DEPARTMENT OF MCA MCA CURRICULUM

(For candidates admitted from 2020-2021 onwards)

CEN4	COURSE	TITLE	HOUDS	CDEDIT	MARKS			
SEM	CODE	TITLE	HOURS	CREDIT	CIA	EE	TOTAL	
	20P1CA01	Core Course- 1 Object oriented programming with C++	4	4	25	75	100	
	20P1CA02	Core Course - 2 Web Technologies	4	4	25	75	100	
	20P1CA03	Core Course- 3 Design and Analysis of Algorithms	4	4	25	75	100	
ı	20P1CA04	Core Course- 4 Advanced Operating System	4	4	25	75	100	
'	20P1CAE_	Elective I -	4	4	25	75	100	
	20P1CAP01	Core Course Practical - 1 Design and Analysis of Algorithms Lab Using C++	4	2	40	60	100	
	20P1CAP02	Core Course Practical - 2 Web Technologies Lab	4	2	40	60	100	
	20P1CAJ01	Soft Skills	2	1	25	75	100	
		Total	30	25	230	570	800	
			,		1		1	
	20P2CA05	Core Course - 5 Advanced Java Programming	4	4	25	75	100	
	20P2CA06	Core Course - 6 Advanced Software Engineering	4	25	75	100		
	20P2CA07	Core Course - 7 Advanced Relational Database Management Systems	25	75	100			
II	20P2CAE_	Elective II -	4	4	25	75	100	
		EDC - Resource Management Techniques	4	2	25	75	100	
	20P2CAP03	Core Course Practical - 3 Advanced Java Programming Lab	4	2	40	60	100	
	20P2CAP04	Core Course Practical - 4 ADBMS Lab	4	2	40	60	100	
	20P2CAPR01	Mini Project	2	2	40	60	100	
		Total	30	24	245	555	800	
	20P3CA08	Core Course - 8 C# and .NET Programming	4	4	25	75	100	
	20P3CA09	Core Course - 9 Scripting Languages	4	4	25	75	100	
	20P3CA10	Core Course - 10 Big Data Analysis	4	4	25	75	100	
	20P3CAE-	Elective Course – III	5	4	25	75	100	
Ш	20P3CAE_	Elective IV-	5	4	25	75	100	
""	20P3CAP05	Core Course Practical - 5 C# and .NET Programming Lab	4	2	40	60	100	
	20P3CAP06	Core Course Practical – 6 Scripting Languages Lab	4	2	40	60	100	
		Human Rights	-	1	25	75	100	
		Total	30	25	230	570	800	
IV	20P4CAPR02	Core Course Project – 2 Dissertation and Viva Voce	-	18	50	150	200	

Total	0	18	50	150	200
Grand Total	90	92	755	1845	2600

Elective : I

	Course Code	Title		
	20P1CAE01	Professional Ethics		
Semester I	20P1CAE02	E-Commerce		
	20P1CAE03	Business Intelligence		
	20P1CAE04	Enterprise Resource Planning		

Elective II

	Course Code	Title				
	20P2CAE05	Mobile Computing				
Semester II	20P2CAE06	Advanced Networks				
	20P2CAE07	Cryptography and Network Security				
	20P2CAE08	Information Security				

Elective III

	Course Code	Title
	20P3CAE09	Digital Image Processing
Semester III	20P3CAE10	Soft Computing
	20P3CAE11	Cloud Computing
	20P3CAE12	Internet of Things

Elective IV

	Course Code	Title
	20P3CAE13	Artificial Intelligence and Machine Learning
Semester III	20P3CAE14	Data Mining and Warehousing
	20P3CAE15	R Programming
	20P3CAE16	Python Programming





MOMEN EMPOWERMENT		Elayampalayam, Ti	ruchenge	ode-6	37 205.					
Programme	MCA	Programme Code	PCA Regulations					2020-2021		
Department		M.C.A			Semester			1		
			Perio	ds	Credit	Maximu	ım Mark	.s		
Course Code	C	Course Name	per W	eek						
			L T	P	С	CA	ESE	Total		
20P1CA01	Prog	ramming in C++	4 0	0	4	25	75	100		
COURSE OBJECTIVES	OOPS in C++,er	To impart adequate knowledge on basics of programming in C,understand the basics and applications of OOPS in C++, enable effective usage of inheritance and polymorphism concepts, teach the various I/O treams and file handling								
POs		PRO	GRAMM	E OU	JTCOME					
PO 1	knowledge appro	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements								
PO 2	· -	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain								
PO 3	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental									
PO 4	Use research-bas	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions								
PO 5	Create, select, ac	lapt and apply appropriate te	chniques	, reso	urces, and mo		iting too	ls to complex		
PO 6		commit to professional ethic				onsibilities,	, and no	rms of		
PO 7	-	eed, and have the ability, to	engage in	inde	pendent learnii	ng for conti	inual dev	velopment as a		
PO 8	Demonstrate knowledge and understanding of the computing and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments									
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand									
PO 10		assess societal, environment and the consequential respon			-					
PO 11		rely as an individual and as a								
PO 12	Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large									
PO 13	To apply knowledge of computing to create effective designs and solutions for complex problems									
PO 14		yse and synthesize scholarly								
PO 15	To develop scier demands	tific outlook that solves any	problem	, enco	ompassing the	expected as	spectsof	market		

COs	COURSE OUTCOME				
CO 1	To learn about key concepts of programming in C++				
CO 2	To understand the basic concepts of OOPS and C++				
CO 3	To apply the OOPS concepts inheritance polymorphism in C++				
CO 4	To gain knowledge about various I/O streams and files				
CO 5	To impart knowledge about templates and exception handling in C++				
Pre-requisites					

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2	Thirdicates the strength of corre	iation, 3-strong, 2-medium, 1-w	(Cak)
COs	KLs	POs	KLs
		PO 1	2
CO 1	2	PO 2	3
		PO 3	3
		PO 4	1
CO 2	3	PO 5	2
		PO 6	1
	3	PO 7	1
CO 3		PO 8	3
		PO 9	2
		PO 10	2
CO 4	4	PO 11	1
		PO 12	3
		PO 13	1
CO 5	3	PO 14	2
		PO 15	2

