

PROGRAMME STRUCTURE

SHARDA SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Computer Science & Applications

Master of Computer Applications

Programme Code: SET0105

Batch 2023-2025



Programme Structure													
			Sharda School of Engi	neer	ing o	& T	echnology						
			Department of Computer	r Sci	ence	e & 1	Applicatio	ns					
		Datala	M(CEMECTED. I				
		Batch	2023-2025						SEMESTER: I				
									1 CC Coro				
				Teaching Load					2. DSE - Interdisciplinary				
a	C								3. OE - Open Elective				
S. No.	Course Code	Paper ID	Course				Credits		4. SEC - Skills Enhancement Courses				
									5. AEC - Ability Enhancement Courses				
				L	Т	Р			6. VAC-I - Value Added Courses				
	THEORY SUBJECTS												
1	MCA177		Database Management Systems	4	0	0	4		CC				
2	MCA175		C Programming and File Handling	3	0	0	3		СС				
		-	OE-I										
	MCA169		Information Security and Cyber Laws										
3	MCA176		Management Information Systems	3	0	0	3		OE				
	MCA013		Essentials of Digital Marketing										
4	MCA273		Software Engineering	3	0	0	3		SEC				
5	ARP106		Logic Building and Soft Skills	2	0	0	2		AEC				
6	COC101		Food, Nutrition & Hygiene	2	0	0	2		VAC				
	Practical/Viva-Voce/Jury												
7MCP177Database Management Systems Lab		Database Management Systems Lab	0	0	2	1		СС					
8	MCP175		C Programming and File Handling Lab	0	0	2	1		СС				
T CF	OTAL REDITS						19						



Programme Structure												
	Sharda School of Engineering & Technology											
	Department of Computer Science & Applications											
MCA												
	Batch 2023-2025 SEMESTER: II											
									Type of Course			
				Teaching Load					1. CC			
G	G	D							2. DSE			
S. No	Course	Paper ID	Course				Credits		3. OE			
110.	Coue	ID							4. SEC			
									5. AEC			
				L	Т	Р			6. VAC-I			
1	MCA105		Data Structure Using C	3	1	0	4		CC			
2	MCA173		Application Programming in Python	4	0	0	4		CC2			
			OE-II									
3	MCA271		Cloud Computing	3	0	0	3		OE			
	MCA307		Cryptography and Network Security									
4	CSP395		Technical Writing	3	0	0	3		SEC			
5	ARP104		Quantitative Aptitude and Verbal Ability Skill Building	2	0	0	2		AEC			
6	COC201		First Aid and Health	2	0	0	2		VAC			
			Practical/Viva-Voce/Jury									
7	MCP265		Data Structure Lab	0	0	2	1		CC			
8	MCP173		Application Programming in Python Lab	0	0	2	1		CC2			
	Lab TOTAL CREDITS 20											



	Programme Structure											
			Sharda School of Engineering & '	Гесł	nnol	ogy						
			Department of Computer Science &	: Ap	plic	atio	ns					
МСА												
Batch 2023-2025 SEMESTER: III												
									Type of Course			
				Teaching Load					1. CC			
S.	Course	Paper							2. DSE			
No.	Code	ÎD	Course			Credi			3. OE			
									4. SEC			
									5. AEC			
				L	Т	Р			6. VAC-I			
	THEORY SUBJECTS											
1	MCA203		Design and Analysis of Algorithms	3	1	0	4		CC			
2	MCA168		Object Oriented Programming with JAVA	4	0	0	4		CC2			
3	MCA357		Computer Architecture and Organization	3	0	0	3		DSE			
			OE-III									
	MCA366		Big Data Analytics									
4	MCA116		Artificial Intelligence and Machine Learning	3	0	0	3		OE			
	MCL011		Android Application Development									
5	BBH203		Health and Hygiene	3	0	0	3		SEC			
6	ARP307		Personality Development Decision Making and Negotiation Skills	2	0	0	2		AEC			
		J	Practical/Viva-Voce/Jury		Į		I					
8	MCP168		Object Oriented Programming with JAVA Lab	0	0	2	1		CC			
9	MCP267		Design and Analysis of Algorithms Lab	0	0	2	1		CC2			
10	MCP358		Research Based Learning-1	0	0	2	0		Audit Course			
			TOTAL CREDITS				21					



	Programme Structure											
			Sharda School of Engineering	& T	echr	olog	gy					
			Department of Computer Scienc	e & /	App	licat	ions					
			MCA									
		Batcl	n 2023-2025				SE	MI	ESTER: IV			
									Type of Course			
				Te	achi	ng			1. CC			
G	C	D		Load				2. DSE				
ð. No	Course	Paper ID	Course				Credits		3. OE			
1101	Cour								4. SEC			
									5. AEC			
				L	Τ	Р			6. VAC-I			
	THEORY SUBJECTS											
1	MCA356		Project-2				12		CC			
			OE-IV									
C	MCA306		C# with ASP.Net	2	0	0	2		OF			
2	MCA359		Introduction to PHP with MySQL	5	0	0	5		OL			
	MCA360		Introduction to R Programming									
3	ARP308		Personality Development	4	0	0	4		AEC			
			Practical/Viva-Voce/Jury									
	MCP306		C# with ASP .NET Lab									
4	4 MCP359		Introduction to PHP with MySQL	0	0	2	1		OE			
	MCP360		Introduction to R Programming Lab		_							
5	MCP361		Research Based Learning-2	Research Based Learning-20020								
			TOTAL CREDITS				20					



Course Modules



TERM-I



Scho	ol: SSET	Batch: 2023-25								
Prog	gramme:	Current Academic Year: 2023-24								
MC	4									
Sem	ester:	Ι								
1	Course Code	MCA-177								
2	Course Title	Database Management Systems								
3	Credits	4								
4	Contact	4-0-0								
	Hours									
	(L-T-P)									
	Course Status									
5	Course	1.Develop the ability to design & implement and manipulate databa	ses.							
	Objective	2.Understand the importance of Normalization								
		3.Introduce various Protocols & schemes used in DBMS								
		4.Apply DBMS concepts to various examples and real-life application	ions.							
6	Course	Students will be able to:								
	Outcomes	CO1. Extend the knowledge & concepts of Database models and EE	R Diagram.							
		CO2. Apply normalization techniques to reduce redundancy from the	e database.							
		CO3 .Appraise the basic issues of Transaction processing & deadlock.								
		CO4. Identify the importance of concurrency control & Granularity								
		CO5 .Explain the concept of Recovery & Distributed System includ	ing parallel							
		database and parallel sites.								
7	9	CO6.Design & develop databases for real life problems.	1							
/	Course	This course introduces database design and creation using a DBN	1S product.							
	Description	Emphasis is on, normalization, EEK Diagram, data integrity, data	modeling,							
		and creation of simple tables, queries, reports, and forms. Opon c	o including							
		narallel and distributed structures by creating simple database tabl	es queries							
		reports and forms	es, queries,							
8	Outline syllabu	15	CO							
-			Mapping							
	Unit 1	Introduction to Databases & Data Models:	11 0							
	A	Concept & Overview of DBMS, Data Models, Database languages,								
		Database Administrator, Database Users.								
	В	Architecture of DBMS, Data Models, Data Modeling using Entity								
		Relationship Model. Enhanced Entity Relationship diagram,								
		Specialization, Generalization, Aggregation								
	С	Various Relational data model concepts, Unary Relational								
		Operations, Binary Relational Operations, Set oriented operations								
	Unit 2	Normalization in Design of Databases:								



А	Codd's Rules Fun	Codd's Rules Functional Dependency, Different anomalies in									
D	designing a Datab	ase, Norma									
B	Second and Third	normal for	ms, Boyce Codd normal form,	CO1							
С	Multi valued depe	endency, Fo	burth normal forms, Inclusion	CO1,							
	dependencies, loss	s less join c	lecompositions, Super key to	CO2, CO6							
	candidate key redu	uction, Pos	itive Closure	000							
Unit 3	Transaction Man	nagement a	and Deadlock								
А	Transaction proce	ssing syste	m, schedule and recoverability,								
В	Testing of serializ view serializable s	zability, Se schedule	rializability of schedules conflict &	CO3, CO6							
С	Dead Lock Phases										
Unit 4	Concurrency Con										
А	Concurrency Cont control,	Concurrency Control: Locking Techniques for concurrency control.									
В	time stamping pr	otocols for	concurrency control, multi-version								
	schemes Time star	mp based a	nd time stamp ordering protocols	СОЗ,							
С	Granularity of Dat	ta Items and	d Multiple Granularity Locking	CO4, CO6							
Unit 5	Pocovory & Dist	ributed Sv	. 4								
emre	Recovery & Distr	induced by	stem								
A	Failure Classificat	tion, Recov	ery and Atomicity, Buffer								
A	Failure Classificat Management	tion, Recov	ery and Atomicity, Buffer								
A B	Failure Classificat Management Failure with Loss	tion, Recov	ery and Atomicity, Buffer atile Storage Recovery Algorithm	CO5,							
A B C	Failure Classificat Management Failure with Loss Distributed Databa	tion, Recov of Nonvola ase Concep	ery and Atomicity, Buffer ntile Storage Recovery Algorithm ots database, Distributed Databases	CO5, CO6							
A B C	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect	tion, Recov of Nonvola ase Concep tures, Paral	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel	CO5, CO6							
A B C	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites	tion, Recov of Nonvola ase Concep tures, Paral	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel	CO5, CO6							
A B C Mode of	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory	tion, Recov of Nonvola ase Concep tures, Paral	ery and Atomicity, Buffer ntile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel	CO5, CO6							
A B C Mode of examination	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory	tion, Recov of Nonvola ase Concep tures, Paral	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel	CO5, CO6							
A B C Mode of examination Weightage	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory	tion, Recov of Nonvola ase Concep tures, Paral MTE	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE	CO5, CO6							
A B C Mode of examination Weightage Distribution	Recovery & DistributedFailure ClassificatManagementFailure with LossDistributed DatabaTypes & ArchitectsitesTheoryCA25%	of Nonvola ase Concep tures, Paral MTE 25%	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50%	CO5, CO6							
A B C Mode of examination Weightage Distribution Text book/s*	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill.	tion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion	CO5, CO6							
A B C Mode of examination Weightage Distribution Text book/s*	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath	tion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi e, Fundam	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson	CO5, CO6							
A B C C Mode of examination Weightage Distribution Text book/s* Other References	Failure Classificat Management Failure with Loss Distributed Databas Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath Education Inc.	tion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi ae, Fundam	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson	CO5, CO6							
A B C Mode of examination Weightage Distribution Text book/s* Other References	Failure Classificat Management Failure with Loss Distributed Databas Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath Education Inc. 2.Thomas Connolition	tion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi ie, Fundam	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson Begg, Database Systems: A Practical	CO5, CO6							
A B C C Mode of examination Weightage Distribution Text book/s* Other References	Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath Education Inc. 2.Thomas Connoli Approach to designed	tion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi ie, Fundam ly, Carolyn gn, Implen	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson Begg, Database Systems: A Practical nentation and Management, Pearson	CO5, CO6							
A B C Mode of examination Weightage Distribution Text book/s* Other References	Recovery & Distributed Failure Classificat Management Failure with Loss Distributed Databa Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath Education Inc. 2.Thomas Connoli Approach to desig Education, Third I	ion, Recov of Nonvola ase Concep tures, Paral MTE 25% Schatz & S Latest Edi ae, Fundam ly, Carolyn gn, Implen Edition.	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson Begg, Database Systems: A Practical nentation and Management, Pearson	CO5, CO6							
A B C Mode of examination Weightage Distribution Text book/s* Other References	Recovery & Distributed Failure Classificat Management Failure with Loss Distributed Databas Types & Architect sites Theory CA 25% 1. Korth, Silbers McGraw-Hill, 1.Elmasri, Navath Education Inc. 2.Thomas Connoli Approach to designed Beducation, Third H 3.Jeffrey D. Ullmas	ion, Recov of Nonvola ase Concep tures, Paral MTE 25% schatz & S Latest Edi ae, Fundam ly, Carolyn gn, Implen Edition. an, Jennife	ery and Atomicity, Buffer atile Storage Recovery Algorithm ots database, Distributed Databases lel database architecture, parallel ETE 50% Sudarshan, Database Concepts, Tata tion entals of Database Systems, Pearson Begg, Database Systems: A Practical nentation and Management, Pearson r Windon, A first course in Database	CO5, CO6							



	4.Date	C.J.,	An	Introduction	to	Database	Systems,	Addison	
	Wesley	•							

S. No.	Course Outcome	Programme OutComes(PO) &
		Programme Specific Outcomes
		(PSO)
1.	CO1: Extend the knowledge & concepts of Database	PO1, PO4, PO10, PSO1
	models.	
2.	CO2: Apply normalization techniques to reduce	PO1, PO10, PSO1
	redundancy from the database.	
3.	CO3: To appraise the basic issues of Transaction	PO1, PO2, PSO1
	processing & deadlock.	
4.	CO4 .Identify the importance of concurrency control &	PO1, PO2
	Granularity and quality for data analysis.	
5	CO5: Explain the concept of Recovery & Distributed	PO1
	System.	
6	CO6: Design & develop database for real life problems.	PO1, PO2, PO3, PO4, PO5, PO7, PO9,
		PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Data Base Management Systems (Course Code MCA177)

	C O s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PS O1	PS O2
MCA1 77 Data Base		Doma in Know ledge	Prob lem Anal ysis	Applic ation Develo pment	Mo dern Too 1 Usa ge	Innovatio n and Entrepren eurship	Enviro nment and Sustain ability	Person al and Profes sional Ethics	Commun ication	Project Manag ement	Life- Lon g Lear ning		
Manag ement System	C O 1	3	-	-	3	-	-	-	-	-	2	2	-
S	C O 2	3	-	-	-	-	-	-	-	-	2	1	-
	C O 3	3	2	-	-	-	-	-	-	-	-	1	-



-	-		-	-						-		
C O 4	3	1	-	-	-	-	-	-	-	-	-	-
C O 5	3	_	-	-	-	-	-	-	-	_	-	-
C O 6	3	3	3	3	3	-	2	-	3	3	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA177	3	2	3	3	3	-	2	-	3	2.3	1.5	2

Strength of Correlation:

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



Scl	100l	Sharda School of Engineering & Technology									
De	partment	Computer Science & Applications									
Pro	ogramme	MCA, Academic Year: 2023-24									
Sei	mester	I									
		-									
1	Course Code	MCA175	Course Name: C Programming and File Handling								
2	Course Title	C Programming and File Handling									
3	Credits	3									
4	Contact Hours (L-T-P)	3-0-0									
	Course Status	Core									
5	Course Objective	 Learn basic programming learning logic aptitude pro Developing software in c p 	constructs –data types, decision structures, control structures in gramming in c language programming	C							
6	Course Outcomes	Students will be able to: CO1: demonstrate the algorithm, Ps CO2: develop better understanding of CO3: create and implement logic us CO4: construct and implement the l CO5: apply user-defined data types CO6: design and develop solutions t	Students will be able to: CO1: demonstrate the algorithm, Pseudo-code and flowchart for the given problem. CO2: develop better understanding of basic concepts of C programming. CO3: create and implement logic using array and function. CO4: construct and implement the logic based on the concept of strings and pointers. CO5: apply user-defined data types and I/O operations in file. CO6: design and develop solutions to real world problems using C.								
7	Course Description	Programming for problem solving g algorithm	ives the Understanding of C programming and implement code	e from flowchart or							
8	Outline syllabus	r		CO Mapping							
	Unit 1	Logic Building									
	А	Flowchart: Elements, Identifying a flowchart	nd understanding input/ output, Branching and iteration in	CO1,							
	В	Algorithm design: Problem solving a	approach (top down/bottom up approach)	CO1							
	С	Pseudo Code: Representation of different flowchart	erent construct, writing pseudo-code from algorithm and	CO1							
	Unit 2	Introduction to C Programming									
	А	Introduction to C programming lang keywords, Storage classes	uage, Data types, Variables, Constants, Identifiers and	CO2, CO6							
	В	Operators and expressions, Types of	Statements: Assignment, Control, jumping.	CO2, CO6							
	С	Control statements: Decisions, Loop	s, break, continue	CO2, CO6							
	Unit 3	Arrays and Functions									
	А	Arrays: One dimensional and multi- manipulation (sorting, searching).	dimensional arrays: Declaration, Initialization and array	CO3, CO6							
	В	Functions: Definition, Declaration/P passing: Call by value, Call by refere	rototyping and Calling, Types of functions, Parameter ence.	CO3, CO6							
	С	Passing and Returning Arrays from I	Functions, Recursive Functions.	CO3, CO6							
	Unit 4	Pre-processors and Pointers									
	А	Pre-processors: Types, Directives, P predefined Macros	re-processors Operators (#, ##, \) Macros: Types, Use,	CO4, CO6							
	В	Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.									
	С	String: Introduction, predefined strin Arguments.	g functions, Manipulation of text data, Command Line	CO4, CO6							
	Unit 5	User Defined Data Types and File	Handling								
	А	Structure and Unions: Introduction, referential structure, Array of structure	Declaration, Difference, Application, Nested structure, self- ires, Passing structure in function.	CO5, CO6							
	В	Files: Introduction, concept of record sequential file and random file,	d, I/O Streaming and Buffering, Types of Files: Indexed file,	CO5, CO6							



С	Creating a data file, Opening and closing a data or records in file, adding records, Ret Reading data from two files and write in t rewinding operations	a data file, Variou trieving, and upda hird file at the sar	IS I/O operations on data files: Storing ting Sequential file/random file. ne time, appending files and	CO5, CO6				
Mode of examination	Theory	Theory						
Weightage	CA							
Distribution	25%	50%						
Text book/s*	1. Kernighan, Brian, and Dennis R	Ritchie. The C Pro	gramming Language					
Other References	1.B.S. Gottfried - Programming w Edition - 2004.2.E. Balagurusamy - Programming							

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1: demonstrate the algorithm, Pseudo-code and flow chart for the given problem.	PO1, PO2, PO3, PO9, PSO1, PSO2
2.	CO2: develop better understanding of basic concepts of C programming.	PO1, PO3, PO4, PO5, PO9, PSO1, PSO2
3.	CO3: create and implement logic using array and function.	PO1, PO3, PO4, PO9, PSO2
4.	CO4: construct and implement the logic based on the concept of strings and pointers.	PO1, PO3, PO4, PO9, PSO2
5.	CO5: apply user-defined data types and I/O operations in file.	PO1, PO3, PSO2
6	CO6: design and develop solutions to real world problems using C.	PO1, PO2, PO3, PO4, PO9, PSO1 PSO2

PO and PSO mapping with level of strength for Course Name C Programming and File Handling (Course Code: MCA175)

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO2
CO1	1	2	2	-	-	-	-	-	2	-	1	2
CO2	2	-	3	2	2	-	-	-	1	-	2	2
CO3	3	-	2	1	-	-	-	-	3	-	-	2
CO4	1	-	2	1	-	-	-	-	1	-	-	3
CO5	1	-	1	-	-	-	-	-	-	-	-	1
CO6	3	3	3	2	-	-	-	-	2	-	2	3

Average of non-zeros entry in following table (should be auto calculated).



Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA175	C Programming and File Handling	1.83	.83	2.17	1	.33				1.50		.83	2.17

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent2. Addressed to Moderate (Medium=2) extent3. Addressed to Substantial (High=3) extent



	School:	Sharda School of Engineering & Technology								
	Department	Computer Science & Application	8							
A	cademic Year	2023-24								
	Programme:	MCA								
	Semester:	Ι								
1	Course Code	MCA169								
2	Course Title	Information Security and Cyber Laws								
3	Credits	3								
4	Contact Hours (L-T-P)	3 0 0								
	Course Status	Elective								
5	Course Objective	Enable learner to understand, explore, and acquire a critical un learners in depth knowledge of Information Technology Act and Privacy, Data Security, Data Protection and tools	derstanding Cyber Law. Give legal frame work of Right to							
6	Course Outcomes	 CO1: Develop competencies for dealing with frauds and scams) and other cybercrimes for example, child pornogivia the Internet CO2: Explore the legal and policy developments in variation Cyberspace CO3: Formulate various security measures for cyber-attanees CO4: Apply the principles in real life situations. CO5: Identify various Cybercrimes and take necessary and CO6: Assess the various online activities. 	deceptions (confidence tricks, raphy etc. that are taking place us countries to regulate cks.							
7	Course Description	This course introduces aspects of cyber security, encompassing data, identify the problems, and choose the relevant countermeas	the principles, to analyze the ures to apply.							
8		Outline syllabus	CO Mapping							
	Unit 1	Introduction to Cyber Security								
	А	Understanding Computers, Internet and Cyber Laws, information security legal liabilities,	CO1, CO2							
	В	intellectual property, defamation, privacy concerns, censorship, cyber fraud, e – commerce law,	CO5, CO6, CO3							
	С	insurance law, the clash of laws, cyber law dispute resolution, the law of linking, cyber crime	CO6, CO4, CO2							
	Unit 2	Intellectual rights								
	А	Protection of Intellectual Property Rights in Cyber Space in India,	CO1, CO2. CO3							
	В	Compensation and Adjudication of Violations of Provisions of It Act and Judicial Review, Some important Offenses under the Cyber Space Law and the Internet in India,								
	С	Other Offenses under the Information Technology Act in India	CO1, CO6, CO3, CO4							
	Unit 3	Role of Evidences and Rules								



	А	The Role of Elect Provisions of the	tronic Evidence an IT Act,	nd the Miscellaneous	CO1, CO2, CO4
	В	Legal Aspects of	Electronic Record	CO6, CO3, CO1	
	С	The Rules and Re	egulations of Cert	ifying Authorities in India	CO3, CO4, CO6, CO5
	Unit 4	Cyber Space Law	/S		
	А	International Effo	orts Related to Cy	ber Space Laws,	CO1, CO2, CO6
	В	Fundamental Juri Classic U.S. Juris	sdiction Principle	s Under International Law,	CO2, CO4, CO6
	С	Principles, Counc	cil of Europe conv	vention on cyber crimes	CO1, CO3, CO5
	Unit 5	Tools			
	А	Cyber Check, Tru	ie Back,		CO1, CO2, CO6
	В	Hasher, Email Tr	acer		CO1. CO2, CO6, CO5
	С	Pasco, Nmap, Bir	CO2, CO3, CO5		
	Mode of examination		Theor	гу	
	Weightage	CA	MTE	ETE	
	Distribution	25%	25%	50%	
	Text book/s*	1. Cyber La	w and IT Protection		
		1. Introduct	ion to Information	n Security and Cyber Laws	
	Other References	by Surya	Prakash Tripathi		

S. No.	Course Outcome	Programme Outcomes (PO) & Programme Specific Outcomes (PSO)
1.	CO1: Develop competencies for dealing with frauds and deceptions (confidence tricks, scams) and other cybercrimes for example, child pornography etc. that are taking place via the Internet	PO1, PO2, PO3, PO7, PO10, PSO1
2.	CO2: Explore the legal and policy developments in various countries to regulate Cyberspace	PO1, PO2, PO6, PO7, PO8, PO10, PSO1, PSO2
3	CO3: Formulate various security measures for cyber-attacks.	PO1, PO2, PO6, PO7, PO8, PO10, PSO1, PSO2
4	CO4: Apply the principles in real life situations.	PO1, PO2, PO3, PO4, PO5, PO10, PSO1
5	CO5: Identify various Cybercrimes and take necessary actions.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PSO1, PSO2
6	CO6: Assess the various online activities.	PO1, PO2, PO3, PO4, PO5, PO7 PO9, PO10, PSO1

PO and PSO mapping with level of strength for Course Name Information Security and Cyber Laws (Course Code MCA169)

Course Code- Course Name	CO's	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
MCA 169	CO1	2	2	3				3			3	2	
Information Security and Cyber	CO2	3	3				2	2	3		3	3	2
Laws	CO3	2	2				2	2	2		2	3	3



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CO4	2	2	2	3	3				3	2	
CO5	2	2	2	2	2	2	2	2	2	2	3
CO6	3	2		2	2		3	3	2	2	

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO2
MCA 169	Information Security and Cyber Laws	2.3	2.1	2.3	2.3	2.3	2	2.4	2.5	2.5	2.4	2.3	2.6

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent

3. Addressed to Substantial (High=3) extent



Syllabus: Management Information System

Sc	hool: SSET	Batch: 2023-2025	Batch: 2023-2025								
Pr	ogramme: MCA	Current Academic Year: 2023-24									
Se	mester:	I									
1	Course Code	MCA176									
2	Course Title	Management Information System									
3	Credits	3									
4	Contact Hours	3.0.0									
4	(L-T-P)	5-0-0									
	Course Status	Elective									
		The objective of this course is to:									
_	Course	1. To understand the basic principles and working of n	nanagement information systems.								
5	Objective	2. Describe the role of information technology and info	ormation systems in business.								
	5	3. To give an overall perspective of the importance o	application of internet technologies in business								
		administration.									
		CO1: Relate the basic concepts and technologies used in the	field of management information systems (K2								
		K6)	field of management information systems. (K2,								
		CO2 : Compare the processes of developing and implementi	ng information systems (K6, K3)								
~	Course	CO3 : Outline the role of the ethical, social, and security issu	ues of information systems(K3)								
6	Outcomes	CO4: Translate the role of information systems in organizati	ons, the strategic management processes, with								
		the implications for the management. (K5)									
		CO5: Interpret and recommend the use information technological experimentation technological experimentation and the second experimentation of the second	bgy to solve business problems (K5)								
		CO6: Apply a framework and process for aligning organizat	ion's IT objectives with								
		business strategy. (k6)									
7	Course	This course introduces developing and managing efficient	ent and effective understanding of management								
0	Outline sullabus	information system that requires understanding the managem	CO Monning								
0		DACIC CONCEPTS OF INFORMATION SYSTEM	CO Wapping								
		BASIC CONCEPTS OF INFORMATION STSTEM									
	А	Role of data and information, Organization structures	CO1, CO6								
	В	Business Process, Systems Approach	CO1, CO6								
	С	Introduction to Information Systems	CO1, CO6								
	TL-:4 0		, ,								
	Unit 2	TYPES OF INFORMATION SYSTEM									
		Resources and components of Information System,	CO1 CO2 CO6								
	Α	developing business models	001, 002, 000								
		Role and advantages of Transaction Processing System	CO1 CO2 CO6								
	В	Management Information System	001, 002, 000								
<u> </u>											
	C	Expert Systems and Artificial Intelligence, Executive	CO1 CO2 CO6								
	C	Support Systems and Strategic Information Systems.	001, 002, 000								
	Unit 3	BASICS OF MANAGEMENT INFORMATION SYSTEM									
1		MIS: Definition – Characteristics and basic requirements of									
	А	MIS Characteristics and basic requirements of	CO3, CO6								
L	В	Structure of MIS-Approaches to MIS development	CO3, CO6								
	С	Computerized MIS- Pre-requisites of an effective MIS- Limitations of MIS	CO3, CO6								
F	Unit 4	DECISION MAKING PROCESS									
	А	Programmed and Non- Programmed decisions	CO4								
-	B	Decision Support Systems									
	D	Decision support systems	0.04								



С	Models and approaches to DS	S	CO4						
Unit 5	INTRODUCTION TANAGEMENT TECHNO	TO ENTERPRISE LOGIES							
А	Business Process Reengineerin	ıg	CO5						
В	Total Quality Management and System	l Enterprise Management	CO5						
С	Understanding of ERP, SCM,	CRM and Ecommerce.	CO5						
Mode of examination	Theory	-							
Weightage	CA	MTE	ETE						
Distribution	25%	25%	50%						
Text book/s*	 Kenneth C. Laudon an Pearson Education, 1- James A. O' Brien, 0 10th Edition, 2011, IS 	nt Information System, Managing the Digital Firm, N:9781292094007. ment Information Systems, Global McGraw Hill,							
Other References	 Goyal, D.P.: "Manager Mahadeo Jaiswal, Mor Delhi, 2008. Murthy C.S.V.: "Mana 	 10th Edition, 2011, ISBN: 978-0072823110. Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, 2008. Mahadeo Jaiswal, Monika Mital: "Management Information System", Oxford University Press, N Delhi, 2008. Murthy C.S.V.: "Management Information System", Himalaya Publications, New Delhi, 2008. 							

S.	Course Outcome (CO)	Programme Outcomes (PO) & Programme Specific Outcomes (PSO)					
INO.		Flogramme specific Outcomes (FSO)					
1.	Relate the basic concepts and technologies used in the field of management information systems.	PO1, PO4, PO8, PO9, PO10					
2.	Compare the processes of developing and implementing information systems.	PO1, PO2, PO4, PO8, PO10					
3.	Outline the role of the ethical, social, and security issues of information systems.	PO1, PO2, PO3, PO4, PO8, PO10					
4.	Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.	PO1, PO2, PO3, PO4, PO8					
5	Interpret and recommend the use of information technology to solve business problems.	PO1, PO2, PO3, PO4, PO10					
6	Apply a framework and process for aligning organization's IT objectives with	PO1, PO2, PO3, PO4, PO5, PO6, PO9,					
0	business strategy.	PO10, PSO1, PSO2					

PO and PSO mapping with level of strength for Course Name: Management Information System

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	-	-	3	-	-	-	2	2	3	-	-
CO2	3	3	-	3	-	-	-	3	-	2	-	-
CO3	3	3	3	3	-	-	-	3	-	2	-	-
CO4	2	2	2	3	-	-	-	2	-		-	-
CO5	2	2	2	3	-	-	-	-	-	2	-	-
CO6	2	3	3	3	2	2	2	3	3	3	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
MCA176/MIS	2.5	2.6	2.5	3	2	2	2	2.6	2.5	2.4	2	2

Strength of Correlation:1. Addressed to Slight (Low=1) extent

2. Addressed to Moderate (Medium=2) extent



Sc	hool:	Sharda School of Engineering & Technology						
De	epartment	Computer Science & Applications						
Pr	ogramme:	MCA, Academic Year: 2023-24						
Se	mester:	Ι						
1	Course Code	MCA013						
2	Course Title	Essentials of Digital Marketing						
3	Credits	3						
4	Contact Hours	0	0					
4	(L-T-P)	3	0					
	Course Status	Departmental Elective						
		The objectives of this Course are:						
		1. Today's marketer has to be aware of the digital Market in	nterventions and this course has					
	G	been designed keeping in mind the requirement of indust	try on one end and competence					
5	Course	enhancement on the other.						
	Objective	2. At the end of this course you will be equipped with the s	kill to understand and initiate digital					
		2. At the end of this course you will be equipped with the s.	kin to understand and mittate digitar					
		marketing.						
		After Successful completion of this course the student will be able	le to:					
		CO1: infer digital marketing practices, inclination of digital cons	umers and their behaviours.					
		CO2: discover various search engine optimization techniques for	digital marketing analysis.					
	_	CO3: determine the value of integrated marketing campaigns across SEO, Paid Search, Social,						
	Course	Mobile, Email, Display Media, Marketing Analytics.						
6	6 Outcomes CO4: develop understanding of the latest digital practices for social media marketing and promotions							
		CO6: construct insights on building organizational competency h	w way of digital marketing practices					
		and cost considerations.	y way of digital marketing practices					
	Course	The primary objective of this module is to examine and explore t	he role and importance of digital					
7	Description	marketing in today's rapidly changing business environment. It a	lso focuses on how digital					
	Description	marketing can be utilized by organizations and how its effectiver	ness can be measured.					
8	Outline syllabus	1	CO Mapping					
	Unit 1	Introduction to Digital Marketing						
	А	What is digital marketing	CO1					
	В	Aligning Internet with Business Objectives	CO1					
	C	User Behaviour & Navigation	CO1					
	Unit 2	Search Engine Optimization						
	A	Stakeholders in Search						
	В	Un & oii-page Uptimisation	102					
	С	Inhound Links & Link Building	CO2					
		Web Site Analytics						
	Unit 3	Web Site Analytics						
	А	Goal Configuration & Funnels	CO3					
	B	Intelligence Reporting	CO3					
	C	Conversions, Bounce Rate, Traffic Sources, Scheduling	CO3					
		Social Media Marketing						
	Unit 4							
	А	What is Social Media Marketing?	CO4, CO6					
	D	Overview of Facebook, Twitter, LinkedIn, Blogging, YouTube	CO4 CO6					
	D	and Flickr						
	C	Building Brand Awareness Using Social Media	CO4, CO6					



Unit 5	Digital Marketing Strategy	7		
А	Understanding strategy			CO5, CO6
В	Email Marketing, Affiliate r Mobile Marketing,	narketing		CO5, CO6
С	Display Advertising			CO5,CO6
Mode of examination	Theory			
Weightage	CA	MTE	ETE	
Distribution	25%	25%	50%	
Text book/s*	Digital Marketing: Global S Experts <u>Jerry Wind</u> , <u>Vijay N</u>	Vorld's Leading		
Other	The Essentials of Digital Ma	arketing Kathryn W	aite and	
References	Rodrigo Perez-Vega	-		

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1. Infer digital marketing practices, inclination of digital consumers and their behaviours.	PO1, PO2, PO7, PO10 PSO1, PSO2
2.	CO2: discover various search engine optimization techniques for digital marketing analysis.	PO1, PO2, PO3, PO4, PO7, PO10, PSO1, PSO2
3.	CO3. Determine the value of integrated marketing campaigns across SEO, Paid Search, Social, Mobile, Email, Display Media, and Marketing Analytics.	PO1, PO2, PO3, PO4, PO7, PO10, PSO1, PSO2
4.	CO4. develop understanding of the latest digital practices for social media marketing and promotions	PO1, PO2, PO3, PO4, PO7, PO10, PSO1, PSO2
5.	CO5. distinguish among the different technology used in Digital Marketing	PO1, PO2, PO4, PO7, PO10, PSO1, PSO2
6.	CO6. Construct insights on building organizational competency by way of digital marketing practices and cost considerations.	PO1, PO2, PO3, PO4, PO7, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Essentials of Digital Marketing (Course Code MCA013)

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	1	2					1			2	2	2
MCA013	CO2	2	2	2	2			1			2	2	2
Essentials	CO3	2	2	2	2			2			2	3	3
of Digital	CO4	1	2	1	1			2			2	3	3
Marketing	CO5	1	1		1			1			2	2	1
	CO6	1	2	1	1			1			2	2	2



A verse of nen zeros entr	w in following table	(chauld be oute coloulated)
Average of non-zeros entr	y in following table	(should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO 2
MCA013	Essentials of Digital Marketing	1.5	1.8	1	1.2			1.4			2	2.4	2.1

Strength of Correlation

- Addressed to Slight (Low=1) extent
 Addressed to Moderate (Medium=2) extent
 Addressed to Substantial (High=3) extent



Scl	nool:	Sharda School of Engineering & Technology						
De	partment	Computer Science & Applications						
Pro	ogramme:	MCA, Academic Year:2023-24						
Sei	nester:	Ι						
1	Course Code	MCA273						
2	Course Title	Software Engineering & Testing						
3	Credits	3						
4	Contact Hours (L-T-P)	3 0	0					
	Course Status	Core						
5	Course Objective	The course will prepare our students to be successful professionals ir fundamental knowledge of software engineering. Course focuses on communication and interpersonal skills when functioning as member disciplinary teams. This Course allows students to apply their founda to adapt to readily changing environments using the appropriate theo	the field with solid Utilizing and exhibiting strong s and leaders of multi- ations in software engineering ry, principles and processes.					
6	Course Outcomes	 CO1: Choose software model to apply on particular kind of project. CO2: Summarize various requirements for the Application under development CO3: Make use of Unified Modeling Language in software specification documents CO4: Inspect code using various testing techniques to meet user needs as per SRS CO5: Develop and deliver quality software as an individual or as part of a multidisciplinary team CO6: Adapt process of designing, constructing, and testing end user applications that will satisfy user needs 						
7	Course Description	This course covers the software development process from analysis, through specification and design, to implementation, testing, and maintenance (evolution).	requirements elicitation and integration,					
8	Outline syllabus		CO Mapping					
	Unit 1	Software Engineering and process models						
	A	Introduction to software engineering, Importance of software, Software characteristics, Software applications, Software crisis and its causes.	CO1					
	В	Software Process models: Waterfall model, Incremental model, Prototyping Model, Spiral Model, V model	CO1					
	С	Agile Process models: Extreme Programming (XP), Adaptive Software Development (ASD), Scrum	CO1					
	Unit 2	Software requirement Specification						
	А	Requirement Engineering process, Elicitation techniques, Review and Management of User Needs, Types of Requirements	CO2					
	В	Feasibility study, DFD, data dictionary, decision tables	CO2					
	С	SRS Document, IEEE standards for SRS with examples.	CO2					
	Unit 3	Software Design						
	Α	Design Concepts, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design	CO3					
	В	Effective modular design: Functional independence, Cohesion, Coupling, Design documentation	CO3					
	С	UML Diagrams and Tools: Introduction to UML Diagrams, Use Case, Object and Class, Interaction diagram: Sequence & Collaboration, Introduction to Rational Rose tool	CO3, CO6					



Unit 4	Software Testing			
А	Fundamental of testing: Object Error, Mistake, Bug, Fault and	tives, principles, my Failure, limitations	ths and facts, of testing	CO4
В	Levels of testing: Unit Testing Testing, Acceptance Testing: A techniques	, Integration Testing Alpha & Beta Testin	g, System ag, Integration	CO4, CO6
С	White Box Testing, Black Box Validation, Test case designing	Testing, Verifications, Coding Guideline	on and s, Debugging	CO4, CO6
Unit 5	Maintenance & Quality Man	agement		
А	Introduction to Maintenance, N Maintenance: Preventive, Corr Cost of Maintenance	CO5, CO6		
В	Quality Concepts: Quality, Qua Software Quality Assurance, S Measures of Reliability and Av	CO5, CO6		
С	Statistical Software Quality As Quality Standards, Capability 1	, The ISO 9000	CO5, CO6	
Mode of examination	Theory/Jury/Practical/Viva			
Weightage	CA	MTE	ETE	
Distribution	25%	25%	50%	
Text book/s*	1. Pressman R S, "Software Er Approach", McGraw Hill.	ngineering: A Practi	tioners	
Other References	1. Sommerville, Ian. "Software 2. Schaum's Series, "Software	rson (Latest Ed).		

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1: Choose software model to apply for particular kind of project.	PO1, PO2, PO7, PO8, PO9, PO10, PSO1, PSO2
2.	CO2: Summarize various requirements for the Application under development.	PO1, PO2, PO3, PO7, PO8, PO9, PO10, PSO1, PSO2
3.	CO3: Make use of Unified Modeling Language in software specification documents;	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO10, PSO1, PSO2
4.	CO4: Inspect code using various testing techniques to meet user needs as per SRS.	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO10, PSO1
5.	CO5: Develop and deliver quality software as an individual or as part of a multidisciplinary team.	PO1, PO2, PO3, PO7, PO8, PO9, PO10, PSO1
6.	CO6: Adapt process of designing, constructing, and testing end user applications that will satisfy user needs	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Software Engineering & Testing (Course Code MCA273)

Course Code_ MCA 273 Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	3	3	-	-	-	-	3	3	2	1	3	2
MCA 273	CO2	3	3	2	-	-	-	3	3	3	1	3	2
Software Engineering	CO3	3	3	3	3	-	-	3	3	3	1	3	3
& Testing	CO4	3	3	2	2	-	-	3	3	3	1	3	-
	CO5	3	3	2	-	-	-	3	3	3	1	3	-
	CO6	3	3	2	3	2	2	3	3	3	3	3	2



Average of non-zeros	entry in	1 following	table (should	be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA273	Software Engineering & Testing	3	3	2.2	2.6	2	2	3	3	2.8	1.3	3	2.25

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



S	chool: SSET	Batch : 2023-2025									
I	Programme:	Academic Year: 2023-2024									
	MCA										
1	Semester										
2	Course Title	Logic Building and Soft Skills									
3	Credits	2									
4	Contact Hours (L-T-P)	1-0-2									
	Course Status	Active									
5	Course Objective	To enhance holistic development of students and improve their employability skills. To provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To step up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 1 st phase of employability enhancement and skill building activity exercise.									
6	Course Outcomes	After completion of this course, students will be able to: CO1: Ascertain a competency level through Building Essential Language and Life Skills CO2: Build positive emotional competence in self and learn GOAL Setting and SMART Goals techniques CO3: Apply positive thinking, goal setting and success-focused attitudes, time Management, which would help them in their academic as well as professional career CO4: Acquire satisfactory competency in use of aptitude, logical and analytical reasoning CO5: Develop strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate an ability to apply various quantitative aptitude tools for making business decisions									
7	Course Description	This Level 1 blended training approach equips the students for Industry employment readiness and combines elements of soft skills and numerical abilities to achieve this purpose.									
8		syllabus – ARP 106									
	Unit 1	BELLS (Building Essential Language and Life Skills)	CO Mapping								
	А	<i>Know Yourself</i> : Core Competence. A very unique and interactive approach through an engaging questionnaire to ascertain a student's current skill level to design, architect and expose a student to the right syllabus as also to identify the correct TNI/TNA levels of the student.	CO1								
	В	Techniques of Self Awareness Self Esteem & Effectiveness Building Positive Attitude Building Emotional Competence	CO1, CO2								
	С	Positive Thinking & Attitude Building Goal Setting and SMART Goals – Milestone Mapping Enhancing L S R W G and P (Listening Speaking Reading Writing Grammar and Pronunciation)	CO1, CO2,CO3								
	Unit 2	Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical									
	А	Syllogism Letter Series Coding, Decoding, Ranking & Their Comparison Level-1	CO4								
	В	Number Puzzles	CO5								



