

Programme Specific Outcomes

PSO1: Demonstrate a comprehensive understanding of core Computer Science concepts and apply this knowledge to develop, implement, and optimize software solutions and technological innovations effectively.

PSO2: Communicate complex technical concepts and solutions clearly. Prepare and present technical reports, documentation, and research findings with clarity and precision.

PSO3: Utilize critical thinking and analytical skills to identify, analyze, and solve complex computing problems. Employ systematic approaches to improve computing practices, methodologies, and technologies.

PSO4: Conduct research and development activities that contribute to technological advancement and innovation.

PSO5: Develop an understanding of global perspectives on technology and its cultural impacts. Integrate environmental sustainability principles into computing practices and solutions to address ecological and societal challenges.

PSO6: Work effectively in teams to accomplish computing projects, demonstrating leadership and project management skills.

PSO7: Engage in lifelong learning to stay current with emerging technologies, tools, and trends in computer science. Utilize digital literacy skills to leverage ICT tools for self-directed learning and professional development.

Department : Computer Science

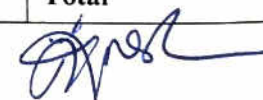
Programme Code : USCS

SEMESTER – I

Part	Course Type	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	LC – I		Tamil	6	3	3	25	75	100
II	ELC - I		English	6	3	3	25	75	100
III	CC – I		Python Programming	5	5	3	25	75	100
	CC-II		Python Programming Practical	3	3	3	40	60	100
	GEC- I		Numerical Methods	6	5	3	25	75	100
IV	VE		Value Education	2	2	3	25	75	100
	FC		Problem Solving Techniques	2	2	3	25	75	100
Total				30	23				700

SEMESTER – II

Part	Course Type	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	LC – II		Tamil	6	3	3	25	75	100
II	ELC –II		English	6	3	3	25	75	100
III	CC – III		Data Structures and Algorithms	5	5	3	25	75	100
	CC-IV		Data Structures and Algorithms using C++ Practical	3	3	3	40	60	100
	GEC-II		Operations Research	6	5	3	25	75	100
IV	SEC		Fundamentals of Information Technology	2	2	3	25	75	100
	EVS		Environmental Studies	2	2	3	25	75	100
Total				30	23				700



SEMESTER – III

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	LC – III		Tamil	6	3	3	25	75	100
II	ELC - III		English	6	3	3	25	75	100
III	CC – V		Programming in Java	6	5	3	25	75	100
	CC – VI		Programming in Java Practical	3	3	3	40	60	100
	GEC -III		Applied Physics	4	3	3	25	75	100
	GEC-IV		Applied Physics Practical	2	2	3	40	60	100
IV	SEC		Fundamentals of Photoshop	1	1	3	25	75	100
	SEC		Multimedia Systems *	2	2	3	25	75	100
			Total	30	22				800

SEMESTER – IV

Part	Course Type	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	LC – IV		Tamil	6	3	3	25	75	100
II	ELC- IV		English	6	3	3	25	75	100
III	CC – VII		Microprocessor and its Applications	5	5	3	25	75	100
	CC-VIII		Microprocessor Practical	3	2	3	40	60	100
	GEC- V		Applied Physics	4	4	3	25	75	100
	GEC-VI		Applied Physics Practical	2	1	3	40	60	100
IV	IDSEC		1.Graphics and Animation 2. Cyber Security 3. E-Commerce	2	1	3	25	75	100
	SEC-IV		Open Source Practical *	2	2	3	40	60	100
V	EA		Extension Activity	-	1				100
			Total	30	23				900
			Internship/Industrial training*	-	-				

* **Internship/industrial training during summer vacation. The credits shall be awarded in Semester V statement of marks.**

SEMESTER – V

SEMESTER – V									
Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
III	CC – IX		Operating Systems	6	5	3	25	75	100
	CC – X		Database Management Systems	5	5	3	25	75	100
	CC – XI		Database Management Systems Practical	6	3	3	40	60	100
	CC –XII		Project with Viva voce	3	3	3	20	80	100
	DSE – I		i. Cloud Computing ii. Web Development iii. Introduction to Data Science	4	4	3	25	75	100
	DSE - II		i. Big Data Analytics ii. Internet of Things iii. Bio Informatics	4	4	3	25	75	100
IV	SEC -V		Hardware Concepts	2	2	3	25	75	100
	AEC - I		Internship / Industrial training	-	2	-	-	-	-
			Total	30	28				700

SEMESTER – VI

Part	Course Type	Course Code	Title of the Course	Hrs/ week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
III	CC-XIII		Computer Networks	6	6	3	25	75	100
	CC-XIV		.NET Programming	5	5	3	25	75	100
	CC-XV		.NET Programming Practical	6	3	3	40	60	100
	DSE- III		i. Software Engineering ii. Robotic Process Automation for Business iii. Cryptography	4	3	3	25	75	100
	DSE -IV		i. Computer Graphics ii. Software Testing iii. Artificial Intelligence	4	3	3	25	75	100
IV	SEC-VI		Social Computing	2	2	3	25	75	100
	AEC- II		Professional Competency Skill – Computer Science for Competitive Examinations	1	2	3	25	75	100
	GS		Gender studies	1	1	3	25	75	100
			Total	30	25				800
			Grand Total	180	142				4600

Semester – I – Core Theory – CC-I

PYTHON PROGRAMMING

U23CSC101

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC1	Python programming	Core	5	-	-	-	5	25	75	100
Learning Objectives										
LO1	To make students understand the concepts of Python programming.									
LO2	To apply the OOPs concept in PYTHON programming.									
LO3	To impart knowledge on demand and supply concepts									
LO4	To make the students learn best practices in PYTHON programming									
LO5	To know the costs and profit maximization									
UNIT	Contents									No. of Hours
I	Basics of Python Programming: History of Python-Features of Python-Literal-Constants-Variables - Identifiers-Key words-Built-in Data Types-Output Statements - Input Statements-Comments - Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays - Array methods.									15
II	Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.									15
III	Functions: Function Definition - Function Call - Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments-Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module - dir() function - Modules and Namespace - Defining our own modules.									15
IV	Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple - Nested tuples- Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary - Dictionary Functions and Methods - Difference between Lists and Dictionaries.									15
V	Python File Handling: Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method - read() and readlines() methods - with keyword - Splitting words - File methods - File Positions- Renaming and deleting files.									15
TOTAL HOURS										75

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of python, Do simple programs on python, Learn how to use an array.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop program using selection statement, Work with Looping and jump statements, Do programs on Loops and jump statements.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of function, function arguments, Implementing the concept strings in various application, Significance of Modules, Work with functions, Strings and modules.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with List, tuples and dictionary, Write program using list, tuples and dictionary.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	ReemaThareja, "Python Programming using problem solving approach", First Edition, 2017 Oxford University Press.	
2	Dr. R. NageswaraRao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.	
Reference Books		
1.	VamsiKurama, "Python Programming: A Modern Approach", Pearson Education.	
2.	Mark Lutz, "Learning Python", Orielly.	
3.	Adam Stewarts, "Python Programming", Online.	
4.	Fabio Nelli, "Python Data Analytics", APress.	
5.	Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.	
Web Resources		
1.	https://www.programiz.com/python-programming	
2.	https://www.guru99.com/python-tutorials.html	
3.	https://www.w3schools.com/python/python_intro.asp	
4.	https://www.geeksforgeeks.org/python-programming-language/	
5.	https://en.wikipedia.org/wiki/Python_(programming_language)	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	14	15	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Semester – I – Core Practical – CC -II

PYTHON PROGRAMMING PRACTICAL

023CSC102P

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC2	Python Programming Practical	Core	-	-	3	-	2	25	75	100
Learning Objectives										
LO1	Be able to design and program Python applications.									
LO2	Be able to create loops and decision statements in Python.									
LO3	Be able to work with functions and pass arguments in Python.									
LO4	Be able to build and package Python modules for reusability.									
LO5	Be able to read and write files in Python.									
PRACTICAL EXERCISES								Required Hours		
1. Program using variables, constants, I/O statements in Python. 2. Program using Operators in Python. 3. Program using Conditional Statements. 4. Program using Loops. 5. Program using Jump Statements. 6. Program using Functions. 7. Program using Recursion. 8. Program using Arrays. 9. Program using Strings. 10. Program using Modules. 11. Program using Lists. 12. Program using Tuples. 13. Program using Dictionaries. 14. Program for File Handling.								60		

Course Outcomes	
On completion of this course, students will	
CO1	Demonstrate the understanding of syntax and semantics of PYTHON language
CO2	Identify the problem and solve using PYTHON programming techniques.
CO3	Identify suitable programming constructs for problem solving.
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.
CO5	Develop a PYTHON program for a given problem and test for its correctness.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1



விழுமிய கல்வி (VALUE EDUCATION)

Theory Hours	: 2	Course Code:	U231VE
Practical Hours	: -	Credits	: 2
Exam Hours	: 3	Marks	: CIA ESE
			25 75

Unit I – முன்னுரை : விழுமியக் கல்வி

- 1) வாழ்வியல் விழுமியங்கள்
- 2) விழுமியங்களின் வகைகள்
- 3) வாழ்வியல் விழுமியங்களை பாதிக்கும் காரணிகள்
- 4) விழுமியக் கல்வியின் அவசியம்

Unit II – நன்னடத்தைகள்

- 1) பெற்றோரை மதித்தல்
- 2) ஆசிரியரை மதித்தல்
- 3) இறை வழிபாடு
- 4) சுயமதிப்பு

Unit III – சமூகம் சார்ந்த மதிப்புகள்

- 1) ஒற்றுமை
- 2) சமத்துவம், சகோதரத்துவம்
- 3) குடும்பம்
- 4) குடிமக்களின் கடமைகள், தேசபக்தி

Unit IV – உடல் நலம் & மன வளம்

- 1) உணவு ஒழுக்கம்
- 2) தனி மனித சுகாதாரம்
- 3) மகளிர் ஆரோக்கியம்
- 4) எண்ணங்களின் வலிமை

Unit V – சிகேடுகளும், சீதிரூத்தங்கள்

சிகேடுகள் :

- 1) வாழ்க்கை விழுமியங்கள் மற்றும் அறங்களில் உலகமயமாதலின் பாதிப்பு
- 2) ஊடகங்களின் பாதிப்பு

சீதிரூத்தங்கள் :

- 1) மனக்கட்டுப்பாடு, விருப்பங்களை நெறிப்படுத்துதல்
- 2) உடற்பயிற்சி, தியானம், யோகா.

Question Paper Pattern

Section A - 5 x 15 = 75 (From each Unit from each 2 Question with Either OR type)

PROBLEM SOLVING TECHNIQUES

U23CS1FC

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
FC	Problem Solving Techniques	FC	2	-	-	-	2	2	25	75	100
Learning Objectives											
LO1	Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.										
LO2	Implement different programming constructs and decomposition of problems into functions.										
LO3	Use data flow diagram, Pseudo code to implement solutions.										
LO4	Define and use of arrays with simple applications										
LO5	Understand about operating system and their uses										
UNIT	Contents	No. Of. Hours									
I	Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language. 4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.	6									
II	Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.	6									
III	Selection Structures: Relational and Logical Operators - Selecting from Several Alternatives - Applications of Selection Structures. Repetition Structures: Counter Controlled Loops -Nested Loops- Applications of Repetition Structures.	6									
IV	Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays - Strings as Arrays of Characters.	6									

V	Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters- Scope of a variable - Functions - Recursion. Files: File Basics-Creating and reading a sequential file- Modifying Sequential Files.	6
TOTAL HOURS		30
Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Study the basic knowledge of Computers. Analyze the programming languages.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudocode.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Determine the various operators. Explain about the structures. Illustrate the concept of Loops	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Study about Numeric data and character-based data. Analyze about Arrays.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Explain about DFD. Illustrate program modules. Creating and reading Files	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	Stewart Venit, "Introduction to Programming: Concepts and Design", Fourth Edition, 2010, Dream Tech Publishers.	
Web Resources		
1.	https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm	
2.	http://www.nptel.iitm.ac.in/video.php?subjectId=106102067	
3.	http://utubersity.com/?page_id=876	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	2	3	3	3	3
CO 4	3	3	2	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	14	14	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Semester II – Core Theory– CC - III

DATA STRUCTURES AND ALGORITHMS U23CSc203

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks			
									CIA	External	Total	
CC3	DATA STRUCTURES AND ALGORITHMS	Core	5	-	-	-	5	5	25	75	100	
Learning Objectives												
LO1	To understand the concepts of ADTs											
LO2	To learn linear data structures-lists, stacks, queues											
LO3	To learn Tree structures and application of trees											
LO4	To learn graph structures and application of graphs											
LO5	To understand various sorting and searching											
UNIT	Contents									No. of Hours		
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal									15		
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations- Circular Queue- Priority Queue- deQueue applications of queues.									15		
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.									15		
IV	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.									15		
V	Searching- Linear search -Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing Extendible Hashing									15		
	Total									75		
Course Outcomes								Programme Outcome				
CO	On completion of this course, students will											
CO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation							PO1,PO6				
CO2	Understand basic data structures such as arrays, linked							PO2				

	lists, stacks and queues	
CO3	Describe the hash function and concepts of collision and its resolution methods	PO2,PO4
CO4	Solve problem involving graphs, trees and heaps	PO4,PO6
CO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO5,PO6
Text Book		
1	1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.	
2	Reema Thareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition	
Reference Books		
1.	Thomas H.Cormen, Chales E.Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", McGraw Hill 2009, 3rd Edition.	
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education 2003	
Web Resources		
1.	https://www.programiz.com/dsa	
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	3	3
CO 3	3	3	3	2	3	2
CO 4	3	2	3	2	3	3
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	13	13	15	14

