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University, Pune**

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Pimpri Chinchwad Education Trust's

Pimpri Chinchwad University

SCHOOL OF ENGINEERING AND TECHNOLOGY

(Established under Maharashtra Act No V of 2023)
Sate, Pune – 412 106. Maharashtra, India

M.C.A. Integrated
(2024 PATTERN)

PCET

PIMPRI CHINCHWAD UNIVERSITY

EFFECTIVE FROM 2024–25 ACADEMIC YEAR

Pimpri Chinchwad Education Trust's

Pimpri Chinchwad University

Sate, Pune - 412106

Curriculum Structure

Integrated M.C.A.
(2024 Pattern)
School of Engineering & Technology

Effective from Academic Year 2024-25

Program Curriculum

Preamble:

At Pimpri Chinchwad University, we present the Integrated Master of Computer Application (Int. MCA), The Integrated Master of Computer Applications (MCA) program is a comprehensive, advanced academic degree program that combines a bachelor's and master's degree in computer applications into a single, streamlined curriculum. This integrated program is designed to provide students with a strong foundation in computer science and application development while allowing them to pursue more specialized knowledge and skills in advanced topics. As aspiring professionals in the field of computing, we acknowledge the weight of responsibility that accompanies our education. Upholding the highest standards of integrity, professionalism, and ethical conduct is fundamental to our academic pursuits and beyond. We embrace the imperative of continuous learning and adaptability in an era marked by rapid technological advancement, pledging to proactively seek new knowledge and master emerging technologies.

The Integrated MCA Program The curriculum begins with foundational courses in computer science, including programming languages, data structures, algorithms, and software engineering principles. As the program progresses, students delve into more advanced topics such as databases, networking, operating systems, and web development. In the later stages of the program, students can choose to specialize in areas such as artificial intelligence, data science, cybersecurity, mobile application development, or software engineering, among others.

Overall, the Integrated MCA Program aims to provide students with a well-rounded education that prepares them for a successful career in the IT industry and for further academic pursuits.

Vision and Mission of Program:

Vision:
To seamlessly blending foundational knowledge with advanced specialization, fostering holistic development, and empowering graduates with the skills and vision to lead in a rapidly evolving digital domain.

Mission:
- To drive transformation, technology, and innovation through a problem-solving approach and research & development.
- To provide students with the IT tools to become productive and lifelong learners. To develop resources for an advanced career in Counter Applications, provide a sound academic base with practical business applications.

Program Outcome:

1. Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
2. Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
3. Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.
4. Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions.
5. Modern Tool Usage: Ability to select modern computing tools, skills and techniques necessary for innovative software solutions
6. Professional Ethics: Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
7. Life-long Learning: Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
8. Project Management: Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
9. Communication Efficacy: Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.
10. Societal & Environmental Concern: Ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.
11. Individual & Team Work: Ability to work as a member or leader in diverse teams in a multidisciplinary environment.
12. Innovation and Entrepreneurship: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

Program Specific Outcome:

PSO 1: Comprehend and employ computing methodologies in conjunction with mathematical principles and industrial knowledge to address real-time challenges encountered in industry.

PSO 2: Assess, create, construct, verify, and sustain software applications utilizing cutting-edge computing tools and technologies.

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CURRICULUM FRAMEWORK

Sr. No.	Type of course	Abbreviations
1	Major	**MAJ**
2	Elective (Minor Stream/Vocational/Program Specific)	**MIN**
3	Open Electives	**OE**
4	Ability Enhancement Courses	**AEC**
5	Skill Enhancement Courses	**SEC**
6	Vocational Skill Course	**VSC**
7	Summer Internship/ On Job Training	**OJT**
8	Project	**PROJ**
9	Field Project	**FP**
10	Indian Knowledge System	**IKS**
11	Co-Curricular	**CC**
12	Community Engagement Program	**CEP**
13	Value Education Course	**VEC**

Sr. No.	Type of course	No. of Courses	Total Credits	
			No	%
1	Major	36	88	54
2	Elective (Minor Stream/Vocational/Program Specific)	5	10	6
3	Open Electives	4	8	5
4	Ability Enhancement Courses	3	0	0
5	Skill Enhancement Courses	6	15	9
6	Vocational Skill Course	7	17	10
7	Summer Internship/On Job Training/Project	2	6	4
8	Field Project	2	20	12
9	Indian Knowledge System	1	-	-
10	Value Education Course	4	-	-
	Total	**70**	**164**	**100**

CREDIT DISTRIBUTION: SEMESTER WISE

Sr. No.	Type of course	No. of Credits/Semester								Total
		1	2	3	4	5	6	7	8	
1	Major	13	12	13	11	13	13	10	3	88
2	Elective (Minor Stream/Vocational/Program Specific)		2	2	2	2	2			10
3	Open Electives	2	2	2	2					8
4	Ability Enhancement Courses									AC
5	Skill Enhancement Courses	3	2	3	2			3	2	15
6	Vocational Skill Course	2	2		3	2	2	3	3	17
7	Summer Internship/On Job Training/Project					3	3			6
8	Field Project							6	14	20
9	Indian Knowledge System									AC
10	Value Education Course (Audit Courses)									AC
	Total	20	20	20	20	20	20	22	22	164

COURSE CODE NOMENCLATURE

Course Code	Course Name	Course Type
IMC101	Programming Concepts Using C Language	MAJM
IMC102	Programming Concepts Using C Language Lab	MAJM
IMC103	Web Programming	MAJM
IMC104	Web Programming Lab	MAJM
IMC105	Computer Organization and Design	SEC
IMC106	Mathematical Foundation for Computer Science	BSC
IMC107	Applied Communication	AEC
IMC108	Information Technology Trends	VSC
ACUHV101	UHV - I: Professional Ethics	AC
ACIKSET102	IKS: Concepts and Application in Science	AC
IMC109A	OE-I: Client Server Computing	OE
IMC109B	OE-I: Computer Graphics and Multimedia	OE
IMC110	Programming using Java	MAJM
IMC111	Programming using Java Lab	MAJM
IMC112	Data Structures and Algorithms	MAJM
IMC113	Data Structures and Algorithms Lab	MAJM
IMC114	Operating Systems Fundamentals	SEC
IMC115	Software Engineering	VSC
IMC116	Discrete Mathematics	BSC
ACIKSET102	IKS: Concepts and Application in Science	MIN
ACUHV101	UHV - I: Professional Ethics	AC

IMC117A	OE – II: Management Information System	OE
IMC117B	OE – II: Mobile Commerce	OE
UCEXIMC101	Exit Policy - UG Certificate: PHP and MySQL	VSC
UCEXIMC101	Exit Policy - UG Certificate: Project	VSC
UDIEXIMC201	Exit Policy - UG Diploma: Advanced C++	VSC
UDIEXIMC201	Exit Policy - UG Diploma: Project	VSC

PROGRAM STRUCTURE
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SEMESTER I											
COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME					ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC101	MAJM	Programming Concepts Using C Language	3	-	-	3	3	40	60	-	100
IMC102	MAJM	Programming Concepts Using C Language Lab	-	2	-	2	4	25	-	25	50
IMC103	MAJM	Web Programming	3	-	-	3	3	40	60	-	100
IMC104	MAJM	Web Programming Lab	-	2	-	2	4	25	-	25	50
IMC105	SEC	Computer Organization and Design	3	-	-	3	3	40	60	-	100
IMC106	BSC	Mathematical Foundation for Computer Science	3	-	-	3	3	40	60	-	100
IMC107	AEC	Applied Communication	2	-	-	-	2	50	-	-	50
IMC108	VSC	Information Technology Trends	2	-	-	2	2	20	30	-	50
ACUHV101 / ACIKSET102	AC	UHV - I: Professional Ethics / IKS: Concepts and Application in Science	2	-	-	-	2	50	-	-	50
IMC109	OE	Open Elective – I	2	-	-	2	2	20	30	-	50
TOTAL			20	4	0	20	28	350	300	50	700
UBC108 Open Elective – I											
IMC109A	OE	Client Server Computing	2		-	2	2	20	30	-	50
IMC109B	OE	Computer Graphics and Multimedia	2		-	2	2	20	30	-	50

			SEMESTER: II									
COURSE CODE	**COURSE TYPE**	**COURSE NAME**	**TEACHING SCHEME**					**ASSESSMENT SCHEME**			
			TH	**PR**	**TUT**	**CREDIT**	**HRS**	**CIA**	**ESA**	**PR/OR**	**TOTAL**
IMC110	MAJM	Programming using Java	3	-	-	3	3	40	60	-	100
IMC111	MAJM	Programming using Java Lab	-	2	-	2	4	25	-	25	50
IMC112	MAJM	Data Structures and Algorithms	3	-	-	3	3	40	60	-	100
IMC113	MAJM	Data Structures and Algorithms Lab	-	2	-	2	4	25	-	25	50
IMC114	SEC	Operating Systems Fundamentals	2	-	-	2	2	20	30	-	50
IMC115	VSC	Software Engineering	2	-	-	2	2	20	30	-	50
IMC116	BSC	Discrete Mathematics	2	-	-	2	2	20	30	-	50
	MIN	Minor-I	2	-	-	2	2	20	30	-	50
ACIKSET102 / ACUHV101	AC	IKS: Concepts and Application in Science / UHV - I: Professional Ethics	2	-	-	-	2	50	-	-	50
IMC117	OE	Open Elective - II	2	-	-	2	2	20	30	-	50
	TOTAL		**18**	**4**	**0**	**20**	**26**	**280**	**270**	**50**	**600**

UBC116 Open Elective – II

COURSE CODE	COURSE TYPE	COURSE NAME	TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC117A	OE	Management Information System	2	-	-	2	2	20	30	-	50
IMC117B	OE	Mobile Commerce	2	-	-	2	2	20	30	-	50

Exit Policy: UG Certificate in Integrated MCA: Students who opt to exit after completion of the first year and have scored the required credits offered by the school in the program structure will be awarded a UG certificate in **Integrated MCA**, provided they must earn additional credits during the summer vacation of the first year.

COURSE CODE	COURSE TYPE	COURSE NAME	**TEACHING SCHEME**					**ASSESSMENT SCHEME**			
			TH	PR	TUT	CREDIT	Hrs	CIA	ESA	PR/ OR	TOTAL
UCEXIMC101	VSC	PHP and MySQL / MOOCs	2	-	-	2	2	50	–	–	50
UCEXIMC102	VSC	Project	–	2	-	2	4	–	–	50	50

*Project- In house/ Sponsored/ Case Study/ Field work

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PIMPRI CHINCHWAD UNIVERSITY, PUNE, MAHARASHTRA
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(Effective from the Academic Year (2024 - 2025)

SEMESTER III

COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME					ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC201	MAJM	Python Programming	3	-	-	3	3	40	60	-	100
IMC202	MAJM	Python Programming Lab.	-	1	-	1	2	25	-	25	50
IMC203	MAJM	Database Management System	3	-	-	3	3	40	60	-	100
IMC204	MAJM	Database Management System Lab	-	1	-	1	2	25	-	25	50
IMC205	MAJE	Major Elective – I	3	-	-	3	3	40	60	-	100
IMC206	SEC	Introduction to AI and ML	3	-	-	3	3	40	60	-	100
IMC207	BSC	Statistical Techniques	2	-	-	2	2	20	30	-	50
	MIN	Minor II	2	-	-	2	2	20	30	-	50
ACUHV201 /ACCOI201	AC	UHV-II: Understanding Harmony / COI: Constitution of India	2	-			2	50	-	-	50
IMC208	OE	Open Elective – III	2	-	-	2	2	20	30	-	50
UFL201	AEC	Foreign Language – I	2	-	-	-	2	50	-	-	50
TOTAL			22	2	0	20	26	370	330	50	750

IMC205 Major Elective – I

IMC205A	MAJE	Software Engineering Using UML	3	-	-	3	3	40	60	-	100
IMC205B	MAJE	Enterprise Resource Planning Management	3	-	-	3	3	40	60	-	100

IMC208 Open Elective – III

IMC208A	OE	Introduction to Google Services	2	-	-	2	2	20	30	-	50
IMC208B	OE	Introduction to Ethical Hacking	2	-	-	2	2	20	30	-	50

UFL201 Foreign Language – I

UFL201A	AEC	Foreign Language – I: German	2	-	-	-	2	50	-	-	50
UFL201B	AEC	Foreign Language – I: Japanese	2	-	-	-	2	50	-	-	50

COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME					ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC209	MAJ M	Advanced Internet Technology	3	-	-	3	3	40	60	-	100
IMC210	MAJM	Advanced Internet Technology Lab	-	1	-	1	2	25	-	25	50
IMC211	MAJM	Big Data Analytics	3	-	-	3	3	40	60	-	100
IMC212	MAJM	Big Data Analytics Lab	-	1	-	1	2	25	-	25	50
IMC213	MAJE	Major Elective - II	3	-	-	3	3	40	60	-	100
IMC214	SEC	Introduction to Image Processing	2	-	-	2	2	20	30	-	50
IMC215	VSC	Applied Statistics using R	3	-	-	3	3	40	60	-	100
ACCOI201 / ACUHV201	AC	COI: Constitution of India / UHV-II: Understanding Harmony	2	-	-	-	2	50	-	-	50
	MIN	Minor-III	2	-	-	2	2	20	30	-	50
IMC216	OE	Open Elective - IV	2	-	-	2	2	20	30	-	50
UFL202	AEC	Foreign Language - II	2	-	-	-	2	50	-	-	50
		TOTAL	**22**	**2**	**0**	**20**	**26**	**370**	**330**	**50**	**750**
IMC213 Major Elective – II											
IMC213A	MAJE	Software Project Management	3	-	-	3	3	40	60	-	100
IMC213B	MAJE	Software Quality Assurance	3	-	-	3	3	40	60	-	100
IMC216 Open Elective – IV											
IMC216A	OE	Soft Computing	2	-	-	2	2	20	30	-	50
IMC216B	OE	Data Communications & Networks	2	-	-	2	2	20	30	-	50
UFL202 Foreign Language – II											
UFL202A	AEC	Foreign Language – II: Japanese	2	-	-	-	2	50	-	-	50
UFL202B	AEC	Foreign Language – II German	2	-	-	-	2	50	-	-	50

UG Diploma in Integrated MCA: Students who opt to exit after completion of the second year and have scored the required credits offered by the school in the program structure will be awarded a UG diploma in **Integrated MCA**, provided they must earn additional credits during the summer vacation of the second year.

COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME						ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	Hrs		CIA	ESA	PR/ OR	TOTAL
UDIEXIMC201	VSC	Advanced C++ / MOOCs	2	–	-	2	2		50	–	–	50
UDIEXIMC202	VSC	Project	–	2	-	2	4		–	–	50	50

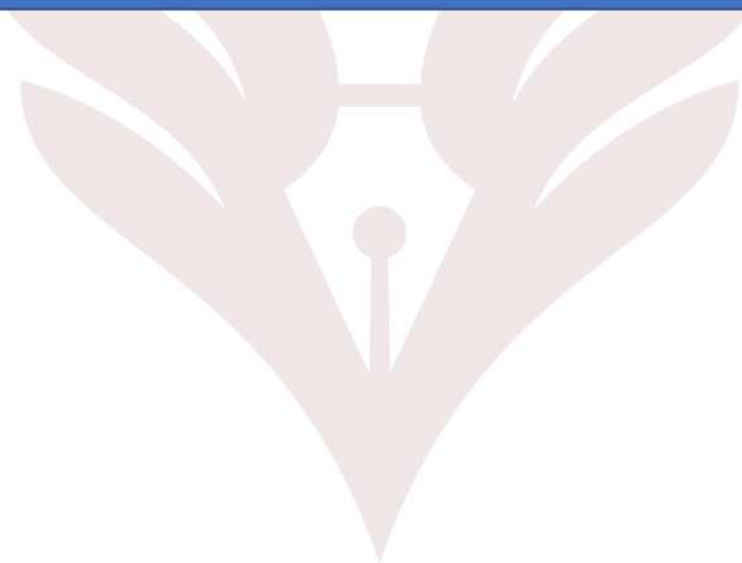***Project- In house/ Sponsored/ Case Study/ Fieldwork**

PIMPRI CHINCHWAD UNIVERSITY, PUNE, MAHARASHTRA
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SEMESTER V

COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME					ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC301	MAJM	Cloud Computing	3	-	-	3	3	40	60	-	100
IMC302	MAJM	Cloud Computing Lab.	-	2	-	2	4	25	-	25	50
IMC303	MAJM	Data Warehousing and Data Mining	3	-	-	3	3	40	60	-	100
IMC304	MAJM	Data Warehousing and Data Mining Lab.	-	2	-	2	4	25	-	25	50
IMC305	MAJE	Major Elective – III	3	-	-	3	3	40	60	-	100
IMC306	PROJ	Mini project	-	3	-	3	6	50	-	50	100
ACALR301	AC	ALR: Aptitude & Logical Reasoning	2	-	-	-	2	50	-	-	50
	MIN	Minor IV	2	-	-	2	2	20	30	-	50
IMCMOOC301	VSEC	MOOCs-1 (NPTEL/SWAYAM)-12 Week Course related to the program which is not listed in the programme structure	2	-	-	2	2	50	-	-	50
		TOTAL	**15**	**7**	**0**	**20**	**29**	**340**	**210**	**100**	**650**

IMC305 Major Elective – III

IMC305A	MAJE	Database Design and Development	3	-	-	3	3	40	60	-	100
IMC305B	MAJE	Business Intelligence	3	-	-	3	3	40	60	-	100

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SEMESTER VI									
COURSE CODE	**COURSE TYPE**	**COURSE NAME**	**TEACHING SCHEME**					**ASSESSMENT SCHEME**			
			TH	**PR**	**TUT**	**CREDIT**	**HRS**	**CIA**	**ESA**	**PR/OR**	**TOTAL**
IMC307	MAJ	Mobile Application Development	3	-	-	3	3	40	60	-	100
IMC308	MAJ	Mobile Application Development Lab	-	2	-	2	4	25	-	25	50
IMC309	MAJ	Data Science	3	-	-	3	3	40	60	-	100
IMC310	MAJ	Data Science Lab	-	2	-	2	4	25	-	25	50
IMC311	MAJE	Major Elective – IV	3	-	-	3	3	40	60	-	100
IMC312	FP	Mini project	-	3	-	3	6	50	-	50	100
	MIN	Minor V	2	-	-	2	2	20	30	-	50
IMC313	VSEC	MOOCs-2 (NPTEL/SWAYAM)-Research Methodologies and Techniques	2	-	-	2	2	50	-	-	50
		TOTAL	**13**	**7**	**0**	**20**	**27**	**290**	**210**	**100**	**600**

IMC311 Major Elective – IV										
IMC311A	MAJE	Cloud Security	3	-	-	3	3	40	60	-	100
IMC311B	MAJE	Bioinformatics	3	-	-	3	3	40	60	-	100

		PIMPRI CHINCHWAD UNIVERSITY, PUNE, MAHARASHTRA									
		PROGRAM STRUCTURE									
		SCHOOL OF ENGINEERING & TECHNOLOGY									
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		(Effective from the Academic Year (2024 – 2025)									
		SEMESTER VII									
COURSE CODE	**COURSE TYPE**	**COURSE NAME**	**TEACHING SCHEME**					**ASSESSMENT SCHEME**			
			TH	PR	TUT	CREDIT	Hrs	CIA	ESA	PR/OR	TOTAL
IMC401	MAJ	Computer Graphics	3	-	-	3	3	40	60	-	100
IMC402	MAJ	Computer Graphics Lab	-	2	-	2	4	25	-	25	50
IMC403	MAJ	Neural Networks and Deep Learning	3	-	-	3	3	40	60	-	100
IMC404	MAJ	Neural Networks and Deep Learning Lab	-	2	-	2	4	25	-	25	50
IMC405	SEC	Applied Data Science in Economics	3	-	-	3	3	40	60	-	100
IMC406	VSC	Introduction to Block chain	3	-	-	3	3	40	60	-	100
IMC407	FP	Major Project – I / Research Project/ Internship	-	6	-	6	12	100	-	100	200
Total			12	10	0	22	32	310	240	150	700

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SEMESTER VIII											
COURSE CODE	COURSE TYPE	COURSE NAME	TEACHING SCHEME					ASSESSMENT SCHEME			
			TH	PR	TUT	CREDIT	HRS	CIA	ESA	PR/OR	TOTAL
IMC408	MAJM	Prompt Engineering	3	-	-	3	3	40	60	-	100
IMC409	VEC	Research Methodology and IPR	3	-	-	3	3	40	60	-	100
IMC410	SEC	Econometrics	2	-	-	2	2	50	-	-	50
IMC410	FP	Major Project-II / Research Project / Internship	-	14	-	14	24	200	-	200	400
TOTAL			8	14	0	22	32	330	120	200	650

INTEGRATED MCA 2024 PATTERN

COURSE DETAILS

Semester - I

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I		Level: IN	
Course Name	Programming Concepts Using C Language	Course Code/ Course Type		IMC101/MAJM	
Course Pattern	**2024**	Version		1.0	
Teaching Scheme				**Assessment Scheme**	

Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-

Prerequisite: Students should have basic Computer Knowledge

Course Objectives (CO):	The objectives of Programming Concepts Using C Language are: 1. To identify the basic concepts of the C programming language. 2. To remember the knowledge about Computer fundamentals. 3. To understand and trace the execution of programs written in C language. 4. To apply input and output operations using programs in C language. 5. To analyze the concepts and techniques in C Programming language.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify the basic concepts of the C programming language. 2. Explain the reason why different decision-making and loop constructs are available for iteration in C language. 3. Apply knowledge of C programming to create Code for a given problem. 4. Analyze the use of different data types. 5. Evaluate the C code for a given Problem.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Fundamentals of Computers & Problem Solving in C: - Fundamentals of Computers: Introduction – History of Computers-Generations of Computers Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software-	CLO 1	9

Overview of Operating System-Programming Languages-Translator Programs-Problem Solving Techniques.		
UNIT II		
Overview of C: - Overview of C, History and Features of C, Structure of a C Program with Examples, Creating and Executing a C Program, Compilation process in C. C Character Set, C tokens – keywords, identifiers, constants, and variables, Data types.	CLO 1	9
UNIT III		
Programming Basic Concepts: - Declaration & initialization of variables, Symbolic constants. Formatted I/O functions – printf and scanf, control stings and escape sequences, output specifications with printf functions, Unformatted I/O functions to read and display single character and a string – getchar, putchar, gets and puts functions.	CLO3	9
UNIT IV		
Input and output with C: - Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions, Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions.	CL04	9
UNIT V		
C Operators, Expressions and Control Structures Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, Bitwise operators, Conditional operators, Special operators, Operator Precedence and Associativity, Evaluation of arithmetic expressions, Type conversion. Decision making Statements - Simple if, if else, nested if else, else if ladder, Switch Case, goto, break & continue statements, Looping Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.	CLO5	9

Learning resources

Textbooks:
1. E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill
2. P. K. Sinha & Priti Sinha: Computer Fundamentals.
3. Kamthane: Programming with ANSI and TURBO C (Pearson Education)

Reference Books:
1. Henry Mullish & Hubert L. Cooper: The Spirit of C, Jaico
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson
3. V. Rajaraman: Programming in C.

Online Resources/E-Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc20_cs913
2. https://www.programiz.com/c-programming

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I		Level: IN	
Course Name	Programming Concepts Using C Language Lab	Course Code/ Course Type		IMC102/MAJM	
Course Pattern	2024	Version		1.0	
Teaching Scheme					

Teaching Scheme

					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
-	2	-	2	4	25	-	25

Prerequisite: Basic Computers are required.

Course Objectives (CO):	The objectives of Programming Concepts Using C Language Lab are: - 1. To understand the fundamentals of programming in C Language. 2. To apply solutions to problems and implement them in C. 3. To analyze programming components to solve computing problems. 4. To evaluate and debug programs in C language. 5. To Design and create C Programs.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify data type for implementing programs in C language 2. Explain the modular programs involving input-output operations. 3. Apply knowledge of decision-making and looping constructs. 4. Analyze decision making and looping constructs. 5. Evaluate the C code for a given Problem.