С	Selection Based On Given Conditions	CO5
Unit 3	Quantitative Aptitude	
А	Number Systems Level 1 Vedic Maths Level-1	CO6
В	Percentage ,Ratio & Proportion Mensuration - Area & Volume Algebra	CO6
Unit 4	Verbal Abilities - 1	
А	Reading Comprehension	CO1
В	Spotting the Errors	CO2
Unit 5	Time & Priority Management	
А	Steven Covey Time Management Matrix	CO3
В	Creating Self Time Management Tracker	CO3
Weightage Distribution	CA MTE ETE 25% 25% 50%	
Text book/s*	Wiley's Quantitative Aptitude-P Anand Quantum CAT – Arihant Publications Quicker Maths- M. Tyra Power of Positive Action (English, Paperback, Napoleon Hill) Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon Goal Setting (English, Paperback, Wilson Dobson	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	-	-	-	1	-	-	-	1	3	-	-
CO2	-	-	-	-	1	-	-	-	1	3	-	-
CO3	-	-	-	-	1	-	-	-	1	3	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	-
CO5	1	-	-	-	-	_	-	-	1	2	-	-
CO6	1	_	_	_	_	_	-	-	1	2	_	_



Scho	ol: SSET	Batch: 2023-25							
Prog	ramme: MCA	Current Academic Year: 2023-24							
Seme	ester:	I							
1	Course Code	MCP177							
2	Course Title	Database Management Systems Lab							
3	Credits	1							
4	Contact Hours (L-T-P)	0-0-2							
	Course Status	Compulsory							
5	Course Objective	 To Develop efficient SQL programs to access Oracle databases Build database using Data Definition Language Statements Perform operations using Data Manipulation Language statements Insert, Update and Delete 	ents like						
6	Course Outcomes	By the end of this course you will be able to: CO1: Understand the concept of SQL commands in DBMS. CO2: Create & Perform operations using DDL, DML & Grouping Clar CO3: Manipulate your data using Sub- queries & Joins CO4: Implementation of Trigger & Cursors CO5: Solve problems using Procedures & Functions CO6: Design & develop database for real life applications.	uses.						
7	7 Course An introduction to the design and creation of relational databases. Create database- Description level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands- on experience.								
8	Outline syllabus		CO Mapping						
	Unit 1	Practical based DDL, DML commands							
		Classification SQL, Data types of SQL/Oracle, create table, alter table and drop table, INSERT, SELECT, UPDATE & DELETE command	CO1, CO2						
	Unit 2	Practical based on Grouping Clauses GROUP BY ORDER BY & GROUP BY HAVING							
		Briefly explain Group by, order by, having clauses with examples. Aggregate functions: sum, avg, count, max, min	CO1, CO2						
	Unit 3	Practical based on Sub- queries, JOINS &							
		Related example of Sub- queries, Joins and related examples,	CO1, CO3						
	Unit 4	Trigger & Cursors	CO4						
		Program related with Trigger & Cursors							
	Unit 5	Procedures & Functions	CO5, CO6						
		Applying Procedures & Functions							
		Develop Real life Applications							



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Value Added Practical:	Applications such	h as Banking, Libr	ary, Payroll, University etc.								
Mode of	Jury/Practical/V	lury/Practical/Viva									
examination											
Weightage	CA	CE (Viva)	ETE								
Distribution	25%	25% 25% 50%									
Text book/s*	1. Korth, Silbers	Korth, Silberschatz& Sudarshan, Database Concepts, Tata McGraw-Hill									
Other References	 Elmasri, I Inc. Thomas Approac Education Jeffrey D Pearson E <u>https://w</u> 	Navathe, Fundamental Connolly, Carolyn ch to design, Impl on, Latest Edition. . Ullman, Jennifer Win Education. ww.slideshare.net/st	ls of Database Systems, Pearson Education Begg, Database Systems: A Practical lementation and Management, Pearson adon, A first course in Database Systems, talinjothi/dbms-lab-manual-126808730								

S No	Course Outcome	Programme OutComes(PO) &			
5. NO.	Course Outcome	Programme Specific Outcomes (PSO)			
1	CO1: Understand the concept of SQL commands in				
1.	DBMS.	r01, r02, r03, r010, r301			
2	CO2 Create & Perform operations using DDL, DML&	PO1 PO2 PO3 PO10 PS01			
۷.	Grouping Clauses.	101,102,105,1010,1501			
3.	CO3: Manipulate your data using Sub- queries & Joins.	PO1, PO2, PO3, PO10, PSO1			
4.	CO4: Implementation of Trigger & Cursors	PO1, PSO2			
5	CO5: Solve problems using Procedures & Functions.	PO1, PO2, PSO2			
6	COG Design & devialon detabase for real life problems	PO1, PO2, PO3, PO4, PO5, PO7, PO9,			
0	COO. Design & develop database for fear the problems.	PO10, PSO1, PSO2			

PO and PSO mapping with level of strength for Course Name: Data Base Management Systems Lab (MCP177)

MCD	C Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PS O1	PS O2
MCP 177/ DBM S Lab		Doma in Know ledge	Prob lem Anal ysis	Applica tion Develo pment	Mo dern Too 1 Usa ge	Innovatio n and Entrepren eurship	Environ ment and Sustain ability	Person al and Profes sional Ethics	Commun ication	Project Manag ement	Life- Long Lear ning		



				-								
C O 1	3	1	1	-	-	-	-	-	-	1	1	-
C O 2	3	1	1	-	-	-	-	-	-	1	1	-
C O 3	3	2	1	-	-	-	-	-	-	1	1	-
C O 4	3	-	-	-	-	-	-	-	-	-	-	1
C O 5	3	2	-	-	-	-	-	-	-	-	-	1
C O 6	3	3	3	3	2	-	2	-	3	2	2	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO 1	PO2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO10	PSO1	PSO2
MCP177	3	1.8	1.5	3	2	-	2	-	3	1.5	1.5	1.7

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent

Syllabus: C Programming and File Handling Lab



Sch	ool	Sharda School of Engineering & Technology										
Dep	artment	Computer Science & Applications										
Prog	gramme	MCA, Academic Year: 2023-24										
Sem	ester	I										
1	Course Code	MCP175										
2	Course Title	C Programming and File Handling Lab										
3	Credits	1										
4	Contact Hours (L-T-P)	0-0-2										
	Course Status	Compulsory										
5	Course Objective	 Learn basic programming constructs –data typ structures, control structures in C learning logic aptitude programming in c lang Developing software in c programming 	pes, decision puage									
6	Course Outcomes	Students will be able to: CO1: Implement core concept of c Programming CO2: develop programs using Array and String CO3: create Functions for any problem CO4: Use Union and Structure to write any progr CO5: implement concept of Pointers CO6: design a real-world problem with the help of	am of c programming									
7	Course Description	Programming for problem solving gives the Understandin and implement code from flowchart or algorithm	g of C programming									
8	Outline syllabu	8	CO Mapping									
	Unit 1	Logic Building	CO1, CO6									
		Draw flowchart for finding leap year										
		Write a c Program to Add Two Integers										
		Write a program to create a calculator										
	Unit 2	Introduction to C Programming	CO2, CO6									
		Write a c program to convert length meter to cm										
		Write a c program to convert temp										
		Write a c program to swap two numbers										
	Unit 3	Arrays and Functions	CO3. CO6									
		Write a c program to calculate the average using arrays										
		Write a c program to find the largest element of the										
		array										
	Unit 4	Pre-processors and Pointers	CO4, CO6									
		Write a c program to swap two values using pointers										
		Write a c program to find largest number from array using pointers										
	Unit 5	User Defined Data Types and File Handling	CO5, CO6									
		Write a c program to store information of a student using structure										
		Write a c program to store information of a student using union										

•



	Mode of examination	Practical	Practical										
	Weightage Distribution	CA	CE(Viva)	ETE									
		25%	25%	50%									
	Text book/s*	1. Kern Prog	ighan, Brian, ramming Langua										
	Other References	1. B.S. Outli 2. E. Ba Editi	 B.S. Gottfried - Programming with C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999 										

PO and PSO mapping with level of strength for Course Name: C Programming and File Handling Lab (MCP175)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	2	-	3	2	2	-	-	-	2	-	3	2
	CO2	3	-	3	2	2	-	-	-	3	-	3	3
MCP175 / C	CO3	2	-	3	1	2	-	-	-	2	-	2	3
Handling Lab	CO4	1	-	2	1	1	-	-	-	2	-	2	2
	CO5	2	-	3	2	2	-	-	-	3	-	3	2
	CO6	3	-	3	3	1	-	-	-	2	-	2	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code Course Name		PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP175	C Programming and File Handling Lab	2.33		2.83	1.83	1.67	-	-	-	2.33	-	2.50	2.50

Strength of Correlation

- **1.** Addressed to Slight (Low=1) extent **2.** Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



TERM-II



Scł	nool:	Sharda School of Engineering & Technology									
De	partment	Computer Science & Applications									
Pro	ogramme:	MCA									
Ser	nester:	П									
1	Course Code	MCA105									
2	Course Title	Data Structure using C									
3	Credits	4									
4	Contact Hours	3 1	0								
	(L-T-P)										
	Course Status	Core									
5	Course Objective	• To impart the basic concepts of data structures and algorithms.									
		The second s	-1								
		• To understand concepts about searching and sorting te	chniques.								
		• To understand basic concepts about stacks, queues, list	ts trees and graphs.								
		• To understand writing algorithms and step by step app	roach in solving problems with the								
		help of fundamental data structures.									
		• To understand the knowledge of algorithm design strate	egies.								
			-								
		• To enable students to analyse time and space complexit	ty.								
6	Course	• CO1: Analyse algorithms and their correctness.									
	Outcomes	• CO2: Describe stack, queue and linked list operation.									
		• CO3: Demonstrate the knowledge of tree and graphs of	concepts								
		 CO4: Apply important algorithmic design paradigms and 	nd methods of analysis								
		CO5: Develop the capability to choose appropriate algorithms and the capability to choose appropriate algorithms are algorithm.	rithm design techniques for solving								
		problems	initial design teeninques for sorving								
		• CO6: Analyse the performance of algorithms									
		• Cool. Analyse the performance of algorithms.									
7	Course	This course starts with an introduction to data structures wi	th its classification, efficiency of								
	Description	different algorithms, array and pointer-based implementations	and Recursive applications. As the								
		course progresses the study of Linear and Non-Linear data str	ructures are studied in detail. This								
		Course also deals with the concept of searching and sorting i	nethods. Specifically, it discusses								
		recurrence relations, and illustrates their role in asymptotic and p	probabilistic analysis of algorithms.								
		It covers in detail greedy strategies, divide and conquer technicity str	inques, dynamic programming and								
8	Outline syllabus	I musuales mem using a number of wen-known problems and ap	CO Mapping								
0	Unit 1	Introduction									
	A	Data Structure – Definition Operations Abstract Data Types	CO1. CO6								
	B	Algorithm – Definition Complexity	CO1, CO6								
	C	Asymptotic notations. Time and Space complexity	CO1, CO6								
	Unit 2	Arrays and Linked List									
	A	Concept of Arrays, Single dimensional array. Two-	CO2, CO6								
		dimensional array, storage strategy of multidimensional arrays									
		(Row Major/ Column Major), Index Formula for single and									
		multidimensional Array,									
	В	Operations on arrays with Algorithms (Insertion, deletion),	CO2, CO6								
		Introduction to linked list and double linked list,									
		Representation of linked lists in Memory, traversing a linked									
		list, searching linked list, Insertion and deletion into linked list									



С	Application of 1 doubly linked li	linked lists, sts, Insertion	doubly linked lists, Traversing a n and deletion into doubly linked	CO2, CO6
	lists			
Unit 3	Stack and Queu	ue		
A	Introduction to s	stacks, Repre	esentation of stacks,	CO3, CO6
В	Implementation stacks, Introduct	of stacks u tion to queue	sing Array & Link List, Uses of es,	CO3, CO6
С	Implementation De-queues, Recu	of queues (vursion	with algorithm), Circular Queues,	CO3, CO6
Unit 4	Tree and Grap	h		
A	Concept of Tree Binary search tr order and In order	es, Concept ees Travers er),	of representation of Binary tree, ing Binary Trees (Pre order, Post	CO4, CO5, CO6
В	Searching, inser Tree, B-Tree,	rting and de	CO4, CO5, CO6	
С	Introduction to g Depth first searc	graphs, type ch	CO4, CO5, CO6	
Unit 5	Sorting and Sea	arching		
А	Introduction, Sea	arch algorith	m (Linear and Binary),	CO4, CO5
В	Concept of sortin Sort, Quick Sort Sort) and their c	ng, Sorting a , Selection S omparisons,	CO4, CO5	
С	Complexity Ana	alysis of Sor	ting Algorithms.	CO4, CO5
Mode of examination	Theory/Jury/Pra	ctical/Viva		
Weightage	CA N	ATE	ETE	
Distribution	25% 2	.5%	50%	
Text book/s*	1. Data Str Data Str	ructure with ructures usin	C, Seymour Lipschutz, TMH 2. g C. Reema Thareja, Oxford	
	2. Cormen Algorith	et al., nms", Prentic	ce Hall India	
	3. Data Str Cengage	ructures, 2/e e	e, Richard F, Gilberg, Forouzan,	
	4. Data stru	uctures and	algorithm analysis in C.	
Other References	 Data Structure Classic Data Fundamentals Anderson Freed, Hopcroft A Algorithms, Add 	es and Algor Structures, 2 s of Data Str , University A, The Da dison Wesley	rithms, 2008, G. A. V. Pai, TMH 2/e, Debasis, Sarnanta, PHI,2009 ucture in C, 2le,' Horowitz, Sahni, Prees esign and Analysis Computer y	

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	Analyse algorithms and their correctness.	PO1, PO2, PO3, PO6, PO8, PO9, PO10, PSO1, PSO2
2.	Summarize searching and sorting techniques	PO1, PO2, PO3, PO4, PO5, PO10, PSO1, PSO2



3.	Describe stack, queue and linked list operation.	PO1, PO2, PO3, PO5, PO10, PSO1, PSO2
4.	Apply important algorithmic design paradigms and methods of analysis	PO1, PO2, PO3, PO5, PO10, PSO1, PSO2
5.	Develop the capability to choose appropriate algorithm design techniques for solving problems.	PO1, PO2, PO3, PO6, PO9, PO10, PSO1, PSO2
6.	Analyse the performance of algorithms	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Data Structures using C (MCA105)

Course Code_ Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	3	1	3	-	-	2		2	1	2	1	2
MCA 105 D (CO2	3	3	2	1	1	-				2	3	1
MCA105_Data	CO3	2	1	2	2	2	-				3	3	2
Structure Using	CO4	1	2	2		2	-				3	2	1
C	CO5	2	1	3			1			2	3	1	3
	CO6	3	3	1	2	3	_		1	1	3	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA105	Data Structure Using C	2.33	1.83	2.17	1.67	2.00	1.50	-	1.50	1.33	2.67	2.00	1.83

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* 2. Addressed to *Moderate (Medium=2) extent*

3. Addressed to Substantial (High=3) extent


Syllabus for Application Programming in Python MCA173

Scho	ol:	Sharda School of Engineering & Technology										
Depa	rtment	Computer Science & A	pplicat	tions								
Prog	ramme:	MCA, Academic Year: 2023	8-24									
Seme	ster	II										
1	Course Code	MCA173										
2	Course Title	Application Programmin	ng in Py	vthon								
3	Credits	4										
4	Contact Hours (L-T-P)	4		0		0						
	Course Status	Regular										
5	Course Objective	The objective of the cou develop robust and effic and minor project.	The objective of the course is to equip students with the knowledge and skills needed to develop robust and efficient Python applications that solve practical problems with case study and minor project.									
6	Course Outcomes	Upon successful complet CO1. Ability to design CO2. Familiarity with F CO3. Understanding of CO4. Ability to work w CO5. Understanding of CO6. Familiarity with b	tion of and im Python I Object ith data web de	this course, the student will be a plement python applications. ibraries and frameworks. -oriented programming (OOP) of bases including case study. evelopment concepts with minor ctices and coding standards.	able to: concepts. • project.							
7	Course Description	Python is a language win many scientific areas for programming language is provide students with a science of the programming and preparation of the program	th a sim data ex for stud solid fo re them	ple syntax, and a powerful set of xploration. This course is an intri- ents without prior programming undation with case study and m for more advanced courses or r	of libraries. In roduction to g experience. inor project i real-world pr	t is widely used in the Python This course will in Python ojects.						
8	Outline syllabus		CO Mapping									
	Unit 1	Introduction										
	А	Introduction: History, D Operators.	Python	architecture, Variables, Data Ty	vpes,	CO1, CO2						
	В	Python Syntax: Comm	ents, va	ariables, conditional statement	s, loops.	CO1, CO2						
	С	Datatypes: Numbers, st	rings, li	st, tuples, sets, dictionaries.		CO1, CO2						
	Unit 2	Libraries and Framew	orks									
	А	Libraries: Introduction SciPy etc.	and wo	rking with NumPy, Pandas, ma	tplotlib,	CO2, CO6						
	В		CO2									
	С	Exception Handling : D clause, Try? finally clau	efinitio se, Use	n Exception, Exception handlin r Defined Exceptions	g, except	CO2, CO6						
	Unit 3	Object oriented progra	ımminş	5								
	Α	OOPs concept : Class an	nd obje	ct, Attributes, Inheritance		C03						
	В	Overloading, Overriding	g, Data	hiding		CO3						
	С	Python File Operation into files. Manipulating	: Openi File Po	ng, Closing, Reading, Writing c	operation	CO3, CO4						
	Unit 4	Database Handling										



А	Python Database Creating and search	Interaction: SQL hing tables.	Database connection using python,	CO4						
В	Reading and storin	g config informati	ion on database.	C04						
С	Programming using	g database connec	tions. Case study (5%)	CO4, CO6						
Unit 5	Modules, Email P	rocessing								
А	Modules: Importin Packages.	ng module, Math r	nodule, Random module, Matplotlib,	CO5, CO6						
В	Contacting User 7 python module, Se	Ontacting User Through Emails Using Python: Installing SMTPthon module, Sending email.eading from file and sending emails to all users addressing themrectly for marketing. Minor Project (15%)								
С	Reading from file a directly for market									
Mode of examination	Theory/Jury/Practi	Theory/Jury/Practical/Viva								
Weightage	CA	MTE	ETE							
Distribution	25%	25%	50%							
Text book/s*	1. The Comp	lete Reference Py	thon, Martin C. Brown, McGrwHill							
Other References	 Introduction Balagurusa Introduction Pearson Mastering Starting out 	 Introduction to computing in problem solving using Python, E Balagurusamy, McGrawHill Introduction to programming using Python, Y. Daniel Liang, Pearson Mastering Python, Rick Van Hatten, Packet Publishing House Starting out with Python, Tony Gaddis, Pearson 								

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1. Ability to design and implement python applications.	PO1, PO3, PO5, PO6, PO10, PSO1, PSO2
2.	CO2. Familiarity with Python libraries and frameworks.	PO1, PO2, PO3, PO4, PO6, PSO1, PSO2
3.	CO3. Understanding of Object-oriented programming (OOP) concepts.	PO1, PO2, PO3, PO4, PO6, PSO1, PSO2
4.	CO4. Ability to work with databases.	PO1, PO2, PO3, PO4, PO5, PO6, PO10, PSO1
5.	CO5. Understanding of web development concepts.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10, PSO1, PSO2
6.	CO6. Familiarity with best practices and coding standards.	PO1, PO2, PO3, PO4, PO 5, PO6, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Application Programming in Python Course Code MCA173)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
MCA173	CO1	3	-	1	-	1	1	-		-	1	1	1
Application	CO2	2	3	2	1	-	1	-	-	-	-	1	2



Programming	CO3	1	2	3	1	-	1	-	-	-	-	2	2
in Python	CO4	1	1	2	3	2	2	-	-	-	1	1	-
	CO5	2	2	2	2	3	1	-	-	-	1	2	2
	CO6	2	3	3	2	2	2	-	-	-	1	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA173	Application Programming in Python	1.8	1.8	2.2	1.5	1.3	1.3	-	-	-	0.6	1.5	1.5

