KANNUR UNIVERSITY

(Abstract)

B.Sc. Computer Science Programme- Scheme, Syllabus and Pattern of Question Papers of Core, Complementary Elective and Generic Elective Course under Choice Based Credit and Semester System (Outcome Based Education System-OBE) in Affiliated colleges with effect from 2019 Admission-Implemented-Orders issued.

Academic Branch

No.Acad.C2/12371/2019 Civil Station P.O, Dated 21/06/2019

Read:- 1. U.O.No.Acad.C2/429/2017 dated 10-10-2017

2. The Minutes of the Meeting of the Curriculum Restructuring Committee held on 28-12-2018.
3. U.O No.Acad.C2/429/2017 Vol.II dated 03-06-2019
4. The Minutes of the meeting of the Board of Studies in Computer Science (UG) held on 07-06-2019
5. Syllabus of B.Sc. Computer Science submitted by the Chairperson, Board of Studies in Computer Science (UG) dated 13/06/2019

ORDER

1. A Curriculum Restructuring Committee was constituted in the University vide the paper read (1) above to co-ordinate the activities of the Syllabus Revision of UG programmes in Affiliated colleges of the University.

2. The meeting of the Members of the Curriculum Restructuring Committee and the Chairpersons of different Boards of Studies held, vide the paper read (2) above, proposed the different phases of Syllabus Revision processes such as conducting the meeting of various Boards of Studies, Workshops, discussions etc.

3. The Revised Regulation for UG programmes in Affiliated colleges under Choice Based Credit and Semester System (in OBE-Outcome Based Education System) was implemented with effect from 2019 Admission as per paper read (3) above.

4. Subsequently, as per paper read (4) above, the Board of Studies in Computer Science (UG) finalized the Scheme, Syllabus & Pattern of Question Paper for Core, Complementary Elective & Generic Elective Course of B.Sc.Computer Science Programme to be implemented with effect from 2019 Admission.

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5. As per paper read (5) above, the Chairperson, Board of Studies in Computer Science (UG) has submitted the finalized copy of the Scheme, Syllabus & Pattern of Question Papers of B.Sc Computer Science Programme for implementation with effect from 2019 Admission.

6. The Vice Chancellor after considering the matter in detail and in exercise of the powers of the Academic Council conferred under Section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with accorded sanction to implement the Scheme, Syllabus & Pattern of Question Paper(Core/Complementary Elective/Generic Elective Course) of B.Sc. Computer Science programme under Choice Based Credit and Semester System(in OBE-Outcome Based Education System) in the Affiliated colleges under the University with effect from 2019 Admission, subject to report before the Academic Council.

7. The Scheme, Syllabus & Pattern of Question Paper of B.Sc.Computer Science Programme are uploaded in the University website (www.kannuruniversity.ac.in)

Orders are issued accordingly.

Sd/-
DEPUTY REGISTRAR (ACADEMIC)
for REGISTRAR

To

The Principals of Colleges offering B.Sc. Computer Science Programme

Copy to:-

1. The Examination Branch (through PA to CE)
2. The Chairperson, Board of Studies in Computer Science (UG)
3. PS to VC/PA to PVC/PA to Registrar
4. DR/AR-I, Academic
5. The Computer Programmer (for uploading in the website)
6. SF/DF/FC

Forwarded/By Order

KANNUR UNIVERSITY
CIVIL STATION P.O.
KANNUR
Pin-670 002
THAVAKKARA

SECTION OFFICER

KANNUR UNIVERSITY

BOARD OF STUDIES-COMPUTER SCIENCE(UG)

SYLLABUS FOR B.SC. COMPUTER SCIENCE CORE, COMPLEMENTARY ELECTIVE COURSE FOR B.SC. MATHEMATICS/STATISTICS/PHYSICS/ ELECTRONICS PROGRAMMES AND GENERIC ELECTIVE COURSES

CHOICE BASED CREDIT AND SEMESTER SYSTEM
(OBE-Outcome Based Education System)

(2019 ADMISSION ONWARDS)

Kannur University

Vision and Mission Statement

Vision: To establish a teaching, residential and affiliating University and to provide equitable and just access to quality higher education involving the generation, dissemination and application of knowledge with special focus on the development of higher education in Kasargode and Kannur Revenue Districts and the Manantavadytaluk of Wayanad Revenue District"

Mission:

- To produce and disseminate new knowledge and to find novel avenues for application of such knowledge.
- To adopt critical pedagogic practices which uphold scientific temper, the uncompromised spirit of enquiry and the right to dissent.
- To uphold democratic, multicultural, secular, environmental and gender sensitive values as the foundational principles of higher education and to cater to the modern notions of equity, social justice and merit in all educational endeavors.
- To affiliate colleges and other institutions of higher learning and to monitor academic, ethical, administrative and infrastructural standards in such institutions.
- To build stronger community networks based on the values and principles of higher education and to ensure the region's intellectual integration with national vision and international standards.
- To associate with the local self-governing bodies and other statutory as well as non-governmental organizations for continuing education and also for building public awareness on important social, cultural and other policy issues.

KANNUR UNIVERSITY

Programme Outcomes (PO)

PO 1. Critical Thinking:

1. Acquire the ability to apply the basic tenets of logic and science to thoughts, actions and interventions.
2. Develop the ability to chart out a progressive direction for actions and interventions by learning to recognize the presence of hegemonic ideology within certain dominant notions.
3. Develop self-critical abilities and also the ability to view positions, problems and social issues from plural perspectives.

PO 2. Effective Citizenship:

1. Learn to participate in nation building by adhering to the principles of sovereignty of the nation, socialism, secularism, democracy and the values that guide a republic.
2. Develop and practice gender sensitive attitudes, environmental awareness, the ability to understand and resist various kinds of discriminations and empathetic social awareness about various kinds of marginalisation.
3. Internalise certain highlights of the nation's and region's history. Especially of the freedom movement, the renaissance within native societies and the project of modernisation of the post-colonial society.

PO 3. Effective Communication:

1. Acquire the ability to speak, write, read and listen clearly in person and through electronic media in both English and in one Modern Indian Language
2. Learn to articulate analysis, synthesis, and evaluation of situations and themes in a well-informed manner.
3. Generate hypothesis and articulate assent or dissent by employing both reason and creative thinking.

PO 4.Interdisciplinarity:

1. Perceive knowledge as an organic comprehensive, interrelated and integrated faculty of the human mind
2. Understand the issues of environmental contexts and sustainable development as a basic interdisciplinary concern of all disciplines.
3. Develop aesthetic, social, humanistic and artistic sensibilities for problem solving and evolving a comprehensive perspective.

PREFACE

Technological innovations have redefined the traditional concepts of education, profession and lifestyles in the contemporary scenario. Computer Systems are a part of every aspect of prevalent culture from home video game consoles to hospital monitoring equipment. Computer scientists design, build and improve these systems, finding new applications for sophisticated technology. India has been one of the leading exporters of IT talent and Indian computer professionals have played major role in the growth and development of IT sector in various countries.

The Board of Studies in Computer Science travails to offer students with a solid technological foundation through the reformed curriculum for undergraduate programme of Kannur University. The curriculum aims at developing technical caliber among students through academic explorations in the classroom, extended academic activities like seminars, workshops and conferences. Formative and summative assessments will absolutely be in tune with the learning outcomes and the instructional strategies.

In this era of unprecedented technological developments, the Board of Studies in Computer Science of Kannur University substantially emphasizes employment-based curriculum to empower the students with refined technical competence. This curriculum categorically states the graduate attributes / outcomes and has been developed after various workshops and academic deliberations with different stakeholders at various levels. The Board of Studies in Computer Science has resolved to introduce the syllabus for UG Programme in the affiliated colleges from 2019 admission onwards and I would like to place on record my gratefulness to the members of the Board of Studies, faculty and stakeholders for having helped me in the formulation of this syllabus.

Lt. Thomas Scaria

Chairperson

Board of Studies, Computer Science (UG)
Kannur University

KANNUR UNIVERSITY

Programme Specific Outcome of B.Sc. Computer Science Programme

PSO1	Understand the concepts of Computer Science and Applications.
PSO2	Understand the concepts of System Software and Application Software.
PSO3	Understand the concepts of Algorithms and Programming.
PSO4	Understand the concepts of Computer Networks and Operating Systems
PSO5	Design, develop, implement and test software systems to meet the given specifications, following the principles of Software Engineering.

KANNUR UNIVERSITY

BSC COMPUTER SCIENCE PROGRAMME

WORK AND CREDIT DISTRIBUTION STATEMENT

Semester	Course Title*	Credits	Hours per week	Total Credits	Total Hours
I	Common Course – English I	4	5	18	25
	Common Course – English II	3	4		
	Common Course – Additional Language I	4	5		
	Core Course I – 1B01CSC Introduction to C Programming	2	1		
	Core Course III – 2B03CSC Lab 1: C Programming*	0	2		
	Complementary Elective I (Mathematics /Statistics)	3	4		
	Complementary Elective II (Physics)	2	2		
	Complementary Elective II (Physics- Practical)	-	2		
II	Common Course – English III	4	5	20	25
	Common Course – English IV	3	4		
	Common Course – Additional Language II	4	5		
	Core Course II – 2B02CSC Advanced C Programming	2	1		
	Core Course III – 2B03CSC Lab 1: C Programming*	2	2		
	Complementary Elective I (Mathematics /Statistics)	3	4		
	Complementary Elective II (Physics)	2	2		
	Complementary Elective II (Physics- Practical)	-	2		
III	General Awareness Course I – 3A11CSC Programming in C++	3	3	15	25
	General Awareness Course II – 3A12CSC Database Management System	3	3		
	Core Course IV – 3B04CSC Data Structures	4	4		
	Core Course VI – 4B06CSC Lab II: Data Structures Using C++**	0	3		
	Core Course VII – 4B07CSC Lab III: Database Management System**	0	2		
	Complementary Elective I (Mathematics /Statistics)	3	5		
	Complementary Elective II (Physics)	2	3		
	Complementary Elective II (Physics- Practical)	-	2		

IV	General Awareness Course III – 4A13CSC Digital Electronics	3	3	24	25
	General Awareness Course IV – 4A14CSC Operating Systems	3	3		
	Core Course V – 4B05CSC Software Engineering	4	4		
	Core Course VI – 4B06CSC Lab II: Data Structures Using C++**	3	3		
	Core Course VII – 4B07CSC Lab III: Database Management System**	2	2		
	Complementary Elective I (Mathematics /Statistics)	3	5		
	Complementary Elective II (Physics)	2	3		
	Complementary Elective II (Physics- Practical)	4	2		
V	Core Course VIII – 5B08CSC Web Technology	4	4	17	25
	Core Course IX – 5B09CSC Java Programming	4	4		
	Core Course X – 5B10CSC Computation Using Python	3	3		
	Core Course XI – 5B11CSC- Discipline Specific Elective I	4	4		
	Core Course XVI – 6B16CSC Lab IV: Java Programming***	0	4		
	Core Course XVII – 6B17CSC Lab V: Web Technology and Python Programming***	0	4		
	General Elective Course	2	2		
VI	Core Course XII – 6B12CSC Computer Networks	4	4	26	25
	Core Course XIII – 6B13CSC Compiler Design	4	4		
	Core Course XIV – 6B14CSC Computer Organization	3	3		
	Core Course XV – 6B15CSC- Discipline Specific Elective II	4	4		
	Core Course XVI – 6B16CSC Lab IV: Java Programming***	3	2		
	Core Course XVII – 6B17CSC Lab V: Web Technology and Python Programming***	3	2		
	Core Course XVIII – 6B18CSC Project	5	6		
Total				120	150

Total Marks of the Programme – 1750 Marks (Eng-200 Marks, Additional Common Course 100 Marks, Core 1050 Marks, First Complementary Elective 200 Marks and Second Complementary Elective -200 Marks)

*External examination will be conducted at the end of second semester

**External examination will be conducted at the end of fourth semester

***External examination will be conducted at the end of sixth semester

First Complementary Elective: Mathematics/Statistics

Second Complementary Elective: Physics

PART A

B.SC. COMPUTER SCIENCE CORE COURSES WORK AND CREDIT DISTRIBUTION

(2019 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HRS	MARKS(INTERNAL + EXTERNAL)
1B01CSC	INTRODUCTION TO C PROGRAMMING	1	1	2	3	10+40
2B03CSC	LAB I: C PROGRAMMING	1	2	0	-	-
2B02CSC	ADVANCED C PROGRAMMING	2	1	2	3	10+40
2B03CSC	LAB I: C PROGRAMMING	2	2	2	3	5+20
3A11CSC	PROGRAMMING IN C++	3	3	3	3	10+40
3A12CSC	DATABASE MANAGEMENT SYSTEM	3	3	3	3	10+40
3B04CSC	DATA STRUCTURES	3	4	4	3	10+40
4B06CSC	LAB II: DATA STRUCTURES USING C++	3	3	0	-	-
4B07CSC	LAB III: DATABASE MANAGEMENT SYSTEM	3	2	0	-	-
4A13CSC	DIGITAL ELECTRONICS	4	3	3	3	10+40
4A14CSC	OPERATING SYSTEMS	4	3	3	3	10+40
4B05CSC	SOFTWARE ENGINEERING	4	4	4	3	10+40
4B06CSC	LAB II: DATA STRUCTURES USING C++	4	3	3	3	5+20
4B07CSC	LAB III: DATABASE MANAGEMENT SYSTEM	4	2	2	3	5+20
5B08CSC	WEB TECHNOLOGY	5	4	4	3	10+40
5B09CSC	JAVA PROGRAMMING	5	4	4	3	10+40
5B10CSC	COMPUTATION USING PYTHON	5	3	3	3	10+40
5B11CSC	DISCIPLINE SPECIFIC ELECTIVE I	5	4	4	3	10+40
5D--CSC	GENERIC ELECTIVE COURSE	5	2	2	2	5+20
6B16CSC	LAB IV: JAVA PROGRAMMING	5	4	0	-	-
6B17CSC	LAB V: WEB TECHNOLOGY& PYTHON PROGRAMMING	5	4	0	-	-
6B12CSC	DATA COMMUNICATION AND COMPUTER NETWORKING	6	4	4	3	10+40

6B13CSC	COMPILER DESIGN	6	4	4	3	10+40
6B14CSC	COMPUTER ORGANIZATION	6	3	3	3	10+40
6B15CSC	DISCIPLINE SPECIFIC ELECTIVE II	6	4	4	3	10+40
6B16CSC	LAB IV: JAVA PROGRAMMING	6	2	3	3	5+20
6B17CSC	LAB V: WEB TECHNOLOGY& PYTHON PROGRAMMING	6	2	3	3	5+20
6B18CSC	PROJECT*	6	6	5	-	20+80
*AN INDUSTRIAL VISIT (STUDY TOUR) IS RECOMMENDED FOR THE PROJECT WORK						

TOTAL MARKS OF CORE COURSES 1050

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HRS
5B11CSC-A	ALGORITHM DESIGNING	5	4	4	3
5B11CSC-B	LINUX ADMINISTRATION	5	4	4	3
5B11CSC-C	COMPUTER GRAPHICS	5	4	4;	3
6B15CSC-A	INFORMATION SECURITY	6	4	4	3
6B15CSC-B	DATA MINING	6	4	4	3
6B15CSC-C	BIO-INFORMATICS	6	4	4	3

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	80%
INTERNAL	20%

CONTINUOUS EVALUATION FOR THEORY

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT1: TEST	80%	MINIMUM OF 2 TESTS SHOULD BE CONDUCTED. MARKS FOR THE TEST COMPONENT SHOULD BE CALCULATED AS THE AVERAGE OF THE MARKS OBTAINED IN THE TESTS CONDUCTED.