Course Contents/Syllabus:

Practical Plan

Activity Number	Assignment/Practical/Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Familiarization with the Programming Environment. Introduction to Programming, Writing of Algorithms, Introduction to Drawing flow Charts /Preparation of Flowchart/ Steps for Writing Code in C/ Turbo C	Week 1	To understand the basic fundamentals of C Programming. 1.1 First Basic Program-Writing a Single Statement. 1.2 Writing a Program to print your Basic details Multi statements.	CLO1	2
2	Using Turbo C and Fundamentals of Programming Language	Week 2	To understand the basic fundamentals of C Programming 1.1 To perform simple Input-Output Operations. 1.2 To add two numbers.	CLO1	2
3	Assignment on use of data types, simple operators (expressions)	Week 3	To understand the basic fundamentals of C Programming. 1.1 WAP to perform simple arithmetic operations in C(Addition, Subtraction, Multiplication, Division, Modulus)	CLO1	2
4	Debugging and Single-Stepping of Programs	Week 4	To understand the basic fundamentals of C Programming. 1.1 WAP to find the area and perimeter of the circle. 1.2 WAP to find area and perimeter of rectangle	CLO1	2
5	Formatted I/O functions – printf and scanf	Week 5	To perform the various, I/O functions. 1.1 Given the values of three variable entered by user, write a program to compute and display	CLO2	2

			the value of x, where x=a/(b-c).		
6	Read and display single character and a string	Week 6	To apply the operations on character and string. 1.1 Write a C program to read a single character as input 1.2 To read sentences as input from the user 1.3 Read and Display ASCII values . 1.4 Read multiple inputs from the user.	CLO2	2
7	Assignment on decision making statements (if and if else)	Week 7	Solve the Programming problems. 1.1 To find whether a given number is positive or not. 1.2 WAP to find the greatest of two numbers. 1.3. WAP to find the greatest of three numbers using nested if/else if statements only.	CLO3	2
8	Assignment on decision making statements-nested if	Week 8	Solve the Programming problems. 1.1 Program for analysis of people of certain age groups who are eligible for getting a suitable job if their condition and norms get satisfied using nested if statements. 1.2 Program to find which number is greater among the considered number and then how the execution happens with the help of nested if statement if the flow gets successful then it is counted as normal flow.	CLO3	2
9	Assignment on decision making statements (switch case)	Week 9	Solve the Programming Problems. 1.1 WAP to design a simple calculation using switch case statements. 1.2 WAP to print day of a week using switch case statement	CLO3	2
10	Assignment on use of while loops	Week 10	Debug the Programs 1.1 WAP to print counting 1 to 10 using while loop	CLO4	2

			1.2 WAP to print table of any number.		
11	Assignment on writing C programs in a modular way.	Week 11	1.1 WAP to print the Fibonacci series up to 10 level. 1.2 WAP to find whether the given number is Armstrong or Not. 1.3 WAP to find whether the given number is Palindrome or Not.	CLO4	2
12	Looping related problems	Week 12	Create the Programs 1.1 WAP to print the Fibonacci series up to 10 level. 1.2 WAP to find whether the given number is Armstrong or Not. 1.3 WAP to find whether the given number is Palindrome or Not. 1.4 WAP to find whether the given number is prime or not. 1.5 WAP to reverse the digits of a given number	CLO5	2
13	Assignment on Conditional operator, Special operators	Week 13	Create the Programs 1.1 Find the number is positive or negative using the conditional operator. 1.2 Write a program to enter two numbers. Make a comparison between them with the conditional operator. If the first number is greater than the second, perform a division operation otherwise multiplication operation.	CLO5	2
14	Assignment on Operator Precedence	Week 14	Create the Programs 1.1 Write a program that prints the result of all the operators available in c (including pre/ post increment, bitwise and logical). 1.2 Write a program which will demonstrate all the operations done by using Operator Precedence.	CLO5	2

| 15 | Evaluation of arithmetic expressions; Type conversion | Week 15 | Create the Programs 1.1 Converting any numeric type to any other numeric type. 1.2 Create a program to calculate the percentage of a user's score in relation to the maximum score in a game. 1.3 Use type conversion to make sure that the result of the following example is 1.5, and not just 1. | CLO5 | 2 |

Learning resources

Textbooks:

1. E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill
2. P. K. Sinha & Priti Sinha: Computer Fundamentals.
3. Kamthane: Programming with ANSI and TURBO C (Pearson Education)

Reference Books:

1. Henry Mullish & Hubert L.Cooper: The Spirit of C, Jaico
2. Ashok N Kamthane: Programming with ANSIand Turbo C, Pearson
3. V. Rajaraman: Programming in C.

Online Resources/E-Learning Resources

1. https://onlinecourses.nptel.ac.in/noc20_cs913
2. https://www.programiz.com/c-programming

COURSE CURRICULUM

Name of the Program:	Integrated MCA			Semester : I		Level: IN	
Course Name	Web Programming			Course Code/ Course Type		IMC103/MAJM	
Course Pattern	2024			Version		1.0	
Teaching Scheme				Assessment Scheme			
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-

Prerequisite: Anyone can take this course with basic knowledge of computers.

Course Objectives (CO):	The objectives of Web Programming Are: 1. To recall different components and technologies of the World Wide Web as a platform. 2. To recognize HTML5 elements and components 3. To apply knowledge of HTML5 and CSS 4. Develop responsive web designs that adapt to various devices, and use JavaScript to enhance user interactivity and create dynamic web applications. 5. To Design and develop websites using fundamental web languages, technologies, and tools.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify basic web development methodologies. 2. Comprehend static web-based application using suitable client-side web technologies 3. Apply knowledge of foundational understanding of web development concepts for further study. 4. Analyze and create responsive layouts that adapt to various devices and screen sizes. 5. Evaluate the JavaScript, enabling dynamic content generation, effective event handling, and efficient DOM traversal techniques.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Basics of Internet and Web: Web Basics: Web Browsers, Web Servers, Three Tier Technology and its types, Static and Dynamic Web Page. Client side and Server-side Scripting. Web Protocols: details of HTTP, HTTPS, Web Hosting: Domain name, DNS, URL	CLO 1	9
UNIT II		
Dietary Assessment tools: Introduction, Document metadata, Basic structure of HTML, Sections, Grouping content, Text-level semantics, Embedded content, Tabular data, Forms, Interactive elements List, Links, Images, Frames	CLO 2	9
UNIT III		
Page Designing with CSS: Introduction to designing approaches, Table-based designs Table-less designs, Cascading Style Sheet and its properties, Introduction CSS vs CSS3, CSS properties — Text and Fonts, Colors and Backgrounds, The Box Model (dimensions, padding, margin and borders), Positioning and Display, Lists, Tables, Media, Converting Image design to HTML (Slicing)	CLO3	9
UNIT IV		
DHTML: Dynamic HTML, Features of DHTML, Document Object Model, CSSP (Cascading Style Sheet Positioning),JSSS (JavaScript assisted Style Sheet),Layers of Netscape, The ID Attribute, HTML Events.	CLO4	9
UNIT V		
Java Script: Objects, Methods, Events and Functions, Tags Operators, Data Types, Literals and Type Casting in JavaScript Programming Construct, Array and Dialog Boxes, Relating JavaScript to DHTML, Dynamically Changing Text, Style, Content.	CLO5	9
Total Hours		**45 Hours**

Learning resources

Textbooks:
1. Learn HTML for Beginners: The Illustrated Guide to Coding Paperback, Jo Foster
2. HTML: A Beginner's Guide, Fifth Edition: A Beginner's Guide, Fifth Edition: CourseLoad ebook for HTML A BEGINNERS GD 5E, Wendy Willard.

Reference Books:

1. JavaScript for Absolute Beginners (Expert's Voice in Web Development) Paperback, by Terry McNavage (Author)

2. Learn JavaScript Quickly: A Complete Beginner's Guide to Learning JavaScript, Even If You're New to Programming by Code Quickly.

Online Resources/E-Learning Resources
1. https://www.w3schools.com/html/
2. https://www.tutorialspoint.com/html5/index.htm
3. https://javascript.info/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I		Level: IN
Course Name	Web Programming Lab	Course Code/ Course Type		IMC104/MAJM
Course Pattern	2024	Version		1.0

Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
-	2	-	2	4	25	-	25

Prerequisite: Basic Knowledge of Computers are required.

Course Objectives (CO):	The objectives of Web Programming Lab are: 1. To recall different components and technologies of the World Wide Web as a platform. 2. To recognize HTML5 elements and components 3. To apply knowledge of HTML5 and CSS 4. Develop responsive web designs that adapt to various devices, and use JavaScript to enhance user interactivity and create dynamic web applications. 5. To Design and develop websites using fundamental web languages, technologies, and tools.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify basic web development methodologies. 2. Comprehend static web-based application using suitable client-side web technologies 3. Apply knowledge of foundational understanding of web development concepts for further study. 4. Analyze and create responsive layouts that adapt to various devices and screen sizes.

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5. Evaluate the JavaScript, enabling dynamic content generation, effective event handling, and efficient DOM traversal techniques.

Course Contents/Syllabus:
Practical Plan

Activity Number	Assignment/Practical/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Write a HTML program for the demonstration of Lists.	Week 1/ Turn 1 and 2	a. Unordered List b. Ordered List c. Definition List d. Nested List	CLO1	2
2	Write a HTML program for demonstrating Hyperlinks.	Week 2/ Turn 1 and 2	a. Navigation from one page to another. b. Navigation within the page.	CLO1	2
3	Assignment on HTML5 Table Element	Week 3/ Turn 1 and 2	Write a HTML program for time-table using tables.	CLO1	2
4	Create Home Page using HTML5	Week 4/ Turn 1 and 2	Write a HTML program to develop a static Home Page using frames.	CLO1	2
5	Create Registration Page using HTML5	Week 5/ Turn 1 and 2	Write a HTML program to develop a static Registration Form.	CLO2	2

6	Create Login Page using HTML5	Week 6/ Turn 1 and 2	Write a HTML program to develop a static Login Page.	CLO2	2
7	Create Product catalogue.	Week 7/ Turn 1 and 2	Write a HTML program to develop a static Web Page for Catalogue.	CLO3	2
8	Create CSS	Week 8/ Turn 1 and 2	Write HTML for demonstration of cascading style sheets. a. Embedded stylesheets. b. External stylesheets. c. Inline styles.	CLO3	2
9	Create Login page using Javascript Validation	Week 9/ Turn 1 and 2	Write a javascript program to validate the USER LOGIN page.	CLO3	2
10	Create Registration page using Javascript Validation	Week 10/ Turn 1 and 2	Write a javascript program for validating REGISTRATION FORM	CLO4	2
11	Event Handling	Week 11/ Turn 1 and 2	Background Color Change	CLO4	2
12	Event Handling	Week 12/ Turn 1 and 2	calendar for the month and year by combo box application	CLO5	2
13	Event Handling	Week 13/ Turn 1 and 2	OnMouseover event	CLO5	2
14	Event Handling	Week 14/ Turn 1 and 2	OnMouseover using objects	CLO5	2
15	Application	Week 15/ Turn 1 and 2	Online Exam application	CLO5	2

Learning resources

Textbooks:
1. Learn HTML for Beginners: The Illustrated Guide to Coding Paperback, Jo Foster
2. HTML: A Beginner's Guide, Fifth Edition: A Beginner's Guide, Fifth Edition: CourseLoad ebook for HTML A BEGINNERS GD 5E, Wendy Willard.

Reference Books:

1. JavaScript for Absolute Beginners (Expert's Voice in Web Development) Paperback, by Terry McNavage (Author)
2. Learn JavaScript Quickly: A Complete Beginner's Guide to Learning JavaScript, Even If You're New to Programming by Code Quickly.

Online Resources/E-Learning Resources
1. https://www.w3schools.com/html/
2. https://www.tutorialspoint.com/html5/index.htm
3. https://javascript.info/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I		Level: IN	
Course Name	Computer Organization and Design	Course Code/ Course Type		IMC105/SEC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme			
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-

Prerequisite: Anyone can take this course with basic knowledge of computers.