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent



Scho	ool: SSET	Batch: 2023-25									
Prog	gramme: MCA	Current Academic Year: 2023-24									
Brai	nch:MCA	Semester: II									
1	Course Code	MCA271									
2	Course Title	Cloud Computing									
3	Credits	3									
4	Contact Hours (L-T-P)	3-0-0									
	Course Status	Elective									
5	Course	1. Provide students with an overview of the fundamental concepts of Cl	oud Computing.								
	Objective	2. Gain insight into the challenges and limitations Models of cloud com	puting.								
		3. To learn the various technologies of the cloud computing paradigm an advances in Cloud Computing and enabling technologies.	. To learn the various technologies of the cloud computing paradigm and learn about recent advances in Cloud Computing and enabling technologies.								
		Prepare students for research in the area of cloud Computing risks and cloud security challenges.									
		5. Enhance student's communication and problem-solving skills									
6	Course Outcomes	At the end of the course, students will have achieved the following learning CO 1. Define the basics of cloud and recall the computer Science concept understanding on demand service architecture.	y objectives. s which are helpful in								
		CO 2. Classify and describe the architecture and taxonomy of par computing, including shared and distributed memory, and da computing.	allel and distributed tta and task parallel								
		CO 3. Apply and Manage Virtualization and Workflow to use the clou applications.	d in file systems and								
		CO 4. Categorize and Characterize between Infrastructure services, dep governance in cloud computing. Examine the design of task and da algorithms for Clouds and use them to construct Cloud applications	loyment models, and ata parallel distributed s.								
		CO 5. Evaluate the importance of cloud using monitoring and manage performance improvement of HPC and to follow the Governance a	ement of services for nd Compliances.								
		CO 6. Elaborate the design concept and formulate to build the solution providers as AWS, MS Azure and Google Cloud. Demonstrate the Vertex-Centric and Continuous Dataflow programming models.	n using cloud service e use of Map-Reduce,								
7	Course Description	This course introduces advanced aspects of Cloud Computing, encompase analyze the cloud, identify the problems, and choose the relevant models an	sing the principles, to d algorithms to apply.								
8	Outline syllabus		CO Mapping								
	Unit 1	Cloud Computing Fundamentals									
		A. Types of Computing, Grid computing, distributed computing,	CO1, CO2, CO3								
		Client-server computing, Introduction to distributed systems,									
		B. Cloud Computing definition Roots of Cloud Computing Cloud									
		Architecture, Layers and Types of Clouds. Desired Features of a									
		Cloud, Cloud Infrastructure Management, Major players in									



		Cloud Computing, issues in Clouds, Understanding Services: SaaS, PaaS, IaaS	
		C. Infrastructure as a Service Providers, Platform as a Service Providers, Database as a service, Communication as services, Challenges and Risks, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud,	
-	Unit 2	Understanding Abstraction and Virtualization	
		A. Introduction to Virtual Machines, The Anatomy of Cloud Infrastructures, Pros and Cons of Virtualization, VM Provisioning and Manageability, Virtual Machine Migration Services, VMware, vSphere, Hyper-V.	CO1, CO2, CO3
		B. Management of Virtual Machines for Cloud Infrastructures, Understanding Machine Imaging, Distributed Management of Virtual Infrastructures, Scheduling Techniques	
		C. The Logical Design, Secure Distributed Data Storage in Cloud Computing, Cloud Storage, Google file system, Technologies for Data Security in Cloud Storage	
	Unit 3	Cloud Computing Services and Applications	
		 A. Introduction of Comet Cloud, Aneka and Cloud Sim, Integration of Private and Public Clouds, Technologies and Tools for Cloud Computing, 	CO2, CO3, CO4
		 B. Introduction of Enterprises Demand and Cloud Computing, Dynamic ICT Services, Workflow Engine for Clouds, Workflow Management Systems, Architecture of Workflow Management Systems 	
		C. Scientific Application for Cloud Environments, Classification of Scientific Applications and Services in the Cloud, MapReduce Programming Model, MapReduce Impacts and Research Directions.	
	Unit 4	Cloud Computing Risk and Performance Issues	
		 A. Model for Federated Cloud Computing, Security Considerations, SLA Management in Cloud Computing: A Service Provider's Perspective, Types of SLA, Life Cycle of SLA, 	CO3, CO4, CO5
		B. HPC in the Cloud: Performance-related Issues, Game Hosting on Cloud Resources, Building Content Delivery Networks Using Clouds, Resource Cloud Mashups	
		C. Legal Issues in Cloud Computing (PCI DSS), Data Privacy and Security Issues, The CIA Triad: Confidentiality, Integrity, And Availability, Common Threats and Vulnerability in cloud, Cloud Service Provider (CSP) Risks	
	TT	AWS MS A zure and Google Cloud Services	



	 A. AWS Services: E Management, Sin Network, CloudV B. MS Azure Servic Virtual Machines C. Google Cloud: Co Cloud Functions, 	lastic Compute Cloud, Ident nple Storage Service, Conter Vatch es: Azure Virtual Machine, , Azure SQL Database, Azu ompute Engine, Migrate for Cloud Lab Balancing,	tity and Access nt Delivery SQL Server on re Active Directory Compute Engine,	CO4, CO5, CO6						
Mode of examination	Theory	Theory								
Weightage Distribution	СА									
	25%	25%	50%							
Text book/s* Other References										

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	Define the basics of cloud and recall the computer Science concepts which are helpful in understanding on demand service architecture.	PO1, PO2
2.	Classify and describe the architecture and taxonomy of parallel and distributed computing, including shared and distributed memory, and data and task parallel computing.	PO1, PO2, PSO1,
3.	Apply and Manage Virtualization and Workflow to use the cloud in file systems and applications.	PO1, PO2, PO3, PSO1, PSO2
4.	Categorize and Characterize between Infrastructure services, deployment models, and governance in cloud computing. Examine the design of task and data parallel distributed algorithms for Clouds and use them to construct Cloud applications.	PO1, PO2, PO4, PSO1, PSO2
5.	Evaluate the importance of cloud using monitoring and management of services for performance improvement of HPC and to follow the Governance and Compliances.	PO1,PO2,PO4,PSO1
6	Elaborate the design concept and formulate to build the solution using cloud service providers as AWS, MS Azure and Google Cloud. Demonstrate the use of Map-Reduce, Vertex-Centric and Continuous Dataflow programming models.	PO1,PO2,PO3,PSO1,PSO2



PO and PSO mapping with level of strength for Course Name Cloud Computing (Course Code MCA 271)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	1	3	3									
CO2	3	2	2								1	
CO3	3	2		3							2	3
CO4	3	3		2							2	3
CO5	2	2		2							3	
CO6	3	2	1								3	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	РО 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA271	Cloud Computing	2.5	2.3	1	1.16							1.83	1.3

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent



Scho	ol	Sharda School of Engineering & Technology											
Depa	rtment	Computer Science & Applications											
Batcl	h:	2023-25, Year 2023-24											
Prog	ramme:	MCA											
Seme	ester	II											
1	Course Code	MCA307											
2	Course Title	Cryptography and Network	x Security										
3	Credits	3											
4	Contact Hours (L-T-P)	3	0		0								
	Course Status	Elective											
5	Course Objective	To Have a good understandinand protocols exist in order to	ng of how applications can co o offer different levels of sec	ommunica urity	te securely and what tools								
6	Course	• On successful completion of this module students will be able to											
	Outcomes	• CO1: Illustrate native	ork socurity sorvices and mad	honisms									
		• CO1. Individe netwo	JIK security services and mee										
		CO2: Evaluate Symmetry	netrical and Asymmetrical cr	yptograph	ıy.								
		• CO3: Apply Data integrity, Authentication, Digital Signatures.											
	CO4: Analyze Various network security applications IDsac Firawall IDS Wab												
		• CO4: Analyze Various network security applications, IPsec, Firewall, IDS, Web security Email security and Malicious software etc.											
		• CO5: Demonstrate va	CO5: Demonstrate various factors which affect the security of network										
		CO6: Estimate the measure a	O6: Estimate the measure adapted towards network security										
7	Course	This course introduces aspect	s of cyber security, encompa	ssing the	principles, to analyze the								
	Description	data, identify the problems, a	nd choose the relevant count	ermeasure	es to apply.								
8	Outline syllabus				CO Mapping								
	Unit 1	Security and Cryptography	,										
	А	Introduction to Security, Security, Methods of Protection.	urity Attack, Security Service	es,	CO1, CO2								
	В	Mathematics behind cryptogr	aphy: Modular mathematics	, GCD,	CO5, CO6, CO3								
		Euclidean and Extended Eucl	idean algorithms, Prime nun	nbers,									
		Primality testing-Miller Rabi	n test.										
	С	Classical cryptography: Subs	titution and Transposition	voio	CO6, CO4, CO2								
	Unit 2	Cryptographic Methods	ipilabetie Cipilers, Cryptanar	y 515.									
		Properties of Trustworthy En	cryption Systems Types of		CO1 CO2 CO3								
	Π	Encryption Systems, Confusi	on and Diffusion. Data Encr	votion	01,002.005								
		Standard (DES) Algorithm, I	Double and Triple DES.	, Parata									
	В	Advanced Encryption Standard (AES) Algorithm, DES and AES CO4, CO5, CO6											
		Comparison.											
	С	Concept of Public Key Crypt	CO1, CO6, CO3, CO4										
	U:4 2	Exchange, Diffie-Hellman Sc											
		Iviancious program and Sec	urity	y Viruses and Other CO1 CO2 CO4									
	A	Malicious Code, Targeted Ma	alicious Code, Methods of C	uner ontrol.	01,002,004								
	В	Cryptographic Hash Functior	s, Digital Signature, Certific	ates,	CO6, CO3, CO1								
		Certificate Authorities.											



С	Memory Protection Operating System	on, File Protections	on, Protection Methods of	CO3, CO4, CO6, CO5						
Unit 4	Network securit	y								
А	Network Concept Controls.	CO1, CO2, CO6								
В	Overview of IP S of Operation, Sec (AH), Encapsulat Exchange.	ecurity (IPSec), urity Association ing Security Pay	IP Security Architecture, Modes as (SA), Authentication Header load (ESP), Internet Key	CO2, CO4, CO6						
C	Web Security Rea Transport Layer S (SET)	Web Security Requirements, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET)								
Unit 5	Electronic Mail									
А	Threats to E-Mail Privacy (PGP), S	l, Requirements a ecure E-Mail Sys	and Solutions, Pretty Good stem	CO1, CO2, CO6						
В	Firewalls – Types Configurations.	s, Comparison of	Firewall Types, Firewall	CO1. CO2, CO6, CO5						
С	Planning and Enf Policies, Risk An External Security	orcing Security I alysis, Security I	Policies: Planning Security Policies for an Organization,	CO2, CO3, CO5						
Mode of examination	Theory									
Weightage	CA	CA MTE ETE								
Distribution	25%									
Text book/s*	 John E. C Security, Handbook of International Content of Internationa Content of Internatio Content of International Con									
 Other References	NA									

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1: Illustrate network security services and mechanisms.	PO1, PO2, PO4, PO10, PSO1
2.	CO2: Evaluate Symmetrical and Asymmetrical cryptography.	PO1, PO2, PO3, PO5, PO10, PSO1, PSO2
3.	CO3: Apply Data integrity, Authentication, Digital Signatures.	PO1, PO2, PO6, PO8 PO10, PSO1
4.	CO4: Analyze Various network security applications, IPsec, Firewall, IDS, Web security, Email security, and Malicious software etc.	PO1, PO2, PO7, PO8, PO10, PSO1, PSO2
5.	CO5: Demonstrate various factors which affect the security of network	PO1, PO2, PO3, PO9, PO10, PSO1, PSO2
6.	CO6: Estimate the measure adapted towards network security	PO1, PO2, PO9, PO10, PSO1, PSO2



PO and PSO mapping with level of strength for Course Name Cryptography and Network Security (Course Code MCA307)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	3	3		3						3	2	
	CO2	3	2	3		3					3	2	3
MCA307 Cryptography	CO3	3	2				3		3		3	3	
and Network Security	CO4	3	3					3	3		3	3	2
	CO5	2	3	3						3	2	3	3
	CO6	2	2							3	2	2	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
(MCA307	Cryptography and Network Security	2.6	2.5	3	3	3	3	3	3	3	2.6	2.5	2.75

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* 2. Addressed to *Moderate (Medium=2) extent*



S	School: SSET	Batch : 2023-2025]							
	Department	Department of Computer Applications								
Pro	gramme: MCA	Academic Year: 2023-2024								
	Semester:	II								
1	Course Code	ARP104								
2	Course Title	Quantitative and Qualitative Aptitude Skill Building								
3	Credits	2								
4	Contact Hours (L-T-P)	1-0-2	-							
	Course Status	Active								
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 2 nd phase of employability enhancement and skill building activity exercise.								
6	Course Outcomes	After completion of this course, students will be able to: CO1: Develop and deliver the effective presentations to interpret the deeper meaning of life. CO2: Improve listening skills so as to understand complex business communication in a variety of global English accents through proper pronunciation CO3: Demonstrate a good understanding of effective business writing and telephone handling Skills CO4: Acquire higher level competency in use of aptitude, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate higher level quantitative aptitude tools for making business decisions								
7	Course Description	This course bundle allows students to build vision, mission and strategy statements while exposing them to various models of communication along with MTI reduction and the 2nd level of quant, aptitude and reasoning abilities								
8		Outline syllabus – ARP104	CO MAPPING							
	Unit 1	Communicate to Conquer								
	А	VMOSA (Vision, Mission, Values and Ethics) Business Communication -Verbal Communication Skills Barriers in communication Basics of effective communication – PRIDE & STAR Model	CO1							
	В	Different styles of communication & style flexing (Based on the 4 social styles-Analytical, Driving, Expressive, Amiable) Importance of Listening & practice of Active Listening The Art of Giving Feedbacks Feedback Skills Asking fact finding questions- Probing Skills	CO2							
	С	Email Etiquette Business Writing Skills Telephone Etiquette Skills (Telephone Handling Skills) Non Verbal Communication-Kinesthetics, Proxemics, Paralanguage MTI Reduction Program	CO3							
	Unit 2	Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical								
	A	Coding Decoding, Ranking & Their Comparison Level-2	CO4							
	В	Series, Blood Relations & Number Puzzle	CO5							
	Unit 3	Quantitative Aptitude								
	A	Number System Level 2	CO5							
	В	Vedic Maths Level-2 Probability Permutation & Combination	CO6							
	C Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest									



Unit 4	Verbal Abilities – 2	
А	Paragraph Jumbles	CO2
В	Critical Reasoning	CO2
Unit 5	Basics of GD and PI	
А	Understanding and Practicing Mock Group Discussions	CO2
В	Understanding and Practicing Mock Personal Interviewsss	CO2
Weightage	CA MTE ETE	
Distribution	25% 25% 50%	
	Wiley's Quantitative Aptitude-P Anand Quantum CAT – Arihant Publications Quicker Maths- M. Tyra Power	
Text book/s*	of Positive Action (English, Paperback, Napoleon Hill) / Streets of Attitude (English, Paperback, Cary Fagan,	
1 CAL 000K/S	Elizabeth Wilson) The 6 Pillars of self-esteem and awareness - Nathaniel Brandon / Goal Setting (English,	
	Paperback, Wilson Dobson	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	1	2	-	-
CO2	-	-	-	-	-	-	-	-	1	2	-	-
CO3	-	-	-	-	-	-	-	-	1	2	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	-
CO5	1	_	-	-	-	-	-	-	1	2	-	-
CO6	1	-	-	-	-	-	-	-	1	2	-	-



Sch	nool:	Sharda School of Engineering & Technology									
De	partment	Computer Science & Applications									
Bat	tch	2023-25									
Ac	ademic Year	2023-24									
Pro	ogramme:	МСА									
Ser	nester:	П									
1	Course Code	MCP265									
2	Course Title	Data Structures using C LAB									
3	Credits	1									
4	Contact Hours (L-T-P)	0-0-2									
	Course Status	Compulsory									
		1. Learn the basic concepts of Data Structures and	algorithms.								
		2. Design and Implementation of Various Basic and	d Advanced Data Structures.								
		3. Learn the concepts of various searching, Sorting	and Hashing Techniques.								
5	Course Objective	4. Choose the appropriate data structures and al application.	4. Choose the appropriate data structures and algorithm design method for a specified application.								
		5. To learn the importance of designing an algorithm in an effective way by considering space and time complexity									
		6. To learn graph search algorithms.									
6	Course Outcomes	 CO1: Analyze algorithms and their correctness. CO2 Summarize searching and sorting techniques CO3 Describe stack, queue and linked list operation. CO4: Apply important algorithmic design paradigms and CO5: Develop the capability to choose appropriate a problems. CO6: Analyze the performance of algorithms. 	 CO1: Analyze algorithms and their correctness. CO2 Summarize searching and sorting techniques CO3 Describe stack, queue and linked list operation. CO4: Apply important algorithmic design paradigms and methods of analysis CO5: Develop the capability to choose appropriate algorithm design techniques for solving problems. 								
7	Course Description	This course starts with an introduction to data structu different algorithms, array and pointer based implementa course progresses the study of Linear and Non-Linear d Course also deals with the concept of searching and so recurrence relations, and illustrates their role in asymptoti It covers in detail greedy strategies divide and conquer illustrates them using a number of well-known problems	res with its classification, efficiency of ations and Recursive applications. As the lata structures are studied in details. This orting methods. Specifically, it discusses ic and probabilistic analysis of algorithms. r techniques, dynamic programming and and applications.								
8	Outline syllabus		CO Mapping								
	Unit 1	Introduction									
		Implementation of factorial of a number using									
		recursion	CO1, CO2								
		Implementation of Fibonacci series using recursions									
	Unit 2	Array and Linked List									
		Insert elements at a specific location in an array	CO2, CO3 CO6								
		Insertion and deletion of elements in linked list	,								
	Unit 3	Stack and Queue									
		Stack implementation using arrays									
		Queue implementation using arrays	CO1,CO2, CO3. CO6								
		Stack implementation using pointers									
		Queue implementation using pointers									



Unit 4	Tree and Grap	oh		
	Implement BFS	S, DFS	CO1, CO4, CO6	
Unit 5	Searching and	Sorting		
	Linear search in	n a given list		
	Binary search in	n a given list		
	Implementation	of binary search tree		
	Implementation	of bubble sort algorithm	n	CO2, CO5
	Implementation	of insertion sort algorit		
	Implementation	of quick sort algorithm		
	Implementation	of selection sort algorit		
Mode of	Jumy/Drastical/A	line		
examination	Jury/Practical/ v	Iva		
Weightage	CA	CE (Viva)	ETE	
Distribution	25%	25%	50%	
Text book/s*	 Data S TMH 2 Thareja Cormer Algorith Data S ,Forouz algorith 	tructure with C, Seyn 2. Data Structures us 1, Oxford n et al., "Introduction hms", Prentice Hall Indi Structures, 2/e, Richa can, Cengage 4. Data im analysis in C.	our Lipschutz, ing C. Reema of Computer a rd F, Gilberg structures and	
Other References	 Data Structur TMH Classic Data Sarnanta,PHI,20 Fundamenta Horowitz, Sahn Hopcroft A, ⁷ Algorithms, Ad 	res and Algorithms, 2008 Structures, 2/e, Debasis 009 Is of Data Structure in C i, Anderson Freed, Univ The Design And Analys dison Wesley	8, G. A. V. Pai, 9, 9, 2le,' 9, 2rees 1, 2le,' 1, 2le,' 2, 2le,' 2	

PO and PSO mapping with level of strength for Data Structures using C Lab(MCP265)

Course Code_ Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	2	2	3	-	-	2		2	1	2	1	3
MCP265_	CO2	3	3	2	1	1	-		2		3	2	2
Data	CO3	1		2	2	3	-				2		2
Using C	CO4		2	3	3	2	-				2	3	
Lab	CO5	2	1	3					2	2		1	2
	CO6	3	3		2	3	-		1	1	3	2	3

Average of non-zeros entry in following table (should be auto calculated)



												Propriet Construction	
Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP265	Data Structure Using C Lab	2.20	2.20	2.60	2.00	2.25	2.00	-	1.75	1.33	2.40	1.80	2.40

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent



Schoo	ol:	Sharda School of Engineering & Technology										
Depar	rtment	Computer Scier	ice & Application	ns								
Progr	amme:	MCA										
Seme	ster	II										
1	Course Code	MCP173										
2	Course Title	Application Prog	gramming in Pythe	on Lab								
3	Credits	1										
4	Contact Hours (L-T-P)	0-0-2	0-0-2									
	Course Status	Regular	Regular									
5	Course Objective	Emphasis is plac common to most	Emphasis is placed on procedural programming, algorithm design, and lar common to most high level languages and Email handling through Pythor									
6	Course Outcomes	Upon successful CO1. Apply deci CO2. Demonstra CO3. Describe a CO4. Implement CO5. Model bott CO6. Build Pyth	ams. ns									
7	7 Course Description Python is a language with a simple syntax, and a powerful set of librarie programming language for data exploration. This course is an introduction programming language for students without prior programming experient types, control flow, object-oriented programming and Email handling											
8	Outline syllabus				CO Mapping							
	Unit 1	Practical based	on conditional st	atements and control structures								
		Program	to implement all	conditional statements	CO1							
		Program	to implement dif	ferent control structures	01							
	Unit 2	Practical related	d to List, Tuples	and Dictionaries								
		 Program Program Program 	to implement ope to implement ope to implement ope	erations on lists erations on Dictionary erations on Tuple	CO1,CO2							
	Unit 3	Practical relate	d to Object Orier	nted Programming								
		Program overloadProgram	to use object orie ling polymorphism for file handling	nted concepts like inheritance, n etc.	CO3							
	Unit 4	Practical related	d to Functions ar	d Exception Handling								
		ProgramProgram	to implement Ex to use different f	ception Handling unctions	CO4							
	Unit 5	Practical related	d to Database									
		ProgramProgram	CO5,CO6									
	Mode of examination	Jury/Practical/Vi	va									
	Weightage	CA	CE (Viva)	ETE								
	Distribution	25%	25%	50%								
	Text book/s*	The Con										



			www.sharda.ac.in
	Other References	• Introduction to computing in problem solving using Python, E Balahurusamy, McGrwHill	
		• Introduction to programming using Python, Y. Daniel Liang, Pearson	
	other References	• Mastering Python, Rick Van Hatten, Packet Publishing House	
		Starting out with Python, Tony Gaddis, Pearson	

