w.e.f. 2018-19

B.Sc (Computer Science)

Semester-I

Paper Code	Course opted	Nomenclature	Credits	Hr/week	Ext.	Int.	Total
					Marks		
CXL 101	Language Skills Compulsory Course-I	English	2	2	80	20	100
CPL- 102	Core Course-I	Mechanics-I	2	2	80	20	100
CPL- 103	Core Course-II	Electricity, Magnetism and EMT-I	2	2	80	20	100
CCsL- 104	Core Course-III	Computer Fundamentals	2	2	80	20	100
CCsL- 105	Core Course-IV	Programming In C	2	2	80	20	100
CML- 106	Core Course-V	Mathematics-I:Algebra	4	4	80	20	100
CML- 107	Core Course-VI	Mathematics-II: Calculus	4	4	80	20	100
CPP- 108	Practical-I	Physics Lab-I	2	4	100	-	100
CCsP- 109	Practical-II	Computer Lab-I	2	4	100	-	100
CMP- 110	Practical-III	Mathematics Lab-I	1.5	3	100	-	100
		Total	23.5	29	860	140	1000

Semester-II

Paper Code	Course opted	Nomenclature	Credits	Hr/week	Ext.	Int.	Total
					Marks		
CXL- 201	Awareness Program Compulsory Course	Environmental Science	2	2	80	20	100
CPL- 202	Core Course-VII	Mechanics-II	2	2	80	20	100
CPL- 203	Core Course-VIII	Electricity, Magnetism and EMT-II	2	2	80	20	100
CCsL- 204	Core Course -IX	Data Structure using 'C'	2	2	80	20	100
CCsL- 205	Core Course -X	Computer Organisation	2	2	80	20	100
CML- 206	Core Course -XI	Mathematics –III: Vector Calculus and Geometry	4	4	80	20	100
CML- 207	Core Course -XII	Mathematics-IV: Ordinary Differential Equations	4	4	80	20	100
CPP- 208	Practical-IV	Physics Lab-II	2	4	100	-	100
CCsP- 209	Practical-V	Computer Lab-II	2	4	100	-	100
CMP- 210	Practical-VI	Mathematics Lab-II	1.5	3	100	-	100
		Total	23.5	29	860	140	1000

CCsL- 104

Core Course-III: COMPUTER FUNDAMENTALS

(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80

Marks for Internal Exam: 20

Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT I

Computer Fundamentals:

Introduction to Computers: Characteristics and Limitations of Computers, Evolution of Computers, Classification of Computers. Computer Languages. Computer Programs, Structured Programming Concepts

Basic Computer Organization:

Units of a computer, CPU, ALU, Memory Hierarchy, Registers, I/O devices. Mother Board,

UNIT II

Word Processing:

Introduction to MS-Word, Creating & Editing: Formatting Document, Page, Table; Bookmark, Mail Merge, Macros.

Spread Sheets:

Introduction to MS-Excel, Creating & Editing Worksheet, Formatting data, Formulas and Functions, Creating Charts, Pivot Tables.

Power Point Presentations:

Creating, Manipulating & Enhancing Slides, Organizational Charts, Animations & Sounds, Inserting Animated Pictures.

UNIT III

Operating Systems:

Introduction to Operating System: Functions of Operating System, Services; Properties: Batch Processing, Multitasking, Multiprogramming, Interactivity, Distributed environment, Spooling;

Types of Operating System:

Single user and Multiuser, Batch OS, Multiprogramming OS, Multitasking OS, Real-Time

OS, Time-Sharing OS, Distributed OS, Network OS.

UNIT IV

Internet Basics:

History of Internet, Web Browsers, Web Servers, Hypertext Transfer Protocol, Internet Protocols Addressing, Internet Connection Types, How Internet Works, ISPs, Search Engines, Emails and Its Working, Internet Security, Uses of Internet, Computer Networks and their advantages, Types of Computer Network, Network Topologies, Basics of Transmission Media. Cloud Computing Basics: Overview, Applications, Intranets and the Cloud. Benefits, Limitations and Security Concerns.

Text/ Reference Books

1. Satish Jain, Kratika, M. Geetha, "MS Office", BPB Publications, 2010.

2. ITL Education Solutio, "Introduction to Computer Science", Pearson Education, 2nd Edition 2012.

3. P. K. Sinha, "Computer Fundamentals", 6th edition, 2003.

4. Tony Feldman, "Introduction to Digital Media", Routledge; 1 edition, 1996.

5. Bartee, Thomas C, "Digital Computer Fundamentals", McGraw-Hill Inc., 6th Edition, 1984.

Marks for Major Test (External): 80

Marks for Internal Exam: 20

Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – 1

Introduction to C Programming:

History of C, Character Set, Identifiers and Keywords,

Constants, Types of C Constants, Rules for Constructing Integer, Real and character Constants, Variables, Data Types, rules for constructing variables. Input/output: Unformatted & formatted I/O function, Input functions: scanf(), getch(), getche(), getchar(), gets(); output functions: printf(), putch(), putchar(), puts().

Operators and Expressions:

Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators, Type Conversion in Assignments, Hierarchy of Operations, Structure of a C program.

UNIT – 2

Decision Control Structure:

Decision making Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder.

Loop Control Structure:

While and do-while, for loop and Nested for loop,

Case Control Structure:

Decision using switch; goto, break and continue statements.

Functions:

Library functions and user defined functions, Global and Local variables, Function Declaration, Calling and definition of function, Methods of parameter passing to functions, recursion, Storage Classes in C.

UNIT – 3

Arrays:

Introduction, Array declaration, Accessing values in an array, Initializing values in an array, Single and Two Dimensional Arrays, Initializing a 2-Dimensional Array, Passing array elements to a function: Call by value and call by reference, Arrays of characters, Insertion and deletion operations, Searching the elements in an array, Using matrices in arrays, Passing an Entire Array to a Function.

Pointers:

Pointer declaration, Address operator "&", Indirection operator "*", Pointer and arrays, Pointers and 2-Dimensional Arrays, Pointer to an Array, Passing 2-D array to a Function, Array of Pointers.

Dynamic Memory Allocation:

malloc(), calloc(), realloc(), free() functions.