COMPONENT 2: ASSIGNMENT/ SEMINAR/VIVA	20%	ANY ONE COMPONENT

PATTERN OF QUESTION PAPER FOR END SEMESTER EVALUATION

Part A	**Short Answer**	**6 Questions x 1 Mark = 6 Marks**
	Answer all questions	6 Questions x 1 Mark = 6 Marks
Part B	**Short Essay**	**8 Questions x 2 Marks = 16 Marks**
	Answer any 6 questions	6 Questions x 2 Marks = 12 Marks
Part C	**Essay**	**6 Questions x 3 Marks = 18 Marks**
	Answer any 4 questions	4 Questions x 3 Marks = 12 Marks
Part D	**Long Essay**	**4 Questions x 5 Marks = 20 Marks**
	Answer any 2 questions	2 Questions x 5 Marks = 10 Marks
Total Marks Including Choice: 60		
Maximum Marks for the Course: 40		

CONTINUOUS EVALUATION FOR PRACTICAL

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT 1: LAB SKILLS, OBSERVATION NOTE AND PUNCTUALITY	20% FOR LAB SKILL 20% FOR OBSERVATION NOTE AND PUNCTUALITY	OBSERVATION NOTE IS MANDATORY. MARKS SHOULD BE GIVEN CONSIDERING OBSERVATION NOTE LAB SKILLS AND PUNCTUALITY.
COMPONENT1: TEST	60%	MODEL EXAMINATION SHOULD BE CONDUCTED BEFORE EXTERNAL EXAM AND CONSIDERED FOR INTERNAL MARK

END SEMESTER EVALUATION FOR PRACTICAL

***EXCEPT : 2B03CSC ADVANCED C PROGRAMMING - LAB**

COMPONENT	PART A	PART B
Code Writing	3	3
Output	3	3
Modification for Part A or Part B	3	
Record	2	
Viva	3	
Total Marks	**20**	

PATTERN OF QUESTION PAPER FOR END SEMESTER EVALUATION-PRACTICAL

Part A	**2 Questions x 10 Mark = 20 Marks**	
	Answer any 1 question	1 Questions x 10 Mark = 10 Marks
Part B	**2 Questions x 10 Mark = 20 Marks**	
	Answer any 1 question	1 Questions x 10 Mark = 10 Marks
Total Marks Including Choice: 40		
Maximum Marks for the Course: 20		

SEMINARS/ASSIGNMENTS/VIVA

These are part of the curriculum and are to be critically assessed for Internal Assessment. Marks should be awarded based on the content, presentation and the effort put in by the student. The course teacher may give the topics for seminars / assignments. The topics shall be related to the syllabus of the course and is not meant for evaluation in the End Semester Examination.

RECORDS

One rough record (Observation Note) and one fair record are compulsory for each practical course. The student will not be permitted to appear for practical examinations without certified practical records. The records are intended as observation records of the practical works done in the lab. The valuation of records, to be done internally, should be based on the effort and promptness of the student in practical works. Record mark is calculated at the time of End Semester Evaluation. Observation notes are compulsory in Lab hours. Students should get signature for each program done in the lab from the faculties and those programs are recommended for fair record.

PROJECT WORK

Every student of B.Sc. Computer Science Programme shall have to work on a project of FIVE credits under the supervision of a faculty member as per the curriculum. The duration of the project is one year, starting in the fifth semester and submission of the dissertation at the end of sixth semester. Individual projects are recommended but, in an instance, where the number of supervising teachers is less, the project may be done as group. The maximum number of students in a group shall be limited to THREE.

PROJECT EVALUATION

Evaluation of the Project Work shall be done under Mark System at two stages:

1. Internal Assessment (supervising teachers will assess the project and award internal Marks)
2. External evaluation (external examiner appointed by the University)

Marks secured for the project will be awarded to candidates, combining the internal and external Marks. Assessment of different components may be taken as below.

CONTINUOUS EVALUATION FOR PROJECT

COMPONENT	WEIGHTAGE
Punctuality	20%
Relevance of topic System study / Design of tables	20%
Project Report	30%
Presentation & Viva-voce	30%
Total	**100%**

END SEMESTER EVALUATION FOR PROJECT

COMPONENT	WEIGHTAGE
Written Synopsis/Abstract	12.5%
Content of the Project	12.5%
Quality of project work/Use of software/ tools	12.5%
Perfection of the work (Designs of tables/ Input & Output forms)	25%
Live demo	12.5%
Viva-voce	25%
Total	**100%**

CORE COURSE I: 1B01CSC INTRODUCTION TO C PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
1	1B01CSC	1	2	3

COURSE OUTCOME

CO1: Aware about basics of programming.
CO2: Capable to analyze the problem and design algorithm and flowchart.
CO3: Familiar the basics of high-level language – C.
CO4: Able to develop efficient and error free programs in C.

Unit I:

Computer Programming and Languages: Introduction, Developing a Program, Program Development Cycle, Algorithm, Flowchart: Flowchart Symbols, Guidelines for Preparing Flowcharts, Benefits of Flowcharts, Limitations of Flowcharts, Examples of Algorithm and Flowchart. [Text Book 1]

(5 Hrs)

Unit II:

Overview of C: History of C, Importance of C, Basic Structure of C Programming Style, Executing a C program, Source Code, Object Code, Executable File, File Extensions, Character Set, C Tokens - Keywords, Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Reading Data from Keyboard, Operators and Expressions: Arithmetic Operator, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operator, Special Operators,. Arithmetic Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions.

(5 Hrs)

Unit III:

Managing Input Output Operation: Reading a Character, Writing a Character, Formatted Input, Formatted Output. Decision Making and Branching: Decision Making with if Statement - Simple if, if - else, Nested if - else, else if Ladder, switch Statement, go to Statement, Decision Making and Looping: while, do-while, for Statement, Jumps in Loops - break and continue Statements.

(4 Hrs)

Unit IV:

Arrays: Introduction, One Dimensional Arrays - Declaration of Arrays, Initialization of Arrays; Two-Dimensional Arrays - Initializing Two-Dimensional Arrays, Multi-Dimensional Array, Handling of Character Strings: Introduction, Declaring and Initializing String Variables, Reading a Line of Text, Writing Strings to Screen, Arithmetic Operations on Characters, String Handling functions: strlen, strcpy, strcmp, strcat, strrev.

(4 Hrs)

Books for Study:

1. Introduction to information technology ITL Education solutions Limited, second Edition
2. Programming in ANSI C Second Edition – E Balagurusamy – Tata McGraw-Hill Publishing company Limited

Books for Reference:

1. Let us C, YeshavantKanetkar, 16th Edn, BPB
2. Programming in C, Ashok N Kamthane, Pearson Education
3. Computer Basics and c Programming, V. Rajaraman, PHI, 2008 6
4. Fundamentals of information technology, Dr. S.B Kishor, A.S Khandelwal, 2nd Ed, Published by DAS GANU Prakashan.

Online References:

1. http://www.yspuniversity.ac.in/cic/algorithm-manual.pdf
2. https://www.it.iitb.ac.in/~vijaya/ssrvm/dokuwiki/media/s6_l7_20jan.pdf

Marks Including Choice:

Unit	Marks
I	14
II	14
III	16
IV	16

CORE COURSE II: 2B02CSC ADVANCED C PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
2	2B02CSC	1	2	3

COURSE OUTCOME

CO1: Familiar with advanced concepts of C program.
CO2: Capable to work with user defined as well as library functions.
CO3: Skilled to solve more complex problems.
CO4: Able to develop C programs using structure, union, pointers and files.

Unit I:

User Defined Functions: Need for User-defined Functions, The Form of C Functions – Function Name, Argument List, Return value and Their Types, Calling a Function, Category of Functions – No Argument and No Return Values, Argument but no Return Values, Arguments with Return Values, Handling of Non-integer Functions, Functions Returning Nothing, Nesting of Functions, Recursion, The Scope and Life-time of Variables in a Function, Automatic Variables, External Variables, Static Variables, Register Variables.

(5 Hrs)

Unit II:

Pointers: Introduction; understanding pointers; Accessing the address of a variable; Declaration and initialization of a pointer; Accessing a variable through its pointer; Pointer expressions; Pointer increments and scale factor; Pointers and Arrays; Pointers and Functions – pointers as function arguments, pointers to functions; pointers and structures.

(4 Hrs)

Unit III:

Structures and Unions: Structure Definition; Giving values to members; Structure initialization; Comparison of structure variables; Arrays of Structures; Arrays within Structures; Structures within Structures; Unions; Dynamic Memory Allocation: Memory allocation process; Allocating a block of memory; Allocating multiple blocks of memory; Releasing the used space, Altering the size of a block.

(4 Hrs)

Unit IV:

File Management in C: Introduction; Defining and Opening a File; Closing a file; Input/ output operations on files – the getc and putc functions; getw and putw functions; fprintf and fscanf functions; Error handling during I/O operations; Random Access to Files; Command line arguments; The preprocessor: Macro substitution-simple macro substitution; Macros with arguments; Nesting of macros; Undefining a macro; File inclusion.

(5 Hrs)

Books for Study:

1. Programming in ANSI C Second Edition – E Balagurusamy – Tata McGraw-Hill Publishing company Limited

Books for Reference:

1. Let us C, YeshavantKanetkar, 3rd Edn, BPB
2. Programming in C, Ashok N Kamthane, Pearson Education
3. Programming using C, Dr. S.B Kishor, 2nd Ed, DAS GANU Prakashan.

Marks including choice:

Unit	Marks
I	17
II	13
III	13
IV	17

CORE COURSE III: 2B03CSC ADVANCED C PROGRAMMING - LAB

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
2	2B03CSC	2*	2	3

*Lab will be conducted for 2 hours each in I and II Semesters

Part A

Conditional operator

1. Write a program to print largest among three numbers

sizeof operator

2. Write a program to print the size of built in data types.

else if

3. Write a program to check whether the given number is odd or even
4. Write a program to find the roots of a quadratic equation

else if ladder

5. Write a program to print grade of students
6. Write a program to count number of vowels, consonants and spaces in a line of text.

switch

7. Write a program to accept two numbers and perform various arithmetic operations (+, -, *, /) based on the symbol entered.

while

8. Write a program to check whether the given number is Armstrong number or not.
9. Write a program to print Fibonacci series up to a given number.

do-while

10. Write a program to print multiplication table for the given number

for

11. Write a program to print prime numbers within range.
12. Write a program to convert decimal number to its binary equivalent.

Part B

Array

13. Write a program to perform Matrix multiplication

String

14. Write a program to check whether the given string is palindrome or not
15. Write a program to implement 5 string handling functions

Function

16. Write a program to print transpose of a given matrix

Recursive function

17. Write a program to find the factorial of a given number.
18. Write a program to print sum of n natural numbers

Pointers

19. Write a program to swap two numbers using pointers

Pointers and function

20. Write a program to access the elements of an array using function pointer

Structure

21. Write a program to add two complex numbers using structure
22. Write a program to calculate and display the Gross_salary and Net_salary of employees working in a retail medical shop if their Basic, DA, TA, other allowances and deductions are given.

File

23. Write a program to read a line of text from the keyboard and write it to a file.

Macros

24. Write a program to print volume of a triangle using the concept macros with argument.

DISTRIBUTION OF MARKS FOR END SEMESTER EVALUATION

COMPONENT	PART A	PART B
Code Writing	3	3
Output	3	3
Modification for Part A or Part B	2	
Algorithm/Flowchart for part A or Part B	2	
Record	1	
Viva	3	
Total Marks	**20**	

PATTERN OF QUESTION PAPER FOR END SEMESTER EVALUATION

Part A	**2 Questions x 10 Mark = 20 Marks**	
	Answer any 1 question	1 Questions x 10 Mark = 10 Marks
Part B	**2 Questions x 10 Mark = 20 Marks**	
	Answer any 1 question	1 Questions x 10 Mark = 10 Marks
Total Marks Including Choice: 40		
Maximum Marks for the Course: 20		

GENERAL AWARENESS COURSE I: 3A11CSC PROGRAMMING IN C++

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3A11CSC	3	3	3

COURSE OUTCOME

CO1: Describe the Object-Oriented Paradigm
CO2: Understand dynamic memory management techniques
CO3: Analyze a problem and construct a C++ program that solves it
CO4: Discover errors in a C++ program and describe how to fix them

Unit I:

Procedure oriented programming; Object oriented programming; OOP-Concepts, benefits, applications. What is c++? Applications of c++; Structure of C++ program; How to create and execute a C++ program.Reference variables.Extraction and insertion operator, Scope resolution operator, Memory dereferencing and memory management operator.Inline function default arguments; Constant arguments.

(12Hrs)

Unit II:

Specifying a class; Defining member functions making an outside function inline; nesting of member functions.private member functions. arrays within a class arrays of objects; objects as function arguments; returning objects. memory allocation for objects, static data members; static member functions, function overloading, friend functions; local classes. Constructors; default constructors, Parameterized constructors; multiple constructors in a class, constructors with default arguments; copy constructor; Destructors.

(16Hrs)

Unit III:

Operator overloading; overloading unary operators, overloading binary operators, overloading binary operators using friends; rules for overloading operators. Inheritance - defining derived classes, single inheritance; making a private member inheritance; multilevel inheritance, multiple inheritance; hierarchical inheritance; hybrid inheritance; virtual base classes constructors in derived classes; abstract classes; Nesting of classes;

Pointers-Pointers to objects; this pointer, Pointers to derived classes; virtual functions, pure virtual functions.