CO / PO Mapping

COs	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	2	3	2	2	2	3	3	2	2	2	3	3
CO2	2	3	3	1	2	1	1	3	2	2	1	3	1	2	2
CO3	2	3	3	1	2	1	1	3	2	2	1	3	1	2	2
CO4	1	2	2	1	1	1	1	2	1	1	1	2	1	1	1
CO5	2	3	3	1	2	1	1	3	2	2	1	3	1	2	2

ourse Assessment Methods
irect
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
direct
1 Course End Delivery

Content of the	Syllabus							
	Basic Concepts of OOP	Periods	12					
	Benefits of OOP- Applications of OOP- Structure of C++ - Applications	of C++ - Difference	ces between C &					
Unit - I	C++. Tokens - Data types - Operators- Manipulators- Expressions - Cont	rol structures. Fur	action in C++:					
	Prototype- Call by Value - Call by Reference - Return by Reference - Inli	ne Function - Def	ault Arguments -					
	Const arguments.							
	Class and Objects	Periods	12					
	Specifying a class – Member function – Arrays within a class – Memory	Allocation for obj	ects – Static data					
Unit - II	members – Static member function – Array of objects - Object as Functio	n Arguments - F	riend functions -					
	Returning Objects – Const member functions – Pointer to members.							
	Constructors and Destructors	Periods	12					
Unit - III	Constructors - Parameterized constructors - Multiple constructors in a class - Dynamic Initialization of							
Omt - m	objects - Copy Constructors - Destructors - Operator Overloading and Ty	pe Conversion.						
	Inheritance	Periods	12					
	Extending classes – Derived classes – Single Inheritance – Multilevel Inh	eritance – Multipl	e Inheritance –					
Unit - IV	Hierarchical Inheritance – Hybrid inheritance – Virtual Base class – Abstract class – Pointers . Virtual							
	Functions and Polymorphism : Pointers – This Pointers – Virtual Function	ns – Pure Virtual l	Functions.					
	Working with Files	Periods	12					
	Classes for file stream Operations – Opening and Closing a file – Detection	ng End of File – F	ile Pointers and					
Unit - V	their Manipulators – Error Handling during file Operations-Command lin	e arguments – Ter	nplates : class					
	Templates – function Templates – Exception Handling : Throwing Mechanism – Catching mechanism – Re							
	throwing an exception - Specifying Exceptions.							
	Total Periods		60					

Text Books	
1	Object Oriented Programming with C++, E.Balagurusamy, 6th edition, T.M.H Publisher, New Delhi, 2013
	(Unit I to V).
References	
1	The C++ Programming Language, Bjarne Stroustrup, Fourth edition, 2013.
2	C++ Programming in Easy Steps, Mike McGrath, Fourth Edition, 2011
E-References	
1	www.tutorialspoint.com
2	www.w3schools.com





MOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.												
Programme	MCA	Programme Code	PO	CA	Regulation	ons	2020-2021						
Department		M.C.A		Semester			3						
Course Code	(Course Name	Periods per Week	Credit	Maximu								
			L T P	С	CA	ESE							
20P1CA02	WEB TECHNOLOGIES 4 0 0 4 25 75 10												
COURSE	Γο learn about web technologies with HTML,CSS, PHP and MySQL concepts.												
OBJECTIVES POs		PRO	OGRAMME OU	JTCOME									
PO 1	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domainknowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements												
PO 2		ate, research literature, and sg fundamental principles of	-			_							
PO 3	systems,compon	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health andsafety, cultural, societal, and environmental											
PO 4	1	sed knowledge and research pretation of data, and synthe			•		ons.						
PO 5	ł	sed knowledge and research			=		ons.						
PO 6	Understand and	commit to professional ethiconal computing practice.											
PO 7	Recognize the no acomputing prof	eed, and have the ability, to essional.	engage in inde	pendent learnin	ng for contir	nual de	velopment as						
PO 8	ł	owledge and understanding s, as a member and leader in venvironments.	=			ples an	d apply these						
PO 9	complexcomputi	fectively with the computing activities by being able to makeeffective presentations	to comprehend	and write effec			n						
PO 10	•	assess societal, environmen											
PO 11		vely as an individual and as											
PO 12	Identify a timely	opportunity and using innot of the individual and socie	=	e that opportu	nity to creat	e value	and wealth						
PO 13		edge of computing to create		ns and solution	ns for compl	ex pro	blems						
PO 14	To identify, anal	yse and synthesize scholarly	y literature rela	ting to the field	d of Compu	ter Scie	ence						
PO 15	To develop scier demands	ntific outlook that solves an	y problem, enco	ompassing the	expected as	pectsof	market						

COs	COURSE OUTCOME
CO 1	Understand the basics of web design using HTML and cascading style sheets.
CO 2	Understand the basics of PHP.
CO 3	Learn about PHP control structures, functions, string handling and arrays
CO 4	Acquire knowledge in file system, cookies and sessions and understand PHP types
CO 5	Implement connecting database with PHP and MySQL.
Pre-requisites	Basic Knowledge about HTML and Tags.

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(5/2/1 indicates the strength of correlation, 5-strong, 2-medium, 1-weak)										
COs	KLs	POs	KLs							
		PO 1	3							
CO 1	2	PO 2	3							
		PO 3	4							
		PO 4	4							
CO 2	2	PO 5	2							
		PO 6	3							
		PO 7	2							
CO 3	3	PO 8	4							
		PO 9	2							
		PO 10	3							
CO 4	3	PO 11	3							
		PO 12	4							
		PO 13	4							
CO 5	4	PO 14	2							
		PO 15	3							