UNIT – 4

String Manipulation in C:

Declaring and Initializing string variables, Reading and writing strings, String Handling functions (strlen(), strcpy(), strcmp(), strcat(), strrev()).

Structures and Unions:

Declaration of structures, Structure Initialization, Accessing structure members, Arrays of structure, Nested structures, Structure with pointers, Union.

Files in C:

Introduction, Opening and Closing files, Basic I/O operation on files.

Text/ Reference Books:

1. Yashvant Kanetkar, "Let Us C", 15th Edition, BPB Publications, 2016.
2. Salaria, R.S. : Test Your Skills in C, Salaria Publications, New Delhi.
3. E. Balaguruswami : Programming with C Language, Tata McGraw Hill, New Delhi.
4. Byron S. Gottfried : Programming in C, McGraw Hills Publishers, New York.
5. M.T. Somashekara : Programming in C, Prentice Hall of India.

CCsP- 109

Practical –II: Computer Lab--I

Based on Computer Fundamentals

(Credits: 02, 60 Hours (4hrs. per week))

Marks: 100

Time: 4 Hours

List of Experiments:

Section- A

1. Create an admission form in MS-Word. You need to use Text-Boxes, Shapes, Colors, formatting options, table and horizontal lines.

2. Send a birthday invitation to your 100 friends using Mail-Merge.

3. Study and use various functions like Sum, Average, Maximum, and Minimum in MS-Excel.

4. Fill 50 students' records in MS-Excel sheet1. The fields must be Roll No., Name, Father Name, Course Joined, Marks obtained in three subjects. Create a marks-sheet in sheet2.

5. Create 10 slides in MS-PowerPoint related to internet advantages and disadvantages in daily life. Add animations to these all slides.

Section-B

1. Program to convert a given decimal number into its binary equivalent using bitwise operators.

2. Program to accept a positive integer and find the sum of the digits in it.

3. Find The Roots of Quadratic Equation using if else statement.

4. Program to generate prime numbers.

5. Program to multiply two matrices.

6. Program to find GCD and LCM using non-recursive function.

7. Program to generate terms of Fibonacci series using recursive function.

8. Program to read a string and check whether it is a palindrome or not (using library functions).

9. Program to create a file called emp.txt and store information about a person, in terms of his name, age and salary.

10. Program to add two complex numbers using structure to store a complex number.

Note: In addition to the above experiments, the teacher may add more programs on the behalf of the theory syllabus.

Marks for Major Test (External): 80
Marks for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – 1

Data Structure Basics:

Introduction to Complexity, Introduction to Data Structures, Classification of data structure, Abstract data type; Data Structure Operations, Applications of Data Structure.

Arrays:

Definition of array, Single and Multi-dimensional Arrays, Representation of single and 2-dimentional arrays and their address calculation, basic operations on single dimensional arrays, Algorithm for insertion and deletion operations; Sparse Matrices and its representation.

Stacks:

Definition of stack, Operations on stack, Algorithms for push and pop operations using array. Stack Applications: Prefix, Infix and Postfix expressions, Conversion of Infix expressions to Postfix expression using stack; Recursion.

UNIT – 2

Queues:

Introduction to Queue. Operations on Queues, Circular queue, Algorithm for insertion and deletion in simple queue and circular queue using array. De-queue, Priority Queues.

Linked Lists:

Introduction, Array vs Linked list; Singly, Doubly and Circular linked Lists and representation of linked lists in memory. Implementation of Stack and simple Queue as single Linked List.

UNIT -3

Trees:

Introduction to Tree as a data structure, Basic Terminology; Binary Trees, Traversal of binary trees: In-order, Pre-order & post-order. Binary tree non recursive traversal algorithms. Binary Search Tree, (Creation, and Traversals of Binary Search Trees)

Graphs:

Introduction, Memory Representation, Graph Traversal (DFS and BFS)

UNIT - 4

Searching:

Binary and Linear Search

Sorting:

Bubble sort, Insertion sort, Selection sort, Merge Sort, Quick sort. Comparison of various Searching and Sorting algorithms.

Text/ Reference Books:

1. Ellis Horowitz & Sartaj Sahni, "Fundamentals of Data structures in C",2nd Edition, Silicon Press, 2007.

2. R. B. Patel, "Expert Data Structures with C", 3rd Edition, Khanna Book Publishing, 2014.

3. A. M. Tenenbaum, Langsam, "Data Structures using 'C'," Pearson Education, 2009.

4. Lipschuitz L. Seymour, 2001 : Data Structure, Schaum Outline Series, TMH, New Delhi.

5. Salaria, R. S. : Data Structures & Algorithm Using C, Khanna Book Publishing Co. (P.) Ltd., New Delhi.

6. Salaria, R. S., Test Your Skills in Data Structures, Khanna Book Publishing Co. (P.) Ltd., New Delhi.

7. Sofat Sanjeev, Data Structure with C and C++, Khanna Book Publishing Co. Patel, R.B., Expert Data Structure in C, Khanna Book Publishing Co.

CCsL- 205

Core Course-IV; COMPUTER ORGANISATION

(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80

Marks for Internal Exam: 20

Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – 1

Data Representation:

Number Systems: Decimal, Binary, Octal, Hexadecimal, Conversion from one number system to other; Binary arithmetic operations, Representation of Negative Numbers: 1's complement and 2's complement; fixed and floating point representation, character representation (BCD, EBCDIC and ASCII Code), BCD number system; Weighted Codes, Self Complementing Code, Excess-3 code, Gray and Cyclic code.

UNIT – 2

Boolean Algebra:

Introduction, Definition, Postulates of Boolean Algebra, Fundamental Theorems of Boolean Algebra; Duality Principle, Demorgan's Theorems, Boolean Expressions and Truth Tables, Standard SOP and POS forms, Canaonical representation of Boolean expressions, Simplification of Boolean Expressions using theorems of Boolean algebra, Minimization Techniques for Boolean Expressions using Karnaugh Map.

Logic Gates:

AND, OR, NOT, NOR, NAND & XOR Gates and their Truth tables.

