Internet and e-Resources	2	10	40	50	2
	Total : Hours / Credits				9			200
IV	Part – 1 DSC	CPSDSCT4.1	Operating System	4	20	80	100	3
		CPSDSCP4.1	Operating System using Unix Lab	3	10	40	50	1
	Part – 2 SEC	CPSSECP4.2	Multimedia Technology	2	10	40	50	2
	Total : Hours / Credits				9			200

CHOICE BASED CREDIT SYSTEM [CBCS]

B.Sc. Program with Computer Science Optional Subject

BSc.: Computer Science as one of the optional subject revised syllabus as per CBCS (w.e.f. 2022-23 onwards)								
Sem	Part	Paper Code	Title of Paper	Hours/ Week	Marks			Subject Credits
					IA	Exam	Total	
V	Part – 1 DSE	CPSDSET5.1	Computer Networks	4	20	80	100	3
		CPSDSEP5.1	Computer Networks Lab	3	10	40	50	1
		CPSDSET5.2A	Elective-1 RDBMS	4	20	80	100	3
		CPSDSEP5.2A	Elective-1 RDBMS Lab	3	10	40	50	1
		CPSDSET5.2B	Elective-II Java Programming	4	20	80	100	3
		CPSDSEP5.2B	Elective-II Java Programming Lab	3	10	40	50	1
	Part – 2 SEC	CPSSECT5.3	Fundamental of e-Governance	2	10	40	50	2
		Total : Hours / Credits			17			350

Note: Students have to choose either Elective-I or Elective-II

VI	Part – 1 DSE	CPSDSET6.1	Web Technology	4	20	80	100	3
		CPSDSEP6.1	Web Technology Lab	3	10	40	50	1
		CPSDSET6.2A	Elective-III Python	4	20	80	100	3
		CPSDSEP6.2A	Elective-III Python Lab	3	10	40	50	1
		CPSDSET6.2B	Elective-IV PHP	4	20	80	100	3
		CPSDSEP6.2B	Elective-IV PHP-Lab	3	10	40	50	1
	Part – 2 SEC	CPSSECT6.3	Cyber Laws	2	10	40	50	2
		Total : Hours / Credits			17			350

Note: Students have to choose either Elective-III or Elective-IV

(T: Theory, P: Practical, CC/EA: Co-curricular/Extension Activities
 AECC: Ability Enhancement Compulsory Course,
 DSC: Discipline Specific Course
 DSE: Discipline Specific Elective, SEC: Skill Enhancement Course)

B.Sc. I Semester-Computer Science

Paper Code: CPSDSCT1.1

Paper Title: Digital Logic & Comp. Design

Teaching Hours: 4 Hrs / Week

Marks: Theory-80+IA-20 Marks

Total Hours: 60 Hrs

Credits: 03

UNIT I

Digital Systems and Binary Numbers: Digital Systems, Number systems and base conversions, Representation of signed Binary Numbers, Binary codes, binary logic. **12Hrs**

UNIT-II

Boolean algebra: Introduction to Boolean algebra, Axioms and Laws of Boolean Algebra, Boolean functions, Canonical and Standard Forms.

Gate – Level Minimization: The Map method, Two, Three, Four Variable K-map's, Don't Care Conditions, NAND and NOR implementation, Exclusive OR function. **12Hrs**

UNIT-III

Combinational Logic:Combinational logic circuits, analysis and design procedure, Binary adder and subtractor, decimal adder, binary multiplier, Magnitude comparator, Decoders, Encoders, Multiplexers. **12Hrs**

UNIT-IV

Synchronous Sequential Logic:Sequential circuits, Latches, Flip Flops, SR, JK, T, D Flip Flops, Flip Flop excitation tables.

Registers and Counters: Registers, Shift registers, Ripple counters, Synchronous counters, other counters. **12Hrs**

UNIT - V

Memory and Programmable Logic: Random access memory, memory decoding, error detection and correction, Read-Only memory, Programmable logic array, Programmable array logic, sequential programmable devices. **12Hrs**

References:

1. M. M. Moris and Michael D. Ciletti, Digital Design, 5thEdition,Pearson.
2. M. Moris Mano, Digital Logic and Computer Design, 4th Edition,Pearson.
3. Paul Malvino, Digital Principles and Applications by Leach, 57th Edition, TataMcGrawHill.

AdditionalReading:

4. Charles H.Roth, Fundamentals of Digital Logic Design, 5th Edition, Cengage
5. G.K. Kharate, Digital Electronics, Oxford University Press
6. A. Anand Kumar, Switching Theory and Logic Design, 2nd Edition,PHI.