S-Strong-3 M-Medium-2 L-Low-1

Semester II – Core Practical – CC -IV

DATA STRUCTURES AND ALGORITHMS PRACTICAL USING C++

U23CSC204P

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CLAs	External	Total
CC4	DATA STRUCTURES AND ALGORITHMS PRACTICAL USING C++ [Note: Practicals may be offered through C / C++ / Python]	Core	-	-	3	-	2	3	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
SL No	Contents	No. of Hours									
1.	Write a program to implement the List ADT using arrays and linked lists.										
2.	Write a programs to implement the following using a singly linked list. • Stack ADT • Queue ADT										
3.	Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).										
4.	Write a program to implement priority queue ADT.										
5.	Write a program to perform the following operations: • Insert an element into a binary search tree. • Delete an element from a binary search tree. • Search for a key element in a binary search tree.										
6.	Write a program to perform the following operations • Insertion into an AVL-tree • Deletion from an AVL-tree										

7.	Write a programs for the implementation of BFS and DFS for a given graph.	60
8	Write a programs for implementing the following searching methods: • Linear search • Binary search.	
9.	Write a programs for implementing the following sorting methods: • Bubble sort • Selection sort • Insertion sort • Radix sort.	
Total		60
Course Outcomes		Programmem Outcome
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO4,PO5
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO1, PO4,PO6
3	Describe the hash function and concepts of collision and its resolution methods	PO1,PO3,PO6
4	Solve problem involving graphs, trees and heaps	PO3,PO4
5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO1,PO5,PO6
Text Book		
1	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.	
2	ReemaThareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition	
Reference Books		
1	Thomas H.Cormen, Chales E.Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", McGraw Hill 2009, 3rd Edition	
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education 2003	
Web Resources		
1.	https://www.programiz.com/dsa	
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1



Semester – II – Skill Enhancement Course – SEC -1

FUNDAMENTALS OF INFORMATION TECHNOLOGY

023CS2SE1

023CS25E

Subject Code	Subject Name	Category	L	T	P	S	Inst. hours	Credits	Marks		
									CIA	External	Total
SEC3	Fundamentals of Information Technology	SkillEnha. Course (SEC)	2	-	-	-	2	2	25	75	100
Learning Objectives											
LO1	Understand basic concepts and terminology of information technology.										
LO2	Have a basic understanding of personal computers and their operation										
LO3	Be able to identify data storage and its usage										
LO4	Get great knowledge of software and its functionalities										
LO5	Understand about operating system and their uses										
UNIT	Contents									No. Of. Hours	
I	Introduction to Computers: Introduction, Definition, Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer									6	
II	Basic Computer Organization: Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.									6	
III	Storage Fundamentals: Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives									6	
IV	Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w									6	
V	Operating System: Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.									6	
TOTAL HOURS									30		
Course Outcomes									Programme		

		Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop organizational structure using for the devices present currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with different software, Write program in the software and applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	Anoop Mathew, S. Kavitha Murugesan (2009), " Fundamental of Information Technology", Majestic Books.	
2	Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2 nd Edition.	
3	S. K Bansal, "Fundamental of Information Technology".	
Reference Books		
1.	Bhardwaj Sushil Puneet Kumar, "Fundamental of Information Technology"	
2.	GG WILKINSON, "Fundamentals of Information Technology", Wiley-Blackwell	
3.	A Ravichandran , "Fundamentals of Information Technology", Khanna Book Publishing	
Web Resources		
1.	https://testbook.com/learn/computer-fundamentals	
2.	https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html	
3.	https://www.javatpoint.com/computer-fundamentals-tutorial	
4.	https://www.tutorialspoint.com/computer_fundamentals/index.htm	
5.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	2	3
CO 5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	15	14	15	14	14

S-Strong-3 M-Medium-2 L-Low-1

**Semester II- Core Theory- CC-V
PROGRAMMING IN JAVA**

Computer Science UG - 2nd Sem
U23CS2S
U23CSC305

Subject Code U23CS2S EL	Subject Name	Category	L	T	P	S	Inst. hours	Credits	Marks		
									CIA	External	Total
	PROGRAMMING IN JAVA	Core	6	-	-	-	3	5	25	75	100

Contents

UNIT I: Java Evolution: Java History – Java Features – How Java Differs from C and C++ - Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Support Systems – Java Environment.

Overview of Java Language: Introduction – Simple Java Program – More of Java – An Application with Two Classes – Java Program Structure – Java Tokens – Java Statements – Implementing a Java program – Java virtual machine – Command line arguments – Programming Style.

Constants, Variables and Data types: Introduction – Constants – Variables – Data Types – Declaration of Variables – Giving values to variables – Scope of variables – Symbolic Constants – Type casting – Getting values of Variables – Standard default values.

UNIT II: Operators and Expressions: Arithmetic operators – Relational Operators – Logical Operators – Assignment Operators – Increment and decrement operators – Conditional operators – Bitwise Operators – Special operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Type conversion in Expressions – Operator Precedence and Associativity – Mathematical Functions – Decision making and branching – Decision making and Looping.

UNIT III: Classes, Objects and Methods: Defining a class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Methods Overloading – Static members – Nesting of methods. **Inheritance:** Extending a class – Overloading Methods – Final Variables and methods – Final Classes – Finalizer Methods – Abstract methods and classes – Methods with Varargs – Visibility Control – Arrays, Strings and Vectors: Introduction – One Dimensional Arrays – Creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types – Annotations. **Interfaces:** Multiple Inheritance – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface variables.

UNIT IV: Packages: Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing A package – Using a Package – Adding a class to a package – Hiding classes – Static Import. **Multithreaded Programming:** Creating Threads – Extending the Thread class – Stopping and Blocking a Thread – Lifecycle of a Thread – Using Thread Methods – Thread Exception Priority – Synchronization – Implementing the “Runnable” Interface. **Managing Errors and Exceptions:** Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch statements – Using Finally Statement – Throwing Our Own Exceptions – Using Exceptions for Debugging.

UNIT V: Applet Programming: How applets differ from Applications – Preparing to

write applets – Building applet code – Applet life cycle – Creating an Executable applet – designing a web Page – Applet Tag – Adding Applet to HTML File – Running the applet – More about Applet Tag – Passing parameter to applets – Aligning the display – More about HTML tags – Displaying Numerical values – Getting input from the user. **Graphics Programming:** The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control loops in applets – Drawing bar charts. **Managing Input/Output Files in Java:** Concept of Streams – Stream classes – Byte Stream Classes – Character stream classes – using streams – other useful I/O classes – Using the file Class – Input / Output Exceptions – Creation of Files – Reading/Writing characters – Reading/Writing Bytes – Handling primitive data types – Concatenating and Buffering files – Random access files – Interactive input and output – other stream classes.

Text Books:

“Programming with Java” – E. Balagurusamy, Tata McGraw Hill Publishing Company Ltd, 6th Edition

Books for Reference:

Java 2 Complete Reference”, Herbert Schildt, Tata McGraw HILL, 8th Edition.

Web References: <https://javabeginnerstutorial.com/core-java-tutorial/>

<http://docs.oracle.com/javase/tutorial/>

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall the historical development, essential features, and unique characteristics of Java programming.	K1
CO2	Demonstrate proficiency in utilizing foundational Java Programming concepts when composing basic programs.	K2
CO3	Design and implement classes, objects, and methods using principles of object-oriented programming.	K3
CO4	Utilize Java API packages for advanced programming tasks, including multithreading and error handling.	K4
CO5	Develop Java applications, including applets and graphical user interfaces, while efficiently managing input/output operations.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	1	2	1	1	2
CO2	3	2	2	1	1	2	2
CO3	4	4	4	2	1	2	2
CO4	4	2	4	2	1	2	4
CO5	4	2	4	2	2	2	4
Weighted % of course contribution to each PSO							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)

[Signature]

SEMESTER-III -Core Practical – CC -VI
PROGRAMMING IN JAVA PRACTICAL

USC 306P
U23CSC306P

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC204 P											
CC4	PROGRAMMING IN JAVA PRACTICAL	Core	-	-	3	-	2	3	40	60	100

Course Contents

LIST OF PROGRAMS :

1. Write a java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
2. Write a Java program to add two given matrices.
3. Write a Java program to multiply two given matrices.
4. Write a Java program that displays the number of characters, lines and words in a text.
5. Write a Java program to perform the following string operations using String class:
 - a. String Concatenation
 - b. Search a substring
 - c. Concatenating two Strings.
6. Write a Java program to perform the following string operations using StringBuffer class:
 - a. Length of a String
 - b. Reverse a String
 - c. Delete a substring from the given string.
7. Write a java program for method overloading and constructor overloading.
8. Write a java program for method overriding.
9. Write a java program to implement Interfaces using extends keyword.
10. Write a program for Vector manipulation
11. Write a java program to create user defined packages.
12. Write a java program that implements a multi-thread application that has three threads.
13. Write a java program for creating multiple catch blocks.
14. Write a java program to demonstrate the use of following exceptions.
 - a. Arithmetic Exception
 - b. Number Format Exception
 - c. Array Index Out of Bound Exception
 - d. Negative Array Size Exception.
15. Write a java program for User Defined Exceptions
16. Write a java program to Copy, Display, Counting characters, words and lines from Text files.
17. Write a java program to create and processing in DataFiles.

18. Applet: a. Write an applet program that displays a simple message.
- b. Write a java program compute factorial value using Applet.
19. Write a java program for passing parameters using Applet.
20. Write a javaProgram for drawing Lines, Rectangle, Oval, StringusingApplet.

Reference Books

1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
2.	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.
3.	Head First Java, O'Reilly Publications,
4.	Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.

Web References

1.	https://www.w3schools.com/java/
2.	http://java.sun.com

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand and apply basic Java programming concepts, such as input/output operations and loop structures, to solve computational problems.	K1
CO2	Demonstrate proficiency in object-oriented programming principles by designing and implementing Java classes, methods, and objects to create modular and efficient programs.	K2
CO3	Apply the functionalities of the String and String Buffer classes to execute a range of string operations, such as concatenation, substring search, and manipulation.	K3
CO4	Analyze the effective management of various exception types, such as arithmetic, number format, array index out of bounds, and user-defined exceptions, to guarantee robustness and reliability within Java programs.	K4
CO5	Develop Java applications that involve advanced concepts such as matrix operations, multi-threading, file handling, and applet programming to solve real-world problems efficiently.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	2	2
CO2	4	4	4	2	1	2	2
CO3	2	2	2	1	1	1	1
CO4	3	2	3	1	1	2	2
CO5	4	2	4	2	2	2	4
Weighted% of course contribution to each PSO							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

[Signature]

SEMESTER-III - SKILL ENHANCEMENT COURSE - U23FP
FUNDAMENTALS OF PHOTOSHOP U23CS2FP

Subject Code U23CS2FP	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	FUNDAMENTALS OF PHOTOSHOP	Core	1	-	-	-	1	3	25	75	100

Course Contents

Unit I: Basic of Photoshop

Photoshop: Introduction, Photoshop Program Window- Creating a New File, Saving a File. Working with Image: Image Size, Image Resolution, Editing Images, Make use of Color Mode, Setting the Current Foreground and Background Colors.

Unit II: Making and Selection

Making and Selections: Making Selection - Moving Portion of an Image - Summarize the Transforming Selections

Unit III: Painting and Drawing Tools

Painting and Drawing Tools: The Painting Tools- The Brush Tool, The Pencil Tool, The Color Replacement Tool, The History Brush Tool, The Art History Brush Tool, The Gradient Tool. The Drawing Tools - The Rectangle Tool, The Custom Shape Tool, The Freeform Pen Tool.

Unit IV: Layers

Layers: Layers Palette - Working with Layers - New Layer via Cut - New Layer via Copy - Hiding / Showing Layers - Flattening Images- Working with Adjustment Layers - Layer Effects.

Unit V: Filters

Filters : The Filter Menu - Filter Gallery - Extract Filter - Liquify Filter - Vanishing Point Filter - Artistic Filters - Blur Filters - Brush Stroke Filters - Distort Filters - Noise Filters - Pixelate Filters - Lighting Effects - Difference Clouds - Sharpen Filters - Sketch Filters - Stylize Filters - Other Filters.