UNIT – 3

Combinational Circuits:

Half Adder & Full Adder, Half Subtractor & Full Subtractor, Adder & Subtractor, decoders, multiplexors. Realization of Boolean expressions using decoders and multiplexor.

Sequential Circuits:

Flip-Flops, Types- RS, T, D, JK and Master-Salve JK flip flop, Triggering of Flip Flops; Flip Flop conversions, Shift Registers, Synchronous and Asynchronous Counters.

UNIT – 4

Basic Computer Organization and Design:

Register Organization, Bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

Programming the Basic Computer:

Instruction formats, addressing modes, instruction codes.

Input-output Organization:

Peripheral devices, I/O interface, Modes of data transfer,

Direct Memory Access.

Text/ Reference Books:

1. William H.Gothman, "Digital Electronics-An Introduction to Theory and Practice" 2nd Edition, Prentice Hall of India Pvt. Ltd., 2009.

2. Mano, M. Morris,"Digital Logic and Computer Design", Prentice Hall of India Pvt.Ltd., 2000.

3. W.Stallings,"Computer Organization & Architecture", Pearson Education, 7th Edition, New Delhi, 2006.

4. N. Carter,"Computer Architecture", Schaums Outline Series, Tata McGraw Hill, New Delhi, 2006.

Practical –V: Computer Lab--II

Based on Data Structure using 'C' language and Database Management System

(Credits: 02, 60 Hrs (4Hrs /week))

Marks: 100

Time: 4 Hours

List of Experiments:

1. Program to convert a given infix expression to postfix.
2. Program to insert/delete an element in/from an array at a given location.
3. Program to implement Stack using structure
4. Program to implement Single Queue using structure
5. Program to insert, delete and display the linked list (Beginning, End and given position)
6. Program to generate BST and traverse recursively (infix).
7. Program to generate BST and traverse recursively (prefix).
8. Program to generate BST and traverse recursively (postfix).
9. Program for Binary Search.
10. Program for sorting an array using any sorting technique

Note: In addition to the above experiments, the teacher may add more programs on the behalf of the theory syllabus.

Semester-III

Paper Code	Course opted	Nomenclature	Credits	Hr/week	Marks Ext.	Marks Int.	Marks Total
CXL- 301	Language Skills Compulsory Course-III	Hindi-I	2	2	80	20	100
CPL- 302	Core Course-V (Physics)	Heat and Thermodynamics	2	2	80	20	100
CPL- 303	Core Course-VI (Physics)	Semiconductor Devices	2	2	80	20	100
CGL-302	Core Course-V (Geography)	Geography of India	2	2	80	20	100
CGL- 303	Core Course-VI (Geography)	Regional Planning with special reference to Haryana	2	2	80	20	100
CCL- 304	Core Course-V (Chemistry)	Physical Chemistry-II (Solutions, Phase Equilibrium, Conductance & Electrochemistry)	2	2	80	20	100
CCL- 305	Core Course-VI (Chemistry)	Organic Chemistry-III (Functional Group Organic Chemistry-II)	2	2	80	20	100
CEL- 304	Core Course-V (Electronics))	Communication Electronics-I	2	2	80	20	100
CEL- 305	Core Course-VI (Electronics))	Microprocessor	2	2	80	20	100
CCsL- 304	Core Course-V (Computer Science)	Database Management System	2	2	80	20	100
CCsL- 305	Core Course-VI (Computer Science)	Operating System	2	2	80	20	100
CCaL- 304	Core Course- V (Computer Applications)	Web Development	2	2	80	20	100
CCaL- 305	Core Course- VI (Computer Applications)	Operating System	2	2	80	20	100
CML- 306	Core Course-V (Mathematics)	Advanced Calculus	4	4	80	20	100
CML- 307	Core Course-VI (Mathematics)	Numerical Analysis	4	4	80	20	100
CPP- 308*	Practical-III (Physics)	Physics Lab-III	2	4	100	-	100
CGP- 308*	Practical-III (Geography)	Geography Lab-III	2	4	100	-	100
CCP- 309*	Practical-III (Chemistry)	Chemistry Lab-III	2	4	100	-	100
CEP- 309*	Practical-III (Electronics)	Communication Electronics Lab-III	2	4	100	-	100
CCsP- 309*	Practical-III (Computer Science)	Computer Lab-III (DBMS Lab)	2	4	100	-	100
CCaP-309*	Practical- III (Computer Applications)	Computer Lab-III (Web Development Lab)	2	4	100	-	100
CMP- 310*	Practical-III (Mathematics)	Mathematics Lab-III	1.5	3	100	-	100

* The practical examination to be conducted annually with Fourth semester examination.

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CXL- 401	Language Skills Compulsory Course-IV	Hindi-II	2	2	80	20	100
CPL- 402	Core Course-VII (Physics)	Statistical Mechanics	2	2	80	20	100
CPL- 403	Core Course-VIII (Physics)	Waves and Optics	2	2	80	20	100
CGL- 402	Core Course-VII (Geography)	Environmental Geography	2	2	80	20	100
CGL- 403	Core Course-VIII (Geography)	Geography of Disaster	2	2	80	20	100
CCL- 404	Core Course-VII (Chemistry)	Inorganic Chemistry-II(Transition Metals & Coordination Chemistry)	2	2	80	20	100
CCL- 405	Core Course-VIII (Chemistry)	Physical Chemistry-III(States of Matter & Chemical Kinetics)	2	2	80	20	100
CEL- 404	Core Course-VII (Electronics)	Communication Electronics-II	2	2	80	20	100
CEL- 405	Core Course-VIII (Electronics))	Microcontroller	2	2	80	20	100
CCsL- 404	Core Course-VII (Computer Science)	Software Engineering	2	2	80	20	100
CCsL- 405	Core Course-VIII (Computer Science)	Computer Networks	2	2	80	20	100
CCaL- 404	Core Course- VII (Computer Applications)	Database Management System	2	2	80	20	100
CCaL- 405	Core Course- VIII (Computer Applications)	Data Analysis	2	2	80	20	100
CML- 406	Core Course-VII (Mathematics)	Partial Differential Equations.&Special Functions	4	4	80	20	100
CML- 407	Core Course-VIII (Mathematics)	Mechanics-I	4	4	80	20	100
CPP- 408*	Practical-IV (Physics)	Physics Lab-IV	2	4	100	-	100
CPS- 409	Skill Enhancement Course-I (Physics)	Electrical Circuits and Network Skills	2	2	50	50	100
CGP- 408	Practical-IV (Geography)	Geography Lab-IV	2	4	100	-	100
CCP-409	Practical-IV (Chemistry)	Chemistry Lab-IV	2	4	100	-	100
CEP-409	Practical-IV (Electronics)	Microprocessor and Microcontroller Lab-IV	2	4	100	-	100
CCsP-409	Practical-IV (Computer Science)	Computer Lab-IV (Computer Networks lab)	2	4	100	-	100
CCaP-409	Practical-IV (Computer Applications)	Computer Lab- IV (DBMS Lab)	2	4	100	-	100
CMP-410	Practical-IV (Mathematics)	Mathematics Lab-IV	1.5	3	100	-	100