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO3	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO5	2	2	3	3	1	2	1	3	1	2	2	3	3	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	HTML Basics	Periods	12								
	Understanding HTML - Formatting text by Using Tags - Creating Lists and Backgrounds -										
Unit - I	Hyperlinks and Anchors. Creating Tables- Creating simple Forms. Style S	Sheets and Graphi	cs: Introduction								
	to Style Sheets - Cascading Style sheetsFormatting Text using Style She	eets - Formatting	Paragraphs using								
	Style Sheets.										
	Introducing PHP	Periods	12								
Unit - II	Why PHP and MySQL-Server-Side Scripting Overview - Getting Started	with PHP - Learn	ing PHP Syntax								
	and Variables.										
	Introducing PHP Control Structures	Periods	12								
Unit - III	Learning PHP Control Structures and Functions-Passing Information with PHP- Learning PHP String										
	Handling - Learning Arrays.										
	Introducing PHP File Systems	Periods	12								
Unit - IV	Learning PHP Number Handling. More PHP: Working with the File System -Working with Cookies and										
Ullit - I V	Sessions - Learning PHP Types.										
	MySQL Database Integration	Periods	12								
Unit - V	Introducing Databases and MySQL Learning Database Administration and Design - Integrating PHP and										
Ullit - V	MySQL Performing Database Queries - Integrating Web Forms and Databases.										
	Total Periods 60										

Text Books	
1	Microsoft Step by Step â€" HTML and XHTML", Faithe Wempen. PHI, 2009
2	Steve Suehring, Tim Converse, and Joyce Park, "PHP6 and MySQL Bible", Wiley Publishing, Inc., 2010.
References	
1	Jay Greenspan and Brad Bulger, MySQL/PHP Database Applications, M & T Books, 2001.
2	Adam Trachtenberg and David Sklar, PHP Cookbook , OReilly, 2nd Edition, 2006.
3	W. Jason Gilmore, Beginning PHP and MySQL from Novice to Professional, Apress, 4th Edition, 2010.
4	Luke Welling, Laura Thomson, PHP and MySQL Web Development, Pearson Education, Inc., 4th Edition,
	2009.
E-References	
1	https://www.w3schools.com/php/
2	https://www.tutorialspoint.com/php/
3	https://www.guru99.com/php_tutorials.html





WOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.												
Programme	MCA	Programme Code		PCA Regulations 20									
Department			1										
			ds	Credit	Maxim	um Mark	S						
Course Code		Course Name											
			L T	P	С	CA	ESE	Total					
20P1CA03	DESIGN AND ANALYSIS OF												
201 101103	Al	LGORITHMS	4 0	0	4	25	75	100					
COURSE	To understand the analysis of various algorithms, different categories of algorithms and implementation of												
OBJECTIVES	To understand the analysis of various algorithms, different categories of algorithms and implementation of algorithms.												
POs		PROGRAMME OUTCOME											
PO 1		e of computing fundamental											
	•	ge appropriate for the compu				traction ar	nd concep	otualization of					
PO 2		els from defined problems ar nte, research literature, and s				hlems reac	hing suh	stantiated					
	1	g fundamental principles of		_			_						
	disciplines			,	1 0	,							
PO 3	Design and evalu	uate solutions for complex c	omputing	g prob	lems, and desi	gn and eva	aluate						
	-	ents, or processes that meet	_	needs	s with appropr	iate consid	deration f	or public health					
	-	al, societal, and environmen											
PO 4	l .	sed knowledge and research				_		ma					
PO 5		pretation of data, and synthe sed knowledge and research						118.					
103	•	pretation of data, and synthe						ns.					
PO 6	<u> </u>	commit to professional ethic											
	normsofprofessi	onal computing practice.											
PO 7		eed, and have the ability, to	engage in	inde	pendent learning	ng for cont	tinual dev	elopment as					
DO 0	acomputing prof		C (1		1			1 1 4					
PO 8		owledge and understanding o c, as a member and leader in		-	-	-	cipies and	apply these					
	multidisciplinary		a waiii, t	.O IIIai	iage projects a	ilid III							
PO 9		fectively with the computing	g commu	nity, a	and with societ	ty at large,	about						
	l .	ing activities by being able to		-		-		1					
		makeeffective presentations,											
PO 10		assess societal, environment											
DO 11		kts, and the consequential res						practice					
PO 11	multidisciplinary	vely as an individual and as a	a member	r or le	ader in diverse	e teams and	d in						
PO 12		opportunity and using inno	vation to	pursii	e that opportu	nity to crea	ate value	and wealth					
1012	1	t of the individual and socie			- mai opportu	, 10 0100	are raide	and would					
PO 13		edge of computing to create			ns and solution	ns for com	plex prob	olems					
PO 14	To identify, anal	yse and synthesize scholarly	literatur	e relat	ing to the field	d of Comp	uter Scie	nce					
PO 15	-	ntific outlook that solves any	problem	, enco	ompassing the	expected a	aspectsof	market					
	demands												

COs	COURSE OUTCOME
CO 1	Recognize general principles and good algorithm design techniques for developing efficient algorithms.
CO 2	Estimate the time and space complexities of algorithms.
CO 3	Apply mathematical preliminaries to the analysis and design stages of different types of algorithms
CO 4	Compare the time and space complexities of different types of algorithms.
CO 5	Analysis the algorithms based on that which algorithm is an efficient one for specific input.
Pre-requisites	Basic Knowledge about Programming Knowledge and algorithms.

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of correlation, 3-strong, 2-incutum, 1-weak)											
COs	KLs	POs	KLs								
		PO 1	3								
CO 1	2	PO 2	3								
		PO 3	4								
		PO 4	4								
CO 2	2	PO 5	2								
		PO 6	3								
		PO 7	2								
CO 3	3	PO 8	4								
		PO 9	2								
		PO 10	3								
CO 4	3	PO 11	3								
		PO 12	4								
		PO 13	4								
CO 5	4	PO 14	2								
		PO 15	3								