1. For the following functions, construct a truth table and draw a circuit diagram.
 1. $y(A,B) = (AB)' + B'$
 2. $y(A,B,C) = (A + B)' C$
 3. $y(A,B,C) = (AC)' + BC$
 4. $y(A,B,C) = (A \oplus B)C'$
 5. $y(A,B) = A' + B$
 6. $y(A,B,C) = ((A+B)'(B+C))'$
2. Study and verify the truth table of various logicgates
 - NOT, AND, OR, NAND, NOR, EX-OR, and EX-NOR
3. Simplify Boolean expressions and realizeit.
4. Verification of Boolean Theorems using basic gates
5. Design a 4-input NAND gate using two 2-input NAND gates and one 2-input NOR gate. Hint: Use De-Morgan's law
6. Construct the K-map for each of the followingfunctions
 - (a) $f(A,B,C) = AB + A'BC' + AB'C$
 - (b) $g(A,B,C) = A'C + ABC + AB'$
 - (c) $h(A,B,C,D) = A'BC' + (A \oplus B)C + A'B'CD' + ABC$
7. For $g(A,B,C) = A'C + ABC + AB'$, design the circuit for the minimal SOP expression found in problem 4 using just NAND gates and inverters. Label the pin-outs on the circuit diagram. Build the circuit and demonstrate the workingcircuit.
8. For the functions listed below, construct a K-map and determine the minimal SOP expression.
 - a. $f(a,b,c) = a'b'c' + a'bc' + abc' + abc$
 - b. $g(a,b,c) = ab'c' + abc' + abc + \text{don't cares}(a'bc + ab'c)$ Build the circuit required for.
9. Design and verify a half/fulladder
10. Design and verify half/fullsubstractor
11. Design a 4 bit magnitude comparator using combinationalcircuits.
12. Design and verify the operation of flip-flops using logicgates.
13. A two bit counter is to be built that will count forward, $00 \rightarrow 01 \rightarrow 10 \rightarrow 11 \rightarrow 00$, when a logical input is set high and counts in reverse order when it islow.
 - (a) Draw the state transition diagram for this statemachine.
 - (b) Assuming a state machine were to be built using D flip-flops, determine the value of the next state for each of the flip-flops. Build and demonstrate the state machines.
14. Verify the operation of acounter.
15. Verify the operation of a 4 bit shiftregister
16. Using SPIM, write and test an adding machine program that repeatedly reads in integers and adds them into a running sum. The program should stop when it gets an input that is 0, printing out the sum at thatpoint.
17. Using SPIM, write and test a program that reads in a positive integer using the SPIM system calls. If the integer is not positive, the program should terminate with the message "Invalid Entry"; otherwise the program should print out the names of the digits of the integers, delimited by exactly one space. For example, if the user entered "128," the output would be "One TwoEight."
 - Any open source simulator like Logisim<https://sourceforge.net/projects/circuit/> can beused.
 - SPIM is a self-contained simulator that will run MIPS R2000/R3000 assembly language programs. (Available at<https://sourceforge.net/projects/spimsimulator/>)

B.Sc. II Semester- Computer Science

Paper Code: CPSDSCT2.1	Paper Title: Programming in C
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Computer Programming concept: Modular Programming and structured programming. Programming Languages and its Classification, Compiler, Interpreter, Linker, Loader.

Problem Solving: Problem Identification, Analysis, flowcharts, Decision Tables, Pseudo codes and algorithms, Program Coding, Program Testing and Execution, Documentation. **12Hrs**

UNIT-II

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity. **12Hrs**

UNIT-III

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement. Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

Functions: Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C. User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters. **12Hrs**

UNIT-IV

Arrays and Strings: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, String handling library functions.

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime. **12Hrs**

UNIT-V

Structure and Union: Structure definition, declaring structure, Accessing structure elements, Array of structure. Definition of union. Declaring and using union. Differences between structure and union

File Management in C: Defining and Opening & Closing File, Input & Output Operations on Files, Error Handling During I/O Operations, Command Line Arguments. **12Hrs**

References:

1. Gill Nasib Singh, Computing Fundamentals and Programming in C, Khanna Books Publishing Co., NewDelhi.
2. Balagurusamy E., Computing Fundamentals and C Programming, Tata McGrawHill.
3. Kenneth. A., C problem solving and programming, PrenticeHall.
4. R.G. Dromey, How to Solve it by Computer, PearsonEducation

Additional reading

5. Anil V. Chouduri, The Art of Programming through Flowchart and Algorithms, LaxmiPub.
6. Gottfried, Byron S., Programming with C, Tata McGrawHill.
7. E. Balaguruswamy, Programming in ANSI C, McGrawhill.
8. Ashok N. Kamthane, Programming in C, PearsonEducation.

Paper Code: CPSDSCP2.1

Paper Title: Programming in C-Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-20 Marks

Credits: 01

Student shall gain hands-on experience of drawing flow chart, writing algorithm, and writing c programming and executing the c program. Following assignments shall be implemented using c.

Note: Students shall draw the flow chart and write algorithm for a minimum of 12 assignments from the below list as identified by the course teacher.

1. Write a program to enter length and breadth of a rectangle and find its perimeter and area.
2. Write a program to enter P, T, R and calculate Simple Interest.
3. Write a program to find maximum between three numbers.
4. Write a program to check whether year is leap year or not using conditional/ternary operator.
5. Write a program to function as a basic calculator; it should ask the user to input what type of arithmetic operation he would like, and then ask for the numbers on which the operation should be performed. The calculator should then give the output of the operation.
6. Write a program that takes in three arguments, a start temperature (in Celsius), an end temperature (in Celsius) and a step size. Print out a table that goes from the start temperature to the end temperature, in steps of the step size; Celsius to Fahrenheit.
7. Write a program to sort array elements in ascending order.
8. Write a program to subtract/add/multiply two matrices.
9. Write a program to check whether an alphabet is vowel or consonant using switch case.
10. Write a program to display all possible permutations of a given input string--if the string contains duplicate characters, you may have multiple repeated results. Input should be of the form *permute string* and output should be a word per line.
Here is a sample for the input *cat*
cat cta act atc tac tca
11. Write a function that accepts a number, n, and prints all prime numbers between 1 to n.
12. Write an iterative function calculate factorial of a given integer.
13. Write a program to find HCF (GCD) of two numbers by passing two numbers to function `compGCD()`.
14. Write a program to find maximum and minimum element in an array by passing array to function.
15. Write a program to input electricity unit charges and calculate total electricity bill according to the given condition:
For first 50 units Rs. 0.50/unit
For next 100 units Rs. 0.75/unit
For next 100 units Rs. 1.20/unit
For unit above 250 Rs. 1.50/unit
An additional surcharge of 20% is added to the bill
16. Write a program to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following. Use structure to create array of students and compute percentage and grade by passing structure to function.
Percentage \geq 90% : Grade A
Percentage \geq 80% : Grade B
Percentage \geq 70% : Grade C
Percentage \geq 60% : Grade D
Percentage \geq 40% : Grade E
Percentage $<$ 40% : Grade F
17. Write a C program to add two complex numbers by passing structure to a function. Consider the following structure definition for complex number.
`typedef struct complex`

```
{  
float real;  
floatimag;  
} complex;
```

18. Write a C program to illustrate difference between structure and union by defining emp_Name, salary, job as members and displaying the size of the defined structure and union.(ie. In terms of memory allocation)
19. Write a C program to compare two strings without using library function.
20. Write a C program to illustrate string library functions (copy, concat, uppercase to lower case and vice-versa, length of string, sort set of strings(use strcmp())).