Recommended Texts:

1. Comdex DTP Course Kit by Vikas Gupta Published by Dream Tek Press
2. Adobe Photoshop CC Bible, First Edition, by Lisa DaNaeDayley and Brad Dayley, Wiley Publications.

Reference Book:

1. "Adobe Photoshop" CS by Bakkianathan
2. Adobe Photoshop Class Room in a Book, Adobe Creative Team.

Web Resources:

1. <https://testbook.com/learn/computer-fundamentals>
2. <https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html>
3. <https://www.javatpoint.com/computer-fundamentals-tutorial>
4. https://www.tutorialspoint.com/computer_fundamentals/index.htm
5. <https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf>

Note: Latest edition of the books may be used.

Course Outcomes : On completion of the course, students will be able to:

CO1	Gain knowledge about basic function of Adobe Photoshop Applications.	K1
CO2	Summarize the concept of image transformation and make various color corrections	K2
CO3	The student is able to organize and edit photo albums	K3
CO4	Discover and design Banners and visiting cards etc.	K4
CO5	Build new layers; perform other basic layer functions and usage of filters	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	2	1	2	3
CO2	4	3	4	2	1	3	3
CO3	3	3	3	2	1	3	3
CO4	4	3	4	2	2	3	3
CO5	4	3	4	3	2	3	4
Weightage							
Weighted% of course contribution to PoS							

Very Strong- 4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A

1 question (a & b) from each unit(5x15=75)



**SEMESTER-IV - CORE COURSE : CC-VII
MICROPROCESSOR AND ITS APPLICATIONS**

Subject Code U23C SC204 P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC7	MICROPROCESSOR AND ITS APPLICATIONS	Core	5	-	-	-	5	3	25	75	100

Course Contents

UNIT I : Evolution of Microprocessor-Architecture of 8085-8085 Pin Details-Instruction Format-8085 Addressing Modes-Timing Diagrams Of 8085-Opcode fetch, memory read, memory write I/O read and I/O write.

UNIT II: Instruction Set of 8085-Interrupts In 8085 Microprocessor-8085 Microprocessor Based System Design-Peripheral Device And Interfacing-Address Space partitioning-Memory and I/O Interfacing-Microprocessor sample programs-BCD Arithmetic-BCD addition and Subtraction-Multibyte addition and Subtraction.

UNIT III: Register Organization of 8086-Architecture of 8086-Signal Descriptions of 8086-Physical Memory Organization-Addressing mode of 8086-8086 Programs-Addition, Subtraction-Programming with an assembler-Entering, Assembling, Linking and Using Debug.

UNIT IV: Basic Peripherals and their Interfacing with 8086: Interfacing I/O Ports-Steps and Methods Of Interfacing I/O Device-Multiplexed 7-seg Displays-Programmable Input-Output Port(8255)-Modes of Operation of 8255-BSR Mode and I/O Mode.

UNIT V: Microprocessor Applications: Application Area of Microprocessors, Real Life Applications of Microcontroller, Exploring the Pentium series of microprocessors. Future trends and potential Developments in Microprocessor Technology.

Text Books:

1. Unit 1&2-B.Ram, "Fundamentals of Microprocessors and MicroComputers", Seventh Revised Edition, Dhanpat Rai Publications, New Delhi.
2. Unit 3&4-A.K.Ray and K.M.Bhurchandi – "Advanced Microprocessors & Peripherals" 3rd Edition, Tata McGraw Hill, New Delhi.
3. Unit 5- N.SenthilKumar, Saravanan, S.Jeevananthan – "Microprocessors and Microcontrollers", 2nd Edition, Oxford University Press.

Books for Reference:

1. Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.
2. Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.
3. Barry B.Brey-"The Intel Microprocessors": 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-Bit Extensions, Architecture, Programming, and Interfacing, Eighth Edition, 2009.

Web References :

1. <https://nptel.ac.in/courses/117104072>
2. https://www.geeksforgeeks.org/application-area-of-microprocessors/?ref=ml_lbp
3. https://www.geeksforgeeks.org/real-life-applications-of-microcontroller/?ref=ml_lbp
4. <https://www.techtarget.com/whatis/definition/Pentium>
5. <https://pcsite.medium.com/what-are-the-future-trends-and-potential-developments-in-microprocessor-technology-99392fa9f6e2>

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall the evolution and Architecture of Microprocessor 8085.	K1
CO2	Demonstrate the 8085 instruction set and their classifications, which enables the students to write the programs easily on their own using different logic.	K2
CO3	Able to describe the register Architecture of 8086. Students can apply their programming skills on assembly language.	K3
CO4	Explore how peripheral devices are connected to 8085 using PIO and PIT Interfaces.	K4
CO5	Develop skills in real time applications using Microprocessor.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)

[Signature]

U23CSC408P
U8C408P

**SEMESTER – IV- CORE COURSE : CC-VIII
MICROPROCESSOR PRACTICAL**

Subject Code U23C SC204 P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC8	MICROPROCESSOR PRACTICAL	Core	-	-	3	-	3	3	40	60	100

LIST OF PROGRAMS :

I. Addition and Subtraction

1. 8 - bit addition
2. 16 - bit addition
3. 8 - bit subtraction
4. BCD subtraction

II. Multiplication and Division

1. 8 - bit multiplication
2. BCD multiplication
3. 8 - bit division

III. Sorting and Searching

1. Searching for an element in an array.
2. Sorting in Ascending and Descending order.
3. Finding the largest and smallest elements in an array.
4. Reversing array elements.
5. Block move.

IV. Code Conversion

1. BCD to Hex and Hex to BCD
2. Binary to ASCII and ASCII to Binary.

Books for Reference:

1. B. Ram, "Fundamentals of Microprocessors and Microcomputers", Seventh Revised Edition, Dhanpat Rai Publications, New Delhi.
2. Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.
3. Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.

Web References:

1. <https://www.javatpoint.com/programming-in-8085>
2. <https://teachics.org/microprocessors/simple-programs-for-8085-microprocessor/>

Course Outcomes : On completion of the course, students will be able to:

CO1	Gain the Basic binary codes and their conversions, which are used in Microprocessor programming to provide a good understanding of the architecture of 8085.	K1
CO2	Illustrate the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	K2
CO3	Identify the different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	K3
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	K4
CO5	Develop the real time applications using microprocessor.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	3	-	3	2	-
CO2	4	3	4	-	3	1	1
CO3	3	3	2	-	2	1	1
CO4	4	4	3	-	2	1	1
CO5	2	3	3	3	1	2	-
Weighted% of course contribution to each PSO							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

[Signature]

SEMESTER-IV- INTERDISCIPLINARY SKILL ENHANCEMENT
COURSE-I

1. GRAPHICS AND ANIMATION

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	GRAPHICS AND ANIMATION	Core	2	-	-	-	1	3	25	75	100

Course Contents

UNIT I : Introduction

HTML Coding – Basic Web Graphics – Web Page Design – Site building – Image Maps – Adding Multimedia to the Web.

UNIT II : Photoshop

Introduction – Image Basics – File Formats – GIF – JPEG – Color Palette – Layers – Creating new Images – Brushes – Grids – Scaling Images – Moving and Merging layer – Tool Palette – Screen Capturing – Gray – Using Style Palette – Animation.

UNIT III : Image Handling

Scanning images – adding text to the images – Designing icons – Creating background images – Color models – Color Depths – Color Calibration – Creating Gradients – Oil paint effect.

UNIT IV: Multimedia

Creating Clipping- Animation with sound effect – audio or video – Window's Media Player ActiveX control – Embedding VRML in a web page – Real player ActiveX control.

UNIT V : Applications

Creating website with a particular theme - Graphics – Animations and Interactions.

Books for reference:

1. Photoshop 6 Visual jump start, Adobe +2000 – Richard Schrand. (I, II & III Units)
2. Flash 5.0 graphics, Animation and Interaction, Macromedia 2000 – James L. Mohles. (IV and V Units)

Web References :

www.adobe.com
<https://www.geeksforgeeks.org/what-is-multimedia/>

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall the basic concepts of web graphics and basic HTML tags to design a website.	K1
CO2	Illustrate the built in tools of Photoshop.	K2
CO3	Apply and adding multimedia to the web page.	K3
CO4	Analyze the basic tools of Photoshop.	K4
CO5	Evaluate and compile the knowledge to handle images in an effective manner.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							
Very Strong-4	Strong-3	Medium-2	Low-1				

Question Pattern:

Section A

1 question (a & b) from each unit (5x15=75)

[Signature]

**SEMESTER-IV -INTERDISCIPLINARY SKILL ENHANCEMENT
COURSE-I**

2. CYBER SECURITY

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC2 04P											
	CYBER SECURITY	Core	2	-	-	-	1	3	25	75	100

Course Contents

UNIT I :

Cyber security basics-Steps to Improve Computer Security-Stay safe from spyware threats with a specialized security solution-Keeping Windows operating system and vulnerable applications up to date Use a standard user account in Windows operating system to go online-UAC- Going online with a secure browser-About trust public and free Wi-fi networks-log out- posting private information on your social media accounts-accessing Questionable web locations

UNIT II :

Internet Security Myths-Internet Security Myths That You Need To Forget-Master basic security terms: Essential cyber security terms-Antispyware Software-Antivirus Software-Cyber-Attack-Drivebydownload-Exploit - Keylogging - Malvertising - Malware - Patching - Phishing - Ransomware-Social engineering - Spam-Trojan-URL or web content filtering - Virus - Vulnerability - Zero-Day virus.

UNIT III :

Mastering password security: The 7 Deadly Sins of Password Management- creating a good password in easy steps-safely store your passwords-Next-generation anti-hacking tools-Steps to Bulletproof Your Digital Security.

UNIT IV :

Guidelines for safe internet browsing-safe browsing-tips for buying online-clearing cache for browsers: Clearing cache for Chrome Browsers above version 10-9.3.2 Clearing cache for Chrome Browsers from version 1 to 9-Clearing cache for Safari for iOS, iPhone and iPad-Clearing cache for Safari for Mac OS x-Clearing cache for Safari for windows.

UNIT V :

Wireless security: What is Wireless LAN?- major issues with WLAN-Email and social media security : Safe browsing guidelines for social

networking sites.

REFERENCES :

1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf (Unit I, II, III)
2. <http://www.uou.ac.in/sites/default/files/slm/FCS.pdf> (Unit-IV, V)

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall basics of cyber security and Wi-Fi measures	K1
CO2	Infer and interpret the knowledge about internet security myths	K2
CO3	Apply the password management techniques and protect the passwords	K3
CO4	Learn and analyze the concept of safe internet browsing with different kinds of browsers	K4
CO5	Adapt the knowledge about wireless LAN, Email and social media security.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO 7
CO1	4	3	1	-	1	-	3
CO2	4	3	2	-	1	-	3
CO3	4	2	2	1	1	-	3
CO4	4	3	2	1	1	2	2
CO5	4	3	3	2	2	1	2
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3

Medium-2

Low-1

Question Pattern:

Section A

1 (a & b) question from each unit (5x15=75)

**SEMESTER - IV - INTERDISCIPLINARY SKILL ENHANCEMENT
COURSE-I**

3. E-COMMERCE

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC2 04P	E-COMMERCE	Core	2	-	-	-	1	3	25	75	100

Course Contents

Unit I

Introduction to Electronic Commerce : What is Electronic Commerce ? – Benefits of Electronic Commerce – Impact of Electronic Commerce – Applications of Electronic Commerce Technologies

Unit II

E-Commerce in India – E- Commerce in banking – Electronic Payments – Online Business

Unit III

Electronic Credit Cards - Electronic Data Interchange(EDI) – Supply Chain Management – Payment Security – Computer Crimes

Unit IV

Electronic Commerce: Search Engines and Directory Services – Internet Advertising

Unit V

Cyber Laws : Privacy protection Act – Electronic Communication Privacy Act - Electronic Communication Service –Digital Signature method of the Recognition – Keypair method of Recognition – Arrest without warrant – Recognition of Electronic records – Indian IT Acts – USA Privacy Policy – Taxation of E-Commerce – Information Technology Act -2000 – Information Technology Security guidelines – Information Technology Acts – 2003

Text Books :

1. Electronic Commerce – Bharat Bhaskar – The MCGrawhill Second edition. (Unit I & IV)
2. Internet & E-Commerce – C. NellaiKannan (Units – II, III & V).

Reference Book :

Introduction to E- Commerce – Martin Katz.

WEB REFERENCES :

1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf (Unit I, II, III)
2. <http://www.uou.ac.in/sites/default/files/slm/FCS.pdf> (Unit IV, UNIT V).