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO3	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO5	2	2	3	3	1	2	1	3	1	2	2	3	3	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

ontent of the	Syllabus						
	Introduction	Periods	12				
Unit - I	Algorithms: Structure, properties - analysis of iterative and recursive algo	rithms - best case	, worst case,				
Ullit - I	average case complexities- Notations. Elementary Data Structures: Stacks	and Queues-List	S.				
	Trees	Periods	12				
IInit II	Introduction-Binary Trees-BINARY SEARCH TREES: Operations: Inser	t, delete,					
Unit - II	search-implementation-Analysis.AVL TREES: Definition - Height - sear	ching - insert, del	ete operations				
	AVL rotations - Examples.						
	Graphs	Periods	12				
Unit - III	Definition - terminologies- Representations: Adjacency matrix, Adjacency	y list, - Graph sea	rch methods:				
Ollit - III	Breadth first Search; Depth first Search. DIVIDE AND CONQUER: Met	hod - Examples -I	Binary Search				
	Merge Sort, Quick Sort- analysis.						
	Greedy and Dynamic Programming	Periods	12				
Unit - IV	Method - Examples - Minimum cost spanning tree, Kruskal's algorith	nm, Prim's al	gorithm. Sing				
UIII - I V	source Shortest Path algorithms. DYNAMIC PROGRAMMING: Method	d - Examples - Al	l pairs shortes				
	path problem - Traveling salesman problem.						
	Back Tracking	Periods	12				
Unit - V	Method-Examples-Eight queen's problem ,Graph Coloring, Hamilton	nian Cycles. NP-H	IARD,				
UIII - V	NP-COMPLETE CLASSES: Basic concepts - Non deterministic algorithms - Satisfiability problem -						
	NP-hard and NP-complete Problems.						
	Total Periods		60				

Text Books	
1	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms,
	The MIT Press, 2009
2	Horowitz Ellis, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second
	Edition Reprint 2012.
References	
1	Vijayalakshmi Pai G.A, Data Structures and Algorithms: Concepts, Techniques and Applications, Tata Mc
	Graw Hill, 2009.
2	Anany Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Publications, 3rd Edition,
	2012
E-References	
1	www.cs.usfca.edu/~galles/visualization/Algorithms.html
2	onlinecourses.nptel.ac.in/noc16_cs04/preview
3	www.coursera.org/learn/introduction-to-algorithms





MOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.								
Programme	MCA	Programme Code		P	tions	2020-2021			
Department		M.C.A		Semester					
			Perio	ods	Credit	Maxim	um Marl	ΚS	
Course Code	Course Name per Week								
			L T	P	С	CA	ESE	Total	
20P1CA04	Advance	d Operating System	4 (0	4	25	75	100	
COURSE OBJECTIVES	management, me	verview of computer system mory management, storage knowledge on Distributed of	managei	nent,	protection and	_	-		
POs		PRO	GRAMN	IE OU	JTCOME				
PO 1	knowledge appro	e of computing fundamental opriate for the computing sports from defined problems and	ecializati	on to	the abstraction				
PO 2	-	te, research literature, and so g fundamental principles of		_			_		
PO 3	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental								
PO 4	Use research-bas	ed knowledge and research data, and synthesis of the in				_		vsisand	
PO 5	Create, select, ad	apt and apply appropriate te	chnique	s, reso	urces, and mo			ols to complex	
PO 6		commit to professional ethic				onsibilities	s, and no	rmsof	
PO 7	<u> </u>	eed, and have the ability, to	engage ii	inde	pendent learnin	ng for cont	inual de	velopment as a	
PO 8	Demonstrate knowledge and understanding of the computing and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.								
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand								
PO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.								
PO 11		rely as an individual and as a							
PO 12	1	opportunity and using innover the individual and society a		pursu	e that opportu	nity to crea	ate value	and wealth for	
PO 13		dge of computing to create of		desig	ns and solution	ns for com	plex prol	blems	
PO 14	-	yse and synthesize scholarly						ence.	
PO 15	To develop scient of marketdemand	tific outlook that solves any s	problem	n, enco	ompassing the	expected a	spects		

COs	COURSE OUTCOME
CO 1	After completion of the course the student will be able to use the system with knowledge of operating system.
CO 2	Able to recognize the process management.
CO 3	Able to understand building blocks operating system.
CO 4	Able to understand security issues of operating system.
CO 5	Able to utilize the languages in all the types of operating environment.
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of contention, 3-strong, 2-inequal, 1-weak)									
COs	KLs	POs	KLs						
		PO 1	4						
CO 1	2	PO 2	3						
		PO 3	3						
		PO 4	2						
CO 2	3	PO 5	3						
		PO 6	4						
		PO 7	2						
CO 3	4	PO 8	4						
		PO 9	3						
		PO 10	4						
CO 4	3	PO 11	3						
		PO 12	2						
		PO 13	4						
CO 5	2	PO 14	3						
		PO 15	3						

CO / PO Mapping

COs						P	rogram	me Out	tcome ((POs)					
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	2	2	3	2	1	1	1	2	1	2	3	1	2	2
CO2	2	3	3	2	3	2	2	2	3	2	3	2	2	3	3
CO3	3	2	2	1	2	3	1	3	2	3	2	1	3	2	2
CO4	2	3	3	2	3	2	2	2	3	2	3	2	2	3	3
CO5	1	2	2	3	2	1	1	1	2	1	2	3	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	An Overview of Operating System and Its Structures	Periods	12					
TT '. T	Introduction: Definition of OS- Operating System Structure-System Components-System Calls- Pro							
Unit - I	Concepts-Process Scheduling-Scheduling Concepts-Criteria-Scheduling A	Algorithms.						
	Process Synchronization and Dead Locks	Periods	12					
	Process Synchronization - Background, Critical Section-Synchronization	Hardware-Semap	hores-Problems					
Unit - II	of Synchronization-Critical Regions-Monitors-Deadlocks-System model,	Characterization-	Methods of					
	Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Deadlock	k Recovery.						
	Memory Management	Periods	12					
Unit - III	Background , Swapping ,Contiguous-Non Contiguous Storage Allocation	-Paging - Segmen	tation -					
Ullit - III	Segmentation with paging - Virtual Memory-Basic Concepts- Page Repla	cement Methods-	Allocation of					
	frames-Thrashing.							
	I/O And File Systems	Periods	12					
	File Concepts-File System Structure-Access Methods-Directory Structure	-Protection-Direc	tory					
Unit - IV	Implementation- Distributed systems - Goals, Software concepts - Network	k Operating syste	ms- True					
	distributed systems Multiprocessor, Time sharing system,- Distributed Fil	e system design-	system structur					
	Linux System	Periods	12					
	Distributed Operating Systems Issues in Distributed Operating System A	Architecture. Linu	x System:					
Unit - V	Design Principles -Kernel Modules -Process Management Scheduling -	Memory Manage	ment					
	-Input-Output Management -File System Inter process Communication.	. iOS and Andro	oid: Architectu					
	and SDK Framework -Media Layer -Services							
	Total Periods		60					