S. No.	Course Outcome	Programme OutComes(PO) &Programme Specific Outcomes (PSO)
1.	CO1. Apply decision and repetition structures in program design.	PO1 PO2,PO3,PO4, PO5,PO10,PSO1,PSO2
2.	CO2. Demonstrate the use of Python lists, tuples and dictionaries	PO1,PO2, PO3,PO4, PO5, PO10,PSO1,PSO2
3.	CO3. Describe and apply object-oriented programming methodology.	PO1, PO2, PO3, PO4, PO5, PO10, PSO1, PSO2
4.	CO4. Implement methods and functions to improve readability of programs.	PO1,PO2,PO3,PO4,PO5,PO10, PSO1
5.	CO5. Model bottom-up approach in programming in database.	PO1,PO2,PO3,PO4,PO5,PO10,PSO1,PSO2
6.	CO6. Built Python programs to illustrate concise and efficient algorithms	PO1, PO2, PO3, PO4, PO5, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Application Programming in Python Lab (**Course Code** MCP173)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	2	1	1	1	1	-	2	-	-	1	2	2
MCP173 Application	CO2	1	1	1	1	1	-	2	-	-	1	1	1
	CO3	2	2	2	1	1	-	2	-	-	1	1	2
Programming in	CO4	2	2	2	2	1	-	2	-	-	1	1	-
Python Lab	CO5	2	2	3	2	1	-	2	-	-	1	2	2
	CO6	3	3	3	2	2	-	2	-	-	1	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP173	Application Programming in Python Lab	2	1.8	2	1.5	1.1		2			1	1.6	1.6

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent



PO and PSO mapping with level of strength for Course Name Application Programming in Python Lab (**Course Code** MCP173)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
MCP173 Application Programming in Python Lab	CO1	2	1	1	1	1	-	2	-	-	1	2	2
	CO2	1	1	1	1	1	-	2	-	-	1	1	1
	CO3	2	2	2	1	1	-	2	-	-	1	1	2
	CO4	2	2	2	2	1	-	2	-	-	1	1	-
	CO5	2	2	3	2	1	-	2	-	-	1	2	2
	CO6	3	3	3	2	2	-	2	-	-	1	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP173	Application Programming in Python Lab	2	1.8	2	1.5	1.1		2			1	1.6	1.6

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* 2. Addressed to *Moderate (Medium=2) extent*



TERM-III



Scho	ol	Sharda School of Engineering & Technology									
Depa	rtment	Computer Science & Applications									
Batc	h	2023-2025, Academic Year 2024-25									
Prog	ramme	МСА									
Seme	ester	III									
1	Course Code	MCA203									
2	Course Title	Design and Analysis of Algorithms									
3	Credits	4									
4	Contact Hours (L-T-P)	3-1-0									
-	Course Status	Core									
5	Course Objective	 Objective of this course is to 1. Reinforce basic design concepts (e.g., pseudocode 2. Knowledge of algorithm design strategies 3. Familiarity with an assortment of important algori 4. Enable students to analyze time and space complete 	, specifications, top-down design) thms. xity.								
6	Course Outcomes	Students will be able to: CO1: Analyze the asymptotic performance of algorithms CO2: How to write rigorous correctness proofs for algorith CO3: Demonstrate familiarity with major algorithms and CO4: Apply important algorithmic design paradigms and CO5: Develop the capability to choose appropriate algorithms. CO6: Analyze the performance of algorithms.	 CO1: Analyze the asymptotic performance of algorithms CO2: How to write rigorous correctness proofs for algorithms. CO3: Demonstrate familiarity with major algorithms and data structures CO4: Apply important algorithmic design paradigms and methods of analysis CO5: Develop the capability to choose appropriate algorithm design techniques for solving problems. CO6: Analyze the performance of algorithms. 								
7	Course Description	This course introduces concepts related to the design and a it discusses recurrence relations, and illustrates their rol analysis of algorithms. It covers in detail greedy strategi dynamic programming and max flow - min cut theory for d them using a number of well-known problems and applica	nalysis of algorithms. Specifically, le in asymptotic and probabilistic es divide and conquer techniques, esigning algorithms, and illustrates tions.								
8	Outline syllabus		CO Mapping								
	Unit 1	Introduction									
	А	Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework	CO2, CO3								
	В	Asymptotic Notations and their properties – Mathematical analysis for Recursive and Non-recursive algorithms, Recurrences relations	CO1, CO2, CO3,CO6								
	С	Divide-and-conquer: Analysis and Structure of divide- and-conquer algorithms, Divide-and-conquer examples- Binary search, Quick sort, Merge sort, Medians and Order Statics	CO1, CO2, CO4, CO5								
	Unit 2	Greedy Method									
	А	Overview of the Greedy paradigm, Analysis and example of exact optimization solution, Minimum Spanning Tree – Prim's and Kruskal's Algorithm	CO1, CO2, CO3, CO4, CO5								



В	Fractional Knapsa paths, task schedu	ack problem, S aling	Single source shortest	CO1, CO2, CO4,CO5
С	Overview and ana Bound: N-Queens	alysis of Backt s problem and	tracking & Branch and Sum of subsets	CO1, CO2, CO3, CO4
Unit 3	Dynamic Program	mming		
А	Overview, Differe	ence between	dynamic programming	CO1, CO2, CO4
В	Applications and a 0/1 Knapsack Pro	analysis: Matı blem records	rix Chain Multiplication,	CO1, CO2 ,CO3, CO4
С	Applications and a sequence, All pai	analysis: Long	gest Common sub- ths	CO1, CO2, CO3, CO4, CO5
Unit 4	Advanced Data S	Structures		
А	Red-Black Trees - and deletion of ele	- Definition, A ements in RB-	CO1, CO2 ,CO3, CO5	
В	B-Trees - Definiti Deletion in B-Tre	ions, Applicati	CO1, CO2, CO3 ,CO6	
С	Data Structure for Applications in K	r Disjoint Sets ruskal's algor	CO1, CO2, CO3	
Unit 5	Selected Topics			
А	Introduction to NI Examples, Amort	P Complete ar ized Analysis	nd NP-Hard Problems,	CO1, CO2, CO3,
В	Approximation A	lgorithms – T		
D	Algorithms.	tex Cover Prol	blem, Randomized	CO3, CO4, CO5,
C	Algorithms. String Matching A Algorithm, Rabin	tex Cover Prol Algorithms – 1 Karp Algorith	blem, Randomized Naive String Matching hm.	CO3, CO4, CO5, CO2, CO5, CO6
 C Mode of Examination	Algorithms. String Matching A Algorithm, Rabin Theory/Jury/Prac	Algorithms – I Karp Algoritl ctical/Viva	blem, Randomized Naive String Matching hm.	CO3, CO4, CO5, CO2, CO5, CO6
C Mode of Examination Weightage	Problem and Vert Algorithms. String Matching A Algorithm, Rabin Theory/Jury/Prace CA	Algorithms – I Karp Algoritl ctical/Viva MTE	blem, Randomized Naive String Matching hm.	CO3, CO4, CO5, CO2, CO5, CO6
C Mode of Examination Weightage Distribution	Problem and Vert Algorithms. String Matching A Algorithm, Rabin Theory/Jury/Prace CA 25%	ex Cover Prol Algorithms – I Karp Algorit ctical/Viva MTE 25%	blem, Randomized Naive String Matching hm. ETE 50%	CO3, CO4, CO5, CO2, CO5, CO6
C Mode of Examination Weightage Distribution Text book/s*	Problem and Vert Algorithms. String Matching A Algorithm, Rabin Theory/Jury/Prade CA 25% 1. Cormen e Algorithm	Algorithms – I Algorithms – I Karp Algorith ctical/Viva MTE 25% et al., "Introdu ns", Prentice H	blem, Randomized Naive String Matching hm. ETE 50% ction of Computer Hall India.	CO3, CO4, CO5, CO2, CO5, CO6



S.	Course Outcome	Programme OutComes(PO) & Programme
No.		Specific Outcomes (PSO)
1.	CO1: Analyze the asymptotic performance of algorithms	PO1,PO2,PO3,PO5,PO10,PSO1,PSO2
2.	CO2: Write rigorous correctness proofs for algorithms	PO1, PO3, PO4, PSO2
3.	CO3: Demonstrate a familiarity with major algorithms and data structures	PO1,PO2,PO3,PO6,PO9,PSO1
4.	CO4: Apply important algorithmic design paradigms and methods of analysis	PO1,PO2,PO3,PO4,PO5,PO9,PO10,PSO1,PSO2
5.	CO5: Ability to choose appropriate algorithm design techniques for solving problems.	PO1,PO2,PO3,PO4,PO5,PO6,PO10,PSO1,PSO2
6.	CO6: Ability to analyze the performance of algorithms.	PO1,PO2,PO3,PO5,PO9,PO10,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Design and Analysis of Algorithms

Course Code_ Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	3	3	2	-	3	-	-	-	-	3	3	2
MCA203	CO2	2	3	3	-	2	2	-	-	3	2	2	1
Design and	CO3	3	2	2	-	-	1	-	-	2	-	2	-
Analysis of	CO4	2	3	3	2	3	-	-	-	1	2	3	2
Algorithm	CO5	3	2	2	2	3	2	-	-	-	1	3	2
	CO6	2	3	3	-	1	-	-	-	1	2	2	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA203	Design and Analysis of Algorithm	2.5	2.67	2.5	2	2.4	1.25			1.75	2	2.5	1.75

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



Sc	hool	Sharda School of Engineering & Technology									
De	epartment	Computer Science & Applications									
Br	anch	2023-25									
Pr	ogramme	MCA: Current Academic Year: 2024-25									
Se	mester:	III	III								
1	Course Code	MCA168	MCA168								
2	Course Title	Object Oriented Programming with Java									
3	Credits	4									
4	Contact Hour (L-T-P)	s 4-0-0	4-0-0								
	Course Status	Core									
5	Course Objective	To learn Java language syntax and semantics and concepts such inheritance, AWT Applets, polymorphism, packages and multithread	as classes, objects, ding Java Servlets.								
6	Course Outcomes	 CO1. Define Object oriented programming concepts by identifying members of a class and relationships among them needed for a specie CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications us such as abstraction, polymorphism and inheritance. CO4: Categorize runtime errors thrown in the application software of by applying the methods of exception handling and File I/O and App CO5. Explain the concept of multithreading and Java Servlet. CO6. Design real life application using Java. 	 CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem. CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance. CO4: Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling and File I/O and Applets CO5. Explain the concept of multithreading and Java Servlet. CO6. Design real life application using Java. 								
7	Course Description	Basic <i>Object Oriented Programming</i> (<i>OOP</i>) concepts including objects, <i>classes</i> , methods, parameter passing, information hiding, inheritance and polymorphism, graphical view and network programming are discussed.									
8	Outline syllab	pus	CO Mapping								
	Unit 1	Object Oriented Programming Concepts									
	А	Introduction to OOP, Characteristics of OOP, Difference between OOP and procedural languages, Features of Java	CO1, CO2								
	В	Platform independency of Java, Architecture of JDK, JRE and JVM. memory allocation and garbage collection to Java Programs.	CO1, CO2								
	С	Introduction to IDE for java development, Writing first program in Java and program execution steps. Features of Java	CO1, CO2								
	Unit 2	Introduction to Java									
	А	Java Programming Fundamentals: declaring variables and Constants, Java data Types and size of each type, arithmetic, logical and bitwise Operators in java,	CO1,CO2								
	В	Control statements: ifelse, switch case, Loop control : for loop, while loop, do while loop, break and continue, nesting of decision and loop control.	CO1, CO2								



С	Passing arguments conversion, promo	from command tion rules in ex	d line, Arrays in Java, Type pressions.	CO1, CO2					
Unit 3	Class , object and	constructor							
А	Defining Classes , from users	class members,	, declaration of Objects, taking Input	CO1,CO2					
В	Methods, Method	overloading, Co	onstructors, Constructors overloading	CO1,CO2,CO3					
С	static keyword, Sta main function stati	atic methods, St ic, Strings, strin	atic members. Reason of making g handling	CO2					
Unit 4	Inheritance, packa	Inheritance, package and Interface Inheritance Implementation							
А	Inheritance Impler Hierarchy, Overric Constructor call in	nentation: Type ling methods, P inheritance	es of Inheritance, Multilevel olymorphism, use of this and super,	CO2,CO3,CO6					
В	Abstract class and Implementing Inte Wrapper class,	CO2,CO3,CO6							
С	Packages: User-de Access modifiers	Packages: User-defined packages, built-in packages (java.langpackage), Access modifiers AWT and Applets (10%)							
Unit 5	I/O, Exception an								
А	Input/output: Explor Character stream Cl	ring java.io, File, asses, Reading a	Stream Classes Byte Stream Classes and nd writing in file	CO4,CO6					
В	Introduction to Exce and throws, Checker	eption Handling, d and Unchecked	Introduction to try, catch, Finally, throw exceptions, User define exception	CO4,CO6					
С	Introduction to Mult thread using Runna priorities, sleep met	ithreading: multi ble interface and hod. Java Servlet	threading advantages and issues, Creating I Thread class, Thread life cycle, Thread and network programming (10%)	CO5,CO6					
Mode of examination	Theory								
Weightage	CA	MTE	ETE						
Distribution	25%	25%	50%						
Text book/s*	1.Schildt H, "The C								
Other	1. Balagurusamy E	1. Balagurusamy E, "Programming in JAVA", TMH							
References	ences 2. Professional Java Programming: BrettSpell, WROX Publication								



S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)				
1.	CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem.	PO1, PO2, PO3, PO5, PO10, PSO1, PSO2				
2.	CO2: Illustrate different features of java.	PO1, PO2, PO4, PO10, PSO1, PSO2				
3.	CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance.	PO1, PO2, PO3, PO5, PO9, PO10, PSO1, PSO2				
4.	CO4:Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling and File I/O	PO1, PO2, PO3, PO5, PO10, PSO1, PSO2				
5.	CO5. Explain the concept of multithreading.	PO1, PO2, PO5, PO10, PSO1, PSO2				
6.	CO6. Design real life application using Java.	PO1, PO2, PO3, PO5, PO9, PO10, PSO1, PSO2				

PO and PSO mapping with level of strength for Course Name Object oriented programming with JAVA (Course Code MCA168)

CO	PO	PO1	PSO	PSO								
S	1	2	3	4	5	6	7	8	9	0	1	2
CO1	2	2	2		2					2	1	2
CO2	2	2								2	1	1
CO3	2	3	3		3				3	2	3	3
CO4	2				3					2	2	3
CO5	1	2			1					2	2	1
CO6	3	3	3		3				3	2	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA168	Object Oriented Programming with Java	2	2	2		2.5				3	2	2	2



Scho	ol	Sharda School of Engineering & Technology								
Depa	rtment	Computer Science & Applications								
Batc	h	2023-25, Academic Year 2023-24								
Prog	ramme	МСА								
Seme	ester	III								
1	Course Code	MCA357								
2	Course Title	Computer Architecture and Organization								
3	Credits	4								
4	Contact Hours (L-T-P)	3-1-0								
	Course Status	Core								
5	Course Objective	 Objective of this cou4rse is to 1. To learn the design of Control Unit and ALU of a 2. To learn about the memory, input –output organiza 3. To learn the concepts of pipelining and vector p 	 Dejective of this cou4rse is to To learn the design of Control Unit and ALU of a typical computer To learn about the memory, input –output organization of a typical computer To learn the concepts of pipelining and vector processing. 							
6	Course Outcomes	 Students will be able to: CO1: Understand the basic structure and operation of a digital computer system. CO2: Analysis of the design of ALU and understanding fixed-point and floating-p arithmetic operations. CO3: Know the concepts of control unit techniques and the concept of Pipelining. CO4: Understand the hierarchical memory system and its mechanisms. CO5: Understand cache memories and virtual memory concepts. CO6: Analyze I/O devices and standard I/O interfaces performance of interrupt in CPU. 								
7	Course Description	Computer Architecture and Organization is a foundational structure of computer systems. Students will learn abou components that enable the execution of programs and the This course covers topics such as instruction set architec organization, input/output systems, and system performance	course that explores the design and at the fundamental principles and functioning of modern computers. cture, memory systems, processor ce evaluation							
8	Outline Syllabus		CO Mapping							
	Unit 1	Introduction								
	А	Functional units of digital system and their interconnections	CO2, CO3							
	В	Buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer.	CO1, CO2, CO3,CO6							
	С	Processor organization, general registers organization, stack organization and addressing modes.	CO1, CO2, CO4, CO5							
	Unit 2	Arithmetic and Logic Unit								
	А	Look ahead carries adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier	CO1, CO2, CO3, CO4, CO5							
	В	Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design.	CO1, CO2, CO4,CO5							
	С	IEEE Standard for Floating Point Numbers	CO1, CO2, CO3, CO4							
	Unit 3	Control System Unit								



А	Instruction types, formats, instruction cycles and subCO1, CO2, CO4cycles (fetch and execute etc), micro operations,CO1, CO2, CO4execution of a complete instruction.CO1, CO2, CO4
В	Program Control, Reduced Instruction Set Computer, Pipelining. CO1, CO2, CO3, CO4
С	Hardwire and micro programmed control: micro programme sequencing, concept of horizontal and vertical microprogramming.
Unit 4	System Memory
А	Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM CO1, CO2 ,CO3, CO5 memories.
В	Cache memories: concept and design issues & performance, address mapping and replacement Auxiliary memories.
С	Magnetic disk, magnetic tape and optical disksCO1, CO2, CO3Virtual memory: concept implementation.CO1, CO2, CO3
Unit 5	Input / Output Devices
А	Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. CO1, CO2, CO3,
В	Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors.
С	SerialCommunication:Synchronous&asynchronouscommunication,standardCO2, CO5, CO6communication interfaces.CO2, CO5, CO6CO2, CO5, CO6
Mode of examination	Theory/Jury/Practical/Viva
Weightage	CA MTE ETE
Distribution	25% 25% 50%
Text book/s*	1. Computer System Architecture - M. Mano.2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, McGraw-Hill, Fifth Edition, Reprint 2012
Other References	 John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, Third Edition, 1998. William Stallings, Computer Organization and Architecture-Designing for Performance, Pearson Education, Seventh edition, 2006. David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier, a division of reed India Private Limited, Fifth edition, 2012



S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1 : Understand the basic structure and operation of a digital computer system.	PO1,PO2,PO3,PO4,PSO1
2.	CO2: Analysis of the design of ALU and understanding fixed-point and floating point arithmetic operations.	PO2,PO3, PO4, PSO2
3.	CO3: Know the concepts of control unit techniques and the concept of Pipelining.	PO2,PO3,PO5,PSO2
4.	CO4: Understand the hierarchical memory system and its mechanisms.	PO6, PO10, PSO2
5	CO5: Understand cache memories and virtual memory concepts.	PO4,PO7,PO8, PO10, PSO1
6.	CO6: Analyze I/O devices and standard I/O interfaces performance of interrupt in CPU.	PO2,PO8, PO1

PO and PSO mapping with level of strength for: Computer Organization and Architecture (Course Code: MCA357)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	2	2	2	-	-	-	-	-	-	3	-
CO2	-	2	3	2	-	-	-	-	-	-	-	2
CO3	-	2	3	-	3	-	-	-	-	-	-	2
CO4	-	-	-	-	-	3	-	-	-	2	-	2
CO5	-	-	-	3	-	-	3	2	-	2	-	3
CO6	-	2	-	-	-	-	-	3	-	-	1	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA357	Computer Architecture and Organization	3	2	2.66	2.33	3	3	3	2.5	-	2	2	2.25



Scho	ol:	Sharda School of Engineering & Technology							
Depa	rtment:	Computer Science & Applications							
Batcl	h:	2023-25							
Prog	ramme: MCA	Current Academic Year: 2024-25							
Seme	ester:	Ш							
1	Course Code	MCA366 Course Name: Big Data Analytics							
2	Course Title	Big Data Analytics							
3	Credits	3							
4	Contact Hours	3-0-0							
	(L-T-P)								
	Course Status	Elective							
5	Course Objective	Understand the Big Data Platform and its Use cases							
		Provide an overview of Apache Hadoop							
		Provide HDFS Concepts and Interfacing with HDFS							
		Understand Map Reduce Jobs							
		Provide hands on Hadoop Eco System							
		• Apply analytics on Structured, Unstructured Data.							
		• Exposure to Data Analytics with							
6	Course Outcomes	The students will be able to:							
		CO1: Identify Big Data and its Business Implications.							
		CO2: List the components of Hadoop and Hadoop Eco-System							
		CO3: Access and Process Data on Distributed File System							
		CO4: Manage Job Execution in Hadoop Environment							
		CO5: Develop Big Data Solutions using Hadoop Eco System							
		CO6: Develop big data handling applications for end user							
7	Course Description	This course provides a comprehensive introduction to big data analytics, equipping students with the skills to extract valuable insights from large and complex datasets.Students will learn techniques for data acquisition, storage, processing, and analysis, using cutting-edge tools and technologies such as Hadoop, Spark, and NoSQL databases.							
8	Outline syllabus	·	CO Mapping						
	Unit 1	INTRODUCTION TO BIG DATA AND HADOOP							



А	Types of Digita History of Hade	l Data, Introduct oop, Apache Had	ion to Big Data, Big Data Analytics, loop	CO1, CO2
В	Analysing Data Streaming,	with Unix tools,	, Analysing Data with Hadoop, Hadoop	CO1, CO2
С	Hadoop Echo S Infosphere BigI	ystem, IBM Big nsights and Big	Data Strategy, Introduction to Sheets.	CO1, CO2
Unit 2	HDFS(Hadoop	Distributed Fil	le System)	
А	The Design of I	HDFS, HDFS Co	oncepts, Command Line Interface	CO1, CO2,CO4
В	Hadoop file sys Scoop and Hade	tem interfaces, I oop archives,	Data flow, Data Ingest with Flume and	CO1, CO2,CO4
С	Hadoop I/O: Co structures	ompression, Seria	alization, Avro and File-Based Data	CO1, CO2,CO4
Unit 3	Map Reduce			
А	Anatomy of a M	C01,C02,C03		
В	Shuffle and Sor	C01,C02,C03		
С	Map Reduce Ty	CO4		
Unit 4	Hadoop Eco S			
A	Pig: Introduction with Databases, Processing open	CO1,CO2,CO3		
В	Hive: Hive She Traditional Data Defined Function	ll, Hive Services abases, HiveQL, ons.	, Hive Metastore, Comparison with Tables, Querying Data and User	CO1,CO2,CO3
С	Hbase : HBasic Big SQL : Intro	es, Concepts, Cla duction	ients, Example, Hbase Versus RDBMS.	CO1,CO2,CO3
Unit 5	Data Analytics	with R:		
А	Introduction, Su	pervised Learning	ng, Unsupervised Learning,	C01,C02,C03
В	Collaborative F	iltering		C01,C02,C03
С	Big Data Analy	C01,C02,C03		
Mode of examination	Theory			
Weightage	CA	MTE	ETE	
DISTITUTION	25%	25%	50%	



		WWWW.DOWNERGE.BL.BL
Text book/s*	 Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012. 	
	 Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015 	
Other References	1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.	
	 Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013) 	
	 Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press. 	