B.Sc. III Semester Computer Science

Paper Code: CPSDSCT3.1	Paper Title: Data-Structure using C
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Advanced C: Dynamic memory allocation and pointers in C- Declaring and initializing pointers, Pointer & Functions, Pointer & Arrays, Pointer & Strings, Pointer & Structure, Pointer to Pointer. Static and Dynamic memory allocations. Memory allocation functions: malloc, calloc, free and realloc. **12Hrs**

UNIT-II

Introduction to Data structures: Definition, Classification of data structures: primitive and non-primitive. Operations on data structures. **Search:** Basic Search Techniques- Sequential search, Binary search- Iterative and Recursive methods.

Sort: General Background: Definition, different types: Bubble sort, Selection sort, Merge sort, Insertion sort, Quick sort. **12Hrs**

UNIT-III

Recursion: Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD, towers of Hanoi.

Stack: Definition, Array representation of stack, Operations on stack-push and pop, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, applications of stacks. **12Hrs**

UNIT-IV

Queue: Definition, Array representation of queue, Types of queue: Simple queue, circular queue, double ended queue (deque) priority queue, operations on all types of Queues. **12Hrs**

UNIT-V

Linked list: Definition, components of linked list, representation of linked list, advantages and disadvantages of linked list, Arrays versus linked list, **Types of linked list:** Singly linked list, doubly linked list, Circular linked list and circular doubly linked list. **Operations on singly linked list:** creation, insertion, deletion, search and display. Implementation of stack and queues using linked list. **12Hrs**

References

1. A. K. Sharma, Data Structures Using C, 2nd edition, Pearson Education.
2. Achuthsankar S. Nair, T. Makhalekshmi, Data Structures in C, PHI.
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson Education.
4. Samanta. D., Classic Data Structures, Prentice Hall

Additional Reading

5. Richard F. Gilberg, Behrouz A. Forouzan, Data structures-A Pseudocode Approach with C, Thomson Learning.
6. A. M. Tenenbaum, Y. Langsam, M. J. Augustein, R. L. Kruse, B. P. Leung and C. L. Tondo, Data Structures using C, PHI.
7. Tannenbaum, Data Structure Using C & C++, Tannenbaum, PHI
8. C. Loudon, Mastering Algorithms, SPD/O'REILLY

Paper Code: CPSDSCP3.1

Paper Title: Data-Structure using C-Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

1. Write a C program to demonstrate the Dynamic Memory Allocation for Structure by reading and printing n student details.
2. Write a C program to read a one dimensional array, print sum of all elements along with inputted array elements using Dynamic Memory Allocation.
3. Write a C program to add two matrices using pointer to an array concept.
4. Write a program to sort array of integers using array of pointers concept.
5. Write a program that takes a file as an argument and counts the total number of lines. Lines are defined as ending with a newline character. Program usage should be count filename.txt and the output should be the line count.
6. Write a C program to read a text file and convert the file contents in capital (upper-case) and write the contents in an output file.
7. Write a C program to find n Fibonacci numbers using recursion.
8. Write a C program to find factorial of any number using recursion.
9. Write a C program to search for an element in an array using Sequential search
10. Write a C program to search for an element in an array using Binary search
11. Write a C program to sort a list of N elements using Bubble sort Technique
12. Write a C program to sort a list of N elements using Merge sort Technique
13. Write a C program to sort a list of N elements using Quick sort Technique
14. Write a C program to sort a list of N elements using Insertion sort Technique
15. Write a C program to demonstrate the working of stack of size N using an array. The elements of the stack may assume to be of type integer or real, the operations to be supported are 1.PUSH 2. POP 3. DISPLAY. The program should print appropriate messages for STACKoverflow, under flow and empty, use separate functions to detect these cases.
16. Write a C program to simulate the working of an ordinary Queue using an array. Provide the operations QINSERT, QDELETE and QDISPLAY. Check the Queue status for empty and full.
17. Using dynamic variables and pointers Write a C program to construct a singly linked list consisting of the following information in each node; Roll – No (Integer), Name (Characterstring). The operations to be supported are :
 1. LINSERT Inserting a node in the front of the list
 2. LDELETE Deleting the node based on Roll – No
 3. LSEARCH Searching a node based on Roll-No
 4. LDISPLAY displaying all the nodes in the list
18. Write a C program to implement stack operations using linked list.
19. Write a C program to evaluate postfix expression using stack.
20. Write a C program to convert infix expression to postfix expression using stack

B.Sc. III Semester Computer Science

Paper Code: CPSSECP3.2	Paper Title: Internet and e-Resources
Practical Hours: 2 Hrs / Week	Marks: Practical- 40+IA-10 Marks
Total Hours: 30 Hrs	Credits: 02

UNIT-I

Internet:Internet and its history, defining and describing the Internet, Brief history, discussing the future of the Internet. **6Hrs**

UNIT-II

Internet Resources:Email, Parts of email, Email software, Web-based email, Email address,Listservers, Newsgroups, Newsgroups names, Newsgroups readers,Chat rooms, Conferencing, Games, File transfer protocol,Telnet, Gopher, World Wide Web. **6Hrs**

UNIT-III

Accessing the Internet: Types of access, Online services, Internet services providers, How and where to look for the service, Browsing the Web, Hypertext and hyperlinks, Using browsers, Uniform resource locator, Following links, Returning to the home page , Favorites and Bookmarks. **6Hrs**

UNIT IV

e-Resources:Introduction, Purpose of e- resources, Need of Electronic Resources, Structure of E- resources, Basic requirement for accessing e-resources, Type of e-resources, Features of E-resources **6Hrs**

UNIT V

How to access E-Resources, Rules for access Electronic Resources, Copy right issue about e-resources, Useful websites for librarians, Impact of E resources on library services and user studies **6Hrs**

B.Sc. IV Semester Computer Science

Paper Code: CPSDSCT4.1	Paper Title: Operating System
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Introduction: Basics of Operating Systems: Definition, types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine. **12Hrs**

UNIT-II

Process Management: Process Definition , Process Relationship , Process states, Process State transitions , Process Control Block , Context switching , Threads, Concept of multithreads , Benefits of threads, Types of threads.