Text Books	
1	Silberschatz and Galvin, Operating System Concepts, 6th Edition, John Wiley & Sons, (Asia) Pvt Ltd ,
	2005.
2	Andrew and Tanenbaum, Distributed Operating System, 4th Edition, Pearsons Ltd, 2002.
3	Daniel P Bovet and Marco Cesati, Understanding the Linux kernel, 3rd edition, OReilly, 2005.
References	
1	Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992
2	P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004
3	H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002
4	Mukesh Singhal and Niranjan G. Shivaratri, Advanced Concepts in Operating Systems Distributed,
	Database, and Multiprocessor Operating Systems•, Tata McGraw-Hill, 2001
5	Rajib Mall, Real-Time Systems: Theory and Practice", Pearson Education India, 2006.
E-References	
1	https://technet.microsoft.com
2	https://en.wikipedia.org
3	www.tutorialspoint.com
4	https://books.google.co.in
5	www.webopedia.com

Signature of BOS Chairman





WOMEN EMPOWERMENT		Elayampalayam, Ti	ruchengo	de-6	37 205.					
Programme	MCA	Programme Code		PCA Regulations						
Department		M.C.A	Semester							
			Period	ls	Credit	Maxim	um Mar	ks		
Course Code	C	Course Name per Week								
			L T	P	С	CA	ESE	E Total		
20P2CA05	Advance	d Java Programming	4 0	0	4	25	75	100		
COURSE	To impart the kn	owledge of core JavaTo intr	oduce adv	ance	d java concept	tsTo learn	about ba	asic concepts		
OBJECTIVES	web applications	To understand how to create	e, test, deb	ug a	nd deploy an v	veb applica	ations			
POs		PRO	GRAMM	E OL	JTCOME					
PO 1	Apply knowledg	e of computing fundamental	s, comput	ing s	pecialization,	mathemati	cs, and	domain		
		opriate for the computing spe				and conce	eptualiza	ation of		
	1 0	ls from defined problems ar								
PO 2	· -	te, research literature, and s	_				_			
	•	g fundamental principles of	mathemat	ics, c	computing scie	ences, and i	relevant	domain		
DO 2	disciplines	. 1			1 11 '		1 ,			
PO 3	-	nate solutions for complex constant and significant		_		_	-			
		processes that meet specified ocietal, and environmental	needs wi	ın ap	propriate cons	ideration i	or publi	c nearm and		
PO 4	•		methods i	nelu	ding design of	evnerimen	te analy	veic and		
104		Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions								
PO 5	_	apt and apply appropriate te					uting to	ols to complex		
		ties, with an understanding	-			1	U	1		
PO 6	1 0	commit to professional ethic				onsibilities	s, and no	orms of		
	professional com	puting practice								
PO 7	Recognize the ne	Recognize the need, and have the ability, to engage in independent learning for continual development as a								
	computing professional									
PO 8		wledge and understanding of		_	-	_	_			
	•	as a member and leader in a	team, to r	nana	ge projects and	l in multid	isciplina	ary		
	environments									
PO 9		fectively with the computing		•				-		
		ties by being able to compre		write	e effective repo	orts, desigr	i docum	ientation, make		
PO 10	effective presentations, and give and understand									
FO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and									
PO 11	global contexts, and the consequential responsibilities relevant to professional computing practice Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary									
1011	environments									
PO 12		opportunity and using inno	vation to r	ursu	e that opportur	nity to crea	ite value	and wealth for		
		the individual and society a	-		FF	<i>y</i>				
PO 13		dge of computing to create		lesig	ns and solution	s for comp	olex pro	blems		
PO 14	To identify, anal	yse and synthesize scholarly	literature	rela	ting to the field	d of Comp	uter Scie	ence		
PO 15	To develop sciendemands	tific outlook that solves any	problem,	enco	ompassing the	expected a	spectso	f market		

COs	COURSE OUTCOME
CO 1	To revisit the important concepts of Core Java Programming
CO 2	To understand the concepts of GUI programming in Java and to implement RPC mechanism through RMI
CO 3	To learn about the server side scripting using servlets
CO 4	To understand the elements of JSP and its syntax and creating custom tags
CO 5	To acquire knowledge in connecting databases with JSP and creating, testing, debugging and deploying web
	applications
Pre-requisites	Programming Language and OOPS

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(5/2/1 indicates the stiength of correlation, 5-strong, 2-medium, 1-weak)						
COs	KLs	POs	KLs			
		PO 1	2			
CO 1	2	PO 2	3			
		PO 3	2			
		PO 4	4			
CO 2	3	PO 5	3			
		PO 6	3			
		PO 7	2			
CO 3	3	PO 8	3			
		PO 9	4			
		PO 10	3			
CO 4	3	PO 11	4			
		PO 12	2			
		PO 13	3			
CO 5	4	PO 14	4			
		PO 15	3			

CO / PO Mapping

COs						P	rogram	me Ou	tcome ((POs)					PO15 2 3 3 3 3
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	3	1	2	2	1	2	1	2	1	3	2	1	2
CO2	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO3	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO4	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO5	1	2	1	3	2	2	1	2	3	2	3	1	2	3	2

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model	
2. Assignment	
3. End Semester Examinations	
Indirect	
1 Course End Delivery	