Course Outcomes : On completion of the course, students will be able to:

CO1	Gain the basic idea of E-Commerce - benefits and applications	K1
CO2	Understand the uses of E-Commerce in banking and how to do online business	K2
CO3	Identify and how to pay online in securely and to get knowledge about computer crimes	K3
CO4	Analyze the search engines used in E-Commerce and how to advertise in Internet	K4
CO5	Elaborate the knowledge of cyber laws regarding E-Commerce	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	1	1	2	1	2
CO2	3	2	2	2	2	2	3
CO3	3	3	3	2	2	2	3
CO4	3	2	3	2	2	2	3
CO5	2	3	2	2	2	1	2
Weightage							
Weighted% of course contribution to PoS							

Very Strong=4 Strong-3

Medium-2

Low-1

Question Pattern:

Section A

1 question (a & b) from each unit (5x15=75)

[Signature]

**SEMESTER – III -SKILL COURSE
MULTIMEDIA SYSTEMS(VAD)**

US 3 MS

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC204P	MULTIMEDIA SYSTEMS	Core	2	-	-	-	2	3	25	75	100

Course Contents

UNIT I : MULTIMEDIA

Definition and Introduction to Multimedia – Introduction to Making Multimedia: Needs of Multimedia - TEXT: The power of meaning – About fonts and faces – Using text in multimedia – Computers and Text – Hypermedia and Hypertext.

UNIT II : BASIC SOFTWARE TOOLS

Text editing and Word Processing Tools – OCR Software - Painting and Drawing tools – 3 D Modeling and Animation tools – Image editing tools Sound Editing Tools – Animation, Video & Digital Movie Tools. Multimedia Authoring Tools : Card - and – Page – Based Authoring tools – Icon and Object Based Authoring Tools – Time Based Authoring tools. Tools for World Wide Web : Web Servers, Web Browser, Search Engine.

UNIT III : ANIMATION : The Power of Motion – Principles of Animation – Making animations that works. **SOUND:** The power of sound – Multimedia system sounds – MIDI versus Digital Audio – Digital Audio – Making MIDI audio – Audio, File formats – Adding sound to your Multimedia project

UNIT IV : VIDEO: Using Video – Working of Video – Broadcast video standards – Integrating computers and television – Shooting and Editing Video – Video tips – Recording formats – Digital Video.

UNIT V : Planning and Costing : Process of Making Multimedia – Scheduling – Estimating – RFP's AND Bid Proposals.

Text Books:

1.Tay Vaughnan, “Multimedia: Making it work” 7th Edition, Tata McGraw - Hill 2001

Books for reference:

Jeffcoate, Judith – “Multimedia in Practice” - Prentice Hall, 2001.

Web References :

<https://www.geeksforgeeks.org/what-is-multimedia/>
https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Recall the basic need and ways of using multimedia.	K1
CO2	Infer the technical aspects of multimedia systems.	K2
CO3	Utilize the knowledge about animation and sounds.	K3
CO4	Analyze the modeling of video and its standards.	K4
CO5	Adapt the multimedia project planning and Costing.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

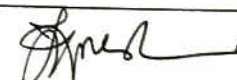
CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	1	2
CO2	4	3	3	1	1	-	2
CO3	4	3	-	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	-	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong=3 Medium-2 Low-1

Question Pattern:

Section A

1 question (a & b) from each unit (5x15=75)



U23CS408P

**SEMESTER – IV - SKILL COURSE
OPEN SOURCE PRACTICAL (VAD)**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC204P	OPEN SOURCE PRACTICAL (VAD)	Core	2	-	-	-	2	3	25	75	100

Course Contents

LIST OF PROGRAMS :

I. PHP- HTML

- 1) Write a PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

II. PHP with Database

- 2) Write a PHP program to access the data stored in a MY SQL table.
- 3) a) Write a PHP program interface to create a database and to insert a table into it.
b) Write a PHP program using classes to create a table.

III. Shell program

- 4) Write a shell program to find the details of a user session.
- 5) Write a shell program to change the extension of a given file.
- 6) Check whether the given number is prime or not.

IV. Shell program using functions

- 7) Find the biggest of given two numbers.
- 8) Write a program to check the given number is odd or even.
- 9) Write a program to generate Fibonacci Series.

V. MY SQL LAB

- 10) Create a MySQL table and write queries to add, insert, delete and modify the data.
- 11) Consider the following relations:

STUDENT (snum: integer, sname: string, major: string, level: string, age: integer)

CLASS (name: string, meets at: string, room: string, d: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries. No duplicates should be printed in any of the answers.

- i. Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof.Anand.
- ii. Find the names of all classes that either meet in room R18 or have five or more Students enrolled.
- iii. Find the names of all students who are enrolled in two classes that meet at the same time.
- iv. Find the names of faculty members who teach in every room in which some class is taught.

- v. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

Books for Reference :

1. Open Source Technology Paperback-1 January 2009 by Kailash Vadera (Author), Bhavyesh Gandhi
2. Gary Cornell, *Core Java 2 Volume 1 – Fundamentals*, Addison Wesley, 1999.
3. Open Source Technology Hardcover – 1 June 2016 by Kailash Vadera (Author), Bhavyesh Gandhi (Author) Open Source Technologies For Mumbai University B.SC Computer by Sandeep Kamble (Author), Ganesh Bhagwat (Author)

Web References

1. https://www.w3schools.com/php/php_syntax.asp
2. <https://www.geeksforgeeks.org/how-to-use-php-in-html/>
3. <https://www.cloudways.com/blog/connect-mysql-with-php/>
4. https://www.tutorialspoint.com/unix/shell_scripting.htm
5. <https://downloads.mysql.com/docs/mysql-tutorial-excerpt-5.7-en.pdf>

Course Outcomes : On completion of the course, students will be able to:

CO1	Show a PHP program that displays marks, total, and grade of a student in tabular format by accepting user inputs for name, number, and marks from a HTML form	K1
CO2	Demonstrate a PHP program to access the data stored in a MySQL table, explain a PHP program interface for creating a database and inserting a table into it, and illustrate a PHP program using classes to create a table.	K2
CO3	Apply a shell program to find the details of a user session, utilize another shell program to change the extension of a given file, and solve the problem of determining whether the given number is prime or not	K3
CO4	Determine the largest of two given numbers, judge whether a given number is odd or even, and generate the Fibonacci Series using a program	K4
CO5	Construct a MySQL table and devise queries to add, insert, delete, and modify the data.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	2	2
CO2	4	3	3	3	1	2	3
CO3	3	2	4	2	1	2	3
CO4	2	2	3	1	1	2	2
CO5	4	3	3	3	1	2	3
Weighted% of course contribution to each PSO							

Very Strong-4 Strong=3

Medium-2

Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External – 60

**SEMESTER – IV - SKILL COURSE
WEB DEVELOPMENT (VAD)**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
U23CSC204P	WEB DEVELOPMENT(VAD)	Core	2	-	-	-	2	3	25	75	100

Course Contents

UNIT I: HTML

Introduction – tag Basics – Page structure – adding comments working with texts, paragraphs and line break. Emphasizing test – heading and horizontal rules – list – font size, color- alignment links – tables – frames.

GRAPHICS: Introduction – web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, list box, combo box text area tools for building web page.

UNIT II: XML&DHTML

Cascading style sheet (CSS) – What is CSS – why we use CSS – adding CSS to your web pages – Grouping styles – extensible markup language (XML)

UNIT III: Dynamic HTML

Document object model (DCOM) – Accessing HTML & CSS through DCOM Dynamic content styles & positioning Event bubbling – data binding.

UNIT IV: WWW and Web Browsers

World Wide Web- Web Browsing Software's- Search Engines- Understanding URL- Domain name - IP Address- Using E -Governance Website.

UNIT V: Communication and Collaboration

Basics of Electronic Mail- Getting an Email Account- Sending and Receiving Emails- Accessing Sent Emails- Using Emails-Document Collaboration- Instant Messaging-Netiquettes.

Text Book :

1. Pankaj Sharma, "Web Technology", SK Kataria & Sons Bangalore 2011.
2. Achyut S Godbole & Atulkahate, "Web Technologies", 2002, 2nd Edition.

Reference Book :

1. Internet Basics E Douglas Commer PHI.
2. Mastering HTML BPB Publications.

Web Resources :

<https://www.geeksforgeeks.org/difference-between-html-xhtml-dhtml/>
https://www.tutorialspoint.com/computer_concepts/computer_concepts_introduction_to_internet_web_browsers.htm

Course Outcomes : On completion of the course, students will be able to:

CO1	Gain the working knowledge of HTML.	K1
CO2	Illustrate the developed and published web pages using HTML.	K2
CO3	Apply CSS to optimize page styles and layout.	K3
CO4	Analyze the fundamentals of internet and list the principles of web design.	K4
CO5	Adapt the usage of Internet concepts and evaluate its components.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	2	1	1	2	2
CO2	4	3	2	1	1	2	-
CO3	3	3	2	1	1	2	2
CO4	4	2	3	-	-	2	2
CO5	3	2	3	-	3	-	2
Weightage							
Weighted% of course contribution to PoS							

Very strong – 4

Strong-3

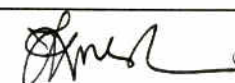
Medium-2

Low-1

Question Pattern:

Section A

1 (a & b) question from each unit (5x15=75)



**SEMESTER - V - CORE COURSE : CC-IX
OPERATING SYSTEMS**

U23CSC509

Subject Code U23CSC 204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC9	OPERATING SYSTEMS	Core	6	-	-	-	5	3	25	75	100

Course Contents

UNIT I : Introduction: Operating system, history (1990s to 2000 and beyond), distributed computing, parallel computation.

Process concepts: Definition of process, process states-Life cycle of a process, process management- process state transitions, process control block(PCB), process operations , suspend and resume, context switching, Interrupts -Interrupt processing, interrupt classes, Inter process communication-signals, message passing.

UNIT II : Asynchronous concurrent processes: Mutual exclusion- critical section, mutual exclusion primitives, implementing mutual exclusion primitives. Semaphores – Mutual exclusion with Semaphores, thread synchronization with semaphores, counting semaphores, implementing semaphores. **Deadlock and indefinite postponement:** Resource concepts, four necessary conditions for deadlock, deadlock prevention, deadlock avoidance and Dijkstra's Banker's algorithm, deadlock detection, deadlock recovery.

UNIT III: Real Memory organization and Management::Memory organization, Memory management, Memory hierarchy, Memory management strategies, contiguous vs non-contiguous memory allocation, single user contiguous memory allocation, fixed partition multiprogramming, variable partition multiprogramming, Memory swapping.

Virtual Memory organization: Virtual memory basic concepts, multilevel storage organization, block mapping, paging basic concepts, segmentation, paging/segmentation systems. **Virtual Memory Management:** Demand Paging, Page replacement strategies.

UNIT IV: Job and processor scheduling: Scheduling levels, scheduling objectives, scheduling criteria, preemptive vs non-preemptive scheduling, interval timer or interrupting clock, priorities, scheduling algorithms- FIFO scheduling, RR scheduling, quantum size, SJF scheduling, SRT scheduling, HRN scheduling, multilevel feedback queues, Fair share scheduling

UNIT V: Disk Scheduling and File Management: Introduction -Evolution of Secondary Storage-Disk Scheduling Strategies-File & Database System : Data Hierarchy – Files-File systems-File Organization-File Allocation.

Learning Resources:

- **Recommended Texts**
 1. H.M. Deitel, Operating Systems, Third Edition, Pearson Education Asia, 2011
- **Reference Books**
 1. William Stallings, Operating System: Internals and Design Principles, Seventh Edition, Prentice-Hall of India, 2012.
 2. A. Silberschatz, and P.B. Galvin., Operating Systems Concepts, Ninth Edition, John Wiley & Sons(ASIA) Pte Ltd.,2012,

Course Outcomes : On completion of the course, students will be able to:

CO1	Define the fundamentals of OS and identify the concepts relevant to process, process life cycle, Scheduling Algorithms, Deadlock and Memory management	K1
CO2	Know the critical analysis of process involving various algorithms, an exposure to threads and semaphores	K2
CO3	Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock.	K3
CO4	Have complete knowledge of Scheduling Algorithms and its types.	K4
CO5	Understand memory organization and management.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit



SEMESTER - V - CORE COURSE : CC-X
DATABASE MANAGEMENT SYSTEM U23CSC2510

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC10	DATABASE MANAGEMENT SYSTEM	Core	5	-	-	-	5	3	25	75	100

Course Contents

UNIT I : Database Concepts: Database Systems - Data vs Information - Introducing the database -File system - Problems with file system - Database systems. Data models - Importance - Basic Building Blocks - Business rules - Evolution of Data models - Degrees of Data Abstraction.

UNIT II : Design Concepts: Relational database model - logical view of data- keys -Integrity rules - relational set operators - data dictionary and the system catalog - relationships -data redundancy revisited -indexes - codd's rules. Entity relationship model - ER diagram

UNIT III: Normalization of Database Tables: Database tables and Normalization - The Need for Normalization -The Normalization Process - Higher level Normal Form.

Introduction to SQL: Data Definition Commands - Data Manipulation Commands - SELECT Queries - Additional Data Definition Commands - Additional SELECT Query Keywords - Joining Database Tables.