Process Scheduling: Definition, Scheduling objectives, Types of Schedulers, CPU scheduling algorithms, performance evaluation of the scheduling. **12Hrs**

UNIT-III

Inter-process Communication Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, and Classical IPC Problems.

Deadlocks: Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance (concepts only). **12Hrs**

UNIT-IV

Memory Management: Logical and Physical address map, Memory allocation, Internal and External fragmentation and Compaction, Paging. Virtual Memory: Demand paging, Page Replacement policies. **12Hrs**

UNIT-V

I/O Management Principles of I/O Hardware: Disk structure, Disk scheduling algorithm. **File Management:** Access methods, File types, File operation, Directory structure, File System structure, Allocation methods, Free-space management, and directory implementation.

Structure of Linux Operating System, Exploring the Directory Structure, Naming Files and Directories, Concept of shell, Types of shell, Editors for shell programming (e.g. vi), basics of Shell programming. Concept of shell, Types of shell, Editors for shell programming (e.g. vi), basics of Shell programming. **12Hrs**

References:

1. Silberschatz, Peter B. Galvin and Greg Gagne, Operating System Concepts, 9th Edition, Wiley Indian Edition.
2. Andrew S Tanenbaum, Modern Operating Systems, Third Edition, Prentice Hall India.
3. Sumitabha Das, UNIX Concepts and Applications, 4th Edition, Tata McGraw Hill.

Additional Reading:

4. Milankovic, Operating Systems, Tata McGraw Hill.
5. Naresh Chauhan, Principles of Operating Systems, Oxford Press.
6. D.M. Dhamdhare, Operating Systems: A concept based approach, 2nd edition, Tata McGraw Hill.

B.Sc. IV Semester Computer Science

Paper Code: CPSSECP4.2	Paper Title: Multimedia Technology
Practical Hours: 2 Hrs / Week	Marks: Practical- 40+IA-10 Marks
Total Hours: 30 Hrs	Credits: 02

Unit-I

What is Multimedia: Definitions - CD-ROM and the Multimedia Highway - Where to use Multimedia - Introduction to Making Multimedia: The stages of a Project - What You Need - Multimedia Skills and Training: The Windows Multimedia PC Platform. **6Hrs**

Unit-II

Basic Tools:Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image-Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools. **6Hrs**

Unit-III

Text:The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext. **6Hrs**

Unit-IV

Sound:The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Audio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your Multimedia Project - Toward Professional Sound: The Red Book Standard - Production Tips **6Hrs**

Unit-V

Images:Making Still Images -Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work - Video: Using Video - How Video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video. **6Hrs**

References:

1. Tay Vaughan - Multimedia: Making it Work. - Fourth Edition - Tata McGraw-Hill Edition - 1999.
2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.
3. John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

B.Sc. V Semester Computer Science

Paper Code: CPSDSET5.1	Paper Title: Computer Networks
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Introduction:Data Communications, Networks, the internet, protocols and standards, network models – OSI model, TCP/IP protocol suite, addressing. **12Hrs**

UNIT-II

Data and Signals: Periodic analog signals, digital signals, transmission impairment, data rate limits, performance.

Digital transmission: Digital to digital conversion, analog-to-digital conversion, transmission modes. **12Hrs**

UNIT-III

Physical Layer and Media:Analog transmission: Digital-to-analog conversion, analog-to-analog conversion. Multiplexing and Spread spectrum. Transmission media – Guided media and unguided media. **12Hrs**

UNIT-IV

Switching: Circuit-switched networks, datagram networks, virtual-circuit networks, structure of a switch. Telephone networks, dialup modems, digital subscriber line, cable-TV networks.

Detection and Correction: Errors, redundancy, detection versus correction, block coding, linear block codes, cyclic codes, checksum. **12Hrs**

UNIT-V

Data Link Control:Framing, flow and error control, noiseless and noisy channels, HDLC, point-to-point control.

Multiple Access: Random access ALOHA, controlled access, channelization.

Wired LANs:Ethernet. **Wireless LANs.** Connecting LANs, Backbone Networks, and Virtual LANs **12Hrs**

References:

1. Behrouza A Forouzan, Data Communication & Networking, Tata McGrawHill.
2. Andrew S. Tanenbaum, Computer Networks, 5th Ed, Pearson Education
3. William Stallings, Data and Computer Communications, 7th Edition, PHI.
4. <http://highered.mheducation.com/sites/0072967757/index.html>

Additional Reading:

5. Proakin, Digital Communications, McGrawHill.
6. W. Stalling, Wireless Communication and Networks, Pearson.
7. Brijendrasingh, Data Communication and Computer Networks, PHI.
8. Dr. Prasad, Data Communication & Network, Wiley Dreamtech

Paper Code: CPSDSEP5.1

Paper Title: Computer Networks Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

Data Communication:

Equipment: DCT-03 Kit 9 Pin D connector Cables – 2 Nos. Computers–2 nos. Connecting Chords. Power Supply. Students shall study basics of serial communication ports and protocols. Study serial port communication in Windows environment.

Networking: NS-3 has been developed to provide an open, extensible network simulation platform, for networking research and education. That is, provides models of how packet data networks work and perform, and provides a simulation engine for users to conduct simulation experiments. This lab gives in depth view of how computer networks works in real time. Simulation of various topologies shall be performed using ns3 tool. The shall install Ubuntu, Fedora Linux, NS3, on their machines.