	An Overview of Java	Periods	12					
	Features of Java-Creating and executing simple Java programs-Classes an	d Objects: A Sim	ple Class and					
Unit - I	Declaring Objects, Methods - Examples - Constructors- Packages and Inte	erfaces-Multithrea	ided					
	Programming- Exception Handling: Fundamentals-Types-Using try and c	atch-Built in Exce	eptions					
	-Throwing our own Exception.							
	GUI Programming and RMI	Periods	12					
Unit - II	The Applet Class- Event Handling-Introducing the AWT: Working with V	Windows, Graphic	es and					
Omt - II	Text-Using AWT Controls, Layout Manager and Menus-A tour of SWIN	GRMI: An Over	view of					
	RMI-Building a Simple Client/Server Application							
	Servlets Periods							
Unit - III	The Life Cycle of a Servlet-A Simple Servlet-The Servlet API-The javax.servlet Package-Reading Servlet							
Ullit - III	Parameters- The javax.servlet.http Package-Handling HTTP Requests and Responses-Using							
	Cookies-Session Tracking							
	JSP Elements	Periods	12					
Unit - IV	JSP - Elements of JSP-JSP Syntax and Semantics- Expressions, Scriptlets	, and Declarations	s-Request					
Ullit - I V	Dispatching-Session and Thread Management-JSP Tag Extensions: Introd	luction to Custom						
	Tag-Developing your first Custom Tag							
	JSP Applications	Periods	12					
Unit - V	Database Access with JDBC-Overview of JDBC-JDBC Drivers-Connecting to a Database with							
Omt - v	DriverManager-The Statement Interface-Result Sets-Using Metadata-JSP and XML-JSP Testing and							
	Debugging-Deploying Web Applications.							
	Total Periods		60					

Text Books	
1	1. H. Schildt, 2002, Java 2 Complete Reference, 5th Edition, Tata McGraw Hill, New Delhi.(Unit
	I,UnitII,Unit III)
2	2. Phil Hanna ,JSP 2.0: The Complete Reference, Tata McGraw Hilll Edition,2003 New Delhi,(Unit IV,
	Unit V)
References	
1	1. James Koegh,2003, J2Me: The complete Reference, Tata McGraw Hill, New Delhi
2	2. J.McGovern, R.Adatia, Y.Fain, 2003, J2EE 1.4 Bible, Wiley-Dreamtech India Pvt.Ltd, New Delhi
E-References	
1	1. www.w3schools.com
2	2. www.javatpoint.com
3	3. https://java-made-easy.com
4	4. www.geeksforgeeks.com





	Elayampalayam, 11	rucnengo	ae-o	37 205.			
MCA	Programme Code		PCA Regulations				
	M.C.A	Semester					1
		Perio	ls	Credit	Maxim	um Mar	ks
C	ourse Name	per We	ek				
		LT	P	С	CA	ESE	E Total
Advanced	Software Engineering	4 0	0	4	25	75	100
To gain Knowled	lge of basic SW engineering	methods	and	practices, and	their appro	priate a	pplication and
general understa	nding of software process m	odels and	testi	ng concepts			
	PRO	GRAMM	E OL	JTCOME			
Apply knowledg	e of computing fundamental	s, comput	ing s	pecialization,	mathemati	cs, and	
domainknowledg	ge appropriate for the compu	iting speci	aliza	tion to the abs	traction an	d conce	ptualization
	*	-					
· -		_				_	
1	_	principles	of m	nathematics, co	omputing s	ciences,	and relevant
-							
-	=		_		-		
•			needs	s with appropri	iate consid	leration	for public health
				1: 1 : 0			
	•				-		
•					aem comp	uting to	ois to
					onsihilities	and s	
•	=	s and cyb	ci ic	suiutions, resp	onsionities	s, and	
		engage in	indeı	oendent learnir	ng for cont	inual de	evelopment as
-					-6		
1 01		of the com	putir	ng and manage	ment princ	ciples an	nd apply these
			_	-	_	•	11.5
•							
Communicate ef	fectively with the computing	g commun	ity, a	and with societ	y at large,	about	
complexcomputi	ng activities by being able to	o compreh	nend	and write effec	ctive repor	ts, desig	n
documentation, r	nakeeffective presentations,	and give	and ı	ınderstand			
•							
		•					g practice
•	-	a member	or le	ader in diverse	teams and	d in	
		_		e that opportur	nity to crea	ate value	e and wealth
		<u> </u>				.1	1.1
demands	outlook that solves any	problem,	-	mpassing the	expected a	spectsol	ппагкеі
	Advanced S To gain Knowled general understant and evaluation and general understant and ge	MCA Course Name Advanced Software Engineering To gain Knowledge of basic SW engineering general understanding of software process m PRO Apply knowledge of computing fundamental domainknowledge appropriate for the computofcomputing models from defined problems Identify, formulate, research literature, and substantiatedconclusions using fundamental domaindisciplines Design and evaluate solutions for complex consystems, components, or processes that meet andsafety, cultural, societal, and environment Use research-based knowledge and research analysisandinterpretation of data, and synthe Create, select, adapt and apply appropriate te complexcomputing activities, with an underst Understand and commit to professional ethic normsofprofessional computing practice. Recognize the need, and have the ability, to eacomputing professional. Demonstrate knowledge and understanding of toones own work, as a member and leader in multidisciplinaryenvironments. Communicate effectively with the computing complexcomputing activities by being able to documentation, makeeffective presentations, Understand and assess societal, environment andglobal contexts, and the consequential resulting for the professional contexts, and the consequential resulting activities and the consequential resulting timely opportunity and using innote for the betterment of the individual and societal to apply knowledge of computing to create to the resulting activities and societal to the professional contexts and synthesize scholarly to develop scientific outlook that solves any	MCA Programme Code M.C.A Course Name Period Course Name Demonstrate knowledge and assess societal, environmental, health, andglobal contexts, and the consequential responsibility function effectively as an individual and as a member multidisciplinaryenvironments. Course Name Period Defined Period Deriod Period Deriod Period L T Advanced Software Engineering PROGRAMMI PROGRAMMI Apply knowledge of basic SW engineering methods general understanding of software process models and PROGRAMMI Apply knowledge of computing fundamentals, comput domainknowledge appropriate for the computing speciof of computing models from defined problems and required Identify, formulate, research literature, and solve computing substantiated conclusions using fundamental principles domaindisciplines Design and evaluate solutions for complex computing systems, components, or processes that meet specified andsafety, cultural, societal, and environmental Use research-based knowledge and research methods it analysis and interpretation of data, and synthesis of the complex computing activities, with an understanding of Understand and commit to professional ethics and cybnorms of professional computing practice. Recognize the need, and have the ability, to engage in a computing professional. Demonstrate knowledge and understanding of the computing communicate effectively with the computing communicate of the individual and as a member multidisciplinary environments. Communicate effectively as an individual and as a member multidisciplinary environments. Identify a timely opportunity and using innovation to professional effectively as an individual and society at large To apply knowledge of computing to create effective of the individual and society at large To apply knowledge of computing to create effective of To identify, analyse and synthesize scholarly literature.	MCA Programme Code M.C.A Periods per Week L T P Advanced Software Engineering du d 0 0 To gain Knowledge of basic SW engineering methods and general understanding of software process models and testing the process models and testing and process models and testing the process models and testing and process models and testing the process models and testing the process models and testing and process models and testing the process of the computing specialization of computing models from defined problems and requirement dentify, formulate, research literature, and solve complex of substantiated conclusions using fundamental principles of the domain disciplines. Design and evaluate solutions for complex computing probsystems, components, or processes that meet specified needs and safety, cultural, societal, and environmental. Use research-based knowledge and research methods included analysis and interpretation of data, and synthesis of the informal creates and process o	Course Name	MCA	MCA Programme Code M.C.A Semester Periods Credit Maximum Mar Course Name Periods Credit Maximum Mar Periods Credit Period