Marks for Major Test (External): 80
Marks for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Basic Concepts: A Historical perspective, File Systems vs. DBMS, Characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of DBMS, DBMS architecture, Data Models, Schemas and Instances, Data Independence.

UNIT-II

Entity Relationship (ER) Model: Basic Concepts-Entity, Attributes, Types of Attributes, Entity set and Keys; Relationships-Relationship set, Degree of Relationship, Mapping Cardinalities. ER diagram representation-Representation of Entity, Attributes and Relationship, Binary Representation and Cardinality, Participation Constraints.

UNIT – III

Relational Model : Relational model concepts (Tables, Tuple, Relation instance, Relation schema, Relation key, Attribute domain), Constraints- Key constraints, Domain constraints, Referential integrity constraints; Relational algebra, Basic operations: Select, Project, Union, Set difference, Cartesian product, Rename.

UNIT - IV

Relational Database design: Mapping ER model to relational database, functional dependencies, Lossless decomposition, Desirable properties of decomposition, Normal forms (1 NF, 2 NF, 3 NF and BCNF).

SQL: Why SQL, Data Types; DDL-Create, Alter and Drop table Commands. DML SELECT

CCsL- 305
Core Course-II (Computer Science)
OPERATING SYSTEM
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

The setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Structure of Operating Systems: Layers-MS-DOS Layer Structure, Traditional UNIX System Structure; Running Multiple Operating Systems, Running a Virtual Operating System, Operating System Modes, System Boot.

Process Management: Introduction to Process, Attributes of a process, Process States, Operations on the Process, Process Schedulers, CPU Scheduling, Scheduling Algorithms, Purpose of a Scheduling algorithms, Introduction to FCFS, Shortest Job First (SJF), Shortest Job First (SJF), Round Robin Scheduling Algorithms.

UNIT - II

Memory Management: Fixed and Dynamic partition, Physical and Logical Address Space, Page Table, Mapping from page table to main memory, Page Table Entry, Size of the page table, Finding Optimal Page Size, Virtual Memory Concepts, Advantages and disadvantage of Virtual Memory, Segmentation, Translation of Logical address into physical address by segment table, Advantages and disadvantage of Segmentation. Paging VS Segmentation.

UNIT - III

File Management: Attributes of File, Operations on File; File Access Methods- Sequential, Direct and Indexed Access; Directory Structure, File Systems, File System Structure- different layers; Master Boot Record, Directory Implementation-Linear List and Hash Table; Disk space Allocation Methods-Contiguous Allocation and FAT.

UNIT - IV

Shell Introduction and Shell Scripting: What is shell and various type of shell, Various editors presen in Linux/Unix, Different modes of operation in vi editor; Shell script, Writing and executing the she script, Shell variable (user defined and system variables); System calls, Pipes and Filters, Decision makin in Shell Scripts (If else, switch), Loops in shell, Utility programs (cut, paste, join, tr , uniq utilities). Patter matching utility (grep)

Suggested Readings:

1. A. Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 9 Edition, John Wiley Publications 2015 India Edition.

2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.

3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education, 1997.

4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice.Hall of India 2008.

5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

Marks
Time: 3-H

A. List of Experiments Using SQL:

1. Create a database and write the commands to carry out the following operation :
   a. Alter table
   b. Describe table
   c. Drop table

2. Create a database and write the programs to carry out the following operation :
   a. Add a record in the database
   b. Delete a record in the database
   c. Modify the record in the database
   d. Generate queries
   e. Generate the report
   f. List all the records of database in ascending order

3. Create a database and write the programs to carry out the following constraints:
   a. Key constraints
   b. Domain constraints
   c. Referential integrity constraints

4. Create a database and write the commands to carry out the following set operation on the databa
   a. Union
   b. Intersect
   c. Minus

B. List of Experiments Operating System Lab:

1. Study of Unix/Linux vi editor.
2. Shell Script To Display Logged in Users, Your UserName and Date / Time.
3. Shell script program to check whether given file is a directory or not.
4. Study of Unix/Linux Utility Programs (cut, paste, join, tr , uniq utilities, grep).
5. Program in C to report behaviour of Linux kernel including kernel version, CPU type and mod (CPU information)
6. Program in C to Copy a file using UNIX-system calls.
7. Program in C to implement FCFS Scheduling.
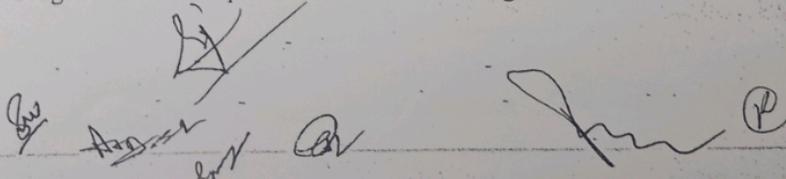
CCsL- 404
Core Course-III (Computer Science)
SOFTWARE ENGINEERING
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No 1 is compulsory.

UNIT – I

Introduction: Program vs. Software, Software Engineering paradigms, Software Crisis – problem and causes.

Phases in Software development: Requirement, Analysis, Software Design, Coding, Testing, Maintenance.

Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models.