1. Program in NS3 to connect two nodes
2. Program in NS3 for connecting three nodes considering one node as a central node.
3. Program in NS3 to implement star topology
4. Program in NS3 to implement a bus topology.
5. Program in NS3 for connecting multiple routers and nodes and building a hybrid topology.
6. Installation and configuration of NetAnim
7. Program in NS3 to implement FTP using TCP bulk transfer.
8. Program in NS3 for connecting multiple routers and nodes and building a hybrid topology and then calculating network performance

B.Sc. V Semester Computer Science

Paper Code: CPSDSET5.2A	Paper Title: Elective- RDBMS
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Introduction: Purpose of Database Systems, View of Data, Database Languages, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators. **12Hrs**

UNIT-II

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Formal Relational Query Languages: The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus. **12Hrs**

UNIT-III

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process, Modeling Temporal Data. **12Hrs**

UNIT-IV

Data Storage: Overview of Physical Storage Media, Magnetic Disk and Flash Storage, RAID, File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer, Indexing and Hashing concepts, Ordered Indices, B+-Tree Index Files, Multiple-Key Access, Static Hashing, Dynamic Hashing, Bitmap Indices. **12Hrs**

UNIT V

Introduction to SQL: SQL Data Definition, Basic Structure of SQL Queries, Basic Operations- Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database, Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries. **12Hrs**

References:

1. Abraham Silberschatz, Henry F. and S. Sudarshan, Database System Concepts, 6th edition, McGrawHill.
2. AtulKahate, Introduction to Data Base Management Systems, PearsonEducation
3. Elmasari&Navathe, Fundamentals of Database System, Pearson Education
4. Feuerstein, Oracle PL/SQL Programming,SPD/O'REILLY

Additional Reading:

5. Korth, Data Base System Concepts, TMH
6. Bipin Desai, An introduction to Database System, GalgotiaPublications
7. S. K. Singh, Database System: concept, Design & Applicatio, PearsonEducation
8. P.S. Deshpande, SQL PL/SQL for Oracle 8 & 8i, WileyDreamtech

Paper Code: CPSDSEP5.2A

Paper Title: Elective-1 RDBMS Lab

Practical Hours: 3 Hrs / Week

Marks: Practical-40+IA-10 Marks

Credits: 01

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario.
2. Write relational algebra queries for a given set of relations.
3. Perform the following:
 - a. Viewing all databases, Creating a Database, Viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing(rollback)
4. Perform the following:
 - a. Altering a Table, Dropping/Truncating/Renaming Tables, Backing up / Restoring a Database.
5. For a given set of relation schemes, create tables and perform the following
Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (group by and having clause), Queries involving- Date Functions, String Functions , Math Functions
Join Queries- Inner Join, Outer Join
Subqueries- With IN clause, With EXISTS clause
6. For a given set of relation tables perform the following
 - a. Creating Views (with and without check option), Dropping views, Selecting from a view
7. Write a PL/SQL program using FOR loop to insert ten rows into a database table.
8. Given the table EMPLOYEE (EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table.
9. Illustrate how you can embed PL/SQL in a high-level host language such as C and demonstrate how a banking debit transaction might be done.
10. Given an integer i, write a PL/SQL procedure to insert the tuple (i, 'xxx') into a given relation

Paper Code: CPSDSET5.2B

Paper Title: Elective-11 Java Programming

Teaching Hours: 4 Hrs / Week

Marks: Theory-80+IA-20 Marks

Total Hours: 60 Hrs

Credits: 03

UNIT-I

Fundamentals of Object Oriented Programming(OOP), difference between Procedural and Object oriented programming , basic OOP concept - Object, classes, abstraction, encapsulation,inheritance, polymorphism .History of Java, features of Java, JDK Environment, Java Virtual Machine, JavaRuntime environment. **12Hrs**

UNIT-II

Identifiers and Keywords, data types, Java coding Conventions, expressions, control structures,decision making statements, Arrays and its methods, Garbage collection & finalize() method.Java classes, define class with instance variables and methods, object creation, accessing member ofclass, argument passing, Constructors, Method overloading, static data, static methods, static blocks,this keyword, Nested & Inner classes, Wrapper Classes, String (String Arrays, StringMethods, StringBuffer) **12Hrs**

UNIT-III

Inheritance:Super class & subclass, abstract method and classes, method overriding, final keyword,super keyword, down casting and up casting, dynamic method dispatch.

Packages and Interfaces: Importing classes, user defined packages, modifiers & access control(Default, public, private, protected, private protected), implementing interfaces, userdefined interfaces, Adapter classes **12Hrs**

UNIT-IV

Exception handling:Types of Exceptions, try, catch, finally, throw, throws keywords, creating yourown exception, nested try blocks, multiple catch statements, user defined exceptions.

Java Input Output: Java IO package, File, Class Byte/Character Stream, Buffered reader / writer, FileReader / writer Print writer File Sequential / Random Serialization and de serialization.

Multithreading: Multithreading Concept, thread life cycle, creating multithreading application, threadPriorities, thread synchronization, and inter thread communication. **12Hrs**

UNIT-V

Abstract Window Toolkit:Components and Graphics, Containers, Frames and Panels, LayoutManagers, AWT all Components, Event Delegation Model, Working with Graphics and Text. **12Hrs**

References:

1. Herbert Schildt, The Java 2 : Complete Reference, Fourth edition, TMH,
2. Balaguruswamy, Programming with JAVA, A primer, TATA McGraw-Hill Company.
3. Cay S Horstmann, Fary Cornell, Core Java 2 Volume – I and II, Sun Microsystems Press
4. <https://docs.oracle.com/javase/tutorial/>

Additional Reading:

5. Peter Van der Liden, Just Java, Prentice Hall
6. H. M. Deitel, P. J. Deitel, Java: how to program, 5th edition, Prentice Hall of India.

Paper Code: CPSDSEP5.2B

Paper Title: Elective-11 Java Programming Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

Students are encouraged to use Linux-Open Source OS for executing java –programs using javac compiler available in Linux.