UNIT IV: Advanced SQL: Relational SET Operators: UNION - UNION ALL - INTERSECT - MINUS.SQL Join Operators: Cross Join - Natural Join - Join USING Clause - JOIN ON Clause - Outer Join.**Sub Queries and Correlated Queries:** WHERE - IN - HAVING - ANY and ALL - FROM. SQL Functions: Date and Time Function - Numeric Function - String Function - Conversion Function

UNIT V: PL/SQL:A Programming Language: History - Fundamentals - Block Structure - Comments - Data Types - Other Data Types - Variable Declaration - Assignment operation -Arithmetic operators. **Control Structures and Embedded SQL:** Control Structures - Nested Blocks - SQL in PL/SQL - Data Manipulation - Transaction Control statements. **PL/SQL Cursors and Exceptions:** Cursors - Implicit Cursors, Explicit Cursors and Attributes - Cursor FOR loops - SELECT...FOR UPDATE -. WHERE 'CURRENT OF clause - Cursor with Parameters - Cursor Variables - Exceptions - Types of Exceptions.

Learning Resources:

Recommended Texts

1. Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition.
2. Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016

Reference Books

1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", McGraw Hill International Publication, VI Edition.
2. Shio Kumar Singh, "Database Systems", Pearson Publications, II Edition

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	K1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	K2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML).	K3
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	K4
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO 5	PSO 6	PSO 7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

**SEMESTER – V- CORE COURSE : CC-XI
DATABASE MANAGEMENT SYSTEM PRACTICAL**

023CSC511P

Subject Code U23C SC204 P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC11	DATABASE MANAGEMENT SYSTEM PRACTICAL	Core	-	-	6	-	3	3	40	60	100

Course Contents

LIST OF PROGRAMS :

I. SQL

- DDL COMMANDS
- DML COMMANDS
- TCL COMMANDS
- ASCENDING AND DESCENDING ORDER
- AGGREGATE FUNCTION
- SET OPERATIONS
- JOIN OPERATIONS

II. PL/SQL

- FIBONACCI SERIES
- FACTORIAL
- STRING REVERSE
- SUM OF SERIES
- TRIGGER

III. CURSOR

- STUDENT MARK ANALYSIS USING CURSOR

IV. APPLICATION

- LIBRARY MANAGEMENT SYSTEM
- STUDENT MARK ANALYSIS

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	K1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	K2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML).	K3
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	K4
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	3	-	3	2	-
CO2	4	3	4	-	3	1	1
CO3	3	3	2	-	2	1	1
CO4	4	4	3	-	2	1	1
CO5	2	3	3	3	1	2	-
Weighted% of course contribution to each PSO							

Very Strong-4

Strong-3

Medium-2

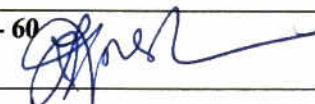
Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60



SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - I

1. CLOUD COMPUTING

U23CSC 204P

Subject Code U23CSC 204P	Subject Name	Category	L	T	P	S	Credits	Inst.	Marks		
									CIA	External	Total
DSE-I	CLOUD COMPUTING	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I : Introduction to Cloud Computing: Definition of Cloud Computing – Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples – Cloud-based Services and Applications.

Cloud Concepts and Technologies: Virtualization – Load balancing - Scalability and Elasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network Function Virtualization – MapReduce – Identity and Access Management – Service Level Agreements – Billing.

UNIT II : Cloud Services Compute Services: Amazon Elastic Computer Cloud - Google Compute Engine - Windows Azure Virtual Machines. **Storage Services:** Amazon Simple Storage Service - Google Cloud Storage - Windows Azure Storage **Database Services:** Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database - Windows Azure Table Service **Application Services:** Application Runtimes and Frameworks - Queuing Services - Email Services - Notification Services - Media Service **Content Delivery Services:** Amazon Cloud Front - Windows Azure Content Delivery Network **Analytics Services:** Amazon Elastic MapReduce - Google MapReduce Service - Google Big Query - Windows Azure HD Insight **Deployment and Management Services:** Amazon Elastic Beanstalk - Amazon Cloud Formation **Identity and Access Management Services:** Amazon Identity and Access Management - Windows Azure Active Directory **Open Source Private Cloud Software:** Cloud Stack – Eucalyptus – OpenStack

UNIT III: Cloud Application Design: Introduction – Design Consideration for Cloud Applications – Scalability – Reliability and Availability – Security – Maintenance and Upgradation – Performance – Reference Architectures for Cloud Applications – Cloud Application Design Methodologies: Service Oriented Architecture (SOA), Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), RESTful Web Services – Data Storage Approaches: Relational Approach (SQL), Non-Relational Approach (NoSQL).

UNIT IV: Cloud Application Benchmarking and Tuning: Introduction to Benchmarking – Steps in Benchmarking – Workload Characteristics – Application Performance Metrics – Design Consideration for Benchmarking Methodology – Benchmarking Tools and Types of Tests – Deployment Prototyping. **Cloud Security:** Introduction – CSA Cloud Security Architecture – Authentication (SSO) – Authorization – Identity and Access Management – Data Security: Securing data at rest, securing data in motion – Key Management – Auditing.

UNIT V: Case Studies: Cloud Computing for Healthcare – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems - Cloud Computing for Manufacturing Industry - Cloud Computing for Education.

Text Book:

1. Arshdeep Bahga, Vijay Madiseti, Cloud Computing – A Hands on Approach, Universities Press (India) Pvt. Ltd., 2018

Books for Reference:

1. Anthony T Velte, Toby J Velte, Robert Elsenpeter, *Cloud Computing: A Practical Approach*, Tata McGraw-Hill, 2013.
2. Barrie Sosinsky, *Cloud Computing Bible*, Wiley India Pvt. Ltd., 2013.
3. David Crookes, *Cloud Computing in Easy Steps*, Tata McGraw Hill, 2012.
4. Dr. Kumar Saurabh, *Cloud Computing*, Wiley India, Second Edition, 2012.

Web References:

1. <https://www.scribd.com/document/583703136/Cloud-Computing-A-Hands-On-Approach-Arshdeep-Bahga-Vijay-Madiseti-Z-lib-org>
2. https://www.lpude.in/SLMs/Master%20of%20Computer%20Applications/Sem_2/DECAP470_CLOUD_COMPUTING.pdf
3. https://photo.lecturer.pens.ac.id/lecture_notes/internet_of_things/CLOUD%20COMPUTING%20Principles%20and%20Paradigms.pdf

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall the basic concepts of web graphics and basic HTML tags to design a website.	K1
CO2	Illustrate the built in tools of Photoshop.	K2
CO3	Apply and adding multimedia to the web page.	K3
CO4	Analyze the basic tools of Photoshop.	K4
CO5	Evaluate and compile the knowledge to handle images in an effective manner.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit(10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit	

[Signature]

SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - I
2. WEB DEVELOPMENT(DSE) *U23CSGF5:2*

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-I	WEB DEVELOPMENT (DSE)	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I :HTML : Introduction – tag Basics – Page structure – adding comments working with texts, paragraphs and line break. Emphasizing test – heading and horizontal rules – list – font size, color- alignment links – tables – frames.

GRAPHICS: Introduction – web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, list box, combo box text area tools for building web page.

UNIT II : XML & DHTML : Cascading style sheet (CSS) – What is CSS – why we use CSS – adding CSS to your web pages – Grouping styles – extensible markup language (XML)

UNIT III: Dynamic HTML :Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning Event bubbling – data binding.

UNIT IV: WWW and Web Browsers :World Wide Web- Web Browsing Software's- Search Engines- Understanding URL- Domain name-IP Address- Using E -Governance Website.

UNIT V: Communication and Collaboration : Basics of Electronic Mail- Getting an Email Account- Sending and Receiving Emails- Accessing Sent Emails- Using Emails-Document Collaboration- Instant Messaging- Netiquettes.

Text Book :

1. Pankaj Sharma, "Web Technology", SK Kataria & Sons Bangalore 2011.
2. Achyut S Godbole & Atulkahate, "Web Technologies", 2002, 2nd Edition.

Reference Book :

1. Internet Basics E Douglas Commer PHI.
2. Mastering HTML BPB Publications.

Web Resources :

<https://www.geeksforgeeks.org/difference-between-html-xhtml-dhtml/>
https://www.tutorialspoint.com/computer_concepts/computer_concepts_introduction_to_internet_web_browsers.htm

Course Outcomes : On completion of the course, students will be able to:

CO1	Recall the basic concepts of web graphics and basic HTML tags to design a website.	K1
CO2	Illustrate the built in tools of Photoshop.	K2
CO3	Apply and adding multimedia to the web page.	K3
CO4	Analyze the basic tools of Photoshop.	K4
CO5	Evaluate and compile the knowledge to handle images in an effective manner.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4

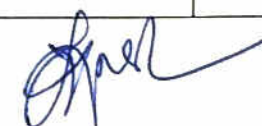
Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit



SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - I
3. INTRODUCTION TO DATA SCIENCE(DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-I	INTRODUCTION TO DATA SCIENCE (DSE)	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I : Introduction:

Benefits and uses – Facets of data – Data science process – Big data ecosystem and data science

UNIT II : The Data science process:

Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building

UNIT III: Algorithms :

Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised - Semi-supervised

UNIT IV: Introduction to Hadoop :

Hadoop framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE – types.

UNIT V: Case Study:

Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation

LearningResources:

RecommendedTexts

Davy Cielen, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”, manning publications 2016

• ReferenceBooks

1. Roger Peng, “The Art of Data Science”, lulu.com 2016.
2. MurtazaHaider, “Getting Started with Data Science – Making Sense of Data with Analytics”, IBM press, E-book.
3. Davy Cielen, Arno D.B. Meysman, Mohamed Ali, “Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools”, Dreamtech Press 2016.

4. Annalyn Ng, Kenneth Soo, “Numsense! Data Science for the Layman: No Math Added”, 2017, 1st Edition.
5. Cathy O'Neil, Rachel Schutt, “Doing Data Science Straight Talk from the Frontline”, O'Reilly Media 2013.
6. Lillian Pierson, “Data Science for Dummies”, 2017 II Edition

Webresources: Web resources from NDL Library, E-content from open-source libraries

Course Outcomes : On completion of the course, students will be able to:

CO1	To describe the key concepts of data science, including its benefits, facets of data, and the overall data science process.	K1
CO2	To apply the data science process by formulating research goals, retrieving and transforming data, performing exploratory data analysis (EDA)	K2
CO3	To differentiate and implement machine learning algorithms	K3
CO4	To understand and utilize Big Data tools and frameworks	K4
CO5	To conduct a complete data science project using a case study	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit	

SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - II

1. BIG DATA ANALYTICS (DSE) U23CS4E 5:4

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-II	BIG DATA ANALYTICS (DSE)	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I : Digital Data : Classification of Digital Data – Introduction to Big Data – Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – What is Big Data? – Other Characteristics of Data which are not Definitional Traits of Big Data – Why Big Data? – Are we just an Information Consumer or Do we also Produce Information? - Traditional Business Intelligence (BI) versus Big Data – A Typical Data Warehouse Environment – A Typical Hadoop Environment – What is New Today? – What is changing in the Realms of Big Data?

UNIT II :Big Data Analytics: What is Big Data Analytics? – What Big Data Analytics Isn't? – Why this Sudden Hype Around Big Data Analytics? – Classification of Analytics – Greatest Challenges that Prevent Businesses from Capitalizing on Big Data –Top Challenges facing Big Data – Why is Big Data Analytics important? – Data Science – Data Scientist – Terminologies used in Big Data Environments – Basically Available Soft State Eventual Consistency(BASE) – Few Top Analytics Tools.

UNIT III: The Big Data Technology Landscape: NoSQL – Where is it Used? – What is it? – Types of NoSQL Databases – Why NoSQL? – Advantages of No SQL – What We miss with No SQL? – Use of NoSQL in Industry – NoSQL Vendors – SQL versus NoSQL – NewSQL – Comparison of SQL, NoSQL and NewSQL - Hadoop – Features of Hadoop – Key Advantages of Hadoop – Versions of Hadoop – Overview of Hadoop Ecosystems – Hadoop Distributions – Hadoop versus SQL – Integrated Hadoop Systems Offered by Leading Market Vendors – Cloud- Based Hadoop Solutions.

UNIT IV:Introduction to Hadoop :Introducing Hadoop - Why Hadoop? – Why not RDBMS? - RDBMS VsHadoop – Distributed Computing Challenges – History of Hadoop – Hadoop Overview – Use Case of Hadoop – Hadoop Distributors – HDFS (Hadoop Distributed File System) – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN – Interacting with Hadoop Ecosystem..

UNIT V: MongoDB : Introduction to MongoDB – What is MongoDB – Why MongoDB – Terms used in RDBMS and MongoDB – Datatypes in MongoDB – MongoDB Query Language – **Introduction to MAPREDUCE Programming :** Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression.**Case Study:** Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation

LearningResources:

• RecommendedTexts

1. SeemaAcharya, SubhashiniChellappan, “Big Data and Analytics”, Wiley India

Pvt. Ltd., 2015.