UNIT – II

Software Requirement Analysis and Specifications: Feasibility Study Software Requirements, Need for SRS, Characteristics of an SRS, Components of an SRS, Structure of a requirements document, validation and metrics. Problem Analysis, Data Flow Diagram, Data Dictionary, Decision table, Decision trees

UNIT – III

Software Project Planning: Process Planning, Effort estimation, COCOMO model, Project scheduling and staffing, team structure, Software configuration management, Quality assurance plans, Risk Management, Project monitoring plans.

Software Implementation and Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

Unit IV

Testing : Testing fundamentals, Error, Fault, and Failure, Test Oracle, Test Case and Test Criteria. Psychology of testing, Black Box Testing, Equivalence Class Partitioning, Boundary value analysis, Cause effect graphing, White box testing , Control flow based criteria, level of testing, Unit testing, Integration testing, System testing, Validation testing, alpha, beta, and Acceptance testing.

Suggested Readings:

1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.
3. Sommerville, "Software Engineering", Pearson Education.
4. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.

<center>

CCsL- 405
Core Course-IIV (Computer Science)
COMPUTER NETWORKS
(Credits: 02, 30 Hrs (2Hrs /week))

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Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

<center>

UNIT – I

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Introduction to Computer Communications and Networking Technologies, Uses of Computer Networks, Network Devices, Nodes, and Hosts, Types of Computer Networks and their Topologies, OSI Reference Model, TCP/IP Reference Model.

<center>

UNIT – II

</center>

Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing.

<center>

UNIT - III

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Data Link Layer: Framing, Flow Control, Error Control, Error Detection and Correction, Sliding Window Protocols, Media Access Control, Random Access Protocols, Token Passing Protocols, Token Ring, Ethernet, gigabit Ethernet, token ring, FDDI, Bluetooth and Wi-Fi.

<center>

UNIT – IV

</center>

Network Layer and Routing Concepts: Virtual Circuits and Datagrams, Routing Algorithms, Flooding, Shortest Path Routing, Distance Vector Routing, Link State Routing, Hierarchical Routing, Congestion Control Algorithms, Internetworking, IPV4 and IPV6.

Suggested Readings:

1. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.

2. Andrew S. Tanenbaum, "Computer Networks", Pearson Education.

3. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson Education.

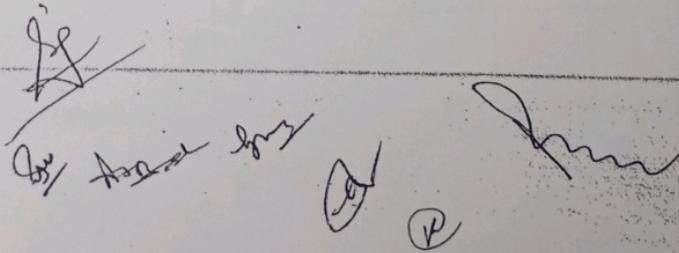4. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.

CCsP- 409
Practical –II: (Computer Science)
Computer Lab--IV
(Credits: 02, 60 Hours (4hrs. per week))

Marks:

Time: 3 Hou

List of Experiments:

1. Study of different types of Network cables and Practically implement the cross-wired cable a straight through cable using clamping tool.

   - Components: RJ-45 connector, Climping Tool, Twisted pair Cable

2. Study of Network Devices in Detail.

   - Repeater, Hub, Switch, Bridge, Router, Gate Way

3. Study of network IP.

   - Classification of IP address, Sub netting, Super netting

4. Connect the computers in Local Area Network.

   - Procedure on the host computer ,

   - Procedure on the client computer

5. Study of basic network command and Network configuration commands.

   - Software: Command Prompt And Packet Tracer.

   Configuring the Router commands
   General Commands to configure network
   Privileged Mode commands of a router
   Router Processes & Statistics
   IP Commands
   Other IP Commands e.g. show ip route etc.

6. Configure a Network topology using packet tracer software.

   - Software: Packet tracer Software

7. Configure a Network using Distance Vector Routing protocol.

   - Software: packet tracer software

8. Configure Network using Link State Vector Routing protocol.

   - Software: packet tracer software

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CPL- 501	Discipline Specific Course-I (Physics)	Elements of Modern Physics	2	2	80	20	100
CPL- 502	Discipline Specific Course -II (Physics)	Nuclear Physics	2	2	80	20	100
CGL-501	Discipline Specific Course-I (Geography)	Geography	2	2	80	20	100
CGL- 502	Discipline Specific Course-II (Geography)	Geography	2	2	80	20	100
CCL- 503(i) OR CCL- 503(ii)	Discipline Specific Course-I (Chemistry)	Polymer Chemistry-I OR Chemistry of Main Group Elements, Theories of Acids and Bases-I	2	2	80	20	100
CCL- 504(i) OR CCL- 504(ii)	Discipline Specific Course-II (Chemistry)	Polymer Chemistry-II OR Chemistry of Main Group Elements-II	2	2	80	20	100
CCS- 505(i) OR CCS- 505(ii)	Skill Enhancement Course-I(Chemistry)	Pesticide Chemistry OR Fuel Chemistry	2	2	50	50	100
CEL- 503(i) OR CEL- 503(ii) OR CEL- 503(iii)	Discipline Specific Course-I (Electronics)	Electronic Instrumentation-I OR Signal and System OR Semiconductor Devices Fabrication	2	2	80	20	100
CEL- 504(i) OR CEL- 504(ii) OR CEL- 504(iii)	Discipline Specific Course-II (Electronics))	Electronic Instrumentation-II OR Programming with Sci Lab/Mat lab OR Antenna Theory	2	2	80	20	100
CEL- 505(i) OR CEL- 505(ii) OR CEL- 505(iii)	Skill Enhancement Course-III (Electronics)	PCB Design and Fabrication OR Robotics OR Mobile Application Programming	2	2	50	50	100
CCsL- 503	Discipline Specific Course-I (Computer Science)	Object Oriented Programming using C++	2	2	80	20	100
CCsL- 504	Discipline Specific Course-II (Computer Science)	Data Analytics	2	2	80	20	100
CCaL- 503	Discipline Specific Course- I (Computer Applications)	Object Oriented Programming using Java	2	2	80	20	100
CCaL- 504	Discipline Specific Course- II (Computer Applications)	Computer Networks	2	2	80	20	100