S. No.	Course Outcome	Programme OutComes(PO) & Programme Specific Outcomes (PSO)
1.	CO1 Identify Big Data and its Business Implications.	PO1,PO2,PO3,PO4,PSO1
2.	CO2: List the components of Hadoop and Hadoop Eco-System	PO1, PO3, PO4, PSO2
3.	CO3: Access and Process Data on Distributed File System	PO2
4.	CO4: Manage Job Execution in Hadoop Environment	PO7, PO10,
5	CO5: Develop Big Data Solutions using Hadoop Eco System	PO4,PO8
6.	CO6: Develop big data handling applications for end user	PO4,PO8

PO and PSO mapping with level of strength for Course Name Big Data Analytics (Course Code MCA 366)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	3	3	3				2	2	1	3	2
CO2	3	2	3	3				2	2	2	2	3
CO3	3	3	3	3				1	1	1	3	2
CO4	2	2	2	2	1			2	3	3	2	2
CO5	3	2	3	3	1	-	1	3	2	2	2	2
CO6	3	2	3	3	1	-	1	3	2	2	2	2



Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	РО 7	PO 8	РО 9	PO 10	PSO 1	PSO 2
MCA366	Big Data Analytics	2.83	2.33	2.83	2.83	1		1	2.16	2	1.83	2.33	2.16

Average of non-zeros entry in following table (should be auto calculated).



Sc	hool: SSET	Batch: 2023-25										
De	epartment	Computer Science & Applications										
Pr	ogramme: MCA	Current Academic Year: 2024-25										
Se	mester:	III										
1	Course Code	MCA116										
2	Course Title	Artificial Intelligence										
3	Credits											
4	Contact Hours	0-0										
	(L-T-P)											
	Course Status	Core										
5	Course	The objective of the course is to introduce basic fundamental c	concepts in Artificial Intelligence (AI),									
	Objective	with a practical approach in understanding them. To visualize t	he scope of AI and its role in futuristic									
		development.										
6	Course	Students will be able to:										
	Outcomes	CO1: Compare AI and non-AI solutions.										
		CO2: Apply AI techniques in problem solving.										
		CO3: Analyze the best search technique and implement it in r	eal-life applications.									
		CO4: Classify supervised and unsupervised learning and know	vledge representation.									
		CO5: To explore the scope of AI in various application domain	ns.									
		CO6: Discuss the applicability of Artificial Intelligence and Ma	achine learning Approaches to develop									
-	9	sustainable solutions using professional ethics.										
1	Course	This course introduces basic aspects of Artificial intelligence	e comparing the AI and conventional									
	Description	solutions to real world problems, utilizing and analyze AI techniques for identifying optimal solutio										
0	0 (1' 11 1	to search strategies.	CO.M. :									
8	Outline syllabus		CO Mapping									
		INTRODUCTION TO AI	CO1 CO5									
	<u>A</u>	Foundation of AI, Goals of AI, History and AI course line,	<u>C01, C05</u>									
	В	Introduction to Intelligent Agents; Environment; Structure of	01,005									
	C	Al Solutions Va Conventional Solutions: a philosophical	CO1 CO5									
	C	Al Solutions VS Conventional Solutions, a philosophical	01,005									
		approach, a practical approach.										
	Unit 2	PROBLEM SOLVING AGENTS										
	A	Problem solving using Search Techniques: Problems:	CO1 CO2 CO3									
	71	Solutions: Optimality	001, 002, 005									
	B	Informed Search Strategies: Greedy Best-First: A* Search:	CO1 CO2 CO3									
	D	Heuristic Functions.	001, 002, 005									
	С	Uninformed Search Strategies: BFS: DFS: DLS: UCS: IDFS:	CO1. CO2. CO3									
	-	BDS. Local Search algorithms: Hill Climbing, genetic	,,									
		Algorithms.										
	Unit 3	KNOWLEDGE & REASONING										
	А	Knowledge-Based Agents; clause form, First-Order Logic;	C01,C04									
		Syntax-Semantics in FOL;										
	В	Representation revisited, ; Simple usage; Inference	CO1, CO4									
		Procedure; Inference in FOL;										
	С	Forward Chaining; Backward Chaining; Resolution	CO4									
	Unit 4	LEARNING										
	А	Common Sense Vs Learning; Components; Representations;	CO4									
		Forms of learning, Feedback, Learning Types: Supervised;										
		Unsupervised;										
	В	Reinforcement Learnings, Decision trees,	CO4									



_					
	С	Artificial Neural Networks	s: Introduction, typ	es of networks;	CO4
		Single Layer and Multi-La	yer n/w.		
	Unit 5	APPLICATIONS			
	А	Case studies on NLP, Imag	ge Processing	CO1,CO5	
	В	Robotics – Hardware; Visi	on, Navigation bas	sed case studies,	CO1,CO5
	С	Water jug problem and sim	nilar case studies		CO1,CO5
	Mode of	Theory			
	examination				
	Weightage	CA	MTE	ETE	
	Distribution	25%	25%	50%	
	Text book/s*	1. Russell S & Nor	vig P, Artificial	Intelligence: A	
		Modern Approach	, Prentice Hall.	-	
	Other	1. Rich E& Knight	K, Artificial Int	elligence, Tata	
	References	McGraw Hill, Edit	tion 3.		
		2 Den W. Detterner	A	оло 6 Б-го и	
		2. Dan w. Patterson	, Artificial Intellig	gence & Expert	
		Systems, Pearson F	Education with Pres	ntice Hall India.	
		Indian Edition.			
1					

S.	Course Outcome	Programme OutComes(PO) & Programme
No.		Specific Outcomes (PSO)
1.	CO1: Compare between AI and non-AI solutions.	PO1,PO2,PO7,PO9,PO10, ,PSO1
2.	CO2: Apply AI techniques in problem solving.	PO2, PO3, PO4, PO5, PSO2
3.	CO3: Analyze the best search technique and implement it in	PO1,PO2,PO3,PO4, PO6, PO9, PO10
	real-life applications.	
4.	CO4: Classify supervised and unsupervised learning and	PO6, PO10
	knowledge representation.	
5.	CO5: To explore the scope of AI in various application	PO9, PO10
	domains.	
6.	CO6: Discuss the applicability of Artificial Intelligence and	PO2,PO3,PO4, PO6, PO9
	Machine learning Approaches to develop sustainable	
	solutions using professional ethics.	

PO and PSO mapping with level of strength for Course Name Artificial Intelligence

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	3	3	3	1	2	1	1	1	2	3	2	3
	CO2	3	3	3	1	2	3	3	1	2	3	2	3
Artificial Intelligence	CO3	3	3	3	1	2	3	3	1	3	3	3	3
(MCA116)	CO4	3	3	3	1	2	3	3	1	3	3	3	3
	CO5	3	3	3	1	2	3	3	1	3	3	3	3
	CO6	3	3	3	1	2	3	3	3	3	3	3	3

Average of non-zeros entry in following table (should be auto calculated).



											WW	v.sharda.ac.in	
Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA116	Artificial Intelligence	3.00	3.00	3.00	1.00	2.00	2.67	2.67	1.33	2.67	3.00	2.67	3.00

Strength of Correlation
1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
3. Addressed to Substantial (High=3) extent



Sch	nool:	Sharda School of Engineering & Technology									
De	partment	Computer Science & Applications									
Bat	ch & Academic year	2023-25 & 2024-25									
Pro	ogramme:	MCA									
Ser	nester	III									
1	Course Code	MCL011									
2	Course Title	Android Application Development Lab									
3	Credits										
4	Contact Hours	0-0-2	0-2								
	(L-T-P)										
	Course Status	Core /Elective/Open Elective									
5	Course Objective	Android application development course is designed to help students	to implement application								
	5	for android devices. The student will learn the basics of android	platform and understand								
		application Lifecycle.									
6	Course Outcomes	CO1: Demonstrate and understanding anatomy of an android applica	tion.								
		CO2: Develop various android applications related to layouts a	and rich uses interactive								
		interfaces.									
		CO3: Apply essential android programming concept.									
		CO4: Distinguish and compare different components of Android.									
		CO5: Access and work with databases under an android operating sy	stem.								
		CO6: Develop Basic and advance android app development for andro	oid devices.								
7	Course Description	This android development course will help students to understand the b	basis of Android platform								
		and its lifecycle. This will help them to implement simple GUI applications, use built-									
	components and work with database to store the data.										
8	Outline Syllabus		CO Mapping								
	Unit 1	Introduction of Android									
	А	History of Android, Features of Android, Android Devices, Open	CO1								
		Handset Alliance (OHA), Advantages of Android, Comparing									
		Android with other platform									
	В	Android Directory Structure, Android Development Tools,	CO1								
		Architecture of Android.									
	С	Structure of Manifest files, Activities, Activity life cycle	CO1								
	Unit 2	Android User Interfaces									
	А	Layouts-Linear layout, Relative layout, Constraint layout	CO1,CO2								
	В	Input Controls – Text input, Checkboxes, Radio buttons, Spinner,	CO1,CO2								
		Toggle buttons and switches									
	C	Event delegation model, Type of Event Listeners, Onclick,	CO1,CO2								
		OnLongClick, OnFocusChanged, OnKeyUp, OnKeyDown									
	Unit 3	Components of Android									
	А	Intents, types of intents, Intent Filter, Sending and Receiving of data.	CO3								
	В	Services, service life cycle, Broadcast receivers.	CO3								
	С	Notifications, Type of notification, Toast notification	CO3								
	Unit 4	Working with SQL Lite									
	А	Introduction to SQLite database, Steps for connecting application	CO4,CO5								
		with database.									
	В	Fetch and update data in database from application,	CO4,CO5								
	С	Cursor and content value, opening and closing database.	CO4,CO5								
	Unit 5	Sensors and Animation									
	А	Sensor Manager, Sensor Framework, Detect availability of sensor,	CO6								
		Fetch data from sensors on frequent basis.									
	В	Types of Sensors Accelerometer, Gyroscope, Proximity Sensor,	CO6								
		Orientation, Light Sensor.									


С	Graphics and Animatio	n.		CO6						
Mode of	Jury/Practical/Viva	Jury/Practical/Viva								
examination										
Weightage	CA	CE (Viva)	ETE							
Distribution	25%	25%	50%							
Text book/s*	1. W.M Lee,	"Beginning Android 4	Application							
	Development",	Wiley.								
	2. Retro Meier," A	android 4 Application Developme	ent", Wiley.							
Other References	1. Lauren Darcy, S	1. Lauren Darcy, Shane Conder, Sams Teach Yourself Android								
	Application Dev									
	2. Jeff Mcwherte	er, Scott Gowell, Profession	al Mobile							
	Application Dev	velopment, Wrox Publisher(2012), 1st ed.							

S.	Course Outcome	Programme OutComes(PO) & Programme Specific
No.		Outcomes (PSO)
1.	CO1: Demonstrate and understanding anatomy of	PO1,PO4,PO5,PO10
	an android application.	
2.	CO2: Develop various android applications related	PO2,PO3,PO4,PO5,PO9,PO10,PSO1,PSO2
	to layouts and rich uses interactive interfaces.	
3.	CO3: Apply essential android programming concept	PO1,PO4,PO5,PO10,PSO1
4.	CO4: Distinguish and compare different	PO4,PO5,PO10
	components of Android	
5.	CO5: Access and work with databases under an	PO1,PO2,PO4,PO5,PO7,PO9,PO10,PSO1
	android operating system.	
6.	CO6: Develop Basic and advance android app	PO1,PO2,PO3,PO4,PO5,PO7,PO8,PO9,PO10,PSO1,PSO2
	development for android devices	

PO and PSO mapping with level of strength for Course Name Android Application Development Lab (**Course Code** MCL011)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	1			2	2					2		
	CO2		2	2	2	2				2	2	1	1
MCL011_Android	CO3	1			2	2					2	1	
Application Development	CO4				2	2					2		
	CO5	1	1		2	2		1		2	2	1	
	CO6	1	2	3	2	2		1	1	2	2	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCL011	Android Application Development Lab	1	1.67	2.5	2	2	0	1	1	2	2	1.25	1.5

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent

3. Addressed to Substantial (High=3) extent



S	chool: SSET	Batch : 2023-2025	
]	Programme: MCA	Academic Year: 2024-2025	
	Semester	III	
1	Course Code	ARP 307	
2	Course Title	Personality Development Decision making and Negotiation Skills	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 3 rd phase of employability enhancement and skill building activity exercise.	
		After completion of this course, students will be able to:	
6	Course Outcomes Course	 CO1: Apply skills of personality development which will help a student groom to meet the needed social strata for establishing themselves in the society CO2: Build a positive behavioural attitude and attributes developing interpersonal skills for building positive and meaningful social and professional relationships CO3: Review and revise development plans to adapt to changing aspirations, circumstances and working environments CO4: Acquire higher level competency in use of numbers and digits, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building cubes and cuboids. CO6: Demonstrate higher level quantitative aptitude such as analytical and statistical tools for making business decisions. 	
	Description	abilities within the student along with level 3 readiness in quant, aptitude and reasoning skills	
8		syllabus – ARP307	<u> </u>
	Unit 1	Impress to Impact	CU MAPPINC
	А	What is Personality? Creating a positive impression – The 3 V's of Impression Individual Differences and Personalities	CO1
	В	Personality Development and Transformation Building Self Confidence Behavioural and Interpersonal Skills	CO2
	С	Avoiding Arguments The Art of Assertiveness Constructive Criticism The Personal Effectiveness Grid Assessing our Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model	CO3
	Unit 2	Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical	
	Α	Numbers & Digits, Mathematical Operations Analytical Reasoning	CO4
	В	Cubes & Cuboids Statement & Assumptions	CO5
	С	Strong & Weak Argument	CO5
	Unit 3	Quantitative Aptitude	
	A	Work & Time ,Pipes & Cistern	CO6
	В	Time, Speed & Distance, Quadratic & Linear Equations, Logs & Inequalities	CO6



	WWW.endwale.com	
С	Sequence & Series, Logarithms, Data Interpretation Data sufficiency - Level 1	CO6
Unit 4	Verbal Abilities-3	
А	Cloze Test	CO3
В	Sentence Rearrangement	CO3
Unit 5	Charisma Building	
А	How to Build Charisma	CO2
В	Steps Towards Building a Charisma	CO2
Weightage	CA MTE ETE	
Distribution	25% 25% 50%	
	Wiley's Quantitative Aptitude-P Anand Quantum CAT – Arihant Publications Quicker Maths- M. Tyra Power of	
Text book/s*	Positive Action (English, Paperback, Napoleon Hill) / Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth	
1 CAL 000K/S	Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon / Goal Setting (English, Paperback, Wilson	
	Dobson	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	-	-	-	-	1	-	-	1	2	-	-
CO2	-	-	-	-	-	1	-	-	1	2	-	-
CO3	-	-	-	-	-	-	-	-	1	2	-	-
CO4	1	-	-	-	-	-	-	-	1	2	-	-
CO5	1	-	-	-	-	-	-	-	1	2	_	-
CO6	1	-	-	-	-	-	-	-	1	2	-	-



Schoo	ol:	Sharda School of Engineering & Technology									
Depa	rtment	Computer Science & Applications									
Batch	l	2023-25, Academic Year: 2024-25									
Progr	amme:	МСА									
Seme	ster	III									
1	Course Code	MCP168									
2	Course Title	Object Oriented Programming Using Java Lab									
3	Credits	1									
4	Contact Hours (L-T-P)	0-0-2									
	Course Status	Compulsory/Elective									
5	Course Objective	To implement Java language syntax and semantics and concepts such as inheritance, polymorphism, packages and multithreading.	s classes, objects,								
6	Course Outcomes (must be 6 COs, following verbs given in Bloom's Taxonomy)	 CO1: Demonstrate Java environment and executing Java Programs CO2: Understand and formulate the problems in basic programming co CO3: Applying OOP concepts to solve real world problems CO4: Implement inheritance and polymorphism features of Java CO5: Implementing multithreading to enhance efficiency and handle ru CO6: Develop Java programs for software development 	nstructs n time errors								
7	Course Description	Apply features of OOPS and Java Programming including objects, class parameter passing, information hiding, inheritance and polymorphism a	ses, methods, re discussed.								
8	Outline syllabus		CO Mapping								
	Unit 1	JDK, IDE installation and program execution									
		installing JDK, configuring the path, installation and applications of IDE, Creating Java code, running programmes using the JVM and .class files	CO1								
	Unit 2	Programming revisited									
		Different data type programmes, expression promotion rules, type casting and narrowing, logical-bit wise arithmetic operators, Using break and continue, for, while, do, and while loop control structures, if else, switch case. Command line arguments, keyboard input, Java arrays, and hierarchical control structures.	CO2, CO3								
	Unit 3	Class, object and constructor									
		Programmes that define classes, specify data members and member functions, build objects, and allow access to class members via those objects, programmes that define constructors, set instance variables, overload methods, and overload constructors.	CO2, CO3, CO6								
	Unit 4	Inheritance, package and Interface									
		Several types of inheritance, method overriding, multiple inheritance through interfaces, inheritance in interfaces, private, protected, and public mode programmes	CO3, CO4, CO6								
	Unit 5	I/O, Exception and Multithreading									
		User defined exceptions, nested try catch, rethrowing exceptions, and programmes that employ try catch finally for exception handling Applications that extend the Thread class and implement the Runnable interface can run and control many threads.	CO3, CO5, CO6								
	Mode of examination	Jury/Practical/Viva									



Weightage	CA	CE (Viva)	ETE	
Distribution	25%	25%	50%	
Text book/s*	1. Schildt H, "T			
Other References				
	Professional Jav	a Programming: B	rettSpell, WROX Publication	

PO and PSO mapping with level of strength for Course Name OOP using Java Lab (MCP168)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	1			2	2					2	1	1
	CO2	2			2	2					2	2	2
MCP_168	CO3	2	3	3	3	2					2	2	3
Java Lab	CO4	3			3	2					2	2	2
	CO5	3			3	2					2	2	2
	CO6	3	3	3	3	2					2	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP168	OOP using Java Lab	2.3	3	3	2.5	3					2	2	2

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent 3. Addressed to Substantial (High=3) extent

List of Experiments

Unit No	S. No.	Name of the Practical
	1.1	Write a Java program to print 'Hello' on screen and then print your name on a separate line.
1	1.2	Write a Java program to print the sum (addition), multiply, subtract, divide and remainder of two numbers.
2	2.1	WAP in java to product of two numbers. Also, take input by the user.
	2.2	WAP in java to implement implicit and explicit type casting
	2.3	WAP in java to implement the various operators in java
	2.4	WAP in java to illustrate the concept of local, instance and static variable
3	3.1	WAP in Java with two classes create an object of first class and call into another class (having main method)
	3.2	WAP in Java for constructor overloading
		Write a program in java to demonstrate method overloading
	3.3	WAP in Java for method overriding.
		WAP in java to show run time polymorphism (up casting)
4	4.1	Write a program in java to demonstrate multilevel inheritance in java.