COs	COURSE OUTCOME
CO 1	Understand the software engineering concepts and various process models
CO 2	Learn about the quality management and software quality assurance
CO 3	Analyze the various testing strategies and testing fundamentals
CO 4	Acquire knowledge in testing of various applications such as object-oriented and web applications
CO 5	Understand the estimation for software projects and advanced trends in software engineering
Pre-requisites	Basic concepts of Software Engineering

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

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(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	3
CO 1	2	PO 2	3
		PO 3	4
		PO 4	4
CO 2	3	PO 5	2
		PO 6	3
		PO 7	2
CO 3	3	PO 8	4
		PO 9	2
		PO 10	3
CO 4	2	PO 11	3
		PO 12	4
		PO 13	4
CO 5	3	PO 14	2
		PO 15	3

CO / PO Mapping

COs		Programme Outcome (POs)											2 3 2 3		
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO3	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO4	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO5	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Software Engineering&practices	Periods	12				
	Software and Software Engineering: Natural Software - The Unique natu	re of WebApps -	·				
TT '. T	SoftwareEngineering - The Software Process - Software Engineering Pra	ctices - Software I	Myths. The				
Unit - I	SoftwareProcess: Process Models: A Generic Process Model- Process As	ssessment And Imp	provement -				
	PrescriptiveProcess Models - Specialized Process Models - The Unified	Process - Personal	and Team				
	Process Models.						
	Quality Management & standards	Periods	12				
	Quality Management: Quality Concepts - What is Quality? - Software Quality	ıality - Software Ç	uality Dilemi				
	Achieving Software Quality. Review Techniques: Cast Impact of Software	re Defects - Defec	t				
Unit - II	Amplification and Removal - Review Metrics and Uses - Reviews (A For	mality Spectrum)	- Informal				
	Reviews - FormalTechnical Reviews. Software Quality Assurance: Back	ground Issues - Ele	ements of				
	Software QualityAssurance - SQA Tasks - Goals and Metrics - Formal A	pproaches to SQA	- Statistical				
	Software Quality Assurance - Software Reliability - ISO 9000 Quality Sta	andards - The SQA	Plan.				
	Software Testing Strategies	Periods	12				
	A Strategic Approach to Software Testing - Strategic Issues - Test Strategic	gies for Conventio	nal Software				
Unit - III	-Test Strategies For Object-Oriented Software - Test Strategies for WebA	Apps -Validation T	esting -				
Omt - m	SystemTesting - Art of Debugging. Testing Conventional Applications: S	Software Testing F	undamentals				
	Internaland External Views of Testing - White-Box Testing - Basis Path	Testing - Control S	Structure Test				
	-Black-Box Testing - Model-Based Testing.						
	Testing Object	Periods	12				
	Oriented Applications: Broadening the View of Testing - Testing OOA a	nd OOD Models -					
Unit - IV	Object-OrientedTesting Strategies - Object-Oriented Testing Methods - T	•					
Cint 1	Class Level -Interclass Test-Case Design. Testing Web Applications: Test	•					
	TestingProcess - Content Testing - User Interface Testing - Component I	Level Testing - Na	vigation Testi				
	-Configuration Testing - Security Testing - Performance Testing		·				
	Estimation for Software Projects	Periods	12				
	Observations on Estimation, The Project Planning Process-Software Sco	•					
Unit - V	Resources-Software Project Estimation -Decomposition Techniques -Empirical Estimation Models -						
'	Estimation for Object-Oriented Projects - Specialized Estimation Technique	=	_				
	EmergingTrends in Software Engineering: Technology Evolution - Obse	=	gineering Tre				
	-Identifying Soft Trends - Technology Directions - Tools-Related Trends	i					
	Total Periods		60				

Text Books	
1	Roger Pressman, Software Engineering A Practitioners Approach, McGraw Hill India Pvt. Ltd. 7th Edition,
	2014
References	
1	Rod Stephens, Begininng Software Engineering, An Imprint of Wiley Publications 2015 Edition
2	Frank Tsui, Orlondo Karam, Essentials of Software Engineering Second Edition
E-References	
1	https://www.geeksforgeeks.org/software-engineering