CML- 506(i) OR CML- 506(ii)	Discipline Specific Course-I (Mathematics)	Groups and Rings OR Sampling Techniques	4	4	80	20	100
CML- 507(i) OR CML- 507(ii)	Discipline Specific Course-II (Mathematics)	Sequence & Series OR Sample Survey and Design of Experiments	4	4	80	20	100
CML- 508(i) OR CML- 508(ii)	Discipline Specific Course-III (Mathematics)	Number Theory & Trigonometry OR Integer programming &Theory of Games	4	4	80	20	100
CPP- 508*	Practical-V (Physics)	Physics Lab-V	2	4	100	-	100
CGP- 508*	Practical-V (Geography)	Geography Lab-V	2	4	100	-	100
CCP- 509(i)* OR CCP- 509(ii)	Practical-V (Chemistry)	Chemistry Lab-V(i) OR Chemistry Lab-V(ii)	2	4	100	-	100
CEP- 509(i)* OR CEP- 509(ii)* OR CEP- 509(iii)*	Practical-V (Electronics)	Electronic Instrumentation Lab OR Signal and System Lab OR Electronics skill lab	2	4	100	-	100
CCsP- 509*	Practical-V (Computer Science)	Computer Lab-V (Object Oriented Programming using C++ Lab)	2	4	100	-	100
CCaP-509*	Practical- V (Computer Applications)	Computer Lab-V (Object Oriented Programming using Java)	2	4	100	-	100

* The practical examination to be conducted annually with Sixth semester examination.

CCsL- 503
Discipline Specific Course-I (Computer Science)
Object Oriented Programming Using 'C++'
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – I

Procedure Oriented Programming, Object-Oriented programming Paradigm, difference between Procedure Oriented Programming and Object-Oriented programming, Basic concepts of Object-Oriented programming, Benefits of OOP, Object Oriented Languages, and application of OOP. Structure of a C++ Program, Insertion operator, Extraction operator, Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations, Manipulators, inline functions.

UNIT-II

C structure revisited, specifying a Class, Creating Objects, Defining member function, Memory allocation for objects, Scope resolution operator and its significance, Static Data Members, Static member functions, Friend Function, Friend Class.

UNIT – III

Dynamic Memory Management using new and delete Operator, Constructor, type of constructors, Dynamic initialization of objects, Constructor overloading, Constructor with default arguments, Destructors, function overloading, Operator Overloading, Overloading unary and binary operators.

UNIT – IV

Inheritance, Single Inheritance, Making a private member inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Class. Abstract Classes, Constructors in derived classes.

Suggested Readings:

1. Balaguruswami, E., Object Oriented Programming with C++, Tata McGraw-Hill.
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
3. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
4. Herbert Scildt, C++, The Complete Reference,Tata McGraw-Hill

CCsL- 504
Discipline Specific Course-II (Computer Science)
DATA ANALYTICS
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT-I

Data Analytics: Introduction to Data Analytics, Business Intelligence (BI) for better decisions. Decision types, BI tools, BI skills, BI applications.

Data warehousing: Introduction to Data warehousing (DW), Design considerations for DW, DW development approaches, DW architecture.

Data Mining: Introduction to Data mining, Data cleaning and preparation, outputs of Data mining, evaluation of data mining results, Data Mining Techniques.

UNIT-II

Decision Trees: Introduction to Decision tree, Decision tree problem, Decision tree construction, Lessons from constructing trees, Decision tree algorithms.

Regression: Introduction, Correlations and Relationships, Visual Look at Relationships, Logistic regression, Advantages and disadvantages of regression models.

Artificial Neural Networks: Introduction, business applications of ANN, Design principles of an ANN, Representation of a neural network, Architecting a neural network, Developing an ANN, Advantages and disadvantages of using ANN.

UNIT-III

Cluster analysis: Introduction, Applications of cluster analysis, Definition of a cluster, Representing clusters, Clustering techniques, K-means algorithm for clustering, Selecting the number of clusters.

Association rule Mining: Introduction, Business applications of association rules, Representing association rules, Algorithms for association rule, Apriori algorithm, Creating association rules.

Web Mining: Introduction, Web content mining, Web structure mining, Web usage mining, Web mining algorithms.

UNIT-IV

Naive-base analysis: Introduction, Probability, Naïve base model, Text classification example.

Support vector machines: Introduction, SVM model, The kernel method,

Big data: Introduction, Defining big data, Big data landscape, Business implications of big data, Technology
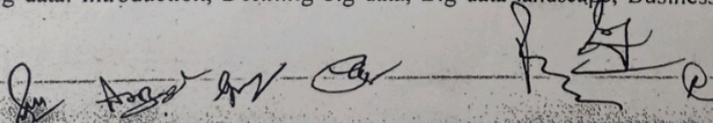
CCsL- 505
Skill Enhancement Course-I (Computer Science)
CLOUD COMPUTING
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 50
Marks for Internal Exam: 50
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT -I

Cloud Computing: Introduction to client server computing, Peer to Peer computing, Distributed computing, collaborative computing and cloud computing, Importance of cloud computing in current era, Characteristics, advantages and disadvantages of cloud computing.

UNIT -II

Cloud Services: Functioning of cloud computing, Classification of cloud Based on services: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (Iaas): Definition, characteristics and their benefits.

UNIT- III

Cloud Architecture: Cloud computing Logical and service architecture, Types of clouds: Private cloud, Public cloud and Hybrid cloud, Comparison of a private, public and hybrid clouds, migrating to a cloud, Seven step model to migrate.

UNIT -IV

Applications: Business opportunities using cloud, Managing Desktop and devices in cloud, cloud as a type of distributed infrastructure, Application of cloud computing for centralizing Email communication, collaboration on schedules, calendars.

CASE STUDY: Overview of major cloud service providers - Amazon Ec2, Google App Engine, Google Drive, etc.