		WWW.androade.an
	4.2	Write a java program to create an abstract class named Shape that contains two integers and
		an empty method named print Area (). Provide three classes named Rectangle, Triangle and
		Circle such that each one of the classes extends the class Shape. Each one of the classes
		contains only the method print Area () that prints the area of the given shape.
5	5.1	WAP in Java for exception handling by using try, catch and finally
	5.2	WAP in Java for throw and throws Exception
	5.3	WAP in Java to throw your own Exceptions
	5.4	WAP in Java how to create thread using Thread Class.
	5.5	WAP in Java how to create thread using a runnable interface.
	5.6	WAP in Java to implement the multithreading.



Schoo	ol:	Sharda School of Engineering & Technology							
Depa	rtment	Computer Science & Applications							
Batch	l	2023-25, Year 2024-25							
Progr	camme:	МСА							
Seme	ster:	Ш							
1	Course Code	MCP267							
2	Course Title	Design and Analysis of Algorithms Lab.							
3	Credits	1							
4	Contact Hours (L-T-P)	0-0-2							
	Course Status	Compulsory/Elective							
5	Course Objective	Learn how to analyze a problem and design the solution for the problem.1. Design and implement efficient algorithms for a specified application.2. Strengthen the ability to identify and apply the suitable algorithm for the given real world problem.							
6	Course Outcomes (must be 6 COs, following verbs given in Bloom's Taxonomy)	 CO1: Design algorithms using divide and conquer methods. CO2: Demonstrate the object-oriented concepts such as class, inheritance, Exception and Multithreading. CO3: Analyze the performance of merge sort and quick sort algorithms using divide and conquer technique. CO4: Analyze the performance of searching algorithms. CO5: Analyze the tree traversals and graph traversals using divide and conquer technique. CO6: Design algorithms using dynamic programming and back tracking methods. 							
7	Course Description	Apply							
8	Outline syllabus		CO Mapping						
	Unit 1	Ouick and Merge Sort							
		a. Sort a given set of elements using the quick sort method and determine the time required to sort the elements.b. Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements.	CO1, CO3						
	Unit 2	Warshall's Algorithm							
		a. Obtain the Topological ordering of vertices in any digraph.b. Compute the transitive closure of a given directed graph using Warshall's algorithm.	CO1, CO5						
	Unit 3	Knapsack Problem and Shortest Path Algorithm, and Minimum Spanning Tree	CO2, CO3						
		a. Implement 0/1 Knapsack problem using Dynamic Programming.b. From a vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.c. Find Minimum Cost Spanning Tree of a undirected graph using Kruskal's algorithm.	CO2, CO4						
	Unit 4	Tree and Graph Traversals							
		a. Perform various tree traversal algorithms for a tree.b. Print the nodes reachable from a starting node in a digraph using BFS method.	CO2, CO5						
	Unit 5	Back tracking							
		Implement N Queen's problem using Back Tracking.	CO2, CO6						



				WWWW.DOWNGCOM.BL.DL				
	Perform a back	tracking program u	using dynamic programming.					
Mode of examination	Jury/Practical/V	Jury/Practical/Viva						
Weightage	CA	CE (Viva)	ETE					
Distribution	25%	25%	50%					
Text book/s*	Levitin A, "Intro Pearson Educati	Levitin A, "Introduction to the Design And Analysis of Algorithms", Pearson Education, 2008.						
Other References	 Goodrich M Analysis and Int Base Sara, Al to Design and A 	 Goodrich M.T., R Tomassia, "Algorithm Design foundations Analysis and Internet Examples", John Wileyn and Sons, 2006. Base Sara, Allen Van Gelder, "Computer Algorithms Introduction to Design and Analysis", Pearson, 3rd Edition, 1999. 						

PO and PSO mapping with level of strength for Course Name Introduction to OOP using Java Lab (Course Code: MCP267)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	2	2	2	1	1	-	-	-	-	1	3	1
MCP267 Design and Analysis of	CO2	2	1	1	1	1	-	-	-	-	1	1	1
	CO3	2	2	2	1	1	-	-	-	-	1	3	1
algorithms	CO4	2	2	2	1	1	-	-	-	-	1	3	1
Lab.	CO5	2	2	2	1	1	-	-	-	-	1	3	1
	CO6	22	2	2	1	1	-	-	-	-	1	3	1

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP267	Design and Analysis of algorithms Lab.	2	1.83	1.83	1	1	-	-	-	-	1	2.66	1

Strength of Correlation

1. Addressed to *Slight* (*Low=1*) *extent*

2. Addressed to *Moderate* (*Medium=2*) extent

3. Addressed to Substantial (High=3) extent



List of Experiments

Unit No	S. No.	Name of the Practical
1	1.1	Sort a given set of elements using the quick sort method and determine the time required to sort the elements.
	1.2	b. Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements.
2	2.1	Obtain the Topological ordering of vertices in any digraph.
	2.2	Compute the transitive closure of a given directed graph using Warshall's algorithm.
3	3.1	Implement 0/1 Knapsack problem using Dynamic Programming.
	3.2	From a vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm
	3.3	Find Minimum Cost Spanning Tree of a undirected graph using Kruskal's algorithm.
4	4.1	Perform various tree traversal algorithms for a tree.
	4.2	Print the nodes reachable from a starting node in a digraph using BFS method.
5	5.1	Implement N Queen's problem using Back Tracking
	5.2	Perform a back tracking program using dynamic programming.



TERM-IV



Scho	ool: SSET	Batch: 2023-25							
Prog	gramme: MCA	Current Academic Year: 2024-25							
Sem	ester:	IV							
1	Course Code	MCA306							
2	Course Title	C# with ASP.Net							
3	Credits	3							
4	Contact Hours (L-T-P)	3-0-0							
	Course Status	Program Elective 3							
5	Course Objective	Understand the fundamentals of object-oriented concept in C#, defining classes, objects, in inheritance, interfaces and exception handling mechanisms. To develop skills in analyzing a web and understand the fundamentals of ASP.NET with ADO.NET.	voking methods the usability of						
6	Course Outcomes	 After successfully completion of this course students will be able to: CO1: Understand the philosophy and architecture of .NET Framework. CO2: Describe the fundamental of C# programming language and learn how to build objec oriented applications using C#. CO3: Explain the concept of Namespace system, multithreading and exception handling. CO4: Implement the ASP.Net web controls in web form. CO5: Apply the validation controls and ADO.NET. CO6: Develop real world problems using C# & ASP.NET. 	t						
7	Course Description	Basic Object-Oriented Programming (OOP) concepts, including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations using C# are discussed. ASP.NET and ADO.NET are discussed to give basic understanding and its implementation to design the web pages.							
8	Outline syllabus		CO Mapping						
	Unit 1	Introduction to .Net framework & components							
	А	Introduction, The Origin of .Net Technology, Common Language Runtime (CLR),	CO1, CO2						
	В	Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL),	CO1, CO2						
	С	Just-In – Time Compilation, Framework Base Classes, Assemblies and its types	CO1, CO2						
-	Unit 2	Introduction to C# with class and object							
	А	Introduction, Data Types, Identifiers, Variables, Constants, Literals, Type conversion, Array and Strings,	CO1, CO2						
	В	Object and Classes, Abstraction, Encapsulations & Data hiding, Inheritance	CO1, CO2						
	С	Polymorphism, Operator Overloading, Interfaces, Delegates and Events.	CO2, CO6						
	Unit 3	Namespace-System, Multi-threading and Exception handling							
	А	Namespace- System, Access Modifiers: Public, Private, Protected, Internal and Protected Internal	CO3, CO6						
	В	Introduction to Multi-Threading: creating thread using Thread class, Thread life cycle, sleep, join, abort and Thread priority	CO3, CO6						
	С	Managing Console, I/O Operations, Input-Output in C#, Error Handling: try, catch, throw and throws, Checked and Unchecked exceptions, User define exception	CO3, CO6						
	Unit 4	ASP.NET Controls							
	А	ASP.NET Web Controls: ASP.Net Life cycle, Differentiate Client side and Server-side controls.	CO4, CO6						
	В	Label, Textbox, Button Controls, Drop-down list, List box,	CO4, CO6						
	С	Radio Button list, Check box list, File Upload, Data Grid, Grid View	CO3, CO6						
	Unit 5	ASP.NET validation controls & ADO.NET							
	А	ASP.NET Validation: Compare Validator, Range Validator, Regular Expression Validator, Required Field Validator, Validation Summary							
	В	ADO.Net: Introduction to ADO.Net. Architecture ADO.NET, Data Set, Data Table,	CO5, CO6						
	С	Data Row, Data Adapter, Data Reader, DB Command and DB Connection Objects	CO5, CO6						
	Mode of examination	Theory							



Weightage	CA	MTE	ETE				
Distribution	25%	25%	50%				
Text book/s*	 Balagurusamy," Programming Shibi Parikkar, "C# with .Net Media.ASP.NET: The Complete 	ΓΜΗ) "', Firewall :: Matthew Macdonald					
Reference Books	 Mark Michaelis, "Essential C# 3.0: For .NET Framework 4.5, 2/e, Pearson Education Fergal Grimes," Microsoft .Net for Programmers". (SPI) 						

Sl. No.	Course Outcome (CO)	
1.	CO1: Understand the philosophy and architecture of .NET	PO1, PO2
2.	CO2: Describe the fundamental of C# programming language and learn how to build object-oriented applications using C#.	PO1, PO2, PO4
3.	CO3: Explain the concept of Namespace system, multithreading and exception handling.	P01, PO2, PO3, PO4, PO10, PSO1
4.	CO4: Implement the ASP.Net web controls in web form.	PO1, PO2, PO3, PO10
5.	CO5: Apply the validation controls and ADO.NET.	PO2, PO3, PO4, PO10
6.	CO6: Develop real world problems using C# & ASP.NET.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name C# with ASP.Net Lab (Course Code -MCP306)

Course Code_ Course Name	COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	3	2	-	-	-	-	-	-	-	2	-	-
	CO2	2	3	-	2	-	-	-	-	-	-	-	-
C# with ASP	CO3	2	3	2	3	-	-	-	-	-	2	2	-
.INE 1 MCA306	CO4	2	3	2	-	-	-	-	-	-	2	-	-
	CO5	-	2	2	3	-	-	-	-	-	2	2	1
	CO6	2	3	2	3	3	2	-	2	-	2	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA306	C# with ASP .NET	2.2	2.67	2	2.75	3	2	0	2	0	2	2	1.5



Scho	ool: SSET	Batch: 2023-25							
Prog	gramme: MCA	Current Academic Year: 2024-25							
Sem	ester:	IV							
1	Course Code	MCA359							
2	Course Title	Introduction to PHP with MySQL							
3	Credits	3							
4	Contact Hours (L-T-P)	3-0-0							
	Course Status	Core/Compulsory							
5	Course Objective	To design & develop secure web pages using server side scripting (f	rontend and backend)						
6	Course On successful completion of the course, the student will: Outcomes CO1: Define the basic concepts of PHP. CO2: Understand how server-side programming works on the web CO3: Apply PHP script to handle HTML forms CO4: Discover PHP programs that use various PHP library functions, and that manipulate files and directories. CO5: Appraise and solve various database tasks using the MySQL language CO6: Develop Websites for Small business and organization or for individual								
7	Course Description	This course introduces Concepts for PHP and learns Form handling, Session Management. Ho we can develop dynamic websites. It will also help students to build applications according to heir problem statements.							
8	Outline syllabus		CO Mapping						
	Unit 1	PHP Basics							
	А	Introduction to PHP, Working with PHP, Why PHP?, Basic Syntax of PHP	CO1,CO2						
	В	PHP statement terminator and case insensitivity, Embedding PHP in HTML	CO1,CO2						
	С	Comments, Variables, Assigning value to a variable, Constants, Managing Variables, Understanding variable scope, Global Variables, Static Variables	CO1,CO2						
	Unit 2	Operators, Control Structures and Functions in PHP							
	А	Arithmetic Operators, Bit-wise Operators, Comparison Operators,LogicalOperators,ConcatenationOperator,Incrementing/Decrementing Operator,Ternary Operator	CO1,CO2,CO6						
	В	Conditional Control Structures: If statement, If- else statement, If- else if statement, Nested If, Switch statement, Looping Control Structures: For loop, While loop, Do- While loop, For-each	CO1,CO2,CO6						
	С	CO1,CO2,CO4							
	Unit 3	Array and Form Handling							
	Α	Array: single, multi-dimensional, numeric array, associative array	CO6						
	В	Accessing form elements using GET and POST, Assigning value to form elements	CO3,CO6						
	С	Form validation: validation, required, validate URL dealing with uploaded file, error handling	CO3,CO6						
	Unit 4	File Handling & Session Management							



А	Opening files in different	modes, handling file open error		CO4,CO6		
В	File Operation: Reading deleting file, renaming file	& writing data on web page : e	from file,	CO4,CO6		
С	Session Management: int session management	roduction, creation, destroying	and login	CO4,CO6		
Unit 5	My SQL					
А	MySQL Basic query: crea drop, where	truncate,	CO5,CO6			
В	MySQL ORDER BY, J database, database connect	uction to	CO5,CO6			
С	MySQL Database, create Default, Retrieving record connection	e Check, d, closing	CO5,CO6			
Mode of examination	Theory					
Weightage	CA	MTE	ETE			
Distribution	25%	25%	50%			
Text book/s*	1. Peter MacIntyre, Rasmus	Lerdorf, Kevin Tatroe, "Programm	ing PHP", C	O'Reilly Publication		
Other References	 Steven Holzner, "Php: The Complete Reference", TMH publication Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript. DHTML and PHP", 4th revised Edition, BPB Publication 					

S.	Course Outcome	Programme OutComes(PO) & Programme
No.		Specific Outcomes (PSO)
1.	CO1: Define the basic concepts of PHP.	PO1,PO2,PO3,PO4,PO5,PO8,PO10
2.	CO2: Understand how server-side programming works on the web	PO3,PO4,PO10,PS02
3.	CO3: Apply PHP script to handle HTML forms	PO3,PO4,PO8,PO10
4.	CO4: Discover PHP programs that use various PHP library functions, and that manipulate files and directories.	PO3,PO4,PO10
5.	CO5: Appraise and solve various database tasks using the MySQL language	PO3,PO4,PO8,PO10,PSO2
6.	CO6: Develop Websites for Small business and organization or for individual	PO1,PO2,PO3,PO4,PO5,PO8,PO10,PSO1,PSO2



PO and PSO mapping with level of strength for Course Name Introduction to PHP with MySQL

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2
CO1	2	2	2	2	2	-	-	3	-	2	-	-
CO2	-	-	2	1	-	-	-	-	-	2	-	1
CO3	-	-	2	1	-	-	-	2	-	2	-	-
CO4	-	-	2	1	-	-	-	-	-	2	-	-
CO5	-	-	2	1	-	-	-	1	-	2	-	2
CO6	2	2	2	3	3	1	-	3	-	3	3	2
Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
Name Introductio n to PHP and MySQL	2.00	2.00	2.00	1.50	2.50	1.00	-	2.25	-	2.17	3.00	1.67

Average of non-zeros entry in following table (should be auto calculated).

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



Syllabus- Introduction to R Programing

Scho	ol: SSET	Batch: 2023-2025						
Prog	ramme: MCA	Academic Year: 2024-25						
Seme	ster:	IV						
1	Course Code.	MCA360						
2	Course Title	Introduction to R Programming						
3	Credits	3						
4	Contact Hours	3.0.0						
-	Course status	Compulsory						
5	Course Objectives	To familiarize the students with the basics of programming in R lang applications in data analysis.	uage, and its					
	Course Outcomes	 Upon successful completion of this course, student will be able to: CO1: Demonstrate R programming using Decision statements, Loops and Function CO2: Apply functions to improve readability of programs. (K3) CO3: Select and construct programs using different data structures available in H K3) CO4: Summarize data using descriptive statistics and perform distribution analysi K4) CO5: Design visualizations of data using different types of graphs and plots. (K5) CO6: Estimate data using complex statistical testing. (K6) 						
7	7 Course Description R is a programming language and software environment for statistical analysis, graph representation and reporting. This course provides an introduction to the basics programming in R, and its applications in data analysis.							
8	Outline syllabus:		CO Mapping					
	Unit 1	Introduction to R Programming, Decisions, Loops and Functions						
	А	Introduction to R Programming, R-Studio Installation (GUI): R Windows Environment, Simple Math in R	CO1					
	В	Introduction to Data Types, Variables, Operators	CO1					
	С	Decision Statements, R Loops, R Functions	CO2					
	Unit 2	Data Structures in R						
	А	Introduction to Arrays, Working with Strings	CO3					
	В	Data Structures/ Objects in R: Vector, List, Matrix, Factor, Data Frame	CO3, CO2, CO6					
	С	Conversion of Data Objects: Matrix to Data frame, Data frame to Matrix, Data Frame to list, Matrix to list.	CO3, CO2					
	UNIT 3	Descriptive Statistics						
	А	Reading Datasets, Working with different file types .txt, .csv etc., Combining Datasets	CO4					
	В	Descriptive Statistics and Tabulation: Summarizing data with R, Contingency Tables	CO4					
	С	Data Distribution Analysis: Shapiro Wilk Test, Kolmogorov Smirnov, Quantile Plots	CO4					
	Unit 4	Data Visualization in R						



А	Load data in R environment intervals and unequal class in	and plotting a graph, h ntervals), Bar Chart, Bo	istograms (equal class x plot,	CO5				
В	Stem-leaf plot, Scatter Plot,	Line Chart, Pie chart,		CO5, CO6				
С	Customization of plot settin legends.	gs, adding text, saving	plot to a file, adding	CO5, CO6				
Unit 5	Hypothesis Testing and Co	rrelation Analysis						
А	Hypothesis Testing: Student	t test, Mann Whitney T	est	CO6				
В	Correlation Analysis, Ran procedures.	CO6						
С	Complex Statistics: One way	and two-way ANOVA		CO6				
Mode of examination	Theory							
Weightage	СА	MTE	ETE					
Distribution	25%	25%	50%					
Text book/s*	1. Gardener, M (2012): Language, Wiley Publication	Beginning R: The Stans.	atistical Programming					
	2. Braun W J, Murdoch D J (2007): A First Course in Statistical Programming with R. Cambridge University Press. New York							
Other References	 Crawley, M.J. (2015): Sta Wiley. Crawley, M.J. (2012): Th 	atistics: An Introduction e R Book, 2 nd Edition. V	Using R, 2 nd Edition.					

