



CO, PO and CO-PO Mapping for Computer Science General

Program Outcome

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Communication Skills: Ability to express thoughts and ideas effectively and in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.

PO3: Critical Thinking and Problem Solving: Capability to apply analytic thought, critically evaluate practices, policies and theories by following scientific to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

PO4: Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO5: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

PO6: Self-directed Learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

PO7: Moral and Ethics: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

PO8: Lifelong Learning: Ability to acquire knowledge and skills, including 'learning how to learn', that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

Course Outcome for

CMSG-CC-1-1-TH: Computer Fundamentals and Digital Logic Design

At the end of the Course, the students will be able to:

CO1: Recall the concept of computer fundamentals and gather knowledge of different characteristics of computer software and hardware

CO2: Gather knowledge of different types of software and computer languages and differentiate among various components

CO3: Understand Flowcharts and Algorithms and apply the techniques to solve various problems.

CO4: Understand different number systems and digital logic and evaluate different expressions and program logic to apply the techniques to design different circuits

CO5: Design digital logic circuits by evaluation of expressions and applying different digital logic techniques and models.

CO - PO Mapping for Computer Fundamentals and Digital Logic Design

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3		1			2	-	
CO2	3		1	1		1	-	1
CO3	3	1	3	3	2	1	-	2
CO4	2	2	2	2	2	2	-	2
CO5	2	2	3	3	2	2	-	3
Avg (Target Attainment)	2.6	1.67	2	2.25	2	1.6	-	2

Course Outcome for

CMS-G-CC-2-2-TH: Algorithms & Data Structure

At the end of the Course, the students will be able to:

CO1: Represent one-dimensional and two-dimensional arrays in row major and column major forms.

CO2: Perform operations Like Insertion, Deletion, Searching on Singly, Circular and Doubly Linked List.

CO3: Understand Concepts of Stack and Queue and perform Insertion and Deletion of Elements in Array and Linked Representation and can perform conversion and evaluation of postfix and prefix expressions from infix expression using stacks.

CO4: Apply Sequential and Binary Search Techniques and implement different sorting techniques using Selection Sort, Bubble Sort, Insertion Sort, Quick Sort and Merge Sort algorithms.

CO5: Illustrate Pre-order, In-order and Post-order traversal in Binary Tree and perform Creation, Insertion and Deletion in Binary Search Tree (BST).

CO - PO Mapping for Algorithms & Data Structure

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3		2	2		2		3
CO2	3		3	3	1	2		2
CO3	3		3	2		2		2
CO4	3		3	2	1	2		2
CO5	2		2	2		2		2
Avg (Target Attainment)	2.8	-	2.6	2.2	1	2	-	2.2

Course Outcome for

CMS-G-CC-3-3-TH: Computer Organization

At the end of the Course, the students will be able to:

CO1: Understand the basic concepts and structure of computer architecture and functionality of Central Processing Unit, Control Unit, ALU and the CPU Registers.

CO2: Summarize the addressing modes. The instruction formats and the execution stages.

CO3: Analyse the basic structure of ALU, and explain 2's complement representation of binary addition and subtraction unit and Booth's Algorithm for multiplication and division.

CO4: Exemplify in a better way the computer peripherals, I/O and memory organization.

CO - PO Mapping for Computer Organization

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3			1		2		2
CO2	2		1	1		2		1
CO3	2		2	2		2		1
CO4	2	1	1	1		1		2
Avg (Target Attainment)	2.25	1	1.3	1.25	-	1.75	-	1.5

Course Outcome for

CMS-G-CC-4-4-TH: Operating Systems

At the end of the Course, the students will be able to:

CO1: Understand the basic concepts and functions of operating System

CO2: Explain the concept of Process, inter-process communication and analyse various process scheduling algorithms

CO3: Understand deadlocks, prevention, recovery and avoidance

CO4: Compare and contrast various memory management schemes

CO5: Understand the functionality of Input-Output and file management system

CO - PO Mapping for Operating Systems

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3	1	1	2		1		1
CO2	3	1	2	3	1	2		2
CO3	3		1	1				1
CO4	2	1	2	2		1		
CO5	2	1				1		1
Avg (Target Attainment)	2.6	1	1.5	1.52	1	1.25		1.25

Course Outcome for

CMS-G-DSE-A-5-1-TH: Database Management System

At the end of the Course, the students will be able to:

CO1 Understand the basic concepts of database management systems

CO2 Use SQL to find solutions to a broad range of queries

CO3 Apply normalization techniques to improve database design

CO4 Analyze a given database application scenario to use ER model for conceptual design of the database

CO - PO Mapping for Database Management System

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3		1	1		2		1
CO2	3	1	3	2	1	2		2
CO3	2		2	2		1		1
CO4	3	1	3	3	1	1		1
Avg (Target Attainment)	2.75	1	2.25	2	1	1.5	-	1.25

Course Outcome for

CMS-G-DSE-B-6-2-TH: Object Oriented Programming

At the end of the Course, the students will be able to:

CO1 understand object-oriented programming concepts, and apply them in solving problems.

CO2: Apply the principles of abstraction, encapsulation, inheritance and polymorphism and demonstrate how they relate to the design of abstract classes

CO3 Solve problems using java programming constructs, Arrays, Strings and I/O classes.

CO4 Develop applets for web applications and design GUI based applications

CO - PO Mapping for Object Oriented Programming

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3	1	2	2		1		2
CO2	2		1			1		1
CO3	3		3	3	1	2		2
CO4	3	1	2	1	2	2	1	2
Avg (Target Attainment)	2.75	1	2	2	1.5	1.5	1	1.75

Course Outcome for

CMS-G-SEC-A-X-1-TH: Communication, Computer Network and Internet

At the end of the Course, the students will be able to:

CO1 understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model

CO2: Outline various types of transmission media, network devices

CO3 Compare the different encoding techniques of digital transmission and analog transmission.

CO4 Understand the concept of Internet Addressing Systems and various Internet Applications

CO - PO Mapping for Communication, Computer Network and Internet

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3	1	2	1	2	1		2
CO2	3					1		
CO3	2		1	2	1	1		
CO4	3	2	1	2	1	2	1	2
Avg (Target Attainment)	2.75	1.5	1.3	1.67	1.3	1.25	1	2

Course Outcome for

CMS-G-SEC-B-X-2-TH: Information Security

At the end of the Course, the students will be able to:

CO1: Develop basic understanding of security, cryptography, system attacks and defenses against them.

CO2: Protect and defend computer systems and networks from cyber security attacks

CO3: Diagnose and investigate cyber security events or crimes related to computer systems and digital evidence.

CO4: Develop a qualitative Understanding of e-mail, IP and Web Security.

CO - PO Mapping for Information Security

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
COs	Disciplinary Knowledge	Communication Skills	Critical Thinking and Problem Solving	Analytical Reasoning	Cooperation/ Team work	Self-directed Learning	Moral and Ethics	Lifelong Learning
CO1	3		2	1	1	1	1	1
CO2	3				1	1	2	1
CO3	2		1	1	1	1	2	2
CO4	3	1			1	1	2	2
Avg (Target Attainment)	2.75	1	1.5	1	1	1	1.75	1.5