Suggested Readings:

1. Srinivasan, A. Cloud Computing: A Practical Approach for Learning and Implementation. Pearson Education India, 2014.

2. Velte, Anthony T., Toby J. Velte, Robert C. Elsenpeter, and Robert C. Elsenpeter. Cloud computing: a practical approach. New York: McGraw-Hill, 2010.

Marks for Major Test (External): 50
Marks for Internal Exam: 50
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Introduction to Python: History and Features of Python Programming, Python Interpreter. Variable, identifiers and literal. Token, keywords. Data Types. Arithmetic operators, Relational operators, Logical operators, Bitwise operators, Assignment operators, Membership operators, Identity operators. Operator precedence. Comment, Indentation, Need for indentation

Built-in Functions: input, eval, composition, print, type, round, min and max, pow. Type Conversion, Random Number Generation. Mathematical Functions. Getting help on a function, Assert Statement.

UNIT - II

Control Statements: if Conditional Statement, for and while Statements. break, continue and pass statements.

Functions: Function Definition and Call, Function Arguments-Variable Function Arguments, Default Arguments, Keyword Arguments, Arbitrary Arguments. Command Line Arguments. Global and local Variables. Accessing local variable outside the scope, Using Global and Local variables in same code, Using Global variable and Local variable with same Name.

UNIT - III

Strings: String as a compound data type. String operations- Concatenation, Repetition, Membership operation, Slicing operation. String methods-count, find, rfind, capitalize, title, lower, upper, swapcase, islower, isupper istitle, replace, isalpha, isdigit, isalnum. String Processing examples.

Lists: List operations-multiplication, concatenation, length, indexing, slicing, min, max, sum, membership operator; List functions-append, extend, remove, pop, count, index, insert, sort, reverse.

Recursion: Recursive solutions for problems on Numbers, String and list.

UNIT - IV

Object Oriented Programming: Introduction to Classes, Method, Class object, Instance object, Method object. Class as abstract data type, Date Class. Access attributes using functions-getattr, hasattr, setattr, delattr. Built-In Class Attributes of Class object (__dict__, __doc__, __name__, module__).

Graphics: Screen Objects- Point and line, box, polygon, circle, arc. Screen Object Methods- move_to(), move_by(), rotate_by(), Text(). Sound- Sound(), play_sound(), stop_sound().

Suggested Readings:

1. Sheetal Taneja and Naveen Kumar, "Python Programming A modular Approach", Pearson

2. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.

3. Dr. Anita Goel, "Computer Fundamentals", Pearson Education, 2010.

4. Allen Downey, Jeffrey Elkner, Chris Meyers.How to think like a computer scientist learning with Python / 1st Edition,2012 .

CCsP- 509
Practical –I: (Computer Science)
Computer Lab--V
(Credits: 02, 60 Hours (4hrs. per week))

Marks: 50 ~

Time: 3 Hours

t of Experiments Using C++:

Write a program to perform different arithmetic operation such as addition, subtraction, division, modulus and multiplication using inline function.

Write a program to find area of square, rectangle, circle using function overloading.

Define a class to represent an item class with data members as number and cost. Write member functions to read and display the data. Write a main program to test the data.

Define a class to represent a bank account with the following members

ata members:

1. Account holder Name
2. Account number
3. Type of account
4. Balance amount in the account

Member functions:

1. to assign initial value
2. To deposit an amount
3. To withdraw an amount after checking the balance
4. To display name and balance

Write a main program to test it.

Write a program to explain the concept of static data member.

Vrite a program to explain the concept of static member function.

Write a program to swap private data of two different classes using friend function.

Define a class for complex number with default, parameterized, copy constructor. Write a program to add two complex numbers using friend function.

Define a class string with dynamic constructors. Write a program to concatenate two strings.

Write a program to show the order in which objects are created and destroyed using constructor and destructor.

Write a program to overload unary minus (-) operator using space class.

Write a program to overload binary plus (+) operator as member function to add two complex numbers.

Write a program to overload binary plus (+) operator as friend function to add two complex numbers.

Semester-VI

Paper Code	Course opted	Nomenclature	Credits	Hr/week	Marks		
					Ext.	Int.	Total
CPL- 601	Discipline Specific Course-III (Physics)	Solid State Physics	2	2	80	20	100
CPL- 602	Discipline Specific Course-IV (Physics)	Quantum Mechanics	2	2	80	20	100
CGL- 601	Discipline Specific Course-III (Geography)	Geography	2	2	80	20	100
CGL- 602	Discipline Specific Course-IV (Geography)	Geography	2	2	80	20	100
CCL- 603(i) OR CCL- 603(ii)	Discipline Specific Course-III (Chemistry)	Organomettalics and Bioorganic Chemistry OR Quantum Chemistry	2	2	80	20	100
CCL- 604(i) OR CCL- 604(ii)	Discipline Specific Course-IV (Chemistry)	Polynuclear Hydrocarbons and UV,IR Spectroscopy OR Spectroscopy and Photochemistry	2	2	80	20	100
CCS- 605	Skill Enhancement Course-IV(Chemistry)	Green Methods in Chemistry	2	2	50	50	100
CEL- 603(i) OR CEL- 603(ii) OR CEL- 603(iii)	Discipline Specific Course-III (Electronics)	Digital System Design OR Digital Signal Processing OR Photonic Devices	2	2	80	20	100
CEL- 604(i) OR CEL- 604(ii) OR CEL- 604(iii)	Discipline Specific Course-IV (Electronics)	VLSI Design OR Internet of Things OR Consumer Electronics	2	2	80	20	100
CCsL- 603	Discipline Specific Course-III (Computer Science)	Computer Graphics	2	2	80	20	100
CCsL- 604	Discipline Specific Course-IV (Computer Science)	Python Programming	2	2	80	20	100
CCaL- 603	Discipline Specific Course- III (Computer Applications)	Mobile Application Development	2	2	80	20	100
CCaL- 604	Discipline Specific Course- IV (Computer Applications)	Cloud Computing	2	2	80	20	100
CML- 605(i) OR CML- 605(ii)	Discipline Specific Course-IV (Mathematics)	Linear Algebra OR Bio-Mathematics	4	4	80	20	100
CML- 606(i) OR CML- 606(ii)	Discipline Specific Course-V (Mathematics)	Mechanics-II OR Queuing and Reliability Theory	4	4	80	20	100