• ReferenceBooks

1. David Loshin, “Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph”, Morgan Kaufmann/Elsevier Publishers, 2013.
2. EMC Education Services, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley publishers, 2015.

Webresources: Web resources from NDL Library, E-Content from open-source libraries

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the classification of digital data, characteristics of Big Data, and the evolution, definition, and significance of Big Data in modern contexts	K1
CO2	Analyze the key challenges associated with Big Data such as volume, velocity, veracity, and security, and understand how organizations can benefit from Big Data.	K2
CO3	Analyze the types of analytics, identify tools, and the role of data science and the responsibilities of data scientists	K3
CO4	Apply MongoDB queries to manipulate data, understand its data model, and differentiate it from relational models	K4
CO5	Learn the roles of Mapper, Reducer, Combiner, and Partitioner, and apply basic MapReducefunctions for data processing tasks like searching and sorting.	K5 & K6

.Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							
Very Strong-4	Strong-3		Medium-2		Low-1		

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit(10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - II

2. INTERNET OF THINGS (DSE) U23CSGE5:5

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSE-II	INTERNET OF THINGS (DSE)	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I : IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT II : M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT III: IoT Architecture -State of the Art –Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT IV: IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brown field IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

UNIT V: Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

Learning Resources:

Recommended Texts

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things: (A Hands-on Approach)", Universities Press (INDIA) Private Limited 2014, 1st Edition.

Reference Books

1. Michael Miller, "The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World", kindle version.
2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", Apress Publications 2013, 1st Edition,.
3. WaltenegusDargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
4. CunoPfister, "Getting Started with the Internet of Things", O'Reilly Media 2011

Course Outcomes : On completion of the course, students will be able to:

CO1	Use of Devices, Gateways and Data Management in IoT	K1
CO2	Design IoT applications in different domain and be able to analyze their performance	K2
CO3	Implement basic IoT application son embedded platform	K3
CO4	To gain knowledge on Industry Internet of Things	K4
CO5	To Learn about the privacy and Security issues in IoT	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question fromEach unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit	

SEMESTER-V- DISCIPLINE SPECIFIC ELECTIVE – DSE - II
3. BIO INFORMATICS (DSE) U23CS4E5:6

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-II	BIO INFORMATICS (DSE)	Core	4	-	-	-	4	3	25	75	100

Course Contents

UNIT I : The Central Dogma: Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom Up – Information Flow – Convergence. Database: Definition – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation.

UNIT II : Network: Geographical Scope – Communication Models – Transmission Technology– Protocols – Bandwidth – Topology – Hardware – Security. Search Engines: The Search Process – The Search Engine Technology – Searching and Information Theory –Computational Methods – Search Engines and Knowledge Management.

UNIT III: Data Visualization: Sequence Visualization – Structure Visualization – User Interface– Animation versus Simulation – General Purpose Technology. Statistics: Statistical Concept– Microarrays – Imperfect Data – Basics – Quantifying Randomness – Data Analysis – Tool Selection – Statistical Of Alignment – Clustering And Classification.

UNIT IV: Data Mining: Methods – Technology Overview – Infrastructure – Pattern Recognition And Discovery – Machine Learning – Text Mining – Tools. Pattern Matching: Fundamentals– Dot Matrix Analysis – Substitution Matrices – Dynamic Programming – Word Method –Bayesian Methods – Multiple Sequence Alignment – Tools.

UNIT V: Modeling and Simulation: Drug Discovery – Fundamentals – Protein Structure –Systems Biology – Tools. Collaboration: Collaboration and Communication – Standards Issues.

LearningResources:

• **RecommendedTexts**

"Bioinformatics Computing", Bryan Bergeron, Pearson Prentice Hall Education.

• **ReferenceBooks**

"Introduction to Bio Informatics", T.K.Attwood, D.J.Parry Smith, Pearson Education, Fourth Impression, 2006.

Webresources:

1. <https://www.ncbi.nlm.nih.gov/guide/all/>
2. <https://www.geeksforgeeks.org/introduction-of-dbms/>
3. <https://www.ebi.ac.uk/services/>, <https://www.kdnuggets.com/>

Course Outcomes : On completion of the course, students will be able to:

CO1	Learn the central dogma of molecular biology and describe the role of databases in managing biological data.	K1
CO2	Understand network communication models, search engine technologies, and their applications in bioinformatics	K2
CO3	Analyze and interpret biological data using data visualization and statistical methods	K3
CO4	Apply data mining and pattern matching techniques to biological sequences and large-scale datasets	K4
CO5	Evaluate modeling and simulation methods used in drug discovery and systems biology, and discuss collaborative tools and standards in bioinformatics.	K5 & K6

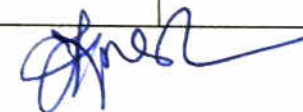
Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	1	1	-	2
CO2	4	3	3	-	1	1	2
CO3	4	-	3	1	2	1	2
CO4	4	2	4	1	1	1	2
CO5	4	2	4	2	2	1	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit	



SEMESTER - V –Skill Enhancement Course :SEC

HARDWARE CONCEPTS

U235C5HC

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
SEC-V	HARDWARE CONCEPTS	Core	2	-	-	-	2	3	25	75	100

Course Contents

UNIT I: Introduction to Computer: Digital and analog computers – Characteristics of computer – History of computer – Generations of computer – Classification of computer.

UNIT II: Computer Hardware : The Computer System – Components of computer hardware - Application of computers – Central Processing Unit(CPU) - Memory unit - Instruction format – Instruction set – Instruction cycle.

UNIT III: Microprocessor : Interconnecting the units of a computer – System Bus – Expansion Bus – External Ports – Performance of a computer – Inside a computer cabinet.

UNIT IV: Computer Memory - Memory representation – Memory hierarchy - CPU Registers - Cache memory – Primary memory – Secondary memory – Access types of storage devices – Magnetic tape – Magnetic disk – Optical disk - CD-R - Magneto-optical disk.

UNIT V: Input and Output Devices - Input-output unit – Input devices – Human data entry devices - Source data entry devices – Output devices - I/O port – Working of I/O system - I/O devices, device controller, device driver.

Books for Reference:

“Hardware” - P.Karthikeyan,
“Hardware BiBle”, Winn L.Rosch

Reference sites:

www.wikipedia.org, www.atariarchives.org

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	K1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	K2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML).	K3
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	K4
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO 5	PSO 6	PSO 7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A

1 (a & b) question from each unit (5x15=75)



**SEMESTER - VI - CORE COURSE : CC-XIII
COMPUTER NETWORKS**

U23CSC613

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC13	COMPUTER NETWORKS	Core	6	-	-	-	6	3	25	75	100

Course Contents

UNIT I : Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media.

UNIT II : Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

UNIT III: Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.

UNIT IV: Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.

UNIT V: Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography.

Learning Resources:

• **Recommended Texts**

1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.

• **Reference Books**

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017.
2. F. Halsall, "Data Communications, Computer Networks

and Open Systems", Pearson Education, 2008.

3. D. Bertsekas and R. Gallager, "Data Networks", 2nd Edition, PHI, 2008.
4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

Course Outcomes : On completion of the course, students will be able to:

CO1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models	K1
CO2	To gain knowledge on Telephone systems and Satellite communications	K2
CO3	To impart the concept of Elementary data link protocols	K3
CO4	To analyze the characteristics of Routing and Congestion control algorithms	K4
CO5	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO 5	PSO 6	PSO 7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit



**SEMESTER – V - CORECOURSE : CC-XV
.NET PROGRAMMING PRACTICAL**

U23CSC615P

Subject Code U23C SC204 P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC15	.Net Programming Practical	Core	-	-	6	-	3	3	25	75	100

Course Contents

LIST OF PROGRAMS :

1. Create an exposure of Web applications and tools
2. Implement the Html Controls
3. Implement the Server Controls
4. Web application using Web controls.
5. Web application using List controls.
6. Web Page design using Rich control. Validate user input using Validation controls. Working with File concepts.
7. Web application using Data Controls.
8. Data binding with Web controls
9. Data binding with Data Controls.
10. Database application to perform insert, update and delete operations.
11. Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.
12. Implement the Xml classes.
13. Implement Authentication – Authorization.
14. Ticket reservation using ASP.NET controls.
15. Online examination using ASP.NET controls

Learning Resources:

• **Recommended Texts**

1. Svetlin Nakov, Veselinov & Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.
2. Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

• **Reference Books**

1. Herbert Schildt, The Complete Reference C#.NET, Tata McGraw-Hill, 2017.

2. Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres, 2013.
3. Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach & Associates Inc. 2016.
4. Denielle Otey, Michael Otey, ADO.NET: The Complete reference, McGraw Hill, 2008.
5. Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS, 2010.

Web resources: Web resources from NDL Library, E-content from open-source libraries

Course Outcomes : On completion of the course, students will be able to:

CO1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.	K1
CO2	To develop web application using various controls	K2
CO3	To analyze C# programming techniques in developing web applications	K3
CO4	To assess a Web application using Microsoft ADO.NET	K4
CO5	To develop a software to solve real-world problems using ASP.NET	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	2	1	-	-	-	-
CO3	3	2	1	1	-	-	-
CO4	3	2	1	2	2	1	1
CO5	3	2	1	2	2	1	1
Weighted% of course contribution to each PSO							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60



SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - III

1. SOFTWARE ENGINEERING (DSE) U23CSQ E6:1

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-III	SOFTWARE ENGINEERING	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Introduction: The software engineering discipline, programs vs. software products, why study software engineering, emergence of software engineering, computer systems engineering.

Software Life Cycle Models: Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.

UNIT II : Requirements Analysis and Specification: Requirements gathering and analysis, Software requirements specification (SRS)

Software Design: Good software design, cohesion and coupling, software design approaches, object – oriented vs function-oriented design.

UNIT III: Function-Oriented Software Design: Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design.

User-Interface design: Characteristics of a good interface; basic concepts; types of user interfaces; component based GUI development: Window System, Types of Widgets, size measurement of a component based GUI.

UNIT IV: Coding and Testing: Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing.

Software Reliability and Quality Management: Software reliability; statistical testing; software quality; software quality management system; SEI capability maturity model: Comparison between ISO 9000 and SEI/CMM, Capability maturity model integration (CMMI).

UNIT V: Computer Aided Software Engineering: CASE and its scope; CASE environment; CASE support in software life cycle; Software Maintenance: Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost;

Learning Resources:

• **Recommended Texts**

Rajib Mall, Fundamentals of Software Engineering, Fifth Edition,

Prentice-Hall of India, 2018

• **Reference Books**

1. Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997.

2. Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.

3. James A. Senn, Analysis & Design of Information Systems, Second Edition, McGraw-Hill International Editions.

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the study of software engineering, emergence of SE, Software Life cycle model	K1
CO2	To gain knowledge on Requirements Analysis and Specifications (SRS) and Software Design.	K2
CO3	Learn the Function-Oriented Software Design and User-Interface Design	K3
CO4	To analyze the Coding and Testing	K4
CO5	Learn Computer Aided Software Engineering	K5 & K6

.Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	4	1	2
CO2	2	3	3	2	2	2	3
CO3	4	3	3	3	3	2	3
CO4	3	4	4	3	3	3	3
CO5	4	4	3	4	3	3	3
Weightage	2	2	2	1	4	1	2
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - III
2. ROBOTICS PROCESS AUTOMATION FOR BUSINESS (DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Externa	Total
DSE-III	Robotics Process Automation for Business	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Introduction: Introduction, brief history, components of robotics, classification, workspace, work-envelop, motion of robotic arm, end-effectors and its types, service robot and its application, Artificial Intelligence in Robotics.

UNIT II : Actuators and sensors :Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors

Kinematics of robots: Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot.

UNIT III: Localization: Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.

UNIT IV: Path Planning :Introduction, path planning-overview-road map path planning-cell decomposition path planning potential field path planning-obstacle avoidance-case studies Vision system: Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations

UNIT V: Application : Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.

Learning Resources:

Recommended Texts

1. Richard D. Klafter. Thomas Achmielewski and Mickael Negin, Robotic Engineering and Integrated Approach, Prentice Hall India- Newdelhi-2001
2. Saeed B. Nikku, Introduction to robotics, analysis, control and applications, Wiley-India, 2 nd edition 2011

Reference Books

1. Industrial robotic technology-programming and application by M.P.Groover et al, McGrawhill 2008
2. Robotics technology and flexible automation by S.R.Deb, THH-2009

Course Outcomes : On completion of the course, students will be able to:

CO1	Describe the different physical forms of robot architectures	K1
CO2	Kinematically model simple manipulator and mobile robots	K2
CO3	Mathematically describe a kinematic robot system.	K3
CO4	Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty	K4
CO5	Program robotics algorithms related to kinematics, control, optimization, and uncertainty.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	4	1	2
CO2	2	3	3	2	2	2	3
CO3	4	3	3	3	3	2	3
CO4	3	4	4	3	3	3	3
CO5	4	4	3	4	3	3	3
Weightage	2	2	2	1	4	1	2
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit	

U23CSG1E6:3

SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - III
3. CRYPTOGRAPHY (DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSE-III	CRYPTOGRAPHY	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Model of Network Security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles DES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 – Differential and linear cryptanalysis–Placement of encryption function – traffic confidentiality.