S.	Course Outcome	Programme OutComes(PO) & Programme Specific
No.		Outcomes (PSO)
1.	CO1. Demonstrate R programming using Decision statements, Loops and Functions.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1
2.	CO2. Apply functions to improve readability of programs	PO1, PO2, PO3, PO4, PO8, PO10, PSO1
3.	CO3. Select and construct programs using different data structures available in R.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1
4.	CO4. Summarize data using descriptive statistics and perform distribution analysis.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1
5.	CO5. Design visualizations of data using different types of graphs and plots.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1
6.	CO6. Estimate data using complex statistical testing.	PO1, PO2, PO3, PO4, PO8, PO 10, PSO1



PO and PSO mapping with level of strength for Course Name Introduction to R Programming (Course Code MCA360)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	2	1	1	2	-	-	-	2	-	-	2	-
	CO2	2	2	2	2	-	-	-	2	-	-	2	-
MCA360	CO3	2	2	1	2	-	-	-	2	-	-	2	-
R Programming	CO4	2	2	2	2	-	-	-	2	-	-	2	-
	CO5	2	2	2	2	-	-	-	2	-	-	2	-
	CO6	3	3	2	2	-	-	-	2	-	-	2	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCA360	Introduction to R Programming	2.1	2	1.7	2	-	-	-	2	-	-	2	

Strength of Correlation

- 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent
- 3. Addressed to Substantial (High=3) extent



	School: SSE	Т	Batch : 2023-2025						
	Programme: M	ICA	Academic Year: 2024-2025						
	Semester:		IV						
1	Course Co	ode	ARP 308						
2	Course Ti	tle	Personality Development						
3	Credits		2						
4	Contact Ho (L-T-P)	ours	1-0-2						
	Course Sta	tus	Active						
5	Course Obje	ctive	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business Engliss readiness program, behavioural traits, achieve softer communication levels and positive self-branding along with augmenting numerical and altitudinal abilitie To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshol of his/her 4 th phase of employability enhancement and skill building activity exercise.	y h a s. e d y					
6	Course Outc	omes	of his/her 4 th phase of employability enhancement and skill building activity exercise. After completion of this course, students will be able to: CO1: Develop a creative resumes, cover letters, interpret job descriptions and interpret KRA and KPI statements and art of conflict management. CO2: Build negotiation skills to get maximum benefits from deals in practical life scenarios. CO3: to Develop skills of personal branding to create a brand image and self-branding CO4: Acquire higher level competency in use of logical and analytical reasoning such as direction sense, strong and weak arguments CO5: Develop higher level strategic thinking and diverse mathematical concepts through building analogies, odd one out CO6: Demonstrate higher level quantitative aptitude such as average, ratio & proportions, mixtures & allegation for making business decisions. This penultimate stage introduces the student to the basics of Human Resources. Allows the student to understand and interpret KRA KPI and understand Job descriptions. A student also understands how to manage conflicts, brand						
8			syllabus – ARP 308						
	Unit 1	Ace the I	nterview	CO MAPPING					
	А	HR Sensi	ization (Role Clarity KRA KPI Understanding JD) Conflict Management	CO1					
	B	Negotiatio	n Skills Personal Branding	CO3, CO4					
	C	Uploading Cover Let	Jploading & Curating Resumes in Job Portals, getting Your Resumes Noticed Writing						
	Unit 2	Introduc	ion to APTITUDE TRAINING- Reasoning- Logical/ Analytical						
	Α	Sitting Ar	Arrangement & Venn Diagrams Puzzles Distribution Selection						
	В	Direction	n Sense Statement & Conclusion Strong & Weak Arguments						
	С	Analogies	ogies, Odd One out Cause & Effect						
	Unit 3	Quantita	Quantitative Aptitude						
	A	Average,	Ratio & Proportions, Mixtures & Allegation	CO6					
	В	Geometry	-Lines, Angles & Triangles	CO6					
	С	Problem of	f Ages Data Sufficiency - L2	CO6					



Unit 4	Verbal Abilities-4	
А	Antonyms and Synonyms	CO1
В	Idioms and Phrases	CO2
Unit 5	Problem Solving and Case Studies	
А	Real time Case Study Solving Exercises	CO4
В	Intra student Mock Situation Handling Exercises	CO4
Weightage Distribution	CA MTE ETE 25% 25% 50%%	
Text book/s*	Wiley's Quantitative Aptitude-P Anand Quantum CAT – Arihant Publications Quicker Maths- M. Tyra Power of Positive Action (English, Paperback, Napoleon Hill) Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon Goal Setting (English, Paperback, Wilson Dobson	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	1	2	-	-
CO2	-	-	-	-	-	-	-	-	1	2	-	-
CO3	-	-	-	-	-	-	-	-	1	2	-	-
CO4	1	-	-	-	-	-	-	-	1	2	-	-
CO5	1	_	-	_	_	_	-	-	1	2	_	-
CO6	1	-	-	-	-	-	-	-	1	2	-	-



Scho	ool: SSET	Batch: 2023-25								
Prog	gramme: MCA	Current Academic Year: 2024-25								
Sem	ester:	IV								
1	Course Code	MCP306								
2	Course Title	C# with ASP.Net Lab								
3	Credits	1								
4	Contact Hours	0-0-2								
	(L-T-P)									
	Course Status	Program Elective 3								
5	Course Objective	This course is prepared for the begin	ners to help then	n to understand basics of C# along with	classes, objects,					
		invoking methods inheritance, interf	aces and except	ion handling mechanisms and ASP.NE	T programming.					
		C# programming from where you ca	its will be able t	to	ASF.INE1 using					
		next levels.	in take yoursen							
6	Course Outcomes	After successfully completion of th	nis course stude	ents will be able to:						
		CO1: Demonstrate C# environment	and executing C	# Programs.						
		CO2: Understand and formulate the	problems in bas	ic programming constructs using C#.						
		CO3: Applying OOP concepts to so	lve real world p	roblems.						
		CO4: Implement inheritance, polym	orphism, multit	hreading features using C# and handle	run time errors.					
		CO6: Develop real world problems	using C# & ASF	NET	E1.					
7	Course	ASP.NET is a web application fram	ework develope	d and marketed by Microsoft to allow	programmers to					
,	Description	build dynamic web sites. It allows ye	ou to use an obje	ect-oriented programming language suc	ch as C# to build					
	-	web applications easily	· ·							
8	Outline syllabus				CO Mapping					
		Visual Studio installation and pro-	gram execution	l						
	A. A	Installing Visual-Studio, uses of IDI	E, Writing C# pr	ograms, program execution,						
	Unit 1	Programs on different data types, pr	omotion rules in	expressions, narrowing & type	CO1, CO2					
		casting, logical-bit wise-arithmetic of	operators.							
	U:4 3	Programming revisited								
	Umt 2	Programs using if else, switch ca	ase statements, f							
		structures, break and continue Progr	ams using comm	nand line arguments, taking input	CO2, CO6					
		along object and constructor	of structures.							
		Programs to define classes, defining	data mombors (r member function create objects						
	Unit 3	accessing members of a class through	the objects Progr	ams to define constructors	CO3 CO6					
		initializing instance variables, metho	od overloading,	constructor overloading.	005,000					
			Ċ,	C						
		Inheritance, package, Interface, E	xception and M	Iultithreading						
		Programs on different types of it	nheritance, met	hod overriding, achieving multiple						
	TI*4 4	inheritance through interfaces, inhe	eritance in inter	faces, private, protected and public						
	Umit 4	mode, try. catch. finally for exception	on handling, the	row user defined exceptions, uses of	CO4, CO6					
		multithreading using Thread class	g exceptions. Pi	rograms to define Thread, acmeving						
		ASP.NET. Validation and ADO N	ЕТ							
	Unit 5	Design the Web Forms using ASP	VET controls V	alidations using various validators in						
		VS. Establish the connection using ADO.NET component in connected and Dis-connected CO5. CO6								
		mode.	r							
	Mode of	Practical/Jury/Viva								
	examination	-								
	Weightage	CA	MTE	ETE						
	Distribution	25%	25%	50%						
	Text book/s*	1 Balagurusamy," Program	nming with C#	", (TMH)						



	 Shibi Parikkar, "C# with .Net Frame Work", Firewall Media.ASP.NET: The Complete Reference:Matthew Macdonald
Reference Books	 Mark Michaelis, "Essential C# 3.0: For .NET Framework 4.5, 2/e, Pearson Education Fergal Grimes," Microsoft .Net for Programmers". (SPI)

Sl. No.	Course Outcome (CO)	
1.	CO1: Demonstrate C# environment and executing C# Programs.	PO1, PO2
2.	CO2: Understand and formulate the problems in basic programming constructs using C#.	PO1, PO2, PO4
3.	CO3: Applying OOP concepts to solve real world problems.	P01, PO2, PO3, PO4, PO10, PSO1
4.	CO4: Implement inheritance, polymorphism, multithreading features using C# and handle run time errors.	PO1, PO2, PO3, PO10
5.	CO5: Apply the validation controls in web forms and connect with database using ADO.NET	PO2, PO3, PO4, PO10
6.	CO6: Develop real world problems using C# & ASP.NET.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name C# with ASP.Net (Course Code -MCP306)

Course Code_ Course Name	COs	PO 1	PO 2	РО 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	3	2	-	-	-	-	-	-	-	2	-	-
MCP306	CO2	2	3	-	2	-	-	-	-	-	-	-	-
C# with	CO3	2	3	2	3	-	-	-	-	-	2	2	-
ASP.Net Lab	CO4	2	3	2	-	-	-	-	-	-	2	-	-
	CO5	-	2	2	3	-	-	-	-	-	2	2	1
	CO6	2	3	2	3	3	2	-	2	-	2	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP306	C# with ASP.Net Lab	2.2	2.67	2	2.75	3	2	0	2	0	2	2	1.5

List of Programs

Write a Simple Program to print your name in C#
Write a program to print the given string by using the Write and Write Line Method.
Write a program how to read the values form console given by the user using Read Line Method
Write a program to make a function (addition of Two numbers) in Single Class
Write a program to make a function in first class (addition of Two numbers) and call a function by creating object of first class in to second class and inputs given by the user.
Write a program to make a function in first class and call a function into second class by declare static method of first class
Write a program to print the element of collections (like. Array) by using For each Loop.

CSA, SSET, SU



Write a program to print the element of an Array by using For each Loop and inputs given by the user.

Write a program to print the tables from 1 to 10 by using the 2- Dimensional Array

Write a program to implements the methods and properties on Array (like: Get Length(),Get Value Get Length(),,Copy To(),Reverse(),Length)

Write a program to print the elements by using Jagged Array with For each Loop.

Write a program to print the elements by using the Array List Class and inputs given by the user.

Write a program to implements the methods and properties on Array List. (like:

Add(),Clear(),Insert(),Remove(),Sort(), Count, Capacity).

Write a program to display the given string by using Immutable String (String Class).

Write a program to implements the methods and properties on string (like: Compare(),Compare To(), Concat(),Trim(),Insert()).

Write a program to display the given sting by using Mutable String (String Builder Class).

Write a program to implements the methods and properties on String Builder (like: Compare(),Compare To(),Concat(),Trim(),Insert()).

Write a program to create a class for Room and make a Constructor & Destructor for Room Class and then use the Construct to pass the values in method for Area and display it.

Write a program to calculate the Area of Circle by using the Parameterized Constructor and inputs given by the user (Length, Width).

Write a program to calculate the Area of Rectangle and perimeter by using the Constructor Overloaded and inputs given by the user (Length, Width)

Write a program to calculate the Area of Room and inherit the base class and calculate the volume of Room in second class and then display the area and volume (Single Inheritance).

Write a program to design a class vehicle, car and bike by using Multi Level inheritance and then call the method of vehicles, car and bike by creating object of bike class (Multi -level inheritance).

Write a program to implement the interfaces which contains the methods Addition, Multiplication respectively and create a new class which implement both methods and display the output of these methods by creating a new class.

Write a program to create a class and make a function for Multiplication for two numbers and overload the existing function then display the output.

Write a program how the unary minus operator is overloaded

Write a program how the binary plus operator is overloaded on addition of two complex numbers.

Write a program to create a class and make the function Display and override the existing Function by using the Virtual and Override keywords.

Write a program how a delegate is created and used in program.

Write a program to Create the Multicast delegate by call the several methods in one call.

Write a program to simulate a calculator by using the delegate

Write a program to create the two event handler of an event and implement by the delegate.

Write a program to handle an arithmetic exception by using try and multiple catch blocks.

Write a program to handle an arithmetic exception by using try and finally block.

Write a program how to create a thread and starts it running

Write a program how to create the multiple thread in a program

Write a program how to manage the priority of threads

Write a program to implement the methods of thread (like: Wait (), Suspend (), Resume (), Abort ()).

Write a program to connect the SQL Database by using the ADO.Net

Write a program to connect the Ms Access by using the ADO.Net



Write a program to illustrate the concept of Connected Mode by using ADO.Net

Write a program to illustrate the concept of Dis-connected Mode by using ADO.Net

Write a program to implement the Pointer in C # by using unsafe mode.

Create a Simple web application by using ASP.Net and Connect with SQL Database and also perform some operation (like: Insert, Update, Delete and Select).



Scho	ol: SSET	Batch: 2023-25							
Prog	ramme: MCA	Current Academic Year: 2024-25							
Seme	ester:	IV							
1	Course Code	MCP359							
2	Course Title	Introduction to PHP with MySQL Lab							
3	Credits	1							
4	Contact Hours (L-T-P)	0-0-2							
	Course Status	Core/Compulsory							
5	Course Objective	This course introduces the open source Web scripting language PHP and help building dynamic Web applications. It defines the Semantics and syntax of the language. It defines SQL commands and query processing using PHP and s integration.							
6	Course Outcomes	CO1: Define regular expressions including modifiers and operators.							
	(same as theory course)	CO2: Demonstrate PHP functions to solve mathematical and data str CO3: Develop PHP scripts to handle HTML forms.	ructure problems						
		CO4: Determine the PHP scripts for file handling and session management.							
		CO5: Analyze and solve various database tasks using the SQL langu	lage.						
		CO6: Solve common Web application tasks by writing PHP program	ns.						
7	Course Description	This course discusses the practical problems that PHP solves. It he server-side cross-platform HTML-embedded scripts to implement d pages that interact with databases and files.	lps in developing lynamic Web						
8			CO Mapping						
	Unit 1	PHP Basics	11 0						
	А	Write a program to print a message. Write a Program to calculate square of given number	CO1						
	В	Write a PHP program to swap two variables.							
	С	Write a PHP program to find the area of rectangle, square, circle by taking user input							
	Unit 2	Operators, Control Structures and Functions in PHP							
	А	Write a PHP program to find factorial of a number. Write a PHP program to implement a calculator.	CO2						
	В	Write a PHP Program for finding the Largest number in an array							
	С	Write a PHP Program for finding the smallest number in an array							
	Unit 3	Array and Form Handling							
	А	Write a program in PHP to sort the elements of an array in ascending order.	CO3						



В	Write a program	n in PHP to sort t	he elements of an array in							
С	Write a program	n in PHP to create	e a form and validate the same.							
Unit 4	File Handling &	Session Manageme	ent	CO4						
А	Write a program	Vrite a program in PHP to upload a file								
В	Write a program	Write a program in PHP to implement file handling.								
С	Write a program	Write a program in PHP to perform session Management.								
Unit 5	SQL and PHP D	SQL and PHP Database Connectivity								
А	Write a program MySQL	Write a program in PHP to Open and close a Connection to MySQL								
В	Write a Program Database	Write a Program in PHP to select and Order Data From a MySQL Database								
С	Create a PHP as information of a	nd SQL based we a Bank. Also incl	bsite which stores the ude query processing using SQL.							
Mode of examination	Jury/Practical/V	/iva								
Weightage	CA	CE(Viva)	ESE							
Distribution	25%	25%	50%							
Text book/s*	Peter MacIntyre, F Publication	Peter MacIntyre, Rasmus Lerdorf, Kevin Tatroe, "Programming PHP", O'Reilly Publication								
Other References	 Steven H Ivan Bay Using H^T BPB Pub 	 Steven Holzner, "Php: The Complete Reference", TMH publication Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and PHP", 4th revised Edition, BPB Publication 								

S.	Course Outcome	Programme OutComes(PO) & Programme
No.		Specific Outcomes (PSO)
1.	CO1: Define regular expressions including modifiers and operators.	PO1,PO2,PO3,PO4,PO10
2.	CO2: Demonstrate PHP programs that use various PHP library functions	PO1,PO2,PO3,PO4,PO10
3.	CO3: Develop PHP scripts to handle HTML forms.	PO1,PO3,PO4,PO8,PO10,PSO1
4.	CO4: Analyze and solve various database tasks using the SQL language.	PO1,PO3,PO4,PO8,PO10
5.	CO5: Determine the PHP script to validate form data.	PO3,PO4,PO8,PO10,PSO1
6.	CO6: Solve common Web application tasks by writing PHP programs.	PO1,PO2,PO3,PO4,PO5,PO8,PO10,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Introduction to PHP with SQL Lab

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
MCD250	CO1	2	2	2	2						2		
MCP339	CO2	2	2	2	2						2		



										www.sharda.ac.m	
Introduction	CO3	1		2	2			1	2	2	
to PHP Lab	CO4	1		2	3			1	2		
	CO5			2	2			1	2	2	
	CO6	2	1	2	3	3		3	3	3	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
MCP359	Introduction to PHP lab	1.6	1.67	2	2.3	3	0	0	1.5	0	2.67	2.3	2

List of Experiments

- Write a PHP program to print a message.
- Write a PHP program to find a square of a number.
- Write a PHP program to swap two numbers without using 3rd variable.
- Write a PHP program to find the area of rectangle, square, circle using predefined value.
- Write a PHP program to find factorial of a number
- Write a PHP program to print Fibonacci series upto 17.
- Write a PHP program to implement calculator.
- Write a PHP program to find the smallest number from an array.
- Write a PHP program to arrange the numbers in ascending order.
- Write a PHP program to make a login form and check the input using another PHP page.
- Write a PHP program to find the sum of all elements in a multidimensional array using for loop.
- Write a PHP program to validate a form input.
- Write a PHP program of file handling (reading a file line by line until end of file
- Write a PHP program for uploading a file in PHP.
- Write a program to read input data, from table and display all these information in tabular form on output screen.



Syllabus- Introduction to R Lab

Scho	ol: SSET	Batch: 2023-2025										
Prog	ramme: MCA	Academic Year: 2024-25										
Seme	ester:	IV										
1	Course Code.	MCP360										
2	Course Title	Introduction to R Lab										
3	Credits	1										
4	Contact Hours (L-T-P)	0-0-2										
	Course status	Compulsory										
5	Course Objectives	To familiarize the students with the basics of programming in R languag applications in data analysis.	ge, and its									
	Course Outcomes	Upon successful completion of this course, student will be able to: CO1: Demonstrate R programming using Decision statements, Loops and Functions. (K3) CO2: Apply functions to improve readability of programs. (K3) CO3: Select and construct programs using different data structures available in R. (K1, K3) CO4: Summarize data using descriptive statistics and perform distribution analysis. (K2, K4) CO5: Design visualizations of data using different types of graphs and plots. (K5)										
7	Course Description	R is a programming language and software environment for statistical analysis representation and reporting. This course provides an introduction to the programming in R, and its applications in data analysis.	s, graphics basics of									
8	Outline syllabus:		CO Mapping									
	Unit 1	Introduction to R Programming, Decisions, Loops and Functions										
	A	P1. Write a R Program to make simple calculate.P2. Write a R program to demonstrate the usage of different types of operators.P3. Write a R program to find whether a given year is leap year or not.P4. Write a R program to calculate factorial of a given number.	CO1, CO2									
	Unit 2	Data Structures in R										
	A	P5. Write R programs to create vector using c, rep, paste and seq functions.P6. Write a R program to find transpose of a given matrix.P7. Write R programs to create and manipulate data frames.	CO3, CO2, CO6									
	UNIT 3	Descriptive Statistics										
	А	P8. Write a R Program to print summary statistics of a given dataset.P9. Write a R Program to perform Shapiro Wilk Test, Kolmogorov Smirnov test.P10. Write a R program to plot quantile quantile plots.	CO4									
	Unit 4	Data Visualization in R										
	A	P11. Write R programs to create bar chart, histogram, pie chart, scatter plot, line chart, stem leaf plot.	CO5, CO6									
	Unit 5	Hypothesis Testing and Correlation Analysis										
	A	P12. Write R programs to implement Student t and Mann Whitney Test.P13. Write a R program to perform correlation analysis of a given dataset.P14. Write a R program to implement ANOVA technique.	CO6									



	Mode of examination	Practical/Jury/Viva							
	Weightage	CA	CE(Viva)	ETE					
	Distribution	25%	25%	50%					
	Text book/s*	1. Gardener, M (2012): Beginning R: The Statistical Programming Language, Wiley Publications.							
		2. Braun W J, Murdoch D J (2007): A First Course in Statistical Programming with R. Cambridge University Press. New York							
	Other References	 Crawley, M.J. (2015): Statistics: An Introduction Using R, 2nd Edition. Wiley. Crawley, M.J. (2012): The R Book. 2nd Edition. Wiley. 							

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CO and PO Mapping											
S.	Course Outcome	Programme OutComes(PO) & Programme									
N0.		Specific Outcomes (PSO)									
1.	CO1. Demonstrate R programming using Decision statements, Loops and Functions.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1									
2.	CO2. Apply functions to improve readability of programs	PO1, PO2, PO3, PO4, PO8, PO10, PSO1									
3.	CO3. Select and construct programs using different data structures available in R.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1									
4.	CO4. Summarize data using descriptive statistics and perform distribution analysis.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1									
5.	CO5. Design visualizations of data using different types of graphs and plots.	PO1, PO2, PO3, PO4, PO8, PO10, PSO1									
6.	CO6. Estimate data using complex statistical testing.	PO1, PO2, PO3, PO4, PO8, PO 10, PSO1									

PO and PSO mapping with level of strength for Course Name Introduction to R Programming Lab (Course Code MCP360)

Course Code_ Course Name	CO's	PO 1	PO 2	РО 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
	CO1	2	1	1	2				2			2	
	CO2	2	2	2	2				2			2	
MCP360	CO3	2	2	1	2				2			2	
Introduction to R Lab	CO4	2	2	2	2				2			2	PSO2
	CO5	2	2	2	2				2			2	
	CO6	3	3	2	2				2			2	

Average of non-zeros entry in following table (should be auto calculated).

Course	Course Name			PO	PO	PO	PO	PO	PO	PO	PO	PSO	
Code		PO 1	PO2	3	4	5	6	7	8	9	10	1	PSO 2
MCP360	Introduction to R lab	2.1	2	1.7	2	-	-	I	2	-	-	2	

Strength of Correlation

1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent

3. Addressed to Substantial (High=3) extent