1. Define a class that will hold the set of integers from 0 to 31. An element can be set with the set member function and cleared with the clear member function. It is not an error to set an element that's already set or clear an element that's already clear. The function test is used to tell whether an element is set.
2. Write a Java program that creates an object and initializes its data members using constructor. Use constructor overloading concept.
3. Write your own simple Account class. You should be able to make deposits and withdrawals and read out the balance — a private double variable. Member functions should be: void Account::withdraw (const double &amount); //Take from account void Account::deposit(const double &amount); // Put into account double account::balance(void); //Return the balance Make sure that the Account constructor function initializes the balance to zero. If you like, add an overloaded constructor function to set an initial balance.
4. Write a derived class DepositAccount that inherits from the Account class. The account should pay interest at an annual rate that is private member data, but impose a £10 fee for every withdrawal. You should overload the member functions of Account where necessary. How will you determine when to pay interest?
5. Write a java program to calculate gross salary & net salary taking the following data. Input: empno, empname, basic Process: DA=50%of basic HRA=12%of basic CCA=Rs240/- PF=10%of basic PT=Rs100/-
6. Write a Java program to sort the elements using bubble sort.
7. Write a Java program to search an element using binary search.
8. Write a Java program that counts the number of objects created by using static variable.
9. Write a Java program to count the frequency of words, characters in the given line of text.
10. Write a java program to identify the significance of finally block in handling exceptions.
11. Write a java program to access member variables of classes defined in user created package.
12. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.
13. Write a Java Program to implement Vector class and its methods.
14. Write a program to demonstrate use of user defined packages.
15. Write a java program to implement exception handling using multiple catch statements.
16. Design stack and queue classes with necessary exception handling. Test the classes by writing a tester program.
17. Write a Java program to illustrate AWT controls frame, panel, layout manager, command button and text boxes.
18. Write a Java program to illustrate basic calculator using grid layout manager.
19. Illustrate creation of thread by extending Thread class
20. Illustrate thread creation by implementing runnable interface.

B.Sc. V Semester Computer Science

Paper Code: CPSDSET5.3	Paper Title: Fundamental of E-Governance
Teaching Hours: 2 Hrs / Week	Marks: Theory-40+IA-10 Marks
Total Hours: 30 Hrs	Credits: 02

UNIT-I

Overview of E-Government and E-Governance, Stages of E-Governance, National E-Governance Plan (NeGP), Mission Mode Projects and their implementation status, E-Governance , Introduction to E-governance, Role of ICT's in e-governance, Need, importance of E-governance.

6 Hrs

UNIT-II

Categories of E-governance, Key Issues of E-Governance, Technology, Policies, Infrastructure, Training, Copyrights , Consulting Funds, E-governance Models, Model of Digital Governance, Broadcasting /Wider Dissemination Model.

6 Hrs

UNIT-III

Critical Flow Model, Interactive-service model/Government –to-Citizen-to-Government Model (G2C2G), Major areas of E-governance Services, Public Grievances: Telephone, Ration card, transportation, Rural services Land Records, Police: FIR registration, Lost and found, Social services: Death, domicile, school certificates.

6 Hrs

UNIT-IV

Public information: employment, hospitals, railway, Agricultural sector: Fertilizers, Seeds, Utility payments Electricity, water, telephone.

6 Hrs

UNIT- V

Commercial: income tax, custom duty, excise duty-Governance Infrastructure, stages in evolution and strategies for success, -Governance Infrastructure, stages in evolution and strategies for success.

6 Hrs

B.Sc. VI Semester Computer Science

Paper Code: CPSDSET6.1

Paper Title: Web Technology

Teaching Hours: 4 Hrs / Week

Marks: Theory-80+IA-20 Marks

Total Hours: 60 Hrs

Credits: 03

UNIT-I

Applet Programming - Creating and executing Java applets, inserting applets in a web page, Java security. Review of AWT Classes, Event Handling, Swing classes, Java swing - JApplet, icons and labels, text fields, buttons, combo boxes, tabbed and scroll panes, trees, tables. **12Hrs**

UNIT-II

JDBC-Setting the JDBC connectivity with a backend database. RMI -Two tier and Multitier Architecture, Object serialization, RMI Fundamentals, Programming using Java RMI Classes and interfaces. **12Hrs**

JAVA Script: Basics, variables, string manipulation, mathematical functions, statements, operators, arrays, functions, data and objects, regular expressions, exceptional handling, built in objects, cookies, events, dynamic HTML with Java Script. **12Hrs**

UNIT-III

HTML and Style sheets:Document body, text, hyperlinks, formatting, lists, color, images, tables, multimedia objects, tables, forms, basic XHTML.

Cascading style sheets(CSS), properties and values in styles, formatting blocks of information, design of CSS2, styling for paged media, using aural presentation, counters and numbering. **12Hrs**

UNIT-IV

Perl and CGI:Basic Perl program, scalars, arrays, hashes, control structures, processing text, regular expressions, using files, subroutines, bits and pieces.

Developing CGI application, processing CGI, CGI.pm methods, creating HTML pages dynamically, carp, cookies. **12Hr**

UNIT-V

XML: Basic XML, Document Type Definition, XML Schema, Document Object Model, presenting XML, XML parser, handling XML and DOM. **12Hr**

References:

1. Patrick Naughton And Herbert Schildt, Java The Complete Reference, TMH Publication.
2. Cay S. Horstmann and Gary Cornell, Core JAVA 2, Volume-II, 7/e, Pearson Education.
3. Web Programming -Building Internet Applications, Chris Bates, Wiley Student edition
4. Ivan Bayross, Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI, BPB Pub.
5. <http://html.com/>, <https://javascript.info/>

Additional Reading:

6. PHP5 and MySQL Bible, Tim Converse and Joyce Park with Clark Morgan, Wiley Publishing.
7. Steven M. Schafer, HTML, CSS, JavaScript, Perl, Python and PHP - Web standards Programmer's Reference, Wiley Publishing, Inc..
8. Thomas A. Powell, The Complete Reference HTML & XHTML, Tata McGraw Hill.