(14Hrs)

Unit IV:

C++ streams; stream classes , unformatted I/O operations; formatted console I/O operations; Managing output with manipulators. Files – classes for file stream operation and their manipulations. Sequential input and output operation updating a file: random access, error handling during file operations.

(12Hrs)

Books for Study:

1. Object Oriented Programming with C++; E. Balagurusamy; 3rd Edn; TMH 2006.

Books for Reference:

1. K R Venugopal, RajkumarBuyya, "Mastering C++", Tata McGraw Hill, 2013.
2. Object Oriented Programming with ANSI & Turbo C++, Ashok N. Kamthane, Pearson Education
3. Programming in C++, M.T. Somashekara, Prentice Hall of India, New Delhi
4. Let us C++, YeshawantKanetkar, BPB

Marks including choice:

Unit	Marks
I	12
II	18
III	18
IV	12

GENERAL AWARENESS COURSE II: 3A12CSC DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3A12CSC	3	3	3

COURSE OUTCOME

CO1: Familiar with organized data collection.
CO2: Able to design data bases.
CO3: Skilled to normalize the data bases.
CO4: Capable to frame queries for various purposes

Unit I:

Introduction – purpose of Database systems. View of Data, Data Models, transaction management, database structure, DBA, Data Base Users.

(10 Hrs)

Unit II:

E-R model, Basic concepts; design issues; Mapping Constraints; Keys; Primary, Foreign, candidate, E-R diagram; Weak entity set; Extended E-R features. Normal forms – 1NF, 2NF, 3NF and BCNF; functional dependency, Normalization.

(15 Hrs)

Unit III:

SQL: database languages; DDL- create, alter, drop; DML- Insert , Select, update, Delete; DCL ,TCL,SQL Functions, Data types in SQL; Creation and deletion of database and user .Developing queries and sub queries; Join operations in Detail .

(15 Hrs)

Unit IV:

Integrity constraints, views, Trigger and Sequences, Relational model – Structure of Relational database. Relational Algebra; Fundamental operations; Relational calculus; Tuple and domain calculus.

(14 Hrs)

Books for Study:

1. Database System Concepts; Silberschatz, Korth and Sudarsan, 5th Edn; McGraw Hill.
2. The Database Book: Principles and Practice Using MySQL; Gehani; University Press.

Books for Reference:

1. Fundamentals of Database systems, E. Navathe, 7th edn, Pearson Education.
2. Introduction to data base systems ITL Education Solutions Limited
3. DBMS and ORACLE, Dr. S.B Kishor, 2nd Ed, DAS GANU Prakashan.

Marks including choice:

Unit	Marks
I	13
II	17
III	14
IV	16

CORE COURSE IV: 3B04CSC DATA STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3B04CSC	4	4	3

COURSE OUTCOME

CO1: Able to analyze the complexity of algorithm.
CO2: Familiar with linear and nonlinear data structures.
CO3: Acquire the ability to select appropriate data structure for a given problem.
CO4: Obtain skill for systematic approach to programming.

Unit I:

Elementary Data Organization, Data Structures, Data Structure Operations. Classification of Data Structures; Linear Arrays - operations – Application: Polynomial- Representation with arrays; Polynomial addition ; Stack – Operations, Application: Evaluation of post fix expression ; Queue – Operations, Printer Queue as application, Circular Queue, Deque, Priority Queue; Linked Lists: Definition, Representation of Linked List in memory, Traversing Linked List, Searching a linked list, Memory Allocation and Garbage Collection , Insert into a linked list, Deletion from a linked list; Header Linked Lists; Two-way Lists – Operations.

(20 Hrs)

Unit II:

Trees – Binary Trees, Complete Binary trees, Extended Binary trees; Representing Binary trees in memory, Traversing Binary trees, Binary search trees – Searching and inserting in Binary Search Trees, Deleting in a Binary Search Tree, Heap – Heap sort, Huffman's Algorithm; General Trees – Computer representation of general trees.

(16 Hrs)

Unit III:

Graphs – Graph Theory terminology; Sequential Representation of Graphs – Adjacency Matrix, Path Matrix ; Operations on graph – searching, inserting, deleting, traversing: Breadth- First Search and Depth First Search.

(16 Hrs)

Unit IV:

Design and Analysis of Algorithms: From Problems to Programs - Algorithms, Pseudo-Language and Stepwise Refinement; Abstract Data Types- Definition of Abstract Data Type, Data Structures and Abstract Data Types; The Running Time of a Program - Measuring the Running Time of a Program, Asymptotic Notations – Big O, Omega, Theta. Search: Linear and Binary search; comparison of searching algorithms. Sort: Insertion, bubble, selection, quick and merge sort; Comparison of Sort algorithms.

(20 Hrs)

Books for Study:

1. Schaum's Outline of Theory and Problems of Data Structures – SymourLipschutz – Mc-Graw Hill Book Company.
2. Data Structures and Algorithms- Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman – Pearson Education.

Books for Reference:

1. Data Structures and Algorithms: Concepts, Techniques and Applications; GAV Pai, McGraw Hill, 2008.
2. Data Structures in C, Achuthsankar and Mahalekshmi, PHI, 2008
3. Fundamentals of Data structures in C++, 2nd Edn, Horowitz Sahni, Anderson, Universities Press
4. Classic Data structures, Samanta, Second Edition, PHI

Marks including choice:

Unit	Marks
I	19
II	11
III	11
IV	19

GENERAL AWARENESS COURSE III: 4A13CSC DIGITAL ELECTRONICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4A13CSC	3	3	3

COURSE OUTCOME

CO1: Introduce the basic and important concepts of Digital Principles and Applications.
CO2: Familiarize with basic building blocks of Digital systems, Digital Logic and Digital Circuits.
CO3: Design simple combinational digital systems.
CO4: Familiarize different number systems, codes and data representation.

Unit I:

Digital Concepts: Digital and Analog Quantities – Binary Digits, Logic Levels and Digital Waveforms - Basic Logic – Number Systems: Decimal, Binary, Hexa-decimal and Octal – Conversions -CODES: BCD, ASCII, Excess-3, GRAY and UNICODE. BINARY ARITHMETIC: Addition, Compliments, Subtraction using Complements (r's and (r-1)'s).

(10 Hrs)

Unit II:

LOGIC GATES: Inverter-AND-OR-NAND-NOR-XOR-XNOR, BOOLEAN ALGEBRA AND LOGIC SIMPLIFICATION: Boolean operations and Expressions – Laws and Rules of Boolean Algebra – De-Morgan's Theorem – Boolean analysis of Logic Circuits – K-Map and Function Simplification using K Map– SOP and POS

(15 Hrs)

Unit III:

Combinational Circuits: Basics of Combinational Logic Circuits – Implementing Combinational Logic – Universal Property of NAND and NOR gates, Adders (Half, Full and Parallel) – Comparators – Decoders – Encoders – Multiplexers - Demultiplexers-Parity Generators-Parity Checkers.

(15 Hrs)

Unit IV:

Sequential Circuits:-Latches, Flip Flops – SR, JK Flip flops – Master Slave Flip flop. COUNTERS: Asynchronous counters - Synchronous counters- Shift Registers in Detail.

(14 Hrs)

Books for Study:

1. Digital Fundamentals, Floyd and Jain, 8th Edn, Pearson Education.
2. Computer system Architecture – M. Morris Mano - PHI Pvt Limited.

Books for Reference:

1. Digital Principles and Applications; Leach and Malvino, GoutamSaha; TMH; 7th edition (Special Indian Edition).

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

GENERAL AWARENESS COURSE IV: 4A14CSC OPERATING SYSTEMS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4A14CSC	3	3	3

COURSE OUTCOME

CO1: Familiarize with basics of design of operating systems.
CO2: Introduce basic working process of operating systems.
CO3: To understand the importance process and scheduling.
CO4: To understand the issues in memory management.

Unit I: Introduction

Functions of an operating system, Kernel Data Structures, Operating Systems in different Computing Environments, Operating System Services, Operating System Interfaces, System Calls (Introduction only), Operating System Design and Implementation approaches, Operating System Structures - simple, layered, micro kernel, modules, System Boot.

(13 Hrs)

Unit II: Process Management

Process Concept- The Process, Process State, Process Control Block Process Scheduling – Scheduling Queues, Schedulers, Context Switch - CPU Scheduling: Basic Concepts – CPU scheduler, Pre-emptive scheduling, Dispatcher - Scheduling Criteria – Scheduling Algorithms - FCFS, SJFS, Priority Scheduling, Round Robin Scheduling.

(14 Hrs)

Unit III: Deadlock

Dead locks: Characterization – necessary conditions – Resource allocation graph – Methods for handling deadlock - Deadlock prevention – mutual exclusion, hold and wait, no preemption, circular wait – Deadlock avoidance – safe state, Resource allocation graph, Banker's algorithm, Safety algorithm, Resource request algorithm – Deadlock detection – single instance of each resource type, several instances of a resource type - recovery from dead lock – process termination, resource preemption.

(15 Hrs)

Unit IV: Memory Management

Main Memory: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Virtual Memory: Demand Paging, Copy-on-Write, Page Replacement - Basic, FIFO Page Replacement, Optimal Page Replacement, LRU Page Replacement

Mass Storage Structure: Disk Structure-Disk Scheduling: FCFS Scheduling, SSTF Scheduling, SCAN Scheduling-SCAN Scheduling, LOOK Scheduling - Selection of a Disk Scheduling Algorithm

(12 Hrs)

Books for Study:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, Operating System Concepts, 9/e, Wiley India, 2015.

Books for Reference:

1. Garry Nutt, Operating Systems: 3/e, Pearson Education, 2004
2. Dhananjay M. Dhamdhere, Operating Systems A Concept Based Approach, 3rd Ed, TMH
3. William Stallings, Operating Systems: Internals and Design Principles, Pearson, Global Edition, 2015.
4. Andrew S Tanenbaum, Herbert Bos, Modern Operating Systems, Pearson, 4/e, 2015.
5. Madnick S. and J. Donovan, Operating Systems, McGraw Hill, 2001.
6. Deitel H. M., An Introduction to Operating System Principles, Addison-Wesley, 1990.

Marks including choice:

Unit	Marks
I	14
II	16
III	16
IV	14

CORE COURSE V: 4B05CSC SOFTWARE ENGINEERING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4B05CSC	4	4	3

COURSE OUTCOME

CO1: To understand the Software Development Life Cycle Models.
CO2: To familiarize with Software Requirement Analysis and Specification.
CO3: To familiarize with Classical Software Design Techniques.
CO4: To familiarize with various Software Testing Techniques and Tools.

Unit I: Introduction to software engineering

Definition, program versus software, software process, software characteristics, brief introduction about product and process, software process and product matrices; Software life cycle models – Definition, waterfall model, increment process model, evolutionary process model, selection of the life cycle model.

(18Hrs)

Unit II: Software Requirement Analysis and Specification

Requirements engineering, types of requirements, feasibility studies, requirement elicitation, various steps of requirement analysis, requirement documentation, requirement validation.

(18Hrs)

Unit III: Software design

Definition, various types, objectives and importance of design phase, modularity, strategy of design, function-oriented design. Objected Oriented Design – Analysis, design concept, design notations and specifications, design methodology.

(18Hrs)

Unit IV:Software Testing

What is testing?, Why should we test?, who should do testing?, test case and Test suit, verification and validation, alpha beta and acceptance testing, functional testing, techniques to design test cases , Boundary value analysis, equivalence class testing, decision table based testing, cause effect graphing techniques; structural testing, path

testing, cyclomatic complexity, mutation testing, levels of testing, unit testing, integration testing, system testing, validation testing

(18Hrs)

Books for Study:

1. Software Engineering (Third Edition), K KAggarwal, Yogesh Singh, New age International Publication (For Module 1,2,4 and case study of Module 3)
2. An integrated approach to software Engineering (Second Edition), PankajJalote, Narosa Publishing House - (For Module 3).
3. Computer system Architecture – M. Morris Mano - PHI Pvt Limited.

Books for Reference:

1. Fundamentals of Software Engineering Rajib Mall PHI Publication
2. Software Engineering (Seventh edition), Ian Sommerville – Addison Wesley.
3. Software Engineering A practitioner's approach (Sixth Edition), Roger S Pressman-McGraw Hill.
4. Fundamentals of Software Engineering (Second Edition), Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli – Pearson Education.

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE VI: 4B06CSC LAB 2 – DATA STRUCTURES USING C++

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4B06CSC	3*	3	3

*Lab will be conducted for 3 hours each in III and IV Semesters

Guidelines

Design C++ programs for the following questions

All concepts must be implemented using classes

main() function create the object of the class and use the property.

SECTION - A

1. Implement Linear search algorithm and print number of comparisons (1hr.)
   Input: Number of numbers must be greater than 20, Number to search
   Output: Found/Not Found, No. of Comparisons
2. Implement Binary search algorithm and print number of comparisons (1hr.)
   Input: Sorted List and Number to search
   Output: Found/ Not Found, No. of Comparison
3. Implement Insertion sort algorithm and print number of comparisons (1hr.)
   Input: Number of numbers must be greater than 20
   Output: Sorted List, No. of Comparison
4. Implement Bubble sort algorithm and print number of comparisons (1hr.)
   Input: Number of numbers must be greater than 20
   Output: Sorted List, No. of Comparison
5. Implement Quick sort algorithm and print number of comparisons (2hrs,)
   Input: Number of numbers must be greater than 20
   Output: Sorted List, No. of Comparison
6. Implement Selection sort algorithm and print number of comparisons (1hr.)
   Input: Number of numbers must be greater than 20
   Output : Sorted List, No. of Comparison
7. Implement Merge sort algorithm and print number of comparisons (1hr.)
   Input: Number of numbers must be greater than 20
   Output : Sorted List, No. of Comparison
8. Add two general Polynomial(1hr.)

Input: Highest Power of Each Polynomial and quotients of each power

Output: Resultant Polynomial

9. Subtract two general Polynomial(1hr.)

Input: Highest Power of Each Polynomial and quotients of each power

Output: Resultant Polynomial

10. Extract substring of given dimension from given string (1hr.)

Input: String, Start Index, No. of characters

Output: Substring

11. Evaluate polynomial entered by user with respect to given value of x (1hr.)

Input: highest power of polynomial, Coefficients, value of x

Output: Value of polynomial with respect to given x value.