UNIT II : Number Theory – Prime number – Modular arithmetic–Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

UNIT III: Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA – HMAC - CMAC - Digital signature and authentication protocols- DSS.

UNIT IV: Authentication applications – Kerberos – X.509 Authentication services - E-mail security– IP security-Web security

UNIT V: Intruder–Intrusion detection system–Virus and related threats–Counter measures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

Learning Resources:

Recommended Texts

1. William Stallings, "Cryptography & Network Security", Pearson Education, Fourth Edition 2010.

Reference Books

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security, Private communication in public world", PHI Second Edition, 2002.
2. BruceSchneier, Neils Ferguson, "Practical Cryptography",

Wiley Dream tech India Pvt Ltd, First Edition, 2003.

3. Douglas R Simson "Cryptography–Theory and practice", CRC Press, First Edition, 1995.

Course Outcomes : On completion of the course, students will be able to:

CO1	To understand and articulate network security models , including the OSI security architecture, types of security attacks	K1
CO2	To analyze and implement classical and modern symmetric encryption, including SDES, DES, AES, RC4, block cipher design principles, cipher modes	K2
CO3	To implement public-key algorithms including RSA, Diffie–Hellman, and Elliptic Curve Cryptography, along with key distribution and management techniques.	K3
CO4	To design and evaluate authentication mechanisms using MACs, hash functions (SHA, HMAC, CMAC), and digital signature standards	K4
CO5	To implement and analyze authentication systems and security protocols, including Kerberos, X.509/PKI, email security.	K5 & K6

.Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	4	1	2
CO2	2	3	3	2	2	2	3
CO3	4	3	3	3	3	2	3
CO4	3	4	4	3	3	3	3
CO5	4	4	3	4	3	3	3
Weightage	2	2	2	1	4	1	2
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

U23CSGE6:4

SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - IV
1. COMPUTER GRAPHICS (DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSE-IV	COMPUTER GRAPHICS	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Overview of graphics Systems – Video Display Devices – Raster scan systems –Random scan systems – Monitors and Workstations – Input Devices- Hard-Copy Devices - Graphics software. OUTPUT PRIMITIVES – Points and Lines – Line – Drawing Algorithms-Loading the Frame Buffer-Line function- Circle-Generating Algorithms –Ellipse-Generating Algorithms-Filled-Area Primitives-Fill Area Functions- Cell Array-Character Generation.

UNIT II : Attributes of output primitives: Line Attributes – Curve Attributes- Color and Grayscale Levels – Area-Fill Attributes – Character Attributes-Bundled Attributes-Inquiry Functions-Antialiasing. TWO-DIMENSIONAL GEOMETRIC TRANSFORMATIONS –Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations – Other Transformations.

UNIT III: Two Dimensional Viewing – The viewing pipeline-Viewing coordinate Reference Frame-Window-to-viewport Coordinate Transformation- Two-Dimensional Viewing Functions-Clipping Operations – Point Clipping-Line Clipping-Polygon Clipping – Curve Clipping-Text Clipping – Exterior Clipping- GRAPHICAL USER INTERFACES AND INTERACTIVE INPUT METHODS – The User Dialogue-Input of Graphical Data-Input Functions-Initial Values for Input-Device Parameters-Interactive Picture-Construction Techniques.

UNIT IV: Three Dimensional concepts – Three- Dimensional Display Methods- Three- Dimensional Graphics Packages-THREE-DIMENSIONAL GEOMETRIC AND MODELING TRANSFORMATIONS –Translation-Rotation-Scaling-Other Transformations –Composite Transformations –Three Dimensional Transformation Functions- Modeling and Coordinate Transformations.

UNIT V: Visible Surface Detection Methods – Classification of Visible-Surface Detection Algorithms – Back Face Detection-Depth-Buffer Method-A-Buffer Method-Scan-Line Method-Depth-Sorting Method-BSP-Tree Method-Area-Subdivision Method-Octree Methods-Ray-Casting Method-Curved Surfaces-Wireframe Methods-Visibility Detection

Functions.

Learning Resources:

Recommended Texts

“COMPUTER GRAPHICS”-DONALD HEARN,M.PAULINE
 BAKER 2nd Edition, PHI Private Limited.

Reference Books:

“Principles of interactive Computer Graphics”- William M.Newman and Sproull.

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the basic principles of graphics systems and video display devices	K1
CO2	Describe and explain the attributes of output primitives such as line, color, and area-fill, and apply algorithms for drawing lines and circles.	K2
CO3	Analyze the use of anti aliasing techniques in graphics rendering	K3
CO4	Apply two-dimensional geometric transformations such as translation, rotation, and scaling	K4
CO5	Evaluate visible surface detection algorithms like depth-buffer and scan-line, and develop optimized rendering solutions.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	1	2
CO2	3	2	3	1	1	1	2
CO3	3	2	4	2	2	1	2
CO4	4	2	3	2	1	2	2
CO5	4	3	4	3	2	3	3
Weightage							
Weighted% of course contribution to PoS							

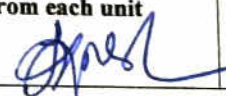
Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit 	1 question from each unit

SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - IV

2. SOFTWARE TESTING (DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSE-IV	SOFTWARE TESTING	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Overview of graphics Systems – Video Display Devices – Raster scan systems –Random scan systems – Monitors and Workstations – Input Devices-Hard-Copy Devices – Graphics software. OUTPUT PRIMITIVES – Points and Lines – Line – Drawing Algorithms-Loading the Frame Buffer-Line function-Circle-Generating Algorithms –Ellipse-Generating Algorithms-Filled-Area Primitives-Fill Area Functions- Cell Array-Character Generation.

UNIT II : Attributes of output primitives: Line Attributes – Curve Attributes-Color and Grayscale Levels – Area-Fill Attributes – Character Attributes-Bundled Attributes-Inquiry Functions-Antialiasing. TWO-DIMENSIONAL GEOMETRIC TRANSFORMATIONS –Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations – Other Transformations.

UNIT III: Two Dimensional Viewing – The viewing pipeline-Viewing coordinate Reference Frame-Window-to-viewport Coordinate Transformation-Two-Dimensional Viewing Functions-Clipping Operations – Point Clipping-Line Clipping-Polygon Clipping – Curve Clipping-Text Clipping – Exterior Clipping-GRAPHICAL USER INTERFACES AND INTERACTIVE INPUT METHODS – The User Dialogue-Input of Graphical Data-Input Functions-Initial Values for Input-Device Parameters-Interactive Picture-Construction Techniques.

UNIT IV: Three Dimensional concepts – Three- Dimensional Display Methods-Three- Dimensional Graphics Packages-THREE-DIMENSIONAL GEOMETRIC AND MODELING TRANSFORMATIONS –Translation-Rotation-Scaling-Other Transformations –Composite Transformations –Three Dimensional Transformation Functions- Modeling and Coordinate Transformations.

UNIT V: Visible Surface Detection Methods – Classification of Visible-Surface Detection Algorithms – Back Face Detection-Depth-Buffer Method-A-Buffer Method-Scan-Line Method-Depth-Sorting Method-BSP-Tree Method-Area-Subdivision Method-Octree Methods-Ray-Casting Method-Curved Surfaces-Wireframe Methods-Visibility Detection

Functions.

Learning Resources:

Recommended Texts

“COMPUTER GRAPHICS”-DONALD HEARN,M.PAULINE
BAKER 2nd Edition, PHI Private Limited.

Reference Books:

“Principles of interactive Computer Graphics”- William M.Newman and Sproull.

Course Outcomes : On completion of the course, students will be able to:

CO1	Understand the basic principles of graphics systems and video display devices	K1
CO2	Describe and explain the attributes of output primitives such as line, color, and area-fill, and apply algorithms for drawing lines and circles.	K2
CO3	Analyze the use of anti aliasing techniques in graphics rendering	K3
CO4	Apply two-dimensional geometric transformations such as translation, rotation, and scaling	K4
CO5	Evaluate visible surface detection algorithms like depth-buffer and scan-line, and develop optimized rendering solutions.	K5 & K6

.Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	1	2
CO2	3	2	3	1	1	1	2
CO3	3	2	4	2	2	1	2
CO4	4	2	3	2	1	2	2
CO5	4	3	4	3	2	3	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

SEMESTER-VI- DISCIPLINE SPECIFIC ELECTIVE – DSE - IV

3. ARTIFICIAL INTELLIGENCE (DSE)

Subject Code U23CS C204P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSE-IV	Artificial Intelligence(DSE)	Core	4	-	-	-	3	3	25	75	100

Course Contents

UNIT I : Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search : State space search –Production Systems – Problem Characteristics – Issues in design of Search..

UNIT II : Heuristic Search techniques: Generate and Test –Hill Climbing - Best-Fist, Problem Reduction, Constraint Satisfaction, Means - endanalysis.

UNIT III: Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations–Issues in Knowledge representations – Frame Problem.

UNIT IV: Using Predicate Logic: Representing simple facts in logic – Representing Instance and Isa relationships –Computable functions and predicates – Resolution – Natural deduction.

UNIT V: Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming–Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems-Definition- Characteristics-architecture- Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies-ExpertSystemTools.

Learning Resources:

Recommended Texts

1. Elaine Rich and Kevin Knight, Shiva Shankar Nair, “Artificial Intelligence”, McGraw-Hill Companies, 3rd edition.

Reference Books

1. Stuart Russell & Peter Norvig, “Artificial Intelligence A Modern Approach”, Perason, 2nd Edition.
2. George FLuger, “Artificial Intelligence”, Pearson2002,4th Edition.
3. VS JanakiRaman, K Sarukesi, P Gopalakrishnan, “Foundations of Artificial Intelligent and Expert Systems”, MacMillan India limited.

Web resources

1. NPTEL&MOOCcoursestitledArtificialIntelligenceandExpertSystems
2. <https://nptel.ac.in/courses/106106140/>
3. <https://nptel.ac.in/courses/106106126/>

Course Outcomes : On completion of the course, students will be able to:

CO1	Apply heuristic search techniques including generate-and-test, hill climbing, best-first (A*), problem reduction, constraint satisfaction, and means–ends analysis	K1
CO2	Represent knowledge using predicate logic, including facts, instance/Is-a relationships, computable functions, predicates	K2
CO3	Differentiate procedural and declarative knowledge, and apply rule-based knowledge using logic programming with forward/backward chaining, matching, and control knowledge.	K3
CO4	Construct AI systems that integrate predicate logic and rule-based reasoning	K4
CO5	Analyze strengths and limitations of different AI techniques, including search strategies, knowledge representations, inference mechanisms, and system architectures.	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	1	2
CO2	3	2	3	1	1	1	2
CO3	3	2	4	2	2	1	2
CO4	4	2	3	2	1	2	2
CO5	4	3	4	3	2	3	3
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit	1 question from each unit

**SEMESTER - VI – SKILL ENHANCEMENT COURSE : SEC
SOCIAL COMPUTING**

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
SEC-VI	Social Computing	Core	2	-	-	-	2	3	25	75	100

Course Contents

UNIT I: Mining Twitter : twitter in all the rage – Exploring Twitter’s API, Analyzing the 140 characters. **Mining Facebook**: Exploring Facebook’s social Graph API – Analyzing social graph connections. **Mining web pages**: Scraping, Parsing and crawling the web.

UNIT II: Analyzing the social web: Nodes, Edges and Network Measures, Basics of network structure, Representing networks, Basic Network Structures and properties- Network Structure and Measures. Describing nodes and edges, Describing networks. Entity Resolution and Link Prediction.

UNIT III : Community Maintained Resources, Supporting technologies for community maintained resources, User motivations- Location based social interaction, location technology, mobile location sharing- Social information Sharing and social filtering, Automated recommender system- Social media in the public sector, Analysing public sector social media.

UNIT IV: Random walks in social networks and their applications a survey: Random walks on Graphs- Background- Related work: Algorithms, Applications, Evaluation and datasets. A survey link prediction in social networks: Feature based link prediction, Bayesian probabilistic models. Privacy in social networks: Privacy breaches in social networks.

UNIT V: Visualizing social networks: A Taxonomy of visualizations- The convergence of Visualization, Integrating sensors and social networks- Multimedia information networks.

Recommended Texts:

1. Matthew A. Russell, :Mining the Social Web; Data mining Facebook, Twitter, LinkedIn, Google+, Github, and More,” 2nd Edition, O’Reilly media, 2013.
2. Jennifer Golbeck, “Analyzing the social web,” Morgan kaufmann, 2013.
3. Charu. Aggarwal (ed.), “Social Network Data Analytics,” Springer, 2011

Reference Books:

1. Tina Yesayan, “Social Networking: A Guide to Strengthening Civil Society Through Social Media (SMGuide4CSO),” U.S Agency for international Development, 2014.