Code	Course	Title	L	P	Ext	Int	Total
CML- 607(i) OR CML- 607(ii)	Discipline Specific Course-VI (Mathematics)	Real & Complex Analysis OR Optimization Techniques	4	4	80	20	100
CMS-608(i) OR CMS-608(ii)	Skill Enhancement Course-IV (Mathematics)	Solid Geometry OR Financial Mathematics	2	2	50	50	100
CPP- 608	Practical-VI (Physics)	Physics Lab-VI	2	4	100	-	100
CGP- 608	Practical-VI (Geography)	Geography Lab-VI	2	4	100	-	100
CCP-609(i) OR CCP-609(ii)	Practical-VI (Chemistry)	Chemistry Lab-VI(i) OR Chemistry Lab-VI(ii)	2	4	100	-	100
CEP- 609(i) OR CEP- 609(ii) OR CEP- 609(iii)	Practical-VI (Electronics)	Digital System Design Lab OR Digital Signal Processing Lab OR Advance communication Lab	2	4	100	-	100
CCsP-609	Practical-VI (Computer Science)	Computer Lab-VI (Computer Graphics Lab)	2	4	100	-	100
CCaP-609	Practical-VI (Computer Applications)	Computer Lab-VI (Mobile Application Development)	2	4	100		100

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CCsL- 603
Discipline Specific Course-III (Computer Science)
COMPUTER GRAPHICS
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Introduction: Historical perspective of Computer Graphics, Basic elements of Computer graphics (Modelling, Rendering, Animation), Applications of Computer Graphics.

Input Devices: Keyboard, Mouse, Light Pen, Graphic Tablets, Joysticks, Trackball, Flatbed Scanner.

UNIT - II

Hard Copy Devices: Laser Printer, Flatbed Plotters.

Video Display Devices: Pixel, Resolution, Aspect Ratio, Refresh Rate and Interlacing. Cathode Ray Tube, Flat Panel Display-LCD and Plasma Panel. Raster and Random scan display system.

UNIT - III

Fundamental Techniques in Graphics: Line Generation Algorithms-DDA Algorithm, Bresenham's Line Generation Algorithm. Circle Generation Algorithms- Bresenham's Algorithm and Midpoint Circle Algorithm. Polygon Filling Algorithms-Scan Line Algorithm. Viewing & Clipping-Point Clipping and Line Clipping, Cohen-Sutherland Line Clipping Algorithm. Polygon Clipping (Sutherland Hodgman Algorithm)

UNIT – IV

2-Dimensional Graphics: Cartesian and Homogeneous Co-ordinate System, Geometric Transformations (Translation, Scaling, Rotation, Reflection).

3-Dimensional Graphics: Geometric Transformations (Translation, Scaling, Rotation, Reflection). Mathematics of Projections(Parallel & Perspective).

CCsL- 604
Discipline Specific Course-IV (Computer Science)
PYTHON PROGRAMMING
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Introduction to Python: History and Features of Python Programming, Python Interpreter. Variable, identifiers and literal. Token, keywords. Data Types. Arithmetic operators, Relational operators, Logical operators, Bitwise operators, Assignment operators, Membership operators, Identity operators. Operator precedence. Comment, Indentation, Need for indentation

Built-in Functions: input, eval, composition, print, type, round, min and max, pow. Type Conversion, Random Number Generation. Mathematical Functions. Getting help on a function, Assert Statement.

UNIT - II

Control Statements: if Conditional Statement, for and while Statements. break, continue and pass statements.

Functions: Function Definition and Call, Function Arguments-Variable Function Arguments, Default Arguments, Keyword Arguments, Arbitrary Arguments. Command Line Arguments. Global and local Variables. Accessing local variable outside the scope, Using Global and Local variables in same code, Using Global variable and Local variable with same Name.

UNIT - III

Strings: String as a compound data type. String operations- Concatenation, Repetition, Membership operation, Slicing operation. String methods-count, find, rfind, capitalize, title, lower, upper, swapcase, islower, isupper istitle, replace, isalpha, isdigit, isalnum. String Processing examples.

Lists: List operations-multiplication, concatenation, length, indexing, slicing, min, max, sum, membership operator; List functions-append, extend, remove, pop, count, index, insert, sort, reverse.

Recursion: Recursive solutions for problems on Numbers, String and list.
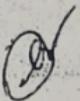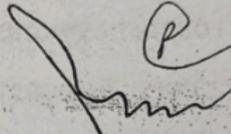
UNIT - IV

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Object Oriented Programming: Introduction to Classes, Method, Class object, Instance obje object. Class as abstract data type, Date Class. Access attributes using functions-getattr, hasa delattr. Built-In Class Attributes of Class object (__dict__, __doc__ , __name__ , module__).
Graphics: Screen Objects- Point and line, box, polygon, circle, arc. Screen Object Methods- m move_by(), rotate_by(), Text(). Sound- Sound(), play_sound(), stop_sound().

Suggested Readings:

1. Sheetal Taneja and Naveen Kumar, "Python Programming A modular Approach", Pearson

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3. Dr. Anita Goel, "Computer Fundamentals", Pearson Education, 2010.

4. Allen Downey, Jeffrey Elkner, Chris Meyers.How to think like a computer scientist learnii Python / 1st Edition,2012 .

CCsP- 609
Practical –II: (Computer Science)
Computer Lab--VI
(Credits: 02, 60 Hours (4hrs. per week))

Marks:

Time: 3 Hou

List of Experiments Using PYTHON:

1. Write a Program to convert decimal number into binary, octal and hexadecimal number system usir built-in functions.
2. Write a program to find the H.C.F of two input number using function.
3. Write a program to slice lists.
4. Write a program to change or add elements to a list.
5. Write a program to display calendar of given month of the year.
6. Write a program to compute factorial of a number using recursion.
7. Write a program to reverse the string using recursion.
8. Write a program to create copy of list using recursion.
9. Write a program to implement Bresenham's line drawing algorithm.
10. Write a program to implement mid-point circle drawing algorithm.
11. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
12. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
13. Write a program to apply various 2D transformations.