SECTION- B

12. Implement Stack Operations (2hrs.)

Input: Size of Stack, choice for menu 1. Push 2. Pop 3. Traverse 4. Exit and data item

Output: with respect to choice

13. Evaluate post fix expression with the support of stack (2hrs.)

Input: Post Fix Expression\

Output: Evaluated Result

14. Implement Queue Operations (1hr.)

Input: Size of Queue, choice for menu 1. Insert 2.Delete 3. Traverse 4. Exit and item

Output: with respect to choice

15. Implement Circular Queue Operations (2hrs.)

Input: Size of Queue, choice for menu 1. Insert 2. Delete 3. Traverse 4. Exit and item

Output: with respect to choice

16. Implement following Linked list Operations (1hr.)

Input: Choice for menu 1. Insert 2. Delete 3. Traverse 4. Exit and data item

Output: with respect to choice

17. Implement following Linked list Operations (2hrs.)

Input: Choice for menu 1. Insert after a given node 2. Delete given node 3,traverse 4.exit and data item

Output: with respect to choice

18. Implement following Two Way List Operations (2 hrs.)

Input: Choice for menu 1. Insert 2. Insert after a given node 3. Delete given node 4. Delete 5. Traverse 6. Exit and data item

Output: with respect to choice

19. Implement following Binary Search Tree operations (2 hrs.)

Input: choice for menu 1. Insert 2. Delete 3. Infix traversal 4. Prefix 5. Postfix 6. Exit and item

Output: with respect to choice

CORE COURSE VII: 4B07CSC LAB 3 – DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4B07CSC	2*	2	3

*Lab will be conducted for 2 hours each in III and IV Semesters

CORE COURSE VIII: 5B08CSC WEB TECHNOLOGY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B08CSC	4	4	3

COURSE OUTCOME

CO1: Understand different components in web technology and WWW.
CO2: Learn to develop interactive Web pages.
CO3: Present a web document with server-side scripting using PHP.
CO4: Know the basics of AJAX.

Unit I: Introduction

Introduction to Internet and WWW, Evolution of the Internet and World Wide Web, Web Basics, Static Vs Dynamic web pages, Client-Side Scripting versus Server-Side Scripting, World Wide Web Consortium (W3C). Web hosting, Types of web hosting, Hosting Space, Domain Name Registration, Free Hosting, Responsive Web designing.

(12 Hrs)

Unit II: Introduction to HTML

Introduction to HTML, Editing HTML5, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, HTML5 Form Input types, input and data list Elements and autocomplete Attribute, Page structure Element.

(18 Hrs)

Unit III: Scripting with JavaScript

Introduction to JavaScript, memory concepts, operators, functions – Introduction, Program Modules in JavaScript, Function Definitions, Notes on Programmer-Defined Functions, scope rules and recursion, arrays – introduction, declaring and allocating arrays, examples using arrays, objects – math, string and date objects, dialog boxes.

(22 Hrs)

Unit IV: PHP and Ajax Enabled Rich Internet Applications

Introduction to PHP, converting between datatypes, operators, initializing and manipulating arrays, string concatenations, Form processing.

Introduction to AJAX, Traditional Web Applications vs. Ajax Applications, Traditional web applications, Ajax applications, Rich Internet Applications (RIAs) with Ajax, History of Ajax.

(20 Hrs)

Books for Study:

1. Internet & World Wide Web How to Program, 5/e – Paul J Deitel, Harvey M Deital, AbbaeyDeital
2. Julie C. Meloni, HTML and CSS in 24 Hours, Sams Teach Yourself (Updated for HTML5 and CSS3), Ninth Edition
3. Programming in PHP, O'Reilly

Books for Reference:

1. Mastering HTML, CSS &Javascript Web Publishing Paperback,2016 - by Laura Lemay, Rafe Colburn & Jennifer Kyrnin , BPB Publications
2. HTML & CSS: The Complete Reference, Fifth Edition - Thomas a Powell, Tata McGraw Hill
3. JavaScript – Definitive Guide O'Reilly 6th Edition
4. https://www.w3schools.com

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE IX: 5B09CSC JAVA PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B09CSC	4	4	3

COURSE OUTCOME

CO1: Know the overall structure and concept of logic building activity of Java programming language
CO2. Identify the real-world things as well as the relationship between them and understand transforming them into their corresponding computer representations.
CO3. Realize how to achieve code reusability using inheritance, interfaces and packages and expedite application development activities.
CO4. Familiarize simple and robust way of handling multitasking and runtime error as well as such kind of abnormal situations within a program.
CO5. Design GUI based applications and applications that can be transmitted over internet.

Unit I:

Introduction to Java programming: Java history; features of java; Byte Code; Overview of Java, Java Language fundamentals: Building blocks; Data types; variables And Arrays. Operators - Arithmetic, Bitwise, Relational, Boolean Logical, Assignment; Control statements.

(12 Hrs)

Unit II:

Introducing Classes: Class fundamentals; Introducing methods; Declaring Objects; Constructors; This keyword; Garbage collection; the finalize method; A closer look at methods and classes; Inheritance basics; Using Super; When Constructors are called; Method Overriding; Dynamic method dispatch; Abstract classes; Uses of final keyword.

(20 Hrs)

Unit III:

Packages: Introduction-Creating a Package- CLASSPATH; Accessing a package- simple program using package; Interfaces: definition-extending interface-implementing interface-simple programs using interface. Exception handling: Basics; Try, catch, finally, multiple catch, nested try, throw; User Defined exception; Chained Exception; Multi-threading: introduction -Creating threads; thread life cycle; thread Priorities, Synchronization. Enumeration and Auto boxing.

(20 Hrs)

Unit IV:

Applets: Fundamentals [page- 318]; Applet skeleton [pg-751], The HTML APPLET tags; The Abstract Window Toolkit:- Introduction to AWT classes; AWT controls (Labels, Buttons, Check box, Radio buttons; Choice control; List, Text box, Scroll bars). Event handling of Buttons and keyboard, Introduction to JDBC.

(20 Hrs)

Books for Study:

1. Java The Complete Reference-Ninth Edition- Oracle Press- Herbert Schildt

Books for Reference:

1. Java complete reference by BalaguruSwamy
2. Core Java 2, Cay S. Horstmann, Gary Cornell, Pearson Education
3. Dr. S. B. Kishor, Rajani Singh etc, PROGRAMMING IN JAVA, 1st Ed. published by DAS GANU Prakashan, Nagpur in Mar. 2018. (ISBN: 978-93-84336-49-3)

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE X: 5B10CSC COMPUTATION USING PYTHON

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B10CSC	3	3	3

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Familiarize with functions and modules in python
CO3: Understand object-oriented programming concepts
CO4: Learn the techniques for database connectivity and GUI programming in Python

Unit I: Basic Elements and Control Statements

Features of Python, Different Methods to Run Python, Basic Elements (Objects, Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python, Input and Output in Python, import function, Operators in Python, Branching (if, else, elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets, Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable Objects.

(14 Hrs)

Unit II: Functions, Modules and Exception Handling

Functions Definition, Function Calling, Function Arguments (Required, Keyword, Default), Recursion, Modules, Built-in Modules, Creating Modules, File Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (IndexError, OverflowError, ZeroDivisionError, RuntimeError), Exception Handling.

(16 Hrs)

Unit III: Object Oriented Programming, numpy Arrays and Data Visualization

Class Definition, Object Creation, Built-in Attribute Methods, Object Oriented Programming Features of Python. Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating, Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays. Data Visualization in Python matplotlib Module, pyplot, plot(), scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2)

(10 Hrs)

Unit IV: Connecting to Database and GUI Programming

Connecting to a Database, Basic Operations on Database (Crater, Insert, Update, Delete), Fetching Data from a Database, Transaction Control.

GUI Programming using Tkinter, Tkinter Widgets (Label, Message, Entry, Text, Button, tkMessagebox, RadioButton, Checkbutton, Listbox, Menu, Menubutton, Scale, Scrollbar, Canvas), Layout Managers.

(14 Hrs)

Books for Study:

1. Taming Python By Programming, Dr. Jeeva Jose, Khanna Publishing
2. Introduction to Computation and Programming Using Python with Application to Understanding Data - John V. Guttag, PHI (2016)
3. https://www.numpy.org/devdocs/user/quickstart.html
4. https://matplotlib.org/users/pyplot_tutorial.html

Books for Reference:

1. https://www.tutorialspoint.com/python/
2. Introduction to Computer Science using Python - Charles Dierbach, Wiley (2015)
3. Python for Education by Ajith Kumar B P
4. https://docs.python.org/3/tutorial/index.html
5. Introduction to Computer Science and Programming Using Python Provided by Massachusetts Institute of Technology (MITx)
   Available at: (https://www.edx.org/course/introduction-to-computer-science-and-programming-using-python-2)

Marks including choice:

Unit	Marks
1	15
2	15
3	15
4	15

CORE COURSE XI: 5B11CSC-A ALGORITHM DESIGNING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B11CSC-A	4	4	3

COURSE OUTCOME

CO1: Capable to select suitable algorithm design technique.
CO2: Able to design optimum algorithms for problems.
CO3: Skilled to design solutions for real problems.

Unit I:

Divide and Conquer – General method;Binary search, Finding the maximum and minimum, Merge sort, Quick sort, Performance measurement of quick sort, Strassen's matrix multiplication.

(20Hrs)

Unit II:

Greedy method – General method, Knapsack problem, job sequencing with deadlines, minimum cost spanning trees, prim's algorithm, kruskal's algorithms, optimal merge patterns, single source shortest path.

(22 Hrs)

Unit III:

Dynamic programming – General method, multistage graph, all pairs shortest path, single shortest path, 0/1 knapsack travelling salesperson problem.

(15Hrs)

Unit IV:

Backtracking – General method, 8-queens problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

(15Hrs)

Books for Study:

1. Ellis Horowitz, SartajSahni, S Rajasekharan – Computer Algorithms/C++ - Second Edition, Universities press, 2008 (Paperback Edn)

Books for Reference:

1. Introduction to the design and Analysis of Algorithms, AnanyLevitin, 2nd Edn, Pearson education.
2. The design and analysis of computer Algorithms Alfred V Aho John E Hopcroft Pearson Education.
3. Algorithm Design, Foundation, Analysis and Examples, Dr. Vijayakumar and Dr. Juby Mathew, Vimala Publications.

Marks including choice:

Unit	Marks
I	17
II	17
III	13
IV	13

CORE COURSE XI: 5B11CSC-B LINUX ADMINISTRATION

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B11CSC-B	4	4	3

COURSE OUTCOME

CO1: To learn basic Linux commands and understand the file system structure
CO2: To understand the Boot loaders and the configuration files
CO3: To learn different system services, maintenance and configuring these
CO4: To experience Shell Scripting

Unit I:

Linux OS: History, Features and benefits of Linux, basic concepts of multi user system , open source, free Software concepts, Types of users in Linux, Types of files. BASICS : login, password, creating an account, shell and commands, logout, changing password, files and directories, relative and absolute pathnames, directory tree, current working directory, referring home directory, creating new directories, copying files, moving files, deleting files and directories , wild cards, hidden files, cat command.

(20 Hrs)

Unit II:

Vi editor: different modes-command mode, insert mode, last line mode, vi Editing commands – moving within a file, deleting, editing,Copy and Paste Commands, Saving and Closing the file, redirecting input/output-filter, pipes. File permissions: user, group, ls command (long listing), changing file permission. Shell Scripting: Types of shell, Basic shell configuration for bourne and bash shell: /etc/profile, /etc/bashrc, ~/.bash_profile, ~/.bash_login, ~/.profile,~/.bashrc, ~/.bash_logout, ~/.bash_history. Bourne shell scripts, script execution, variables and parameters, Control structures - Shell if then else, Shell if then elif, Shell for loop, Shell while loop, Shell until loop, Shell case, Shell function.

(20 Hrs)

Unit III:

Linux Boot process: LILO - boot process, /edc/lilo.conf file, GRUB - /etc/grub.conf file runlevels, rc files, startup scripts. Mounting: mounting file systems, structure of /etc/fstab. Linux Administration: Major services in Linux system - init, /etc/inittab file,

login from terminal, syslog and its configuration file /etc/syslog.conf, periodic command execution: at and cron, crontab file, GUI, X windows. Starting and stopping different services – service command.

(16 Hrs)

Unit IV:

System Maintenance: tmpwatch command, logrotate utility. Backup and Restore: types of backup - full, differential, incremental, cp, tar commands. Linux Installation: Partitioning, MBR, SWAP, file system mount points, rpm utility - installation of packages.

(16 Hrs)

Books for Study:

1. Unix Shell Programming, Yeshwanthkanethkar
2. Essential System Administration, O'reilly& Associates.

Books for Reference:

1. Unix in a Nutshell, by Daniel Gilly, O'Reilly & Associates.
2. Linux Administration handbook, Nemeth, PHI.
3. Red Hat Linux Bible.
4. A user guide to the Unix system, Thomas, Yates Tata McGraw Hill

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE XI: 5B11CSC-C COMPUTER GRAPHICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B11CSC-C	4	4	3

COURSE OUTCOME

CO1: Understand basic concepts of graphics input and display devices.
CO2: Learn line and circle drawing algorithms.
CO3: Familiarization with 2D and 3D transformations and projections.
CO4: Understand fundamentals of image processing.

Unit I:

Introduction, Overview of Graphics Systems, Display devices, Input devices, Hard-Copy devices, Graphics software.Line Drawing Algorithms-DDA, Bresenham, Circle Generating Algorithm – Midpoint Algorithm, Area filling algorithms – Flood Fill and Boundary Fill algorithms.

(18 Hrs)

Unit II:

Output primitives-Color and Grayscale levels, 2D Transformations-Translation, Rotation, Scaling, Reflection, Shear, Matrix Representation and Homogenous Coordinates, Composite Transformations.

(18 Hrs)

Unit III:

Two-Dimensional viewing, Window-to-viewport Transformation, Clipping - Point Clipping, Line Clipping – Cohen Sutherland Algorithm, Polygon Clipping – Sutherland Hodgeman Algorithm, Text clipping.

(18 Hrs)

Unit IV:

3D object representations-Polygon surfaces, Polygon tables, Plane equations, Polygon Meshes, 3D transformations-Translation, Rotation, Scaling, Rotation about an arbitrary axis, Reflection, Shear, 3D viewing- Parallel Projection, Perspective Projection.

(18 Hrs)

Books for Study:

1. Donald D Hearn and M. Pauline Baker, Computer Graphics, C Version, 2nd Edition, Pearson.

Books for Reference:

1. Foley, van Dam, Feiner& Hughes, Computer Graphics: Principles and Practice in C, 2nd Edition, Pearson
2. Ranjan Parekh, Principles of Multimedia, Tata McGrawHill,2006
3. D.P. Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI.
4. David Rogers, Procedural Elements of Computer Graphics, Rogers, 2nd Edition, McGraw Hill Education.