Paper Code: CPSDSEP6.1

Paper Title: Web Technology Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

1. Write a java program to demonstrate key events by using Delegation eventmodel.
2. Write a java program to implement mouse events like mouse pressed, mouse released and mouse moved by means of adapterclasses.
3. Write a java program to demonstrate window events on frame.
4. Write an applet to display a simple message on a colored background.
5. Write an applet that computes the payment of a loan based on the amount of the loan, interest rate and the number of months.
6. Write an applet to perform the 4 basic arithmetic operations as buttons in a form accepting two integers in textboxes and display their result.
7. Write a java program to design a registration form for creating a new eMail account.
8. HTML (five assignments may be identified)
 - a. Program to illustrate various HTML tags: body and pre-tag, font tag, text formatting tags, ordered/unordered list tags, image tag, anchor tag, table tag, frame tag, form tag, span tag. Use suitable examples to illustrate various tags in combination.
 - b. Illustrate importance of CSS.
 - c. Illustrate embedded multimedia i.e. To create a Html multimedia support to play different audio and video formats in a browser
9. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag
10. Develop and demonstrate a XHTML file that includes Javascript script for the following problems:
 - a) Input : A number n obtained using prompt Output : The first n Fibonacci numbers
 - b) Input : A number n obtained using prompt Output : A table of numbers from 1 to n and their squares using alert
11. Develop and demonstrate a XHTML file that includes Javascript script that uses functions for the following problems:
12. Parameter: A string Output: The position in the string of the left-most vowel
13. Parameter: A number Output: The number with its digits in the reverse order
14. Design an XML document to store information about a student in an affiliated college affiliated to RCUB. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
15. Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc
16. Write a Perl program to accept LINUX command from a HTML form and to display the output of the command executed.
17. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings
18. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table

B.Sc. VI Semester

Paper Code: CPSDSET6.2A	Paper Title: Elective-111 Python
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT -I

Introduction to Python: Working with python, Variables, expressions, and statements, accepting user input, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Iteration, Function Basics- Built-in Functions, Declaring and calling user defined functions, Parameters and default arguments, Fruitful functions and void functions, Recursion, Scope :Global, Local variables. Modules: Creating and importing modules- importing all or specific classes from module.

12Hrs

UNIT-II

Lambda -- functions as objects, map() function, Strings, indexing, Slicing, Built-in String methods, Lists, Dictionaries and Tuples, Files: Opening the file – modes : read, write, append. Reading from and writing to a file, closing, deleting a file.

12Hrs

UNIT-III

Exception: Exceptions in Python, Handling Exceptions: try block, except block, else block, finally block, Raising an exception, User defined exception, Assertions. Object-Oriented Programming: Classes : defining classes with `__init__()` and methods, creating objects, class variables and instance variables, Inheritance `_super()` function.

12Hrs

UNIT IV

Regular Expressions: Concept of regular expression, meta characters, using `match()` function, `search()`, `findall()`, `sub()` and `split()` functions. GUI Programming in Python (using Tkinter): Introduction to GUI library. Layout management with `pack`, `grid` and `place`, Widgets with their attributes: Frame, Label, Button, Checkbutton, Radiobutton, Entry, Listbox, Text. Events and bindings, Drawing on canvas (line, oval, rectangle, arc.).

12Hrs

UNIT V

Database connectivity in Python: Installing mysql connector, Accessing connector module, Using `connect`, `cursor`, `execute` & `close` functions, Reading single & multiple results of query execution, Executing different types of SQL statements, Executing transactions, Handling exceptions in database connectivity.

12Hrs

References:

1. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, Create Space Independent Publishing Platform, 2016.
2. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall ofIndia
3. Paul Gries , Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf,2/E
4. Lukaszewski, MySQL for Python: Database Access Made Easy, PactPublisher
5. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015
6. Magnus Lie Hetland, Beginning Python: From Novice to Professional, Apress

Additional Reading:

7. James Payne , Beginning Python: Using Python 2.6 and Python 3, WileyIndia,
8. Python Programming,http://en.wikibooks.org/wiki/Python_Programming
9. The Python Tutorial,<http://docs.python.org/release/3.0.1/tutorial/>
10. Learn Python the Hard way,<http://learnpythonthehardway.org/>
11. Swaroop C H. A Byte of Python,<http://www.swaroopch.com/notes/python>
12. <https://www.tutorialspoint.com/python3>

Paper Code: CPSDSEP6.2A

Paper Title: Elective-111 Python Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

1. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.
2. Write a Python program to get the sum of digits of a non-negative integer.
3. Write a Python program to create a module Calculation.py that contains functions to perform basic arithmetic operations. Demonstrate importing the module.
4. Write a Python program to read a file line by line store it into an array.
5. Write a Python GUI program to design Student Registration Form using any 5 widgets.
6. Write a Python program to demonstrate modification of an existing table data from MySQL database.
7. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
8. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area and perimeter of rectangle. Inherit a class Box that contains additional method volume. Override the perimeter method to compute perimeter of a Box.
9. Write a program to show use of Regular expressions with match(), search(), findall(), sub() and split().
10. Write a python program to demonstrate Exception handling using 'try', 'except', 'finally' and 'else' block.

Practice Programs:

1. Write a Python program to solve the Fibonacci sequence using recursion.
2. Write a Python function to check whether a number is perfect or not.
3. Write a Python program to converting an Integer to a string in any base.
4. Write a Python program to count the number of lines in a text file.
5. Write a Python program to copy the contents of a file to another file.
6. Write a Python class to reverse a string word by word. Input string : 'hello .py' Expected Output : '.py hello'
7. Write a Python program to read a random line from a file
8. Write a Python class to implement pow(x, n).
9. Write a Python program to demonstrate operations on tuple.

B.Sc. VI Semester Computer Science

Paper Code: CPSDSET6.2B	Paper Title: Elective-IV PHP
Teaching Hours: 4 Hrs / Week	Marks: Theory-80+IA-20 Marks
Total Hours: 60 Hrs	Credits: 03

UNIT-I

Introducing PHP –Basic development Concepts –Creating first PHP Scripts –Using Variable and Operators –Storing Data in variable –Understanding Data types –Setting and Checking variables– Data types –Using Constants –Manipulating Variables with Operators. **12Hrs**

UNIT-II

Controlling Program Flow:Writing Simple Conditional Statements -Writing More Complex Conditional Statements –Repeating Action with Loops –Working with String and Numeric Functions. **12Hrs**

UNI- III

Working with Arrays:Storing Data in Arrays –Processing Arrays with Loops and Iterations –Using Arrays with Forms -Working with Array Functions –Working with Dates and Times. **12Hrs**

UNIT-IV

Using Functions and Classes: Creating User-Defined Functions -Creating Classes –Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files-Processing Directories. **12Hrs**