Course Objectives (CO):	The objectives of Computer Organization and Design are:
	1. Comprehend the basic principles of computer organization and architecture:
	2. Analyze the performance of computer systems:
	3. Design and implement digital logic circuits:
	4. Explain the role of instruction set architecture (ISA):
	5. Apply knowledge to solve real-world problems:
Course Learning Outcomes (CLO):	Students would be able to:
	1. Demonstrate an understanding of the basic principles of computer organization.
	2. Design and implement digital logic circuits using Boolean algebra and logic gates.
	3. Comprehend the knowledge of CPU architecture.
	4. Explain memory hierarchy.
	5. Demonstrate of input and output devices in computer systems

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Computer Organization: Overview of computer architecture and organization, History and evolution of computer systems, Role of computer organization in computer science, Introduction to instruction set architecture (ISA), Basic components of a computer system: CPU, memory, I/O devices, Performance metrics and benchmarks	**CLO 1**	9
UNIT II		
Digital Logic and Boolean Algebra: Fundamentals of digital logic circuits, Boolean algebra and logic gates, Combinational and sequential logic, Arithmetic circuits: adders, subtractors, multipliers, Memory units: SRAM, DRAM, ROM, Introduction to FPGA and CPLD	**CLO 2**	9
UNIT III		
Architecture and Organization: Overview of CPU architecture, Instruction execution cycle: fetch, decode, execute, CPU components: ALU, control unit, registers, Instruction formats and addressing modes, Assembly language programming, Pipelining and hazards in CPU design	**CLO3**	9
UNIT IV		
Memory Hierarchy and Storage Systems: Memory hierarchy: cache, main memory, secondary storage, Cache organization and mapping techniques, Cache coherence and replacement policies, Virtual memory concepts and paging, I/O subsystem: buses, controllers, devices, Disk storage systems: HDD, SSD, RAID	**CLO4**	9
UNIT V		
Input/Output and System Interfacing: Input/output devices and interfaces, Polling vs. interrupt-driven I/O, DMA and I/O processor architectures, Device communication protocols: USB, Ethernet, PCIe, System buses and bus protocols: PCI, SATA, SCSI, Introduction to parallel and distributed systems	**CLO5**	9
Total Hours		**45 Hours**

Learning resources

Textbooks:
1. Computer Organization and Design: The Hardware/Software Interface" by David A. Patterson and John L. Hennessy
2. Computer Systems: A Programmer's Perspective" by Randal E. Bryant and David R. O'Hallaron

Reference Books:
1. Computer Organization and Design Fundamentals" by David Tarnoff
2. Structured Computer Organization" by Andrew S. Tanenbaum

Online Resources/E-Learning Resources
1. https://onlinecourses.nptel.ac.in/noc20_cs64/preview
2. https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
3. https://www.cse.iitd.ac.in/~rijurekha/col216/edition5.pdf

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I		Level: IN	
Course Name	Mathematical Foundation for Computer Science	Course Code/ Course Type		IMC106/BSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-

Prerequisite: Basic mathematics

Course Objectives (CO):	The objectives of Mathematical Foundation for Computer Science are: 1. To memorize the Matrices and its operations. 2. Classify the trigonometric functions. 3. To execute various operations on analytical geometry. 4. To compare the various forms of differential calculus. 5. To evaluate the different forms of calculus.
Course Learning Outcomes (CLO):	Students would be able to: 1. Students will be able to identify the matrices and the operations associated with it. 2. Explain the various trigonometric functions. 3. Apply knowledge of geometry to various real-life situations. 4. To examine the differential calculus with respect to different forms. 5. To execute gamma functions and its properties.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		

Matrices: Matrices, Types of matrices, Elementary properties of matrices, inverse matrices, Rank of a matrix, Symmetric, Skew symmetric and Orthogonal matrices, system of linear equations, Gauss elimination method and Gauss Jordan method.	**CLO 1**	**9**
UNIT II		
Trigonometry: Introduction, Trigonometric ratios, Transformations, Identities, Inverse trigonometric functions (only elementary topics)	**CLO 2**	**9**
UNIT III		
Analytical Geometry: Scalar product, vector product, angle between two vectors, shortest distance between two lines, conditions for two lines to intersect, point of intersection, collinearity of three points (self- study topics). Direction ratios, direction cosines of a line passing through two points, equation of a line in space, angle between two lines, shortest distance between two lines, plane, equation of a plane in normal form.	**CLO3**	**9**
UNIT IV		
Differential Calculus: Limit continuity, differentiability, Roll's Theorem, Mean value theorems (Cauchy's and Lagrange's), Power series expansions of functions in Taylor's and Maclaurin's forms; indeterminate forms and L - Hospital's rule.	**CLO4**	**9**
UNIT V		
Integral Calculus: Integral as limit of sum, Fundamental theorem of calculus, indefinite integrals, Methods of Integration, Substitution method, Integration by parts and by partial fraction technique, Beta Gamma functions and their properties.	**CLO5**	**9**
Total Hours		**45**

Learning resources
Textbooks:
1. Hugh Neill, Trigonometry: A complete Introduction, John Murray Learning, 2018.
2. George B. Thomas and Ross L. Finney, Calculus and Analytical Geometry, Addison- Wesley, 9th Edn, 1998.

Reference Books:
1. Erwin Krayzie, Advanced Engineering Mathematics, John Wiley and sons, Inc.10th Edition.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2010.

Online Resources/E-Learning Resources
    4. https://bs-ug.iisc.ac.in/UG-Math.pdf
    5. https://mathinova.com/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I		Level: IN	
Course Name	Applied Communication	Course Code/ Course Type		IMC107/AEC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	-	2	50	-	-

Prerequisite: Anyone can take this course with basic knowledge of English communication.

Course Objectives (CO):	The objectives of Applied Communication are: 1. To comprehend the basic English communication components. 2. To Identify the Factors influencing interpersonal communication. 3. To apply the knowledge of written communication. 4. To Demonstrate English communication in public speaking and presentation. 5. To develop students' understanding of digital communication tools, media literacy skills, and ethical considerations in online communication.
Course Learning Outcomes (CLO):	Students would be able to: 1. Define communication and explain its significance in personal, professional, and societal contexts. 2. Apply interpersonal communication skills in various contexts, such as social interactions, group

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discussions, teamwork, leadership, and professional settings.		

3. Comprehend the fundamental principles of effective writing, including clarity, coherence, conciseness, and correctness.

4. Reflect on their presentation experiences, seek feedback from peers.

5. Demonstrate digital tools for collaboration, communication, and productivity, including project management platforms.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Communication: Definition and models of communication, Importance of effective communication in personal and professional contexts, Basic elements of communication: sender, receiver, message, channel, feedback, Communication barriers and strategies for overcoming them, Verbal and nonverbal communication skills	CLO 1	6
UNIT II		
Interpersonal Communication: Understanding interpersonal relationships, Factors influencing interpersonal communication: culture, gender, perception, and self-concept, Effective listening skills and techniques, Assertiveness and conflict resolution strategies, Building and maintaining healthy, relationships	CLO 2	6
UNIT III		
Written Communication: Principles of effective writing: clarity, coherence, conciseness, and correctness, Types of written communication: emails, memos, letters, reports, and resumes, Planning and organizing written documents, Grammar, punctuation, and style conventions, Proofreading and editing techniques	CLO3	6
UNIT IV		
Public Speaking and Presentation Skills: Understanding the importance of public speaking, Preparing and organizing a presentation: topic selection, audience analysis, and speech outline, Delivery techniques: voice modulation, body language, and eye contact, Overcoming stage fright and anxiety, Handling questions and feedback from the audience	CLO4	6
UNIT V		
Digital Communication and Media Literacy: Overview of digital communication tools: email, social media, instant messaging, and video conferencing, Netiquette and online professionalism, Understanding media messages and sources	CLO5	6

Total Hours		30 Hours

Learning resources

Textbooks:
1. Communication in Everyday Life: A Social Interpretation" by Steve Duck and David T. McMahan
2. Applied Communication in the 21st Century" by Carole L. Huston and Ronald B. Adler:

Reference Books:
1. The SAGE Handbook of Communication and Instruction" edited by Deanna L. Fassett and John T. Warren
2. Communication: Principles for a Lifetime" by Steven A. Beebe, Susan J. Beebe, and Diana K. Ivy

Online Resources/E-Learning Resources
1. https://www.udemy.com/topic/communication-skills/free/
2. https://www.uou.ac.in/sites/default/files/slm/BHMAECC-II.pdf

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I		Level: IN	
Course Name	Information Technology Trends	Course Code/ Course Type		IMC108/VSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-

Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-

Prerequisite: Anyone can take this course with basic knowledge of computers.

Course Objectives (CO):	The objectives of Information Technology Trends are: 1. Comprehend the basic knowledge of AI and ML. 2. Describe the data security and data privacy. 3. Understand the basic knowledge of Data Analytics. 4. Explain the role of the Internet in Cloud Computing. 5. Discuss the overview and application of IoT
Course Learning Outcomes (CLO):	Students would be able to:

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	1. Recognize and discuss practical applications of AI and ML in various industries such as healthcare, finance, and entertainment.
	2. Identify common cybersecurity threats, such as malware, phishing, and ransomware.
	3. Define key terms and concepts in data analytics.
	4. Describe different types of cloud computing services.
	5. Recognize and discuss the use of IoT in various contexts, such as smart homes, wearables, and industrial IoT.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Artificial Intelligence and Machine Learning: Introduction to AI and ML, Basic concepts and definitions, Applications: AI in industries such as healthcare, finance, and entertainment.	CLO 1	6
UNIT II		
Cybersecurity and Data Privacy: Overview of Cybersecurity: Types of threats and security measures, Data Privacy and Regulations: Legal and ethical considerations (e.g., GDPR).Emerging Trends: Ransomware, phishing, and zero-day vulnerabilities.	CLO 2	6
UNIT III		
Data Analytics: Introduction to Data Analytics: Concepts and techniques for analyzing data	CLO3	6
UNIT IV		
Cloud Computing: Introduction to Cloud Computing, Concepts and deployment models (public, private, hybrid). Types of Cloud Services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).	CLO4	6
UNIT V		
Internet of Things (IoT): Overview of IoT: Technologies and concepts behind connected devices. Applications of IoT: Smart homes, wearable devices, and industrial IoT.	CLO5	6
Total Hours		**30 Hours**

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Learning resources

Textbooks:
1. Information Technology for Management: Transforming Organizations in the Digital Economy" by Efraim Turban, Carol Pollard, and Gregory Wood
2. Principles of Information Systems" by Ralph Stair and George Reynolds

Reference Books:
1. Artificial Intelligence: A Guide to Intelligent Systems" by Michael Negnevitsky
2. Cybersecurity Essentials" by James Graham, Ryan Olson, and Rick Howard

Online Resources/E-Learning Resources
1. https://www.tutorialspoint.com/aiml/aiml_tutorial.pdf
2. https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
3. https://www.ftc.gov/system/files/attachments/cybersecurity-small-business/cybersecuirty_sb_factsheets_all.pdf

COURSE CURRICULUM

Name of the Program:	Integrated MCA		Semester : I/II		Level: IN		
Course Name	UHV-I: Professional Ethics		Course Code/ Course Type		ACUHV101/AC		
Course Pattern	2024		Version		1.0		
Teaching Scheme				Assessment Scheme			
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	0	0	0	2	50	-	-
Prerequisite: UHV-I							
Course Objectives (CO):			The objectives of Universal Human Value-Professional Ethics are: 1. To make the students understand the importance of ethical behavior 2. To expose the students to the ethical practices to be followed in the profession 3. To sensitize the students to become responsible persons who will uphold ethics in their profession when they pursue their career 4. To make students understand Psychological and Philosophical approaches				

	5. To make students understand social responsibility and corporate Sustainability
Course Learning Outcomes (CLO):	Students would be able to: 1. Equip themselves with an understanding of moral, professional and personal values. 2. Understand the need of ethics in shaping their profession The learners will hone their decision-making skills. 3. Refine their business ethics based on psychological and philosophical perspectives. 4. Assess the need for a balance between ecology, and economy. 5. Equip themselves with a better understanding of themselves and the society they live in and the responsibilities they shoulder in creating a sustainable world.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Individual and Professional Ethics: Introduction to Professional Ethics, Morals, Values and Ethics – Personal and Professional- Sensé of Professional Ethics – Code of Ethics by NSPE-Making decisions with ethical dimensions–definition–roadmap to ethical decision making–common standards– internal obstacles – bias – empathy	CLO 1	6
UNIT II		
Business Ethics: Philosophical approaches to Business Ethics – ethical reasoning – ethical issues in business - Social Responsibility of Business- conflict of interest– cultural relativism-Ethical Leadership-Resisting un-ethical authority and domination-Global Business Ethics	CLO 2	6
UNIT III		
Psychological Approaches: Ethical Theories-Psychological and Philosophical Approaches-Myths about Morality-conflict of interest in psychological perspective - Courage-Integrity – ethical dilemma – Emotional Intelligence (Mahabharata-Iskcon Publications)	CLO 3	6
UNIT IV		
Workplace Ethics: Ethics in changing domains of Research–academic integrity– intellectual honesty-Role of Engineers and Managers-Ethical issues in Diverse	CLO 4	6

workplace – competition – free will- Confidentiality – employee rights – Intellectual property rights – discrimination		
UNIT V		
Safety, Responsibilities and Rights: Ecology, and Economy-Risk benefit analysis and reducing risk SDGs–Corporate social responsibility and Corporate Sustainability - CSR in India - Sustainability Case Studies	CLO 5	6
Total Hours		30

Learning resources

Textbooks:
1. Subramanian. R. *Professional Ethics*, Oxford Publication,2013.
2. Nagarasan. R. S. *Professional Ethics and Human Values*. New Age International Publications, 2006.