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE XII: DATA COMMUNICATION AND COMPUTER NETWORKING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B12CSC	4	4	3

COURSE OUTCOME

CO1: Understand state-of-the-art in network protocols, architectures and application.
CO2: To acquire knowledge about different computer networks
CO3: To understand the use of layer architecture for networking systems.

Unit I:

Introduction to data communication, important elements /components of data communication. Transmission media- Guided media, Unguided media. Synchronous / Asynchronous data transmission.Line configuration – Simplex, Half duplex, Duplex.Network topologies – star, Bus, ring, Mesh. Computer networks, Use, network hardware, network structure- point to point connection, multicast, broadcast, classification of networks-LAN, WAN, MAN.

(18 Hrs)

Unit II:

Reference models, the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / Ip models. Data Link Layer, Design issues, Services to network layer, Framing- character count, character stuffing, bit stuffing, physical layer coding violation. Error control, flow control, Elementary data link protocols- unrestricted simplex protocol, simplex stop and wait protocol, simplex protocol for a noisy channel.

(18 Hrs)

Unit III:

Network layer, design issues, services to the transport layer, routing algorithms- adaptive, non-adaptive algorithms, optimality principle, dijkstras shortest path routing algorithm, flow-based routing, hierarchical routing, congestion control algorithms–the leaky bucket algorithm, the token bucket algorithm.

(18 Hrs)

Unit IV:

Transport layer, design issues, connection management-addressing, establishing and releasing connection, transport layer protocols- TCP, UDP

Application layer – Basic Idea of telnet, ftp, http, smtp, pop3.

(18 Hrs)

Books for Study:

1. Computer Networks, Andrew S. Tanenbaum& David J. Wetherall, Pearson.

Books for Reference:

1. Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill Education.
2. Achyut S. Godbole and AtulKahate, Data communication and Networks, 2nd Ed, McGraw Hill
3. Computer Networking: A Top-Down Approach, Kurose James F. and Ross Keith W., Pearson.
4. R. S. Rajesh, K. S. Easwara Kumar and R. Balasubramanian, Computer Networks – Fundamentals and Applications, Vikas Publishing House.

Marks including choice:

Unit	Marks
1	15
2	15
3	15
4	15

CORE COURSE XIII: 6B13CSC COMPILER DESIGN

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B13CSC	4	4	3

COURSE OUTCOME

CO1: Learn the basic principles of compiler.
CO2: Get an idea about the related programs.
CO3: Understand different components of a compiler.
CO4: Understand the phases of a compiler.

Unit I: INTRODUCTION TO COMPILING

Compilers, Analysis of the Source program, phases of a compiler, cousins of the compiler, grouping of phases, compiler construction tools.

(18Hrs)

Unit II: LEXICAL ANALYSIS

Role of Lexical Analyzer, Input buffering, Specification of tokens, recognition of tokens, Finite Automata.

(18Hrs)

Unit III: SYNTAX ANALYSIS

The role of a Parser, context free grammars, Top down parsing, Recursive Descent Parsing, Predictive Parsers, bottom up parsing, shift reduce parsing, operator precedence parsing.

(18Hrs)

Unit IV: CODE GENERATION & OPTIMIZATION

Symbol table, Intermediate languages, Issues in the design of code generator, the target machine, basic blocks and flow graphs, peep-hole optimization, principal sources of optimization, optimization of basic blocks, Loops in flow graphs

(18Hrs)

Books for Study:

1. Alfred V Aho, Ravi Sethi& Jeffrey D Ullman, “Compilers- Principles, Techniques and Tools”, Pearson education

Books for Reference:

1. KVN Sunitha,Compiler Construction, Pearson Education

2. Parag H Dave, Himanshu B Dave, Compilers –Principles and Practice

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE XIV: 6B14CSC COMPUTER ORGANIZATION

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B14CSC	3	3	3

COURSE OUTCOME

CO1: Understand the basic terminology of computer system.
CO2: Understand the functional units of a computer system.
CO3: Understand the basic operations of a computer system.
CO4: Understand the memory organization in a computer system.

Unit I:

Basic structure of computer-Types of computers-Functional Units-Basic Operational Concepts-Bus Structure-Multiprocessors and Multi computers-Data Representation-Fixed Point representation and floating-point representation.

(9 Hrs)

Unit II:

Register Transfer and Micro operations – Register Transfer language-Register Transfer-Bus and memory Transfer-Three state bus buffers-Memory Transfer-Basic Computer Organization and Design – Instruction Codes – Fetch & Decode Instructions – Register Reference Instructions – Memory Reference Instruction – Input output & Interrupt.

(14 Hrs)

Unit III:

Micro Programmed Control – Control Memory – Address sequencing – Central Processing Unit – General Register Organization – Control word – Stack Organization – Register stack - Memory Stack – Reverse Polish notation – Evolution of Arithmetic expressions – Instruction Formats – Addressing modes – Data Transfer and Manipulations – reduced Instruction set computer(RISC).

(16 Hrs)

Unit IV:

Input Output Organization– Input/Output Interfaces –Asynchronous Data Transfer – Modes of transfer –Priority Interrupt – Direct Memory Access (DMA) - Input Output Processor - Serial Communications. Memory Organization – Hierarchy – Main memory – Auxiliary Memory –Associative Memory – Cache memory – Mapping – Multiprocessors

– Characteristics of multiprocessors - Inter connection structures.

(15 Hrs)

Books for Study:

1. Computer system Architecture –M.Morris Mano - PHI Pvt Limited
2. Computer Organization - Carl Hamacher –International Edition

Books for Reference:

1. Computer Organization and Architecture, William Stallings, 7th Edn, Pearson Education.
2. Computer Architecture & Organization John P Hayes –McGraw Hill

Marks including choice:

Unit	Marks
I	10
II	18
III	15
IV	17

CORE COURSE XIV: 6B15CSC-A INFORMATION SECURITY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B15CSC-A	4	4	3

COURSE OUTCOME

CO1: To understand the need of information security and to master information security Concepts, mechanisms and services as well as issues related to information Security.
CO2: To be familiar with cryptography and its categories.
CO3: Distinguish public and private key crypto systems and familiarize the rsa crypto System.
CO4: To attain the knowledge of digital signature and its security services.

Unit I:

Introduction to Information Security-The need for Security, Principles of security - confidentiality, Authentications, Integrity, Non-repudiation.Types of attacks-Passive attacks, Active attacks, Virus, Worm, Trojan horse.Introduction to Cryptography and Steganography.

(15Hrs)

Unit II:

Symmetric Key Encipherment - Traditional symmetric Key Ciphers: Introduction-Kirchhoff's principle, cryptanalysis, categories of traditional ciphers; Substitution Ciphers- mono-alphabetic ciphers, polyalphabetic ciphers; Transposition Ciphers-key-less and keyed transposition ciphers, Stream and Block Ciphers.

(20Hrs)

Unit III:

DES: Data Encryption Standard:-Introduction, DES Structure-Initial and final permutations, DES function; Round Key Generation; Avalanche and completeness effect; Weak keys; Multiple DES- Double DES, Triple DES; Security of DES- Brute- force attack, Differential cryptanalysis, Linear cryptanalysis. Public key Cryptosystem: Principles of Public Key Cryptosystems; Applications of public Key Crypto systems,

Requirement for Public Key Cryptosystem, Public Key Cryptanalysis. RSA Algorithm– Description of the Algorithm, The security of RSA

(18Hrs)

Unit IV:

Digital Signature:-Comparison between conventional and digital signature-Inclusion, Verification, Relationship, Duplicity; Process-needs for keys, signing the digest; Services-message authentication,message integrity, non-repudiation, confidentiality; Digital signature Forgery and types;Digital Signature Schemes-RSA digital signature scheme. **(19Hrs)**

Books for Study:

1. Behrouz A. Forouzan and DebdeepMukhopadhyay, Cryptography And Network Security, 3rd Ed, McGraw Hill (Units I, II, IV)
2. William Stallings, Cryptography and Network Security - Principles and Practice Paperback, 7th Ed, Pearson (Unit III)

Books for Reference:

1. Bishop Matt, Introduction to Computer Security, Addison-Wesley,2004.
2. Pieprzyk Josef, Hardjono Thomas and Seberry Jennifer, Fundamentals of Computer Security, Springer, 2003.

Marks including choice:

Unit	Marks
I	10
II	20
III	15
IV	15

CORE COURSE XIV: 6B15CSC-B DATA MINING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B15CSC-B	4	4	3

COURSE OUTCOME

CO1: To Introduce the Concepts of Data Mining and its Applications.
CO2: To Understand Investigation of Data using practical Data Mining Tools.
CO3: To Introduce Association Rules Mining.
CO4: To Introduce Clustering and Classification.

Unit I: Fundamentals of Data Mining

Introduction: Data Mining – Knowledge Discovery Process (KDD), Fundamentals of Data Mining. Functionalities of Data Mining, Classification of Data Mining Systems, Major Issues in Data Mining. Data Warehouse: Definition, Multi – User Architecture, OLAP, Data Warehouse Vs Heterogeneous DBMS, Data Warehouse Vs Operational DBMS, OLAP Vs OLTP, Needs of Data Warehouse. Multi -Dimensional Data Model, OLAP Operations, Data Warehouse Schema, Data Warehouse Architecture, Warehouse Server, Meta Data, OLAP Engine, Data Warehouse Backend Process.

(16 Hrs)

Unit II: Data Preprocessing

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Integration, Discretization and Concept Hierarchy Generation.

(20 Hrs)

Unit III: Association Rules and Clustering Techniques

Association Rule Mining: Apriori Algorithm, Partition Algorithm, FP – Tree Growth Algorithm, Generalized Association Rule. Partitioned Algorithm: K – Means Algorithm, K- Medoids Algorithm. Density – Based Clustering: DBSCAN. Categorical Clustering, STIRR.

(18 Hrs)

Unit IV:Classification

Classification Models: Introduction to Classification Models, Decision Tree: Definition, Tree Construction Principles, Best Split, Splitting Indices, Splitting Criteria. Introduction to Web, Spatial and Temporal Data Mining.

(18 Hrs)

Books for Study:

1. Data Mining Concepts and Techniques - Jiaweihan&MichelineKamber Harcourt, 2nd ED. 2005
2. Data Mining Techniques, Arun K Pujari, University Press

Books for Reference:

1. Intelligent Data Mining: Techniques and Applications, Da Raun, Guoqing Chen, Springer 1st Ed.
2. Data Mining: introductory and Advanced Topics, M. Dunham, Pearson Pub.

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE XIV: 6B15CSC-C BIOINFORMATICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B15CSC-C	4	4	3

COURSE OUTCOME

CO1: Understand Bioinformatics and biological databases.
CO2: Understand Concept of Biology.
CO3: Understand Sequence alignment and Similarity search tools.
CO4: Structural bioinformatics and Bioinformatic tools.

Unit I: Introduction and Biological Databases

Introduction to bioinformatics, Molecular Biology and computational Biology, Goal, Scope, Applications and Limitations; Introduction to Biological databases – databases and types of databases, biological databases – primary, secondary and specialized; Information retrieval from biological databases.

(18 Hrs)

Unit II: Cell Biology and Genetics

Prokaryotes and Eukaryotes, Introduction to cell structure –Plant and animal cell, Introduction to DNA – Chemical nature of DNA, Central dogma of molecular biology.

(16 Hrs)

Unit III: Sequence Alignment

Pairwise sequence alignment – Global and local, Alignment algorithms – Dot matrix method, Dynamic programming method, Scoring matrices – PAM, BLOSUM, Statistical significance of Sequence alignment; Database Similarity Searching – BLAST, FASTA, Comparison of BLAST and FASTA, Statistical significance,Introduction to sequences.

(18 Hrs)

Unit IV: Structural Bioinformatics and Bioinformatic Tools

Structure of protein – Amino acids, peptide formation, Structural forms of protein; Protein structure visualization – SwissPDB viewer, Pymol, Rasmol; Bioinformatic tools (EMBOSS package, Expasy).

(18 Hrs)

Books for Study:

1. Essential Bioinformatics – JinXiong
2. Bioinformatics and molecular Evolution – T K Attwood and Paul G Higgs

Books for Reference:

1. Cell Biology, Genetics, Molecular biology, Evolution and Ecology – P S Verma, V K Agarwal.
2. Bioinformatics – A Practical guide to the analysis of genes and proteins - Andreas D. Baxevanis.

Marks including choice:

Unit	Marks
I	15
II	15
III	15
IV	15

CORE COURSE XVI: 6B16CSC LAB 4 – JAVA PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B16CSC	4+2*	3	3

*Lab will be conducted for 4 hours in V semester and 2 hours in VI semester

CORE COURSE XVII: 6B17CSC LAB 5 – WEB TECHNOLOGY AND PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B17CSC	4+2*	3	3

*Lab will be conducted for 4 hours in V semester and 2 hours in VI semester

CORE COURSE XVIII: 6B18CSC PROJECT

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
6	6B18CSC	6	5	-

PART B

B.SC. COMPUTER SCIENCE COMPLEMENTARY ELECTIVE COURSES

[FOR B.SC.MATHEMATICS/B.SC.STATISTICS/B.SC.PHYSICS/B.SC. ELECTRONICS PROGRAMMES]

WORK AND CREDIT DISTRIBUTION

(2019 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS (INTERNAL + EXTERNAL)
1C01CSC	INTRODUCTION TO COMPUTERS AND PROGRAMMING	1	2	2	3	8+32
1C01CSC	LAB 1: PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING	1	2	0	-	-
2C02CSC	PROGRAMMING IN C	2	2	2	3	8+32
2C02CSC	LAB 1: PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING	2	2	0	-	-
3C03CSC	WEB TECHNOLOGY WITH DATA BASE MANAGEMENT SYSTEM	3	3	2	3	8+32
3C03CSC	LAB 1: PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING	3	2	0	-	-
4C04CSC	COMPUTATION USING PYTHON	4	3	2	3	8+32
4C05CSC	LAB 1: PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING*	4	2	4	3	8+32

TOTAL 200 MARKS

- PRACTICAL DONE IN ALL THE 4 SEMESTER

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	4
INTERNAL	1

CONTINUOUS EVALUATION FOR THEORY

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT1: TEST	75%	MINIMUM OF 2 TESTS SHOULD BE CONDUCTED. MARKS FOR THE TEST COMPONENT SHOULD BE CALCULATED AS THE AVERAGE OF THE BEST TWO MARKS OBTAINED IN THE TESTS CONDUCTED.
COMPONENT 2: ASSIGNMENT/ SEMINAR/VIVA	25%	ANY ONE COMPONENT