UNIT-V

Working with Database and SQL :Introducing Database and SQL-Using MySQL-Adding and modifying Data-Handling Errors –Using SQLite Extension and PDO Extension. Introduction XML— Simple XML and DOM Extension. **12Hrs**

REFERENCE BOOKS:

1. PHP A Beginner's Guide, VIKRAM VASWANI, Tata McGraw-Hill, 2008.
2. The PHP Complete Reference, Steven Holzner –Tata McGraw-Hill Edition, 2010
3. Spring into PHP5, Steven Holzer, Tata McGraw Hill Edition, 2005

Paper Code: CPSDSEP6.2B

Paper Title: Elective-1V PHP-Lab

Practical Hours: 3 Hrs / Week

Marks: Practical- 40+IA-10 Marks

Credits: 01

1. Develop a PHP program to display prime numbers between the given range and display the total number of prime numbers.
2. Develop a PHP program and check message passing mechanism between pages.
3. Write a PHP program to implement simple calculator operations.
4. Develop a PHP program to demonstrate String functions. (any 6).
5. Write a PHP program to illustrate built in Array manipulation functions.(any 6)
6. Write a PHP program that displays a different message based on time of day. For example page should display “Good Morning” if it is accessed in the morning.
7. Write a PHP program that accepts two numbers using a web form and calculates greatest common divisor (GCD) and least common multiple (LCM) of entered numbers.(Use recursive function)
8. Develop a PHP program to demonstrate inheritance.
9. Develop a PHP program to demonstrate constructors and destructors.
10. Write a PHP program that writes contents of one file to another.
11. Develop a PHP code to read the values entered into the form and test them against the values in the Mysql database. Perform necessary exception handling.
12. Write a PHP program to sort the student records which are stored in the database using selection sort.
13. Develop a PHP program to design a college admission form using MYSQL database.
14. Develop a PHP program using session.
15. Develop a PHP program using cookie and session.

B.Sc. VI Semester

Paper Code: CPSSECT6.3

Teaching Hours: 2 Hrs / Week

Total Hours: 30 Hrs

Paper Title: Cyber Laws

Marks: Theory-40+IA-10 Marks

Credits: 02

UNIT-I

Introduction -Cyberspace vs. Physical space; Scope of Cyber Laws.Components of Cyber Laws in India - Information Technology Act, 2000; Relevant provisions from Indian Penal Code, Indian Evidence Act, Bankers Book Evidence Act, Reserve Bank of India Act, etc. **6 Hrs**

UNIT-II

Information Technology Act– a brief overview; Documents or transactions to which IT Act shall not be applicable; meaning of Computer, Computer system and Computer network; E – commerce; E – governance; Concept of Electronic Signature; Concept of Cyber contraventions and Cyber Offences. **6 Hrs**

UNIT-III

E- Contract –legal provisions regulating the e – contract with special reference to the provisions of IT Act, 2000. Copyright issues in Cyberspace – relevant provisions under Copyright Act, 1957 regulating copyright issues in Cyberspace; Online Software Piracy – legal issues involved; Analysis of sufficiency of provisions of Copyright Act to deals with Online Software Piracy. **6 Hrs**

UNIT-IV

Concept of Cyber Crimes –‘Cyber Contraventions’ & ‘Cyber Offences’ “Study of Some Specific Kinds of Cyber Crimes”- Unauthorized Access’ & ‘Accessing the Protected System-meaning with referenceto an idea of Cyber Hacking; the legal issues involved. **6 Hrs**

UNIT-V

Introducing Computer contaminant or virus –legal issues involved. Denial of Access To Authorized Person– e.g. - Denial of Service (DoS) Attacks; E mail bombing – legal issues involved. Web jacking, Web Defacement & Salami Attacks- legal issues involved. **6 Hrs**

References:

1. Pavanduggal – cybercrime and jurisdiction in India
2. Rohasnagpal “cyber terrorism in the context of globalization”, the it and law initiative (symbiosis publication)
3. Rohasnagpal, ipr& cyberspace – Indian perspective
4. Indian penal code 1860
5. Indian evidence act 1972
6. Bankers book evidence act 1891
7. Rbi of india act 1934
8. Information technology act 2000, it amendment bill 2006, it amendment bill 2008.
9. Copy rights act and trademark act 10. E-contract

Theory and Practical Evaluation Scheme

(i) Internal Test– 20 Marks:Two tests shall be conducted and average of the two shall be considered as final. Duration: 45 mins.

Teachers are encouraged to conduct the test either using any open source learning management system such as Moodle (Modular object-oriented dynamic learning environment) Or a test based on an equivalent online course on the contents of the concerned course (subject) offered by or build using MOOC (Massive Open Online Course) platform.

(ii) External Theory Examination- 80 Marks:Duration - 3 Hours.

Theory question paper pattern:-

Question 1 is compulsory	
Answer any four from the remaining questions	
Question	Marks
SECTION A Q1. Answer all the questions 10 sub questions(a - j)	2 marks x 10 = 20
SECTION B Q2. through Q6: Answer any four questions	5 marks x 4 = 20
SECTION C Q7. through Q11: Answer any four questions	10 marks x 4 = 40

Note: Each Question (from 7 through 11) may be sub-divided into sub questions as {a and b} and allocate marks based on weightage of the topic (eg. a : 4 marks and b: 6).

(iii) Practical Examination – 50 marks

Internal Test– 10 Marks:Two tests shall be conducted and average of the two shall be considered as final. **Duration: 45 mins.**

Students shall design and implement the programs/assignments given from the set of assignments provided at the beginning of the course commencement.

Course teacher are encouraged to test the students by giving the students from the course topic other than the set of assignments to strengthen student’s ability in problem solving

(iv) External Practical Examination- 40 Marks Duration - 3 Hours.

Certified Journal is compulsory for appearing at the time of Practical Examination

Students shall be given two programming assignments taking into consideration of duration of the time allotted to students for typing and executing the programs.

Algorithm/programdesign includes program code	: 15 marks
Execution (correctness and correct executionresults)	:15 marks
Journal	: 05 marks
Viva-Voce	: 05 marks