Reference Book:
1.   Mike W Martin and Roland Schinzinger, *Ethics in Engineering*,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014

Online Resources/E-Learning Resources
1. https://www.nspe.org/resources/ethics/code-ethics

1.   https://www.toolshero.com/tag/ethical-decision-making/

2.   https://pagecentertraining.psu.edu/public-relations-ethics/introduction-to-public-relations-ethics/lesson-1/ethical-theories/

3.   https://peer.asee.org/case-studies-in-engineering-ethics.pdf

CIA Guidelines

Online Quiz (Based on MCQ)– 20 marks

Activity (with short Report Submission) -   20 Marks

Academic Sincerity - 10 marks

Few of the suggested activities are Assignments, Debates, Poster presentations, Model making, Group presentation, Field visits and Group Discussions.

Few of suggested topics related to **UHV1- Professional Ethics** are:

Debate Topics

- Ethical Approach versus Realistic Approach
- Individual and Social Approach
- Dilemma between heart and Mind

Activity

- Analyze the wastage (Electricity or any other) at work place? How you managed.

Assignment

- Analyze the code of ethics at work place
- If you fulfil the duties, rights will automatically fall in place. Justify the statement

References:

1. https://uhv.org.in/
2. https://vvce.ac.in/wp-content/uploads/2021/04/Realising-Aspirations-of-NEP2020-UHV.pdf

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I/II		Level: IN	
Course Name	Concepts and Application in Science	Course Code/ Course Type		ACIKSET102/AC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	
Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	50	-	-
Prerequisite: None							

Course Objectives (CO):	The objectives of Concepts and Application in Science are:
	1. To remember Indian Knowledge Systems: Origin, Evolution and Ontological Approach
	2. To understand Indian Knowledge Approaches.
	3. To apply Sciences of Life and Mind.
	4. To examine Indian Knowledge System Torchbearers – Ancient and Modern
	5. To analyze Self-Knowledge for Personal Effectiveness.
Course Learning Outcomes (CLO):	Students would be able to:
	1. Identify and appreciate the rich heritage that resides in our traditions.
	2. Explain the mind/voice dynamic in Indian knowledge systems.
	3. Explain the practices that will prepare one for the inner-journey to discover the Self.
	4. Analyze the need and importance of Sanskrit in getting to the roots of the philosophical concepts.
	5. Analyze the various functions in Indian knowledge systems.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Indian Knowledge System and Vedic Corpus: Introduction to IKS, Need for IKS, Historicity of IKS, Salient aspects of IKS, IKS in ancient India and in modern India.Introduction to Vedas, Four Vedas, Sub-classification of Vedas, Messages in Vedas, Basics of Nirukta and Chandas.	CLO1	6
UNIT II		
wisdom through the Ages: Puranas, Ithihasas, Niti shastras, Subhasitas, Linguistics, Components of a language, Paṇini's work on Sanskrit grammar, Phonetics in Sanskrit, Role of Sanskrit in natural language processing, Framework for establishing valid knowledge.	CLO2	6
UNIT III		
Number Systems and Units of Measurement: Salient features of the Indian numeral system, Importance of decimal representation, The discovery of zero and its importance, Unique approaches to represent numbers, Unique aspects of Indian Mathematics, Great mathematicians and their significant contributions in the area of arithmetic, algebra, geometry, trigonometry, combinatorial problems in Chandaḥ-sastra of Pingala	CLO3	6
UNIT IV		
Knowledge Framework and classifications: Indian scheme of knowledge,The knowledge triangle,Prameya,A vaiśeṣikan approach to physical reality, Dravyas,The constituents of the physical reality	CLO4	6
UNIT V		
Science and Technology in the Vedic Age and Post-Vedic Records.		

Knowledge: Framework and Classification, Astronomy Encryption Method used in ancient India, Introduction to Yantra Shastra, Vaimanik Shashtra, Agriculture Technologies	CLO5	6
Total hours		**30**

Activity 1: Comparative Analysis of Traditional and Modern Scientific Methods

Activity 2: Presentation on Indian scientific texts such as the Phonetics in Sanskrit, Astronomy Encryption Method used in ancient India

Learning resources

Textbooks:

1. Health Science: Concepts and Applications, Authors: Jacquelyn Rhine Marshall and Sue C. Roe
2. Introduction to Indian Knowledge Systems: Concepts and Applications by Prof. B Mahadevan

Reference Books: -

1. Introduction to Indian Knowledge System: Concepts and Applications by Pallavi Ghosh

Online Resources/E-Learning Resources
1. https://onlinecourses.swayam2.ac.in/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I	Level: IN
Course Name	**Client Server Computing**	Course Code/ Course Type	IMC109A /OE
Course Pattern	**2024**	Version	1.0

Teaching Scheme					Assessment Scheme		
Theory	**Practical**	**Tutorial**	**Total Credits**	**Hours**	**CIA (Continuous Internal Assessment)**	**ESA (End Semester Assessment)**	**Practical/Oral**
2	-	-	2	2	20	30	-

Prerequisite: Data communication and networking knowledge	
Course Objectives (CO):	The objectives of Client Server Computing are: 1. To comprehend the fundamental principles and architecture of client-server computing 2. To explore various client server components. 3. To analyze and compare different client-server architectures, such as two-tier, three-tier, and n-tier models. 4. To explain SQL database server. 5. To comprehend the knowledge of transaction models in client server computing.
Course Learning Outcomes (CLO):	Students would be able to: 1. Understand the foundational concepts of client-server architecture. 2. Demonstrate a comprehensive understanding of the key components involved in client-server computing 3. Acquire a detailed comprehension of the diverse components comprising client-server system architecture. 4. Develop a thorough understanding of the essential components of SQL database servers. 5. Explore data warehousing techniques and data mining methodologies within client-server computing environments.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Client Server System Concepts: Introduction, Concepts, Client Server Architecture, Two-Tier Architecture, Three-Tier Architecture, N-Tier Architecture, N-Tier vs 2-Tier Architecture, Case Study of N-Tier Architecture – Client Server Models, Gartner Classification, Middleware Characteristics and types of Server – File Server – Database Server – Communication Server – Object Server – Groupware Server – Transaction Server, Characteristics and types of Clients – Thin Client – Fat Client.	CLO 1	6

UNIT II		
Components of Client Server Computing: Client – Role of the Client, Client Services, Request for Service, Components of Client Server Computing, Server – Role of the Server, Server Functionality in detail, Components of Client Server Applications, Connectivity, OSI – Communications Interface Technology.	CLO 2	6
UNIT III		
Client Server System Architecture: Client Server Building Blocks, Hardware – Client Hardware, Server Hardware, Client Server Building Blocks, Software - Client Server Systems Development Methodology, Project Management, Architecture Definition, Systems Development Environment, Middleware – Types of Middleware – DCE, MOM, TP – Monitors, ODBC – Design Overview of ODBC - ODBC Architecture, Components, Applications – Driver Managers, Database Drivers, ODBC Data Sources, Network Operating System - Base Services, External Services.	CLO3	6
UNIT IV		
SQL Database Servers: Server Architecture, Multi Thread Architecture, Hybrid Architecture, Stored Procedures, Triggers	CLO4	6
UNIT V		
Transaction Models: Chained and Nested Transactions, Transaction Management Standards, Data Warehousing - Warehousing Techniques, Data Mining.	CLO5	6
Total Hours		30

Learning resources

Textbooks:

1. Robert Orfali, Dan Harkey and Jerri Edwards: Essential Client/Server Survival Guide, John Wiley &Sons Inc 1996.

Reference Books:

1. Alex Berson: Client Server Architecture

2. Patrick Smith, Steve Guengerich: Client Server Computing, Second Edition, Prentice Hall of India Pvt Ltd.

Online Resources/E-Learning Resources
1. https://www.javatpoint.com/computer-network-client-and-server-model
2. https://www.knowledgehut.com/blog/cloud-computing/client-server-architecture

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I	Level: IN
Course Name	Computer Graphics Multimedia	Course Code/ Course Type	IMC109B /OE
Course Pattern	2024	Version	1.0
Teaching Scheme		Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-

Prerequisite: Data communication and networking knowledge

Course Objectives (CO):	The objectives of Computer Graphics Multimedia are:
	1. To comprehend the fundamental principles and Computer graphics.
	2. To explore output primitives and attributes in computer graphics.
	3. To analyze two-dimensional geometric transformation.
	4. To evaluate three-dimensional concepts in computer graphics.
	5. To comprehend the knowledge of multimedia components, hardware and software.
Course Learning Outcomes (CLO):	Students would be able to:
	1. Comprehend the knowledge on computer graphics.
	2. Explore output primitives and attributes in computer graphics.
	3. Analyze two-dimensional geometric transformation.
	4. Evaluate three-dimensional concepts in computer graphics.
	5. Comprehend the knowledge of multimedia components, hardware and software.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
An Introduction Graphics System : Computer Graphics and Its Types, Application of computer graphics, Graphics Systems : Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors and Workstations, Input Devices, Hard Copy Devices, Graphics Software.	CLO 1	6
UNIT II		

Output Primitives and Attributes of Output Primitives : Output Primitive Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm, Cell Array, Character Generation, Attributes of Output Primitives : Line Attributes, Color and Grayscale Levels, Area fill Attributes, Character Attributes, Bundled Attributes, Antialiasing.	**CLO 2**	**6**
UNIT III		
Two-dimensional Geometric Transformations: Basic Transformations, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing. Two-Dimensional Viewing : The viewing Pipeline, Window to viewport coordinate transformation, Clipping Operations, Point Clipping, Line Clipping, Polygon Clipping, Text Clipping, Exterior Clipping	**CLO3**	**6**
UNIT IV		
Three-Dimensional Concepts: Three Dimensional Display Methods, 3D Transformations, Parallel Projection and Perspective Projection.	**CLO4**	**6**
UNIT V		
Multimedia: Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio : Analog to Digital conversion, sound card fundamentals, Audio play backing and recording Video, Text : Hypertext, Hyper media and Hyper Graphics, Graphics and Animation : Classification of Animation. Authoring Process and Tools.	**CLO5**	**6**
Total Hours		**30**

Learning resources

Textbooks:

1. Donald Hearn & M. Pauline Baker, "Computer Graphics with OpenGL", Third Edition, 2004, Pearson Education, Inc. New Delhi.
2. Ze-NianLi and Mark S. Drew, "Fundamentals of Multimedia", First Edition, 2004, PHI Learning Pvt. Ltd., New Delhi.

Reference Books:

1. Plastock : Theory & Problem of Computer Graphics, Schaum Series.

2. Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison- Wesley.

3. Newman : Principles of Interactive Computer Graphics, McGraw Hill.

Online Resources/E-Learning Resources
1. https://www.tutorialspoint.com/computer_graphics/index.htm
2. https://www.youtube.com/watch?v=NmMky9Pg8Yc&list=PLrjkTql3jnm9cY0ijEyr2fPdwnH-0t8EY

INTEGRATED MCA 2024 PATTERN

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: II		Level: IN
Course Name	Programming Using JAVA	Course Code/ Course Type		IMC110 / MAJM
Course Pattern	2024	Version		1.0
Teaching Scheme			Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-

Prerequisite: Knowledge of basic programming and its concepts.

Course Objectives (CO):	The Course objectives of Programming Using JAVA are: 1. To recall and monitor object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism. 2. To recognize inheritance and packages in program design. 3. To analyze programming insight using OOP constructs. 4. To explain advanced programming by using a collection framework. 5. To Design and create GUI programming with swing controls in various real-life applications.
Course Learning Outcomes (CLO):	Students would be able to: 1. To understand different concepts of OOPs and java 2. To recall and design, develop, test, document and debug Java programs using object-oriented principles 3. Apply inheritance with developing interfaces and packages 4. To study exception handling and multithreading and their applications in real-world problems. 5. To implement, compile, test, and run Java programs comprising more than one class, to address a particular software problem.