PATTERN OF QUESTION PAPER FOR END SEMESTER EVALUATION

Part A	**Short Answer**	**5 Questions x 1 Mark = 5 Marks**
	Answer all questions	5 Questions x 1 Mark = 5 Marks
Part B	**Short Essay**	**6 Questions x 2 Marks = 12 Marks**
	Answer any 4 questions	4 Questions x 2 Marks = 8 Marks
Part C	**Essay**	**5 Questions x 3 Marks = 15 Marks**
	Answer any 3 questions	3 Questions x 3 Marks = 9 Marks
Part D	**Long Essay**	**4 Questions x 5 Marks = 20 Marks**
	Answer any 2 questions	2 Questions x 5 Marks = 10 Marks
Total Marks Including Choice: 52		
Maximum Marks for the Course: 32		

CONTINUOUS EVALUATION FOR PRACTICAL

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT 1: LAB SKILLS, OBSERVATION NOTE AND PUNCTUALITY	25% FOR LAB SKILL 25% FOR OBSERVATION NOTE AND PUNCTUALITY	OBSERVATION NOTE IS MANDATORY. MARKS SHOULD BE GIVEN CONSIDERING OBSERVATION NOTE LAB SKILLS AND PUNCTUALITY.
COMPONENT1: TEST	50%	MODEL EXAMINATION SHOULD BE CONDUCTED BEFORE EXTERNAL EXAM AND CONSIDERED FOR INTERNAL MARK

END SEMESTER EVALUATION FOR PRACTICAL

COMPONENT	PART A	PART B
Code Writing	7	7
Execution & Output	8	8
Record	2	
Total Marks	**32**	

COMPLEMENTARY ELECTIVE COURSE I: INTRODUCTION TO COMPUTERS AND PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
1	1C01CSC	2	2	3

COURSE OUTCOME

CO1: Familiarize with the hardware components of a digital computer
CO2: Understand the basic idea of how data is represented in computers
CO3: Familiarize with types of software
CO4: Ability to design algorithmic solutions to problems

Unit I: Introduction to Computers

Characteristics of Computers, Computer System Hardware, Basic Concepts of CPU, ALU, Registers, Control Unit and System Bus, Components Inside a Computer Cabinet (Motherboard, BIOS, CMOS Chip, Ports and Interfaces, Expansion Slots, Memory Chips, Storage Devices, Processor - Basic functions), Computer Memory Representation, Memory Hierarchy, Basic Concepts of Cache Memory, Primary Memory (RAM and ROM), Secondary Memory Types (Working principle is not required).

(10 Hrs)

Unit II: Number System and Codes

Decimal, Binary, Hexa-Decimal and Octal Number Systems, Conversion Between Number Systems, Binary Arithmetic, Complements of Binary Numbers (1's Complement and 2's Complement), Signed Numbers, Floating Point Numbers, Binary Coded Decimal (8421 BCD Code, Applications, BCD Addition), Gray Code, ASCII Code, Unicode

(8 Hrs)

Unit III: Types of Software and Networking

System Software, Operating System (Functions of Operating Systems), Application Software, Software Acquisition (Retail, OEM, Demo, Shareware, Freeware, Open-Source Software), Computer Networks (Importance, Types of Networks – LAN, MAN, WAN).

(8 Hrs)

Unit IV: Introduction to Programming

Types of Computer Languages (Machine Language, Assembly Language, High-level Language), Basic Concepts of Compiler, Assembler, Interpreter, Linker and Loader.

Program Development Life Cycle, Algorithm, Flowcharts, Program Control Structures (Sequential, Selection, Loop), Programming Paradigms (Structured Programming, Basic Idea of Object-Oriented Programming), Characteristics of a Good Program

(10 Hrs)

Books for Study:

1. Anita Goel, Computer Fundamentals, Pearson
2. Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson

Books for Reference:

1. Rajaraman V and Adabala N, Fundementals of Computers, PHI
2. Brian W Kernighan, D is for Digital: What a well-informed person should know about computers and communications, CreateSpace Independent Publishing Platform
3. Stewart Venit and Elizabeth Drake, Prelude to Programming (6th Edition), Pearson

Marks including choice:

Unit	Marks
I	17
II	13
III	9
IV	13

COMPLEMENTARY ELECTIVE COURSE II: PROGRAMMING IN C

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
2	2C02CSC	2	2	3

COURSE OUTCOME

CO1: Understand the building blocks of C programming language
CO2: Familiarize with program control structures in C
CO3: Learn procedural programming using functions
CO4: Understand user defined data types

Unit I: Introduction to C

C Character Set, Constants, Variables, Keywords, Instructions in C (Type Declaration, Arithmetic, Integer and Float Conversions), Operators in C (Arithmetic, Relational, Logical, Increment/Decrement, Assignment, Bitwise), Operator Precedence, Data Types (int, char, float, double, void), Compiling and Running C Programs in Linux.

(7 Hrs)

Unit II: Inputs and Control Statements

Formatted Console I/O Functions (printf, scanf), Escape Sequences, Unformatted Console I/O Functions (getch, putch, gets, puts), Decision control structures (Different forms of if statement), Conditional Operator, Case Control Structure (switch), Loop control structure (while, do-while, for), break and continue statements.

(10 Hrs)

Unit III: Functions and Pointers

User defined Functions (Advantages, Definition, Calling and Prototype), Library Functions, Pointers (Introduction to Pointers, Pointer Notation, Pointer Declaration and Initialization, Accessing Variable through Pointer), Call by Value and Call by Reference, Recursion

(10 Hrs)

Unit IV: Arrays, Strings and Structures

Arrays (Introduction, One Dimensional Arrays, Two Dimensional Arrays), Strings, Standard Library String Functions (strlen, strcpy, strcat, strcmp), Two-Dimensional Array of Characters. Storage Classes in C, Structures (Declaration, Initialization,

Accessing Structure Elements), Array of Structures, Array Within Structure, Renaming Data Types with Typedef, C Preprocessors (#define, #include).

(9 Hrs)

Books for Study:

1. Yashavant P. Kanetkar, Let Us C, 16th Edition, BPB

Books for Reference:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

Marks including choice:

Unit	Marks
I	10
II	16
III	16
IV	10

COMPLEMENTARY ELECTIVE COURSE III: WEB TECHNOLOGY WITH DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3C03CSC	3	2	3

COURSE OUTCOME

CO1: Develop skills to design a web page using HTML
CO2: Understand HTML Forms and CSS Styling
CO3: Develop skills to develop database and retrieve data using SQL
CO4: Learn basics of server-side programming with PHP

Unit I:HTML Basics

Introduction to WWW and HTML, Steps for hosting a website, Structure of HTML, HTML elements and attributes, Headings, Paragraphs, Formatting tags, line breaks, Comments, Links, Images, Lists, HTML5 Semantic Elements (header, footer, nav, section, article, nav, aside), HTML Tables.

(14 Hrs)

Unit II:HTML Forms and CSS

HTML Forms (input, select, textarea, button, datalist), Input types (text, password, submit, radio, checkbox, date, email), Input attributes (value, readonly, disabled, maxlength, autocomplete, list, min, max, placeholder), HTML5 form validation (required and pattern attribute of input type), Applying style to html using CSS (Inline, Internal and External CSS, Colors, Fonts, Borders, Padding, Applying style using class and id attribute)

(12 Hrs)

Unit III: Database Management System

Database Management System (Introduction, Simplified DBMS structure, advantages of DBMS, Database Administrators, Designers, End Users, System Analysts and Application Programmers), Relational Data Model (Domains, Attributes, Tuples, Relations), Relational Data Model Constraints (Domain Constraints, Key Constraints)

SQL Data Definition and Basic Data Types, Schema, DDL Statements (Create, Alter, Drop), Specifying Key Constraints in SQL, DML (Select, Insert, Update, Delete),

Ordering Tuples, Renaming Attributes, Substring Pattern Matching and Arithmetic Operators, Aggregate Functions in SQL, Group By and Having, Joins (Inner and Outer)

(18 Hrs)

Unit IV: Introduction to PHP

Introduction to PHP, PHP basics (Variable, data types, Constants, Operators), Flow control (if, switch, while, for), Functions, Strings, Arrays, Form Handling (GET and POST methods), Connecting php to a database.

(10 Hrs)

Books for Study:

1. Julie C. Meloni, HTML and CSS in 24 Hours, Sams Teach Yourself (Updated for HTML5 and CSS3), Ninth Edition
2. RamezElmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson
3. https://www.w3schools.com/php/

Books for Reference:

1. Powell, Thomas A. HTML & CSS: The Complete Reference. McGraw Hill Education; 5 edition.
2. Silberschatz, Abraham, Henry F. Korth, and ShashankSudarshan. Database system concepts. McGraw-Hill.
3. PHP: The Complete Reference, Steven Holzner, McGraw Hill Education
4. https://www.w3schools.com/css/
5. https://www.w3schools.com/html/

Marks including choice:

Unit	Marks
I	12
II	12
III	20
IV	8

COMPLEMENTARY ELECTIVE COURSE IV: COMPUTATION USING PYTHON

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4C04CSC	3	2	3

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Familiarize with functions and modules in python
CO3: Understand object-oriented programming concepts
CO4: Learn the techniques for data visualization in python

Unit I: Basic Elements and Control Statements

Features of Python, Different Methods to Run Python, Basic Elements (Objects, Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python, Input and Output in Python, import function, Operators in Python, Branching (if, else, elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets, Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable Objects.

(16 Hrs)

Unit II: Functions, Modules and Exception Handling

Functions Definition, Function Calling, Function Arguments (Required, Keyword, Default), Recursion, Modules, Built-in Modules (math, statistics), Creating Modules, File Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (IndexError, OverflowError, ZeroDivisionError, RuntimeError), Exception Handling.

(16 Hrs)

Unit III: Object Oriented Programming

Class Definition, Object Creation, Built-in Attribute Methods, Encapsulation, Data Hiding, Inheritance, Multi-Level Inheritance, Polymorphism (Method Overriding, Operator Overloading)

(10 Hrs)

Unit IV: Arrays and Data Visualization

Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating,

Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays.

Data Visualization in Python (matplotlib Module, pyplot, plot(), hist, scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2)

(12 Hrs)

Books for Study:

1. Taming Python By Programming, Dr. Jeeva Jose, Khanna Publishing
2. Introduction to Computation and Programming Using Python with Application to Understanding Data - John V. Guttag, PHI (2016)
3. https://www.numpy.org/devdocs/user/quickstart.html
4. https://matplotlib.org/users/pyplot_tutorial.html

Books for Reference:

1. https://www.tutorialspoint.com/python/
2. Introduction to Computer Science using Python - Charles Dierbach, Wiley (2015)
3. Python for Education by Ajith Kumar B P
4. https://docs.python.org/3/tutorial/index.html
5. Introduction to Computer Science and Programming Using Python Provided by Massachusetts Institute of Technology (MITx) - Available at : (https://www.edx.org/course/introduction-to-computer-science-and-programming-using-python-2)

Marks including choice:

Unit	Marks
1	15
2	15
3	10
4	12

COMPLEMENTARY ELECTIVE COURSE V: LAB 1 – PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
4	4C05CSC	2*	4	3

*Lab will be conducted for 2 hours each in I, II, III and IV semesters

COURSE OUTCOME

CO1: Achieve skills to use C language for problem solving
CO2: Understand SQL and basic web programming
CO3: Achieve skills to use Python for problem solving

Part I: C Programming

1. Write a program to receive an angle in degrees and check whether sum of the squares of sines and cosines of the angle is equal to 1. (Hint: Convert the angle in degrees to radians and apply mathematical functions).
2. Write a C program to check whether a year entered through the keyboard is leap year or not.
3. Write a program to reverse the digits of a positive integer number up to 5 digits. Display an error message if any other number is entered.
4. Write a program to enter numbers till the user wants. At the end, it should display the count of positive, negative and zeros entered.
5. Given the value of n, write a program to generate n Fibonacci numbers.
6. Create a menu driven calculator using switch statement. The menu should contain options for Addition, Subtraction, Multiplication, Division and Exit. The program should end only when the user enters the choice as Exit.
7. Create function which takes an integer value as parameter and returns 1 if the number is prime and 0 otherwise. Write a program which uses this function to generate first 100 prime numbers.
8. Write a program using recursion to find the factorial of a number.
9. Write a program to sort n numbers in ascending/descending order.
10. Write a program to check whether a string is palindrome or not.
11. Write a program to add two matrices. Display an error message if the matrices cannot be added due to incompatibility.

12. Create a structure student with membersroll_no, name and year_of_admn. Write a program to read n students into an array of the structure student. Write a function which takes year as argument and displays the names of students who joined that year. Get an input year from the user and display the student list using this function. (Hint: Make student array and number of students as global variables).

Part II: DBMS and Web Programming

To be updated

Part II: Python Programming

To be updated

PART C

B.SC. COMPUTER SCIENCE GENERIC ELECTIVE COURSES
WORK AND CREDIT DISTRIBUTION
(2019 ADMISSION ONWARDS)

STUDENTS OF OTHER DEPARTMENTS CAN CHOOSE **ANY ONE OF THE GENERIC ELECTIVE COURSES FROM THE POOL OF FIVE COURSES.**

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS (INTERNAL + EXTERNAL)
5D01CSC	PROGRAMMING IN C	5	2	2	2	5+20
5D02CSC	WEB TECHNOLOGY	5	2	2	2	5+20
5D03CSC	DATABASE MANAGEMENT SYSTEM	5	2	2	2	5+20
5D04CSC	FUNDAMENTALS OF COMPUTERS AND PROGRAMMING	5	2	2	2	5+20
5D05CSC	INTRODUCTION TO PYTHON PROGRAMMING	5	2	2	2	5+20

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	4
INTERNAL	1

CONTINUOUS INTERNAL ASSESSMENT FOR THEORY

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT1: TEST	80%	MINIMUM OF 2 TESTS SHOULD BE CONDUCTED. MARKS FOR THE TEST COMPONENT SHOULD BE CALCULATED AS THE AVERAGE OF THE BEST TWO MARKS OBTAINED IN THE TESTS CONDUCTED.
COMPONENT 2: ASSIGNMENT/ SEMINAR/VIVA	20%	ANY ONE COMPONENT

PATTERN OF QUESTION PAPER FOR END SEMESTER ASSESSMENT

Part A	**Short Answer**	**6 Questions x 1 Mark = 6 Marks**
	Answer all questions	6 Questions x 1 Mark = 6 Marks
Part B	**Short Essay**	**6 Questions x 2 Marks = 12 Marks**
	Answer any 4 questions	4 Questions x 2 Marks = 8 Marks
Part C	**Essay**	**2 Questions x 6 Marks = 12 Marks**
	Answer any 3 questions	1 Question x 6 Marks = 6 Marks
Total Marks Including Choice: 30		
Maximum Marks for the Course: 20		

GENERIC ELECTIVE COURSEI:5D01CSC PROGRAMMING IN C

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5D01CSC	2	2	2

COURSE OUTCOME

CO1: To understand the basic knowledge of programming
CO2: To develop C programs
CO3: To develop skill in advanced program constructs
CO4: To develop skill in programming

Unit I:

Importance of C, C Tokens: Keywords, Identifiers, Constants, Operators- arithmetic operators, relational operator, logical operators and assignment operator. Fundamental data types, declaration of variables.