2. Subhasish Dasgupta, “Social Computing: Concepts, Methodologies, Tools, and Applications, : Information Science Reference, Hershey, New York, 2010.
3. Todd Kelsey, :Social Networking Spaces: From Facebook to Twitter and Everything in Between, ”A press the experts voice, 2010.
4. Parongama Sen, Bikas K. Chakrabarti, “Sociophysics: An Introduction, ”Oxford University press, 2014.
5. Davina Rungen, “Web 2.0 and Social Computing,” Lambert Academic Publishing, 2011.

Web References:

1. <https://social.cs.washington.edu/cse481social/slides/Day-1.pdf>
2. <https://www.nii.ac.jp/userimg/nii-borzea-lect3.pdf>
3. <https://www.scribd.com/document/793341658/SOCIAL-COMPUTING-Ch-5>

Course Outcomes : On completion of the course, students will be able to:

CO1	To develop knowledge about mining the social networks like Twitter, Facebook	K1
CO2	To get analyzing skills about network structures and their properties.	K2
CO3	To gain the knowledge about community maintained resources, Supporting technologies and Social information Sharing and social filtering	K3
CO4	To know about random walks, link prediction and privacy in social networks.	K4
CO5	To learn the knowledge about the Taxonomy of visualizations in social networks	K5 & K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	-	1	1	1	2
CO2	4	3	3	-	2	4	-
CO3	3	4	3	1	-	1	1
CO4	4	1	3	-	1	1	-
CO5	4	3	3	2	-	-	1
Weightage							
Weighted% of course contribution to PoS							

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A

1 (a & b) question from each unit (5x15=75)



SEMESTER - VI – AEC – II
PROFESSIONAL COMPETENCY SKILL -
COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Extern	Total
AEC-II	PROFESSIONAL COMPETENCY SKILL - COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS	Core	2	-	-	-	2		25	75	100

Course Contents

UNIT -I : Discrete Structures and Optimization : Mathematical Logic - Sets and Relations - Counting, Mathematical Induction and Discrete Probability - Group Theory - Graph Theory - Boolean Algebra – Optimization.

Computer System Architecture: Digital Logic Circuits and Components - Data Representation - Register Transfer and Microoperations - Basic Computer Organization and Design - Programming the Basic Computer - Microprogrammed Control - Central Processing Unit - Pipeline and Vector Processing - Input-Output Organization - Memory Hierarchy – Multiprocessors

UNIT –II : Programming Languages and Computer Graphics : Language Design and Translation Issues - Elementary Data Types - Programming in C- Object Oriented Programming - Programming in C++ - Web Programming - Computer Graphics - 2-D Geometrical Transforms and Viewing - 3-D Object Representation, Geometric Transformations and Viewing.

Database Management Systems : Database System Concepts and Architecture - Data Modeling – SQL - Normalization for Relational Databases - Enhanced Data Models - Data Warehousing and Data Mining - Big Data Systems – NOSQL

UNIT -III : System Software and Operating System : System Software - Basics of Operating Systems - Process Management – Threads - CPU Scheduling – Deadlocks - Memory Management - Storage Management - File and Input / Output Systems – Security - Virtual Machines - Linux Operating Systems - Windows Operating Systems - Distributed Systems.

Software Engineering : Software Process Models - Software Requirements - Software Design - Software Quality - Estimation and Scheduling of Software Projects - Software Testing - Software Configuration Management.

UNIT -IV : Data Structures and Algorithms : Data Structures - Performance Analysis of Algorithms and Recurrences - Design Techniques - Lower Bound Theory - Graph Algorithms - Complexity Theory - Selected Topics - Advanced Algorithms.

Theory of Computation and Compilers : Theory of Computation - Regular Language Models - Context Free Language - Turing Machines (TM) - Unsolvability

Problems and Computational Complexity - Syntax Analysis - Semantic Analysis - Run Time System - Intermediate Code Generation - Code Generation and Code Optimization.

UNIT –V : Data Communication and Computer Networks : Data Communication - Computer Networks - Network Models - Functions of OSI and TCP/IP Layers - World Wide Web (WWW) - Network Security - Mobile Technology- Cloud Computing and IoT.

Artificial Intelligence (AI) : Approaches to AI - Knowledge Representation - Planning - Natural Language Processing - Multi Agent Systems - Fuzzy Sets - Genetic Algorithms (GA) - Artificial Neural Networks (ANN).

Books:

- UGC NET/JRF/SET Computer Science and Applications-By:Upkar Prakashan Editorial Team
- Trueman's UGC NET/SET/JRF Computer Science - 2024 Edition
- Arihant NTA UGC NET 1 Book 2024/JRF/SET Paper 2 Computer Science & Applications by Kailash Chandra Gururani Surabhi Sharma.

Web References :

- <https://www.gatevidyalay.com>
- <https://www.sanfoundry.com>
- <https://www.w3schools.com>
- <https://www.geeksforgeeks.org>

Course Outcomes : On completion of the course, students will be able to:

CO1	Get the knowledge of ER model and the need of normalization	K1
CO2	Summarize the mechanisms used in distributed databases	K2
CO3	Identify the Spatial Database Characteristics and Recursive Query Processing	K3
CO4	Evaluate the routing metrics and protocols of Network layer	K4
CO5	Develop the basics of temporal and multimedia databases	K5&K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	1	2
CO2	4	3	3	3	2	2	3
CO3	4	3	4	3	2	2	3
CO4	4	3	4	4	2	2	3
CO5	4	3	3	3	2	2	2

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A

50 x 1.5 = 75 (Objective type questions (MCQ - 75) From each unit-10 questions)

SEMESTER - VI – AEC – II
PROFESSIONAL COMPETENCY SKILL -
COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Extern	Total
AEC-II	PROFESSIONAL COMPETENCY SKILL - COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS	Core	2	-	-	-	2		25	75	100

Course Contents

UNIT -I : Discrete Structures and Optimization : Mathematical Logic - Sets and Relations - Counting, Mathematical Induction and Discrete Probability - Group Theory - Graph Theory - Boolean Algebra – Optimization.

Computer System Architecture: Digital Logic Circuits and Components - Data Representation - Register Transfer and Microoperations - Basic Computer Organization and Design - Programming the Basic Computer - Microprogrammed Control - Central Processing Unit - Pipeline and Vector Processing - Input-Output Organization - Memory Hierarchy – Multiprocessors

UNIT –II : Programming Languages and Computer Graphics : Language Design and Translation Issues - Elementary Data Types - Programming in C- Object Oriented Programming - Programming in C++ - Web Programming - Computer Graphics - 2-D Geometrical Transforms and Viewing - 3-D Object Representation, Geometric Transformations and Viewing.

Database Management Systems : Database System Concepts and Architecture - Data Modeling – SQL - Normalization for Relational Databases - Enhanced Data Models - Data Warehousing and Data Mining - Big Data Systems – NOSQL

UNIT -III : System Software and Operating System : System Software - Basics of Operating Systems - Process Management – Threads - CPU Scheduling – Deadlocks - Memory Management - Storage Management - File and Input / Output Systems – Security - Virtual Machines - Linux Operating Systems - Windows Operating Systems - Distributed Systems.

Software Engineering : Software Process Models - Software Requirements - Software Design - Software Quality - Estimation and Scheduling of Software Projects - Software Testing - Software Configuration Management.

UNIT -IV : Data Structures and Algorithms : Data Structures - Performance Analysis of Algorithms and Recurrences - Design Techniques - Lower Bound Theory - Graph Algorithms - Complexity Theory - Selected Topics - Advanced Algorithms.

Theory of Computation and Compilers : Theory of Computation - Regular Language Models - Context Free Language - Turing Machines (TM) - Unsolvable

Problems and Computational Complexity - Syntax Analysis - Semantic Analysis - Run Time System - Intermediate Code Generation - Code Generation and Code Optimization.

UNIT –V : Data Communication and Computer Networks : Data Communication - Computer Networks - Network Models - Functions of OSI and TCP/IP Layers - World Wide Web (WWW) - Network Security - Mobile Technology- Cloud Computing and IoT.

Artificial Intelligence (AI) : Approaches to AI - Knowledge Representation – Planning - Natural Language Processing - Multi Agent Systems - Fuzzy Sets - Genetic Algorithms (GA) - Artificial Neural Networks (ANN).

Books:

- UGC NET/JRF/SET Computer Science and Applications-By:Upkar Prakashan Editorial Team
- Trueman's UGC NET/SET/JRF Computer Science - 2024 Edition
- Arihant NTA UGC NET 1 Book 2024/JRF/SET Paper 2 Computer Science & Applications by Kailash Chandra Gururani Surabhi Sharma.

Web References :

- <https://www.gatevidyalay.com>
- <https://www.sanfoundry.com>
- <https://www.w3schools.com>
- <https://www.geeksforgeeks.org>

Course Outcomes : On completion of the course, students will be able to:

CO1	Get the knowledge of ER model and the need of normalization	K1
CO2	Summarize the mechanisms used in distributed databases	K2
CO3	Identify the Spatial Database Characteristics and Recursive Query Processing	K3
CO4	Evaluate the routing metrics and protocols of Network layer	K4
CO5	Develop the basics of temporal and multimedia databases	K5&K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	1	2
CO2	4	3	3	3	2	2	3
CO3	4	3	4	3	2	2	3
CO4	4	3	4	4	2	2	3
CO5	4	3	3	3	2	2	2

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Section A

50 x 1.5 = 75 (Objective type questions (MCQ - 75) From each unit 10 questions)

[Handwritten Signature]

Semester – VI - GS

GENDER STUDIES

Subject Code U23CSC2 04P	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Extern	Total
GS	பாலின சமத்துவம்	Core	1	-	-	-	1		25	75	100

Course Contents

அலகு - 1

பாலினம் தொடர்பான கோட்பாடுகள் : பாலியல்-பாலினம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின பாகுபாடு - பாலின வேலைப்பாகுபாடு - பாலின ஒருபடித்தானவைகள் - பாலின உணர்வூட்டல் - பாலின சமவாய்ப்பு - பாலின சமத்துவம் - பாலின மைய நிரோட்டமாக்கல் - அதிகாரப்படுத்துதல்.

அலகு- 2

மகளிரியல் Vs பாலின சமத்துவக்கல்வி - பல்கலைக்காங்க மானியக்குழுவின் வழிக்காட்டுதல்கள் - ஏழாவது ஐந்தாண்டுத்திட்டம் முதல் பதினோராவது ஐந்தாண்டுத்திட்டம் - பாலின சமத்துவக்கல்வி : பெய்ஜிங் மாநாடு மற்றும் பெண்களுக்கு எதிரான அனைத்து வன்முறைகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை - இணைத்தல்/ உட்படுத்தலுதல் - ஒதுக்கல்

அலகு - 3

பாலியல் பாகுபாட்டிற்கான தளங்கள் : குடும்பம் - பாலின விகிதாச்சாரம் - கல்வி - ஆரோக்கியம் - ஆளுமை - மதம் - வேலை Vs வேலைவாய்ப்பு - சந்தை - ஊடகங்கள் - அரசியல் - சட்டம் - குடும்ப வன்முறை - பாலியல் துன்புறுத்தல் - அரசு கொள்கைகள் மற்றும் திட்டங்கள் .

அலகு- 4

பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு : முயற்சிகள் - சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு - பெண்களின் மேம்பாட்டிற்கான தேசிய கொள்கை - பெண்கள் அதிகார ஆண்டு 2001 - சர்வதேச கொள்கைகளை மைய நிரோட்டமாக்கல்.

அலகு - 5

பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு நிறுவன ஏற்பாடுகள் : தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதி மன்றங்கள் - குடும்ப வன்முறையிலிருந்து பெண்களைப் பாதுகாக்கும் சட்டம் 2005- பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான உச்சநீதிமன்ற வழிக்காட்டுதல்கள் - தாய்சேய் மற்றும் தவறாக பயன்படுத்துதலை தடை செய்திடும் சட்டம் - ஈவ்மசிங் (பெண்களை தொல்லை செய்தல்) தடுப்புச் சட்டம் - சுய உதவிக்குழுக்கள் - பஞ்சாயத்து அமைப்புகளுக்கான 73 - வது மற்றும் 74 -வது சட்டத்திருத்தம்.

Course Outcomes : On completion of the course, students will be able to:

CO1	To get knowledge about gender theories	K1
CO2	To know about women's studies and Gender Equality Education	K2
CO3	Awareness to create about harassment	K3
CO4	Women's Empowerment and Gender Equality Promotion	K4
CO5	Women's Movements and security Institutional arrangements	K5&K6

Mapping of Course Outcomes with Pos

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	0	0	0	0	3	0	0
CO2	1	0	0	0	2	0	0
CO3	1	2	1	1	1	2	0
CO4	0	2	1	1	1	2	0
CO5	0	0	1	1	0	0	0

Very Strong-4 Strong-3 Medium-2 Low-1

Question Pattern:

Question Paper Pattern

Section A - 5 x 15 = 75

(From each Unit 2 Questions with Either OR type)