Course Contents/Syllabus:

Descriptors/Topics		Hours
UNIT I		
Introduction & Concepts of Classes And Objects: History of Java, Byte code, JVM, Java buzzwords, OOP principles, Data types, Variables, Scope and lifetime of variables, Operators, Control statements, Type conversion and casting, Arrays, Introducing methods, Method overloading, Constructors, Constructor overloading, Usage of static with data and method, Access control, this keyword, Garbage collection, String class, String Tokenizer.	CLO 1	9
UNIT II		
Inheritance & Packages: Inheritance basics, Types of inheritance, Member access rules, Usage of super keyword, Method overriding, Usage of final, Abstract classes, Interfaces - differences between abstract classes and interfaces, defining an interface, implementing an interface, applying interfaces, variables in interface and extending interfaces; Packages - defining, creating and accessing a package, importing packages, access control in packages.	CLO 2	9

UNIT III		
Exception Handling and Multithreading: Concepts of exception handling, Types of exceptions, Usage of try, catch, throw, throws, and finally keywords, Built-in exceptions, Creating user-defined exceptions; MULTITHREADING: Concepts of multithreading, Differences between process and thread, Thread life cycle, creating multiple threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter thread communication.	CLO 3	9
UNIT IV		
Collection Framework: Collections Overview, Collection Interfaces - List, Set, Map, List - Array List, Linked List, Vector, Set - HashSet, Tree Set, Map - Hash Table, HashMap, Accessing a collection via an Iterator, comparator, comparable.	CLO 4	9
UNIT V		
Gui Programming with Swing: Applets - Applet Class, Applet skeleton, Simple Applet; Delegation event model - Events, Event sources, Event Listeners, Event classes, handling mouse and keyboard events. EXPLORING SWING CONTROLS: JLabel and ImageIcon, JTextField, JButton, JCheckBox, JRadioButton, JTabbedPane, JList, JComboBox.	CLO 5	9
Total Hours		45

Learning resources
TEXT BOOKS:

1. Herbert Schildt, "Java the complete reference", 9th edition, McGraw Hill, Education, 2014.

2. T. Budd, "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education, 2000.

REFERENCE BOOKS:

1. J. Nino and F.A. Hosch, "An Introduction to programming and OO design using Java", 3rd edition, John Wiley & sons, 2008
2. P. Radha Krishna, "Object Oriented Programming through Java", 1st edition, Universities Press, 2007.
3. R. A. Johnson, "Java Programming and Object Oriented Application Development", 1st edition, Cengage Learning, 2006.

Online Resources/E-Learning Resources
1. https://www.w3schools.com/java/
2. https://www.javatpoint.com/java-tutorial

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : II	Level: IN

Course Name	Programming Using JAVA Lab	Course Code/ Course Type	IMC111/MAJM
Course Pattern	2024	Version	1.0

Teaching Scheme

					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
	2		2	4	25		25

Prerequisite: Student should learn at least one programming language, such as C++, Java, or Python

Course Objectives (CO):	The objectives of Programming Using JAVA Lab are: 1. To recall and monitor object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism. 2. To recognize inheritance and packages in program design. 3. To analyze programming insight using OOP constructs. 4. To explain advanced programming by using a collection framework. 5. To Design and create GUI programming with swing controls in various real-life applications.
Course Learning Outcomes (CLO):	Students would be able to: 1. Define different concepts of OOPs and java 2. Apply the knowledge of design, develop, test, document and debug Java programs using object-oriented principles 3. Comprehend inheritance with developing interfaces and packages 4. Explain exception handling and multithreading and their applications in real-world problems. 5. Develop a connection framework and develop GUI programs using swing.

Course Contents/Syllabus:
Practical Plan

Practical Number	Practical Title	Week Number /Turn	Details	CLO	Hours
1	.Program to define a structure of a basic JAVA program	Week 1/Turn 1	WAP to demonstrate data types available in java	CLO1,CLO2	2
2	Program to define the data types, variables, operators, arrays and control structures.	Week 2/ Turn 1 and 2	WAP to design a simple calculator using switch case statement	CLO1,CLO2	2
			WAP to print all prime numbers between 1 to 1000	CLO1,CLO2	
3		Week3/ Turn 1 and 2	WAP to implement linear search in 1D array	CLO1,CLO2	2
			WAP to implement bubble sort in 1 D array	CLO1,CLO2	
4		Week 4/ Turn 1 and 2	WAP to multiply 2 matrices in java	CLO1,CLO2	2
			WAP to implement recursion function in java	CLO1,CLO2	
			WAP to demonstrate some in-built functions on Strings	CLO1,CLO2	
5	Program to define class and constructors. Demonstrate constructors	Week5/ Turn 1 and 2	WAP to demonstrate concepts of Class, Object, and methods in java.	CLO 2	2
6	Program to define class, methods and objects. Demonstrate method overloading	Week6/ Turn 1 and 2	WAP to demonstrate method overloading in java	CLO2	2
7	Program to define inheritance and show method overriding	Week7/ Turn 1 and 2	WAP to demonstrate inheritance in java	CLO1, CLO 3	2
8	Program to demonstrate Packages.	Week8/ Turn 1 and 2	WAP to demonstrate multiple inheritance using interface	CLO3	2
9	Program to demonstrate Exception Handling.	Week 9/ Turn 1 and 2	WAP to demonstrate exception handling in java	CLO4	2
			Program to demonstrate Multithreading.	CLO3	2
10	Program on Collection Framework	Week11/ Turn 1 and 2	Write a Java program to shuffle elements in an array list	CLO5	2

			Write a Java program to test whether an array list is empty or not		
11	The objective of this problem is to create a student registration form using different swing components.	Week12/ Turn 1 and 2	Write a Java program called SwingArithmetics that works as a simple calculator. Use default layout to arrange buttons for the digits and for the +, -,*, % and clear operations. Add a text field to display the result. Handle any possible exceptions such as divided by zero.	CLO5	2
12	The objective of this problem is to create a simple Graphical User Interface using Java Swing Components	Week13/ Turn 1 and 2	Create a Java program that will work as a simple student registration form. Students need to use various swing components like JMenu, JButton, JRadioButton, JComboBox, JTable, JPasswordField, JTextField, JLabel to design the frames. Information about students entered in the student registration form must be displayed in the JTable.	CLO5	2
13	The objective of this session is to provide in-depth knowledge about Java Swing components specially JMenu, Radio button, ComboBox, JTable and event handling in Swing components. The brief introduction of file reading and writing utilities are also given in the session.	Week 14/15 Turn 1 and 2	Create a Java program that will work as a simple employee management system where admin can login into the system and manage the employee information. The system has two frames one is login for Admin and other is to add/edit/delete employees' information. Admin can access the employee information frame if he/she is authenticated. Students need to use various swing components like JMenu, JButton, JRadioButton, JComboBox, JTable, JPasswordField, JTextField, JLabel to design the frames. Information about employee must be displayed in the JTable. Contents of the JTable	CLO5	4

Learning resources

TEXT BOOKS:

1. Herbert Schildt, "Java the complete reference", 9th edition, McGraw Hill, Education, 2014.

2. T. Budd, "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education, 2000.

REFERENCE BOOKS:

1. J. Nino and F.A. Hosch,"An Introduction to programming and OO design using Java", 3rd edition, John Wiley & sons, 2008
2. P. Radha Krishna,"Object Oriented Programming through Java", 1st edition, Universities Press, 2007.
3. R. A. Johnson,"Java Programming and Object Oriented Application Development", 1st edition, Cengage Learning, 2006.

Online Resources/E-Learning Resources
1. https://www.freecodecamp.org/news/object-oriented-programming-concepts-java/
2. https://www.w3schools.com/java/java_oop.asp
3. https://www.minds.co.za/wp-content/uploads/2019/06/object-oriented-programming-using-java.pdf

COURSE CURRICULUM

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Name of the Program:	Integrated MCA		Semester : II		Level: IN	
Course Name	Data Structure And Algorithms		Course Code/ Course Type		IMC112 /MAJM	
Course Pattern	2024		Version		1.0	
Teaching Scheme				Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	-	-	3	3	40	60	-
Prerequisite:						

Course Objectives (CO):	The objectives of Data Structure And Algorithms are:
	1. To comprehend basic data structures (like arrays, linked lists, stacks, queues, trees, and graphs) and essential algorithms for manipulating them.
	2. To analyze the time and space complexity of algorithms
	3. Tp design and implement various data structures efficiently, including methods for insertion, deletion, traversal, and searching.
	4. To apply various data structures and algorithms to solve real-world problems.
	5. To apply data structures and algorithms concepts to practical problems encountered in computer science, software development.
Course Learning Outcomes (CLO):	Students would be able to:
	1. Analyze and solve complex problems efficiently through the selection and implementation of appropriate data structures and algorithms.
	2. Evaluate the time and space complexity of algorithms to make informed decisions regarding algorithmic efficiency.
	3. Design and implement data structures such as arrays, linked lists, stacks, queues, trees, and graphs, along with associated algorithms for traversal, insertion, deletion, and search operations.
	4. Explore and apply various sorting and searching algorithms, including but not limited to bubble sort, merge sort, quick sort, binary search, and hash tables, to efficiently manipulate and retrieve data.
	5. Develop proficiency in algorithmic problem-solving techniques through hands-on coding exercises, algorithm analysis, and problem-solving strategies.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction To Algorithm Analysis: Introduction, Need of Data Structure, Definitions - Data and information, Data type, Data object, ADT, Data Structure, Types of Data Structures, Algorithm analysis, Space and time complexity, Graphical understanding of the relation between different functions of n, examples of linear loop, logarithmic, quadratic loop etc., Best, Worst, Average case analysis, Asymptotic notations (Big O, Omega Ω, Theta θ), Problems on time complexity calculation.	CLO 1	9
UNIT II		
Fundamental Data Structures – List, Stacks, And Queues: List ADT, Singly-linked lists, Doubly Linked lists, and Circular Linked Lists – Stack ADT, Implementation of Stacks and Applications. Queue ADT, Implementation of Queue and Applications.	CLO 2	9
UNIT III		
Trees: Tree ADT, Binary tree, Search Tree ADT, Tree Traversals, AVL tree, Splay tree	CLO3	9
UNIT IV		
Sorting And Searching: Insertion Sort, Selection, heap sort and Merge sort. Linear time sorting – bucket and radix sort. Linear search and binary search.	COL4	9
UNIT V		
Graph Algorithms: The Graph ADT, Representation of adjacency list and matrix, Graph traversals – Depth First Search and Breadth First Search implementation. Shortest path – weighted graphs – Dijkstra's algorithm. Minimum spanning tee – Prims and Kruskal's algorithm.	COL5	9
Total Hours		45

Learning resources

Textbooks:

1. Mark Allen Weiss, Data Structure and Algorithm Analysis in C++, 2014, 4th Edition, Pearson Education Limited.

Reference Books:

1. AnanyLevitin, Introduction to design and analysis of algorithm, 2012, 3rd Edition, Addison Wesley.
2. Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms,PaperBack, 2010, 3rd Edition, MIT Press.

Online Resources/E-Learning Resources
1. https://www.javatpoint.com/data-structure-tutorial
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : II	Level: IN

Course Name	Data Structure And Algorithm Lab	Course Code/ Course Type	IMC113 / MAJM		
Course Pattern	2024	Version	1.0		
Teaching Scheme					

						Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
-	2	-	2	4	25	-	25	

Prerequisite: Student should learn at least one programming language, such as C++, Java, or Python

Course Objectives (CO):	The objectives of (Data Structure And Algorithm Lab) are: 1. To comprehend basic techniques of algorithm analysis. 2. To identify the factors implementation of linked list, Stack, Queue data structures. 3. To apply the different algorithms for sorting and searching techniques. 4. To Demonstrate and create tree structure. 5. To develop and evaluate the graph algorithms on real life applications.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify the time and space complexities of various algorithms. 2. Explain the appropriate data structures like Linked List, stack, Queue as applied to the specified problem definition. 3. Apply the concepts of trees on given data 4. Apply knowledge of Handle operations like searching, insertion, deletion, and traversing mechanisms on various data structures 5. Evaluate the linear and non-linear data structures through graph theory.

Course Contents/Syllabus:
Practical Plan

Practical Number	Practical Title	Week Number /Turn	Details	CLO	Hours
1	Practical 1: Write C program that implement the Single Linked list applications	Week 1 / 2 Turn 1	1. Insert 2. Delete 3. Search 4. Display	CLO1	4
2	Write C program that implement the Double Linked list applications	Week 2/3	1. Insert 2. Delete 3. Search 4. Display	CLO2	4

3	Write a C program that converts the given expression from Infix to prefix using templates.	Week 4/5	1. (A+B) * (C+D) 2. ((A/B)*C-(D-E))*(F+G)	CLO 2	4
4	Write program that implement all the operations on DE Queue with array representation with templates	Week 6/7	1. Insert 2. Delete 3. Display	CLO2	4
5	Write programs to implement the following using an array representation with templates.	Week 8/9	1. Ascending Priority Queue 2. Descending Priority Queue	CLO2	4
6	Write a C program to implement the following operations on Binary Tree	Week 10/11	1. Insert 2. Delete 1. Search 4. Display	CLO3	4
7	Write a C program to implement the following Searching operations	Week 12	1. Selection Search 2. Binary Search	CLO4	2
8	Write a C program to implement the following Sorting operations	Week13	1. Selection Sort 2. Bubble Sort 3. Insertion Sort	CLO4	2
8.	Write a C program to implement the following operations on Graph	Week 14/15	Create BFS Traversing Display Nodes By BFS Traversing Create DFS Traversing Display Nodes By BFS Traversing	CLO5	4

Learning resources

Textbooks:

1. Mark Allen Weiss, Data Structure and Algorithm Analysis in C++, 2014, 4th Edition, Pearson Education Limited.

Reference Books:

1. AnanyLevitin, Introduction to design and analysis of algorithm, 2012, 3rd Edition, Addison Wesley.
2. Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms,PaperBack, 2010, 3rd Edition, MIT Press.