(8Hrs)

Unit II:

Data input and output functions: getchar(), putchar(),scanf(), printf(). Control statements: Branching: if, if-else, else...if ladder. Looping: while, do while and for loops.

(12Hrs)

Unit III:

Arrays: Introduction to Arrays - one dimensional array and two-dimensional arrays. Strings: basic concepts, standard library string functions- strlen, strcpy, strcmp, strcat, strrev.

Functions: function declaration (prototype), function definition and calling a function. Recursion.

(10Hrs)

Unit IV:

Pointer: pointer declaration and initialization. Structures: structure definition, structure variable declaration, Initialization of structure variable, accessing a structure member.

(6Hrs)

Books for Study:

1. ANSI C, E. Balagurusamy, 3rd edition McGraw-Hill Publication

Books for Reference:

1. Programming with ANSI and Turbo C, Ashok N. Kamthane, 1edn, Pearson Education.
2. Programming with C in Linux, NIIT, PHI.

Marks including choice:

Unit	Marks
I	6
II	10
III	10
IV	4

GENERIC ELECTIVE COURSE II: 5D02CSC Web Technology

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5D02CSC	2	2	2

COURSE OUTCOME

CO1: To understand the knowledge of HTML
CO2: To understand the knowledge of various HTML tags
CO3: To enable students to program for the World Wide Web using HTML
CO4: To understand the basic knowledge of Java Script

Unit I: HTML Basics

Introduction to WWW and HTML, Steps for hosting a website, Structure of HTML, HTML elements and attributes, Headings, Paragraphs, Formatting tags, line breaks, Comments, Links, Images, Lists, HTML5 Semantic Elements (header, footer, nav, section, article, nav, aside).

(8 Hrs)

Unit II: HTML Tables and Forms

HTML Tables, HTML Forms (input, select, textarea, button, datalist), Input types (text, password, submit, radio, checkbox, date, email), Input attributes (value, readonly, disabled, maxlength, autocomplete, list, min, max, placeholder)

(12 Hrs)

Unit III: CSS

HTML5 form validation (required and pattern attribute of input type), Applying style to html using CSS (Inline, Internal and External CSS, Colors, Fonts, Borders, Padding, Applying style using class and id attribute).

(6 Hrs)

Unit IV: JavaScript

JavaScript: Introduction, data types, variables, operators, functions, arrays. Dialog boxes: Alert, confirm and prompt dialog boxes

(10 Hrs)

Books for Study:

1. Julie C. Meloni, HTML and CSS in 24 Hours, Sams Teach Yourself (Updated for HTML5 and CSS3), Ninth Edition
2. Javascript-Definitive Guide O'reilley 6th edn

Books for Reference:

1. Powell, Thomas A. HTML & CSS: The Complete Reference. McGraw Hill Education; 5 edition.
2. https://www.w3schools.com/css/
3. https://www.w3schools.com/html/

Marks including choice:

Unit	Marks
I	8
II	8
III	6
IV	8

GENERIC ELECTIVE COURSE III: 5D03CSC DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5D03CSC	2	2	2

COURSE OUTCOME

CO1: To understand the fundamentals of database management system
CO2: To develop Skill in designing database
CO3: To understand the concept of SQL commands
CO4: To develop Skill in writing queries

Unit I:

Introduction: Advantages of database systems, View of Data, data models (Network model, Hierarchical model, Relational model). Field, Record, Entity, Attribute, Relation, Domain, Tuple.

(8 Hrs)

Unit II:

Database Administrator, data base users, E-R model: basic concept, E-R diagram. Constraints: Primary key, not null, foreign key and Unique. Relational Algebra (Union, Intersection, Difference, Product, Project and Selection).

(10Hrs)

Unit III:

SQL: Introduction to SQL, database languages, DDL(create, alter, Drop), DML(Insert into, Select, update, Delete) and DCL commands. Data Types in SQL

(8Hrs)

Unit IV:

SQL Functions: aggregate, number, date and character functions. Operators (Arithmetic, Relational, Logical), Sub Queries (in Detail), Clauses (Having, Group By), Joins (Different Types of Join Statements), View, Introduction to Sequence.

(10 Hrs)

Books for Study:

1. Data Base Concept 3rd edition Abraham Silberschatz, Henery f Korth McGraw Hill
2. A Guide to the SQL Standard, C. J. Date and Hugh Darwen, 1997, Addison-Wesley

Books for Reference:

1. An Introduction to Database Systems, C. J. Date, 1994, Addison-Wesley
2. Understanding the New SQL, Jim Melton and Alan R. Simon, 1993, Morgan Kaufmann

Marks including choice:

Unit	Marks
I	5
II	9
III	8
IV	8

GENERIC ELECTIVE COURSE IV: 5D04CSC FUNDAMENTALS OF COMPUTERS AND PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5D04CSC	2	2	2

COURSE OUTCOME

CO1: To know the working principle of a computer
CO2: To understand the concept of number system
CO3: To understand the basics of computer network
CO4: To understand the basics of programming

Unit I:

Introduction to Computers: Characteristics, Generation, Basic operations of a computer system: Inputting, storing, processing, outputting and controlling, CPU, ALU, Control Unit, Main Memory Unit, Secondary storage devices: tape, floppy, hard disk, CD, DVD.

(12Hrs)

Unit II:

Representation of information: Number system: binary, octal and hexadecimal system, Conversion: decimal to binary, decimal to octal, decimal to hexadecimal, binary to decimal, octal to decimal and hexadecimal to decimal, Different code used: BCD, ASCII, EBCDIC, and GRAY Code.

(8Hrs)

Unit III:

Introduction to Computer networking: Goals, Transmission modes: simplex, half duplex and full duplex, Classification of networks: LAN, MAN and WAN, Topologies: bus, star, ring, and mesh.

(8 Hrs)

Unit IV:

Computer Programming: Introduction, algorithm, flowchart, characteristics of a good program. Programming languages: machine, assembly and high-level languages, Assembler, Compiler and Interpreter. Source code and object code.

(8Hrs)

Books for Study:

1. Computer Fundamentals, Pradeep.K. Sinha&PritiSinha, BPB Pub
2. Introduction to Information Technology, V. Rajaraman, Prentice Hal
3. Computer Networks 3rd Edn, A S Tanenbaum . Pearson Pub

Books for Reference:

1. Peter Norton, Introduction to Computers,6e, (Indian Adapted Edition)
2. B Forouzan, Introduction to data communication and networking

Marks including choice:

Unit	Marks
I	9
II	6
III	8
IV	7

GENERIC ELECTIVE COURSE IV: 5D05CSC INTRODUCTION TO PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5D05CSC	2	2	2

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Learn about program control statements in python
CO3: Familiarize with functions and modules in python
CO4: Learn the techniques for data visualization in python

Unit I:

Features of Python, Different Methods to Run Python, Basic Elements (Objects, Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python, Input and Output in Python, import function, Operators in Python.

(12 Hrs)

Unit II:

Branching (if, else, elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets, Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable Objects.

(8 Hrs)

Unit III:

Functions Definition, Function Calling, Function Arguments (Required, Keyword, Default), Recursion, Modules, Built-in Modules (math, statistics), Creating Modules, File Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (IndexError, OverflowError, ZeroDivisionError, RuntimeError), Exception Handling.

(8 Hrs)

Unit IV:

Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating, Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays.

Data Visualization in Python (matplotlib Module, pyplot, plot(), hist, scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2).

(8 Hrs)

Books for Study:

1. Computer Fundamentals, Pradeep.K. Sinha&PritiSinha, BPB Pub
2. Introduction to Information Technology, V. Rajaraman, Prentice Hal
3. Computer Networks 3rd Edn, A S Tanenbaum . Pearson Pub

Books for Reference:

1. Peter Norton, Introduction to Computers,6e, (Indian Adapted Edition)
2. B Forouzan, Introduction to data communication and networking

Marks including choice:

Unit	Marks
I	5
II	10
III	10
IV	5

Model Question Papers

Model Question Paper
1B01CSC Introduction to C Programming

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. What are the advantages of arrays?
2. Define the term algorithm
3. Explain the purpose of getchar() function
4. What is source code?
5. What is a keyword?
6. Define the term string.

Part B: Short Essay

Answer any 6 questions **(6 x 2 = 12 Marks)**

7. Which function is used to read a line of text in C?
8. Write notes on limitations of flowchart
9. Explain switch statement in C.
10. Explain the working of increment Operator with an example
11. Explain go-to statement in detail
12. Explain the basic structure of C language.
13. Explain working of strcmp() function.
14. How do you initialize an array in C? explain with suitable examples

Part C: Essay

Answer any 4 questions **(4 x 3 = 12 Marks)**

15. Explain benefits of flowchart.
16. Write notes on conditional operator with an example program.
17. Write a program to perform matrix addition.
18. Write a program to print prime numbers within range.
19. Explain the difference between while and do-while loop in detail.
20. Write algorithm to find the largest number among three numbers.

Part D: Long Essay

Answer any 2 questions **(2 x 5 = 10 Marks)**

21. Write an algorithm and flowchart to swap two Numbers without using temporary variable.
22. Write detailed note on data types in C language.
23. Explain about the looping statements in C.
24. Explain string-handling functions in detail.

Model Question Paper
3B04CSC Data Structures

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Define Data Structure.
2. What do you mean by Deque?
3. Full Binary Tree – Define.
4. Define Adjacency Matrix.
5. What is ADT?
6. Write the complexity of Bubble sort.

Part B: Short Essay

Answer any 6 questions **(6 x 2 = 12 Marks)**

7. Write a short note on polynomial representation using arrays.
8. Describe the advantages of Two-way list.
9. Write a short note on Post Fix expression.
10. Write a short note on computer representation of general trees.
11. Explain about sequential representation of graphs.
12. Define and explain - algorithms.
13. Differentiate Data Structure and Abstract Data type.
14. Write a short note on linear search.

Part C: Essay

Answer any 4 questions **(4 x 3 = 12 Marks)**

15. Explain push operation in stack with the support of example.
16. Write a detailed note on representation of linked list in memory.
17. Differentiate Complete Binary Tree and Extended Binary Tree.
18. How can I insert an item into a graph? Explain.
19. Explain about measuring of running time of a program.
20. Sort the following data set using selection sort – 10,5,8,2,12,6.

Part D: Long Essay

Answer any 2 questions **(2 x 5 = 10 Marks)**

21. Write in detail about Queue Data Structure.
22. Describe Binary Search tree in detail.
23. Explain the functioning of BFS algorithm with the support of example.
24. Write a detailed note on insertion sort algorithm and explain with example.

Model Question Paper
5B08CSC Web Technology

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Describe the difference between client-side programming and server-side programming.
2. Give the syntax to embed JavaScript code into the web document.
3. How can we add comments to a web document?
4. What is the importance of PHP?
5. What is Ajax?
6. Define DOM.

Part B: Short Essay

Answer any 6 questions **(6 x 2 = 12 Marks)**

7. Explain any two mouse events.
8. Write a note on WWW.
9. What are the different types of heading available in HTML5?
10. What is meant by page structure element?
11. What are the different parts of a URL?
12. What is the function of AJAX?
13. What are the arithmetic operators used in JavaScript?
14. Write a short note on string object in JavaScript.

Part C: Essay

Answer any 4 questions **(4 x 3 = 12 Marks)**

15. What are the types of data used in PHP?
16. What is meant by dialog boxes? Explain with various types of dialog boxes.
17. What are the different types of lists possible in HTML 5?
18. What are the different types of web hosting?
19. Differentiate between traditional Web Applications and Ajax Applications
20. How can we insert an image into your web page?

Part D: Long Essay

Answer any 2 questions **(2 x 5 = 10 Marks)**

21. Explain forms and various tags associated with it.
22. What is recursion? How is it implemented in JavaScript?
23. Define array. Explain the declaration and usage of arrays in JavaScript with example.
24. How can we process forms using PHP? Explain in detail

Model Question Paper
5B09CSC Java Programming

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Define Byte code.
2. What do you mean by Auto boxing?
3. Define DMD.
4. Define this keyword.
5. What is chained exception?
6. Define Applet.

Part B: Short Essay

Answer any 6 questions **(6 x 2 = 12 Marks)**

7. Write a short note on short circuit operators in java.
8. Describe the advantages of arrays in java.
9. Write a short note on static method.
10. Explain the uses of super keyword.
11. Briefly explain exception handling in Java.
12. Explain labeled break and labeled continue.
13. What is synchronization in Java?
14. Explain two ways to create threads.

Part C: Essay

Answer any 4 questions **(4 x 3 = 12 Marks)**

15. Explain three uses of final keyword.
16. With an example explain DMD.
17. Write a Java program to print the elements of an integer array with recursion.
18. How to create user-defined packages in Java?
19. Explain bitwise operators.
20. Distinguish abstract class and interfaces in Java.

Part D: Long Essay

Answer any 2 questions **(2 x 5 = 10 Marks)**

21. Write in detail of fundamental Data types.
22. Describe packages and interfaces.
23. Explain applet skeleton and applet tags.
24. Write an applet program to draw a string when an awt Button is pressed.

Model Question Paper
5B10CSC Computation Using Python

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Give syntax for function definition in python.
2. What are built-in attribute methods.
3. What is the purpose of zeros function in numpy module?
4. Explain the use of linspace function in numpy with an example?
5. What is meant by widget in Tkinter?
6. Give syntax for connecting to a database in python.

Part B: Short Essay

Answer any 6 questions

(6 x 2 = 12 Marks)

7. What are the different methods to run python?
8. What is the difference between mutable and immutable objects in python?
9. How a module can be created? Give an example.
10. Write a recursive function in python to find the n^{th} Fibonacci number and use it to generate a Fibonacci series of required numbers.
11. Explain about built-in exceptions in python.
12. How a class is defined? Explain with an example.
13. Explain 2 different methods for changing the shape of an array.
14. Explain about message widget.