Online Resources/E-Learning Resources
1. https://www.audisankara.ac.in/has/pdf/DATA%20STRUCTURE.pdf
2. https://github.com/Rustam-Z/data-structures-and-algorithms/tree/master/lecture%20notes
3. https://www.programiz.com/dsa/linked-list

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : II	Level: IN

Course Name	Operating Systems Fundamentals	Course Code/ Course Type	IMC114/SEC	
Course Pattern	2024	Version	1.0	

Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-

Prerequisite:	
Course Objectives (CO):	The objectives of Operating Systems Fundamentals are: 1. To explain main components of OS and their working 2. To familiarize the operations performed by OS as a resource Manager 3. To impart various deadlock and scheduling policies of OS 4. To demonstrate the different memory management techniques. 5. To comprehend the knowledge of I/O System.
Course Learning Outcomes (CLO):	Students would be able to: 1. Identify components of OS and their working. 2. Ability to contrast Unix and Windows in terms of operating system process management. 3. Analyze and differentiate between various deadlock prevention, avoidance, detection, and recovery techniques employed in operating systems. 4. Evaluate and demonstrate various memory management techniques utilized in operating systems. 5. Understand the principles and components of input/output (I/O) systems in operating systems, including device controllers, I/O buses, and device drivers.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
OPERATING SYSTEMS OVERVIEW: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems. **OPERATING SYSTEMS STRUCTURES:** Operating system services and systems calls, system, programs, operating system structure, operating systems generations.	CLO 1	6
UNIT II		
PROCESS MANAGEMENT: Process concepts, process state, process control block, scheduling queues, process scheduling, multithreaded programming, threads in UNIX, comparison of UNIX and windows.	CLO 2	6

CONCURRENCY AND SYNCHRONIZATION: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions. Comparison of UNIX and windows.		
UNIT III		
DEADLOCKS: System model, deadlock characterization, deadlock prevention, detection and avoidance MEMORY MANAGEMENT: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing, case study - UNIX.	**CLO3**	**6**
UNIT IV		
FILE SYSTEM: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX and windows.	**CLO4**	**6**
UNIT V		
I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure. I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.	**CLO5**	**6**
Total Hours		**30**

Learning resources
Textbooks:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), Operating System Principles, 7th edition, Wiley India Private Limited, New Delhi.

Reference Books:

1. Stallings (2006), Operating Systems, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2nd edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), Operating systems, 3rd edition, Pearson Education, India.

Online Resources/E-Learning Resources
1. https://www.javatpoint.com/operating-system
2. https://www.geeksforgeeks.org/operating-systems/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : II		Level: IN	
Course Name	Software Engineering	Course Code/ Course Type		IMC115 /VSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				**Assessment Scheme**	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-

Prerequisite: ER Modelling

Course Objectives (CO):	The objectives of Software Engineering are: 1. To learn and understand the principles of System Engineering. 2. To learn and understand the principles of Software Engineering. 3. To gain the knowledge of Software Development Life Cycle and methodology. 4. To impart various software requirement techniques. 5. To demonstrate the different system analysis and design engineering.
Course Learning Outcomes (CLO):	Students would be able to: 1. Compare and contrast various Software Engineering models. 2. Decide on an appropriate process model for developing a software project.. 3. Classify software applications and Identify unique features of various domains.. 4. Prepare System Requirement Specification (SRS) for the given problem.. 5. Design and analyze Data Flow diagrams.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to System Engineering: Definition, Basic Components, Elements of the system, System Components, Types of System.	CLO 1	6
UNIT II		
Introduction to Software Engineering: Definition of Software, Characteristics of Software, Software Application Domain, Definition of Software Engineering, Need for software Engineering, Mc Call's Quality factors, The Software Process, Software Engineering Practice.	CLO 2	6
UNIT III		

Software Development Life Cycle (SDLC) and Methodologies: Introduction, Activities of SDLC, A Generic Process Model, Prescriptive Process models- Waterfall Model, Incremental Process Models, Evolutionary process Models (Prototyping and Spiral Model), Concurrent Models, Types	**CLO3**	6
UNIT IV		
Requirement Engineering: Introduction, Requirement Engineering Tasks, Establishing Groundwork for understanding of Software Requirement, Requirement Gathering, Feasibility study, Fact Finding Techniques.	**CLO4**	6
UNIT V		
Analysis and Design Engineering: Decision Tree and Decision Table, Data Flow Diagrams (DFD), Data Dictionary, Elements of DD, Advantages of DD, Input and Output Design, Entity Relationship Diagram (ERD), Case Studies on above topics.	**CLO5**	6
Total Hours		30

Learning resources

Textbooks:

1. Rajib Mall, "Fundamentals of Software Engineering", PHI 2018, 5th Edition.

Reference Books:

1. Roger S. Pressman, "Software Engineering - A Practitioner's Approach", McGraw Hill 2010, 7th Edition.

2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House 2011, 3rd Edition.

Online Resources/E-Learning Resources
1. https://www.javatpoint.com/software-engineering
2. https://www.scaler.com/topics/software-engineering/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: II		Level: IN	
Course Name	Discrete Mathematics	Course Code/ Course Type		IMC116/BSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	-	-	2	2	20	30	-

Prerequisite:	None
Course Objectives (CO):	The objectives of Discrete Mathematics are: 1. To remember Graph theory and associated concepts. 2. Recognize the mathematical logic of truth tables. 3. To apply set operations in algebraic structures. 4. Classify the different properties of relations. 5. To evaluate the relative frequency.
Course Learning Outcomes (CLO):	Students would be able to: 1. To identify the fundamental concepts of graph theory. 2. Explain the use of the truth table in mathematical logic. 3. Complete the operations on sets, 4. Assess the various operations on relations. 5. Justify the use of Probability.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Graph Theory: Introduction, Simple graph, adjacency/ incident/ neighbourhood / degree of a vertex, degree sequence of a graph, first fundamental theorem of graphs, subgraph and induced sub-b graphs, Adjacent matrices and incidence matrices, walk, length of a walk, open and closed walks, trial and path, circuit and cycle, connected graph and disconnected graph.	CLO1	6
UNIT II		
Mathematical Logic: Introduction, proposition, connectives, truth tables and duality, converse/contrapositive/inverse,tautology,contradiction,contingency,logically equivalent, DNF, CNF, PDNF, PCNF	CLO2	6
UNIT III		
Algebraic Structures: Introduction, sets and set operations, functions, relations and their properties & representations of relation by matrix, closure of different types of relations, equivalence relations, primitive recursive function.	CLO3	6
UNIT IV		

Relations and Partially Ordering: Introduction, Properties of relations, relation matrix, directed graph, closures of relation, equivalence relations, congruence relation, equivalence classes, equivalence classes and partitions, Partially ordered set, lexicographic ordering, Hesse diagrams, minimal and maximal elements, upper and lower bounds.	**CLO4**	**6**
UNIT V		
Probability and Statistics: Introduction, Classical relative frequency and axiomatic, Definition of probability, Addition rule and conditional probability, multiplication rule and total probability, Bayes' theorem and independence problems, measures of central tendency, measures of dispersion, coefficient of variation.	**CLO5**	**6**
Total Hours		**30**

Learning resources

Textbooks:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2014.
2. Ronald E Walpole, Raymond H Myers, Sharon L Myers, and Keying E Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Delhi-9th edition, 2012.
3. B S Grewal, "Higher Engineering Mathematics", 44th edition, Khanna Publishers.

Reference Books:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2010.
2. B S Grewal, Numerical methods in engineering and science, 10th Edition, Khanna publishers, 2016.
3. Kishor S Trivedi, "Probability and Statistics with reliability, Queuing and Computer Science Applications", John Wiley & Sons, 2nd edition, 2008.

Online Resources/E-Learning Resources
1. https://www.edx.org/learn/discrete-mathematics
2. https://www.codecademy.com/learn/discrete-math

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: I/II		Level: IN	
Course Name	Concepts and Application in Science	Course Code/ Course Type		ACIKSET102/AC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	50	-	-

Prerequisite: None

Course Objectives (CO):	The objectives of Concepts and Application in Science are: 1. To remember Indian Knowledge Systems: Origin, Evolution and Ontological Approach 2. To understand Indian Knowledge Approaches. 3. To apply Sciences of Life and Mind. 4. To examine Indian Knowledge System Torchbearers – Ancient and Modern 5. To analyze Self-Knowledge for Personal Effectiveness.
Course Learning Outcomes (CLO):	Students would be able to: 1. Students will be able to identify and appreciate the rich heritage that resides in our traditions. 2. Explain the mind/voice dynamic in Indian knowledge systems. 3. Explain the practices that will prepare one for the inner-journey to discover the Self. 4. Analyze the need and importance of Sanskrit in getting to the roots of the philosophical concepts. 5. Analyze the various functions in Indian knowledge systems.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		

Indian Knowledge System and Vedic Corpus: Introduction to IKS, Need for IKS, Historicity of IKS, Salient aspects of IKS, IKS in ancient India and in modern India. Introduction to Vedas, Four Vedas, Sub-classification of Vedas, Messages in Vedas, Basics of Nirukta and Chandas.	CLO1	6
UNIT II		
wisdom through the Ages: Puranas, Ithihasas,Niti shastras, Subhasitas, Linguistics, Components of a language, Paṇini's work on Sanskrit grammar, Phonetics in Sanskrit, Role of Sanskrit in natural language processing, Framework for establishing valid knowledge.	CLO2	6
UNIT III		
Number Systems and Units of Measurement: Salient features of the Indian numeral system, Importance of decimal representation, The discovery of zero and its importance, Unique approaches to represent numbers, Unique aspects of Indian Mathematics, Great mathematicians and their significant contributions in the area of arithmetic, algebra, geometry, trigonometry, combinatorial problems in Chandaḥ-sastra of Pingala	CLO3	6
UNIT IV		
Knowledge Framework and classifications: Indian scheme of knowledge, The knowledge triangle, Prameya, A vaiśeṣikan approach to physical reality, Dravyas, The constituents of the physical reality	CLO4	6
UNIT V		
Science and Technology in the Vedic Age and Post-Vedic Records. Knowledge: Framework and Classification, Astronomy Encryption Method used in ancient India, Introduction to Yantra Shastra,Vaimanik Shashtra, Agriculture Technologies	CLO5	6
Total hours		30

Activity 1: Comparative Analysis of Traditional and Modern Scientific Methods

Activity 2: Presentation on Indian scientific texts such as the Phonetics in Sanskrit, Astronomy Encryption Method used in ancient India

Learning resources

Textbooks:

1. Health Science: Concepts and Applications, Authors: Jacquelyn Rhine Marshall and Sue C. Roe
2. Introduction to Indian Knowledge Systems: Concepts and Applications by Prof. B Mahadevan

Reference Books: -

1. Introduction to Indian Knowledge System: Concepts and Applications by Pallavi Ghosh

Online Resources/E-Learning Resources

1. https://onlinecourses.swayam2.ac.in/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : I/II		Level: IN	
Course Name	UHV-I: Professional Ethics	Course Code/ Course Type		ACUHV101/AC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	-	2	50	-	-
Prerequisite: UHV-I					
Course Objectives (CO):		The objectives of Universal Human Value- Professional Ethics are: 1. To make the students understand the importance of ethical behavior 2. To expose the students to the ethical practices to be followed in profession 3. To sensitize the students to become responsible persons who will uphold ethics in profession when they pursue their career 4. To make students understand Psychological and Philosophical approaches 5. To make students understand social responsibility and corporate Sustainability			
Course Learning Outcomes (CLO):		Students would be able to: 1. Equip themselves with an understanding of moral, professional and personal values. 2. Understand the need of ethics in shaping their profession The learners will hone their decision-making skills. 3. Refine their business ethics based on psychological and philosophical perspectives. 4. Assess the need for a balance between ecology, and economy. 5. Equip themselves with a better understanding of themselves and the society they live in and the responsibilities they shoulder in creating a sustainable world.			