Part C: Essay

Answer any 4 questions

(4 x 3 = 12 Marks)

15. Explain about sets in python.
16. Explain about branching statements in python.
17. How python can be used to write in to a file? Explain with an example.
18. Explain how operator overloading can be done in python with an example.
19. Explain how transaction control can be done in python.
20. Explain about pack layout manger.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

21. Explain in detail about lists and dictionaries in python.
22. Explain about exception handling in python.
23. What are the object-oriented programming features of python?
24. Explain about 5 widgets in Tkinter.

Model Question Paper
5B11CSC-A Algorithm Designing

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Define divide and Conquer method.
2. What is partitioning.
3. Define spanning tree.
4. What do you mean by job sequencing with deadlines problem?
5. Define path.
6. Write about Hamiltonian Cycle.

Part B: Short Essay

Answer any 6 questions

(6 x 2 = 12 Marks)

7. How Binary Search is a Divide and Conquer method algorithm?
8. Discuss the performance of Quick sort algorithm.
9. Define greedy method.
10. What do you mean by single source shortest path?
11. What is 0/1 knapsack.
12. Describe all pairs shortest path.
13. What is 8 queens' problem.
14. Write a short note on back tracking.

Part C: Essay

Answer any 4 questions

(4 x 3 = 12 Marks)

15. Explain Binary Search in terms of divide and conquer.
16. Do merge sort in following data set: 34,78,26,5,92,4,71,8
17. Explain knapsack problem.
18. What is single source shortest path.
19. Write a note on dynamic programming.
20. Explain sum of subsets problem.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

21. Explain Strassen's Matrix Multiplication Algorithm.
22. Describe Prim's algorithm with the support of an example.
23. Write a detailed note on multistage graph.
24. Explain graph coloring problem in detail.

Model Question Paper
6B12CSC Data Communication and Computer Networking

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. What is meant by network topology?
2. Give examples for network hardware.
3. What is bit stuffing.
4. Mention 2 services provided by network layer.
5. What is a LAN?
6. What is the need of flow control?

Part B: Short Essay

Answer any 6 questions

(6 x 2 = 12 Marks)

7. What are the design issues of network layer?
8. What is meant by congestion?
9. List the file transfer protocols.
10. What is the need of error control?
11. What is meant by character stuffing?
12. Explain simplex transmission.
13. What is meant by parallel transmission?
14. What is service point addressing?

Part C: Essay

Answer any 4 questions

(4 x 3 = 12 Marks)

15. Compare between TCP and UDP.
16. Explain flow-based routing.
17. Explain Framing.
18. What are the functions of presentation layer?
19. Briefly explain unicast, multicast and broadcast.
20. Explain about leaky bucket algorithm.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

21. Explain ISO-OSI reference model.
22. List and explain elementary protocols used in DLL.
23. Explain different types of routing.
24. Explain the various transmission media.

Model Question Paper
6B13CSC Compiler Design

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. What are compiler construction tools?
2. What is a symbol table?
3. Define preprocessor.
4. What is meant by instruction cost in code generation?
5. What is activation record?
6. What is basic block?

Part B: Short Essay

Answer any 6 questions

(6 x 2 = 12 Marks)

7. Define compiler.
8. What are the phases of analyzing a source program?
9. What is the role of lexical analyzer in compiler?
10. Define tokens. Give example.
11. What is syntax error? Give example.
12. Write a short note operator precedence parsing.
13. What are the structure preserving transformations?
14. Write a short note on peephole optimization?

Part C: Essay

Answer any 4 questions

(4 x 3 = 12 Marks)

15. What is meant by semantic analysis?
16. Define regular expression with an example.
17. Define DFA.
18. Briefly explain the working of a parser.
19. Explain ambiguity of grammar.
20. What are the different types of intermediate representation?

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

21. Explain top down parsing in detail.
22. Explain lexical analyzer.
23. Explain the phases of a compiler.
24. Explain code optimization.

Model Question Paper
6B15CSC-B Data Mining

Time: 3 Hours **Max. Marks: 40**

Part A: Short Answer

Answer all questions **(6 x 1 = 6 Marks)**

1. Define Data Warehouse.
2. List the distinct features of OLAP and OLTP.
3. List out the major tasks done in Data Preprocessing.
4. What is Data Integration?
5. What is a Decision Tree?
6. List out the stages of KDD.

Part B: Short Essay

Answer any 6 questions

(6 x 2 = 12 Marks)

7. What is CLARANS?
8. How Data Warehouse differ from Heterogeneous Database Management System?
9. Explain about different OLAP operations
10. What is Multi-Dimensional data model. Give example.
11. Why we need Data transformation. Mention the ways by which data can be transformed.
12. What is Categorical Clustering?
13. What is Clustering?
14. What is the need of Data Preprocessing?

Part C: Essay

Answer any 4 questions

(4 x 3 = 12 Marks)

15. Explain about Data Warehouse Architecture.
16. Explain Apriori algorithm.
17. Differentiate CLARA and CLARANS.
18. Explain the working of K-Means algorithm.
19. Discuss in detail about the concept of Spatial Data Mining
20. Discuss about the Decision Tree Construction Principles.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

21. Explain in detail about Partitioned Algorithms.
22. Explain in detail about Data Preprocessing.
23. Discuss about
    a. FP Tree Growth Algorithms
    b. Data Warehouse Backend Process
24. Explain about Density-Based Algorithms and STIRR.

Model Question Paper
1C01CSC Introduction to Computers and Programming

Time: 3 Hours **Max. Marks: 32**

Part A: Short Answer

Answer all questions **(5 x 1 = 5 Marks)**

1. What is the function of BIOS?
2. Give two types of secondary memory.
3. Find the 2's complement of 10110011_2.
4. What is meant by open source software?
5. What is a Compiler?

Part B: Short Essay

Answer any 4 questions

(4 x 2 = 8 Marks)

6. Write short note about ALU.
7. Explain about SRAM.
8. Explain about ASCII code.
9. What is BCD? Explain with an example?
10. What is an algorithm? Explain with an example.
11. What are the characteristics of a good program?

Part C: Essay

Answer any 3 questions

(3 x 3 = 9 Marks)

12. Explain about different types of ROM.
13. What are the characteristics of a computer?
14. Convert the following numbers as indicated.
    a. 234_{10} to binary
    b. 110011.101_2 to decimal
    c. 1245_8 to hexadecimal
15. What are the uses of computer networks?
16. Explain about program development life cycle?

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

17. Explain about basic hardware components of a computer system with a diagram.
18. Explain about different number systems with examples.
19. Explain about functions of an operating system.
20. Explain about different program control structures.

Model Question Paper
2C02CSC Programming in C

Time: 3 Hours **Max. Marks: 32**

Part A: Short Answer

Answer all questions **(5 x 1 = 5 Marks)**

1. What is a keyword? Give an example.
2. What is a type declaration instruction in C?
3. What is an escape sequence character? Give an example.
4. Explain about library function.
5. Explain how a one-dimensional array can be declared with an example.

Part B: Short Essay

Answer any 4 questions

(4 x 2 = 8 Marks)

6. Write a C program to find the greatest of three numbers entered through the keyboard.
7. Explain about break and continue statements with an example.
8. Write a recursive function to find the factorial of a number.
9. What are the advantages of using functions in a program?
10. Write a short note about two-dimensional arrays.
11. What are C Preprocessors? Give examples.

Part C: Essay

Answer any 3 questions

(3 x 3 = 9 Marks)

12. Explain about different types of constants in C.
13. Differentiate between while and do-while statements with an example.
14. Explain about switch statement in C with an example.
15. Write a short note about pointers in C.
16. Explain about different methods for passing parameter to functions in C.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

17. Explain about different types of operators in C.
18. Explain about different forms of if statement.
19. Explain about different storage classes in C.
20. What are strings? Explain in detail about standard string handling functions in C.

Model Question Paper
3C03CSC Web Technology with Database Management System

Time: 3 Hours **Max. Marks: 32**

Part A: Short Answer

Answer all questions **(5 x 1 = 5 Marks)**

1. How hyperlinks can be created in a HTML page?
2. What are the heading tags in HTML?
3. What is meant by database schema?
4. How tuples of a select query can be ordered based on an attribute?
5. What is the purpose of GET method in an HTML form?

Part B: Short Essay

Answer any 4 questions

(4 x 2 = 8 Marks)

6. Explain about formatting tags in HTML.
7. Explain about any 2 semantic elements in HTML5.
8. Explain about inline, internal and external css styling.
9. Write short note about datalist tag in HTML with an example.
10. Explain about CREATE TABLE statement with an example.
11. Explain how user defined functions are created in php with an example.

Part C: Essay

Answer any 3 questions

(3 x 3 = 9 Marks)

12. Explain about different lists in HTML.
13. Explain how tables can be created in HTML with an example.
14. Explain about HTML5 form validation techniques.
15. Explain about different aggregate functions in SQL.
16. Explain briefly about relational data model.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

17. Explain in detail about different form elements, input types and attributes.
18. Explain in detail about advantages of DBMS.
19. Explain about different types of joins in SQL.
20. Design an HTML page which contains a form for accepting basic student details. Explain how this form data can be stored in a database table using php.

Model Question Paper
4C04CSC Computation Using Python

Time: 3 Hours **Max. Marks: 32**

Part A: Short Answer

Answer all questions **(5 x 1 = 5 Marks)**

1. Explain about input function in python.
2. Give syntax for function definition in python.
3. What is meant by exception? Give an example.
4. What is the purpose of zeros function in numpy module?
5. Explain the use of linspace function in numpy with an example?

Part B: Short Essay

Answer any 4 questions

(4 x 2 = 8 Marks)

6. What are the different methods to run python?
7. What is the difference between mutable and immutable objects in python?
8. Explain for loop in python with an example.
9. Explain about any two functions in math module.
10. How a class is defined? Explain with an example.
11. Explain 2 different methods for changing the shape of an array.

Part C: Essay

Answer any 3 questions

(3 x 3 = 9 Marks)

12. Explain about sets in python.
13. How python can be used to write in to a file? Explain with an example.
14. Explain about different types of function arguments in python.
15. What is operator overloading? Explain with an example.
16. Write a python program to plot the mathematical function x^2.

Part D: Long Essay

Answer any 2 questions

(2 x 5 = 10 Marks)

17. Explain in detail about lists and dictionaries in python.
18. Explain about exception handling in python.
19. What are the object-oriented programming features of python?
20. Explain about different data visualization techniques in python. Write python program for plotting the mathematical function sin x.

Model Question Paper
5D01CSC Programming in C

Time: 2 Hrs **Max Marks: 20**

Part A (Short Answer)

Answer All Questions **(6 x 1 = 6)**

1. What is keyword?
2. What is the use of getchar()?
3. Define array.
4. What is function prototype?
5. What is pointer?
6. What is structure?

Part B (Short Essay)

Answer Any FOUR Questions **(4 x 2 = 8)**

7. Explain fundamental data types.
8. Explain about arithmetic and relational operators.
9. Write the syntax of if-else statement.
10. Explain recursion.
11. Explain about for loop?
12. How structure variables are initialized and accessed? Explain with example.

Part C (Essay)

Answer Any ONE Questions **(1 x 6 = 6)**

13. Explain looping statements in C with example.
14. Explain any four string handling functions in C with example.

Model Question Paper
5D02CSC Web Technology

Time: 2 Hrs **Max Marks: 20**

Part A (Short Answer)

Answer All Questions **(6 x 1 = 6)**

1. How images can be added in an HTML page?
2. What is the use of <a> tag in HTML?
3. What are the different heading tags in HTML?
4. Give 2 examples for semantic tags.
5. What is the use of password input in an HTML form?
6. What is a checkbox in an HTML form?

Part B (Short Essay)

Answer Any FOUR Questions **(4 x 2 = 8)**

7. Explain about lists in HTML.
8. Explain about structure of an HTML document.
9. Explain about HTML form validation.
10. Explain about inline, internal and external css styling.
11. Explain about data list and list attribute with an example.
12. Explain about confirm and prompt boxes in java script.

Part C (Essay)

Answer Any ONE Questions **(1 x 6 = 6)**

13. What is meant by Table? What are the tags used for table creation? What are the different attributes? Illustrate with an example.
14. Explain different types of operators in java script.

Model Question Paper
5D03CSC Database Management System

Time: 2 Hrs **Max Marks: 20**

Part A (Short Answer)

Answer All Questions **(6 x 1 = 6)**

1. What is tuple?
2. Define primary key.
3. What are DDL commands?
4. What is sequence?
5. What is the use of delete command?
6. List the arithmetic operators in SQL.

Part B (Short Essay)

Answer Any FOUR Questions **(4 x 2 = 8)**

7. Explain the advantages of DBMS.
8. Write a note on relational model.
9. Explain the functions of DBA.
10. Explain update command.
11. Explain about insert command.
12. Explain about data types in SQL.

Part C (Essay)

Answer Any ONE Questions **(1 x 6 = 6)**

13. Explain about relational algebra operations.
14. Explain various SQL functions with suitable examples.

Model Question Paper

5D04CSC Fundamentals of Computers and Programming

Time: 2 Hrs **Max Marks: 20**

Part A (Short Answer)

Answer All Questions **(6 x 1 = 6)**

1. What is gray code?
2. What is ASCII?
3. What are secondary storage devices?
4. What is flowchart?
5. Define algorithm.
6. What is source code?

Part B (Short Essay)

Answer Any FOUR Questions **(4 x 2 = 8)**

7. Explain the function of CPU.
8. Explain BCD.
9. Converts the decimal number 256 to binary.
10. Explain transmission modes.
11. Differentiate compiler and interpreter.
12. Explain the characteristics of a good program.

Part C (Essay)

Answer Any ONE Questions **(1 x 6 = 6)**

13. Explain the generations of a computer.
14. Explain network topologies.

Model Question Paper
5D05CSC Introduction to Python Programming

Time: 2 Hrs **Max Marks: 20**

Part A (Short Answer)

Answer All Questions **(6 x 1 = 6)**

1. Explain about input function in python.
2. Give syntax for function definition in python.
3. What is meant by exception? Give an example.
4. What is the function of zeros function in numpy module?
5. Explain plot function.
6. Explain the use of linspace function in numpy with an example.

Part B (Short Essay)

Answer Any FOUR Questions **(4 x 2 = 8)**

7. What are the different methods to run python?
8. What is the difference between mutable and immutable objects in python?
9. Explain for loop in python with an example.
10. Explain about any two functions in math module.
11. Explain 2 different methods for changing the shape of an array.
12. Explain about any 2 operators in python.

Part C (Essay)

Answer Any ONE Questions **(1 x 6 = 6)**

13. Explain in detail about lists and dictionaries in python.
14. Explain about exception handling in python.