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Individual and Professional Ethics: Introduction to Professional Ethics, Morals, Values and Ethics – Personal and Professional- Sensé of Professional Ethics – Code of Ethics by NSPE-Making decisions with ethical dimensions–definition–roadmap to ethical decision making–common standards– internal obstacles – bias – empathy	CLO 1	6
UNIT II		
Business Ethics: Philosophical approaches to Business Ethics – ethical reasoning – ethical issues in business - Social Responsibility of Business- conflict of interest–cultural relativism-Ethical Leadership-Resisting un-ethical authority and domination-Global Business Ethics	CLO 2	6
UNIT III		
Psychological Approaches: Ethical Theories-Psychological and Philosophical Approaches-Myths about Morality-conflict of interest in psychological perspective - Courage-Integrity – ethical dilemma – Emotional Intelligence (Mahabharata-Iskcon Publications)	CLO 3	6
UNIT IV		
Workplace Ethics: Ethics in changing domains of Research–academic integrity–intellectual honesty-Role of Engineers and Managers-Ethical issues in Diverse workplace – competition – free will- Confidentiality – employee rights – Intellectual property rights – discrimination	CLO 4	6
UNIT V		
Safety, Responsibilities and Rights: Ecology, and Economy-Risk benefit analysis and reducing risk SDGs–Corporate social responsibility and Corporate Sustainability - CSR in India - Sustainability Case Studies	CLO 5	6
Total Hours		30

Learning resources

Textbooks:

1. Subramanian. R. *Professional Ethics*, Oxford Publication,2013.
2. Nagarasan. R. S. *Professional Ethics and Human Values*. New Age International Publications, 2006.

Reference Book:

1. Mike W Martin and Roland Schinzinger, *Ethics in Engineering*,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014

Online Resources/E-Learning Resources

1. https://www.nspe.org/resources/ethics/code-ethics

1. https://www.toolshero.com/tag/ethical-decision-making/

2. https://pagecentertraining.psu.edu/public-relations-ethics/introduction-to-public-relations-ethics/lesson-1/ethical-theories/

3. https://peer.asee.org/case-studies-in-engineering-ethics.pdf

CIA Guidelines

Online Quiz (Based on MCQ)- 20 marks

Activity (with short Report Submission) - 20 Marks

Academic Sincerity - 10 marks

Few of the suggested activities are Assignments, Debates, Poster presentations, Model making, Group presentation, Field visits and Group Discussions.

Few of suggested topics related to **UHV1- Professional Ethics** are:

Debate Topics

- Ethical Approach versus Realistic Approach
- Individual and Social Approach
- Dilemma between heart and Mind

Activity

- Analyze the wastage (Electricity or any other) at work place? How you managed.

Assignment

- Analyze the code of ethics at work place
- If you fulfil the duties, rights will automatically fall in place. Justify the statement

References:

1. https://uhv.org.in/
2. https://vvce.ac.in/wp-content/uploads/2021/04/Realising-Aspirations-of-NEP2020-UHV.pdf

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester : II		Level: IN	
Course Name	Management Information System	Course Code/ Course Type		IMC117A/OE	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	-	2	20	30	-

Prerequisite: None

Course Objectives (CO):	The objectives of Management Information System are: 1. Identifying the basic concepts of MIS, Decision making. 2. Classify the need, Characteristics, strategies and Categories of a System. 3. Classify the types of computers and other processing units. 4. List out the role of system analyst, Functional Information system. 5. Elaborate the need for creating a Decision Support System.
Course Learning Outcomes (CLO):	Students would be able to: 1. Define the Role of Management Information system in various organizations. 2. Explain the application of the Information System.

3. Illustrate the role of Information Processing and Computer devices for designing a system.
4. Integrate the various parts of a System for designing a functional information system.
5. Discuss the Importance of Decision support system for enhancing the decision making.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Management Information System: Definition, MIS support for planning, Organizing and controlling, Structure of MIS, Information for decision making.	CLO 1	6
UNIT II		
System: Concept of System, Characteristics of System, Systems classification, Categories of Information Systems, Strategic information system and competitive advantage.	CLO 2	6
UNIT III		
Computers and Information Processing: Classification of computer, Input Devices, Output devices, Storage devices, Batch and online processing, Hardware, Software. Database management Systems.	CLO3	6
UNIT IV		
System Analysis and design: SDLC, Role of System Analyst, Functional Information system, Personnel, production, material, marketing.	CLO4	6
UNIT V		
Decision Support System: Definition, Group Decision, Support Systems - Business Process Outsourcing, Definition and function, Case Studies	CLO5	6
Total Hours		30 Hours

Learning resources

Textbooks:
1. Mudrick& Ross , "Management Information Systems", Prentice - Hall of India.
2. Sadagopan , "Management Information Systems" - Prentice- Hall of India

Reference Books:
1. CSV Murthy -"Management Information Systems" Himalaya publishing House.
2. Dr. S.P. Rajagopalan ,"Management Information Systems and EDP " , Margham Publications , chennai

Online Resources/E-Learning Resources
https://www.cleverism.com/management-information-systems-mis/
https://open.umn.edu/opentextbooks/textbooks/189

COURSE CURRICULUM

Name of the Program:	Integrated MCA			Semester : II		Level: IN	
Course Name	Mobile Commerce			Course Code/ Course Type		IMC117B /OE	
Course Pattern	2024			Version		1.0	
Teaching Scheme				Assessment Scheme			
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	20	30	-
Prerequisite: Basic computer knowledge							
Course Objectives (CO):				The objectives of Mobile Commerce are: 1. To understand the E – commerce strategies and environments. 2. To understand the M-commerce services 3. To understand M – commerce infrastructure and applications. 4. To know the availability of latest technology applications of M- commerce in various domains. 5. To apply mobile commerce in business-to-business applications.			
Course Learning Outcomes (CLO):				Students would be able to: 1. Understand the E – commerce strategies and value chains			

2. Comprehend the knowledge of M-commerce services

3. Analyze mobile commerce technology.

4. Compare the mobile commerce application and payment systems.

5. Comprehend the mobile commerce analytics for real world applications.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
ELECTRONIC COMMERCE: E-commerce environment & e-commerce marketplace, Information about Business models & Revenue Models for e-commerce, Reasons to Focus on internet start-up companies	**CLO 1**	6
UNIT II		
MOBILE COMMERCE: Introduction to Infrastructure of M– Commerce, Types of Mobile Commerce Services, M-commerce Technologies, Overview of mobile commerce and its role in the modern business landscape, Comparison with traditional e-commerce, Current trends and future outlook in mobile commerce.	**CLO 2**	6
UNIT III		
MOBILE COMMERCE TECHNOLOGY: Framework for Mobile Commerce, Digital Wireless Devices For Mobile Commerce, Types of mobile devices (smartphones, tablets, wearables). Mobile operating systems and their features (iOS, Android, etc.). Mobile device capabilities (sensors, cameras, GPS, NFC). .	**CLO3**	6
UNIT IV		
Mobile E-Commerce: Mobile-friendly website design and responsive design, Mobile app strategies for e-commerce, Mobile user experience (UX) and user interface (UI) design principles, Mobile Payment Systems: Overview of mobile payment methods (mobile wallets, payment gateways), Security considerations for mobile payments, Trends in mobile payments.	**CLO4**	6
UNIT V		
Mobile E-Commerce Analytics: Tracking and analyzing mobile user behavior, Key performance indicators (KPIs) for mobile e-commerce, Tools for mobile analytics.	**CLO5**	6
Total Hours		30

Learning resources

Textbooks:

1. Mobile Commerce: Opportunities and Challenges" by Rajiv Misra and Sanjeev Puri, published by Idea Group Inc (IGI Global).
2. M-Commerce: Technologies, Services, and Business Models" by Nansi Shi, published by Wiley.

Reference Books:

1. Mobile Commerce: How It Contrasts with Traditional Commerce" by Sanjeev Gupta, published by Springer.

2. Mobile Commerce and Applications: Theory and Practice" by Jagdish Chandra Patni, published by CRC Press.

3. Mobile Commerce: Cutting Edge Solutions" by Paul Skeldon, published by Springer.

Online Resources/E-Learning Resources
1. https://www.tutorialspoint.com/mobile_marketing/m_commerce.htm
2. https://www.techtarget.com/searchmobilecomputing/definition/m-commerce

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: Exit Policy		Level: UG Certificate	
Course Name	PHP and MySQL	Course Code/ Course Type		UCEXIMC101/VSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	50	-	-

Prerequisite: Students should have basic Knowledge of web programming	
Course Objectives (CO):	The objectives of PHP and MySQL are: 1. To remember the knowledge about PHP. 2. To understand and trace the execution of programs written using Function. 3. To apply array and HTML Form using programs in PHP language. 4. To analyze the concepts files and directories in PHP language. 5. To demonstrate database connectivity with MySQL
Course Learning Outcomes (CLO):	Students will be able to: 1. Remember the knowledge about PHP. 2. Understand and trace the execution of programs written using Function. 3. Apply array and HTML Form using programs in PHP language. 4. Analyze the concept of files and directories in PHP language.

	5. Demonstrate database connectivity with MySQL

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator, and Expression. Decisions and loop: Making Decisions, Doing Repetitive tasks with looping, Mixing Decisions, and looping with HTML.	CLO 1	6
UNIT II		
Function in PHP: What is a function, Define a function, Call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function	CLO 2	6
UNIT III		
Array: Anatomy of an Array, Creating index-based and Associative array Accessing array, Element Looping with Index based array, Looping with associative array using each () and foreach(), Some useful Library function. **Handling Html Form with Php**: Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.	CLO3	6
UNIT IV		
Working with files and Directories Understanding file & directory, Opening, and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folders, File Uploading & Downloading. **Session and Cookie** Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.	CL04	6
UNIT V		
Database Connectivity with MySql: Introduction to RDBMS, Connection with MySql Database, Performing basic database operation(DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query- Join (Cross joins, Inner joins, Outer Joins, Self joins.)	CLO5	6
Total		**30 Hrs**

Learning resources

Textbooks:
1. PHP and MySQL Web Development (4th Edition), Luke Welling and Laura Thomson, SamsImprint of Simon and Schuster 201 W. 103 St. Indianapolis, IN United States

Reference Books:

1. Learning PHP, MySQL, books by ' O'riley Press

Online Resources/E-Learning Resources:

1. https://www.mysql.com/
2. https://www.w3schools.com/php/

COURSE CURRICULUM

Name of the Program:	Integrated MCA	Semester: Exit Policy		Level: UG Diploma	
Course Name	Advance C++ Programming	Course Code/ Course Type		UDIEXIMC201/VSC	
Course Pattern	2024	Version		1.0	
Teaching Scheme				Assessment Scheme	

Theory	Practical	Tutorial	Total Credits	Hrs.	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2	-	-	2	2	50	-	-

Prerequisite: Students should have basic Knowledge of C++ Programming.	
Course Objectives (CO):	The objectives of Advance C++ Programming are: 1. To remember the knowledge about C++ templates. 2. Understand and trace the execution of programs by using Exception Handling. 3. To apply Class Design in a Program. 4. To analyze the concepts of Object Storage Management. 5. To demonstrate multiple Inheritance in C++
Course Learning Outcomes (CLO):	Students will be able to: 1. Remember the knowledge about templates. 2. Understand and trace the execution of programs written using Exception handling. 3. Apply the concept of Class for designing a program. 4. Analyze the concept of object storage management for design approach. 5. Demonstrate the use of multiple Inheritance.

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Templates: Template Functions and Classes, Instantiation, Overloading Working with Templates, Member Templates, Using export STL (Standard Template Library) Containers and Iterators	CLO 1	6
UNIT II		
Exception Handling: Using Exceptions, Exception Formats, Exception, Specifications, Unexpected Exceptions, Uncaught Exceptions, Designing with Exceptions, Exception Hierarchies, Exceptions thrown from Constructors, Exceptions thrown from Destructors, Resource Management	CLO 2	6
UNIT III		
Class Design: Class Design, Mutable Data Members, Using explicit with Constructors, Member Initialization, Class Design Boilerplate, Copy Initialization and Assignment, Modifiers and Selectors, Clone Functions	CLO3	6
UNIT IV		
Object Storage Management: New and Delete Formats, No throw Operator new, Explicit Destructor Calls, Class Specific New and Delete, Overriding Global Operators, Memory Pools, Reference Counts, Design Approach, Implementation	CL04	6
UNIT V		
Multiple Inheritance: Design Concepts, Member Initialization, Ambiguities, Multiple Inheritance Patterns, Distinct Bases, Multiple Inclusion, Virtual Bases	CLO5	6
Total		**30 Hrs**

Learning Resources

Textbooks:
1. Effective Modern C++ by Scott Meyers
2. Beyond the C++ Standard Library: An Introduction to Boost by John Purcell

Reference Books:
1. Modern C++ Design: Andrei Alexandrescu
2. C++ Template Metaprogramming by Bjorne Stroustrup.

Online Resources/E-Learning Resources:

3. https://www.programiz.com/cpp-programming

4. https://www.pluralsight.com/courses/adv-cpp