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Signature of BOS Chairman





OMEN EMPOWERMEN		Elayampalayam, Ti	ruchengo	ae-o	37 205.								
Programme	MCA	Programme Code	PCA Regulations 2020-20										
Department		M.C.A Semester											
			Perio	ds	Credit	Maxim	um Mark	TS .					
Course Code	C	ourse Name	per We	eek									
			LT	P	С	CA	ESE	Total					
20P2CA07	Advanced database Management System 4 0 0 4 25 75 10												
COURSE	Students will be explored to various databases and its design techniquesof the distributed												
OBJECTIVES	environment. They are also able to design temporal, spatial & web databases.												
POs	PROGRAMME OUTCOME												
PO 1	Apply knowledg	e of computing fundamental	s, comput	ting s	pecialization,	mathemati	ics, and d	lomain					
	11.	opriate for the computing spe		_									
		ls from defined problems ar					•						
PO 2	Identify, formula	te, research literature, and s	olve comp	olex o	computing pro	blems reac	ching sub	stantiated					
	conclusions usin	g fundamental principles of	mathemat	ics, c	computing scie	ences, and	relevant	domain					
	disciplines												
PO 3	Design and evalu	nate solutions for complex c	omputing	prob	lems, and desi	gn and eva	aluate sys	stems,					
	components, or p	processes that meet specified	l needs wi	th ap	propriate cons	ideration f	for public	health and					
	safety, cultural, s	ocietal, and environmental											
PO 4		Use research-based knowledge and research methods including design of experiments,											
		pretation of data, and synthe											
PO 5	•	apt and apply appropriate to				dern comp	uting too	ls to complex					
PO 6		ties, with an understanding				11 1114	1	C					
PO 6	•	commit to professional ethic	s and cyb	er re	guiations, resp	onsibilities	s, and no	rmsor					
PO 7	professional com	eed, and have the ability, to	ngaga in	indo	nandant laarnii	ng for cont	tinual day	zalonment as a					
ro /	computing profe		engage m	mue	pendem rearm	ng for com	illiual uev	veiopinent as a					
PO 8		wledge and understanding of	of the com	mutir	ng and manage	ment princ	rinles and	d annly these to					
100		as a member and leader in a		-		-	-						
	environments.	u u u			ge projects uni		тострина	-)					
PO 9		fectively with the computing	g commun	ity, a	and with societ	ty at large,	about co	mplex					
		ties by being able to compre		-				•					
		ations, and give and underst			•								
PO 10	Understand and	assess societal, environment	al, health,	safe	ty, legal, and c	ultural issi	ues withi	n local and					
	global contexts,	and the consequential respon	nsibilities	relev	ant to professi	onal comp	outing pra	actice.					
PO 11	Function effective	ely as an individual and as a	a member	or le	ader in diverse	e teams and	d in mult	idisciplinary					
	environments.												
PO 12		opportunity and using inno-	-	oursu	e that opportu	nity to crea	ate value	and wealth for					
		the individual and society a											
PO 13		dge of computing to create											
PO 14		yse and synthesize scholarly						nce.					
PO 15	-	tific outlook that solves any	problem,	enco	ompassing the	expected a	spects						
	ofmarketdemand	S											

COs	COURSE OUTCOME
CO 1	Understand various databases such as object oriented, parallel, distributed, spatial, distributed, geographic
	& multimedia databases
CO 2	Understand query processing, transaction management, concurrency control etc. in distributed environment
CO 3	Understand various design issues and techniques of different databases
CO 4	Understand web databases and various concepts of wb related to DBMS
CO 5	Understand how to develop an application using an advanced database system
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2) I medicated the strength of contention, 3 strong, 2 median, 1 weak,											
COs	KLs	POs	KLs								
		PO 1	2								
CO 1	3	PO 2	4								
		PO 3	3								
		PO 4	3								
CO 2	3	PO 5	4								
		PO 6	2								
		PO 7	3								
CO 3	4	PO 8	3								
		PO 9	2								
		PO 10	3								
CO 4	2	PO 11	4								
		PO 12	3								
		PO 13	4								
CO 5	3	PO 14	2								
		PO 15	4								

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	3	3	2	2	1	3	2	3	2	3	2	2	2
CO2	2	2	3	3	2	2	1	3	2	3	2	3	2	2	2
CO3	1	3	2	2	3	1	2	2	1	2	3	2	3	1	3
CO4	3	1	2	2	1	3	2	2	3	2	1	2	1	3	1
CO5	2	2	3	3	2	2	1	3	2	3	2	3	2	2	2

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model	
2. Assignment	
3. End Semester Examinations	
Indirect	
1 Course End Delivery	

	Object Oriented Databases And Object	Periods	12								
	Relational Databases: Object oriented databases - Complex data types, Object-oriented data model,										
Unit - I	Object-oriented languages, Persistent programming languages - Object re	lational databases	- Nested								
	relations, Complex types, Inheritance, Reference types, Querying with co	mplex types, Fund	ctions and								
	procedures, Object-oriented versus object-relational.										
	Distributed Databases And Parallel Databases	Periods	12								
	Distributed databases - Homogeneous and heterogeneous databases, Distr	ibuted data storag	e, Distributed								
Unit - II	transactions, Commit protocols, Concurrency control in distributed databate	ases, Availability,	Distributed								
	query processing, Heterogeneous distributed databases.										
	Directory systems	Periods	12								
Unit - III	Directory systems - Parallel databases - I/O parallelism, Inter query parallelism, Intra query parallelism,										
Omt - m	Intra operation parallelism, Interoperation parallelism, Design of parallel systems.										
	Specialized Databases	Periods	12								
	Spatial databases and spatial, Geographic data - Representation of geometric	ric information -	Design								
Unit - IV	databases, Geographic data, Spatial queries, Indexing of spatial data - Temporal and time series databases -										
	Time in databases- Time specification in SQL, Temporal query language.										
	Other Databases	Periods	12								
	Multimedia databases - Multimedia data formats, Continuous media data,	Similarity-based	retrieval - We								
Unit - V	databases - Web fundamentals, URL, HTML, Client side scripting and Ap	oplets, Web server	rs and sessions								
	Servlets, Server side scripting, Improving performance.										
	Total Periods		60								

Text Books	
1	Henry Korth, F., Abraham Silberchatz, Sudarshan, S., Database System Concepts, 4th Edition, Mc Graw
	Hill International Editions.
2	Elmasri, R., Navathe, S.B., Fundamentals of Database Systems , Addison Wesley, 2000.
References	
1	Gary Hanson, W., James Hanson, V., Database Management and Design, Prentice Hall of India Pvt. Ltd.,
	1999.
2	Alex Benson, Stephen Smith and Kurt Thearling, Building Data Mining Applications for CRM, Tata
	McGraw-Hill,2000.
3	Stefano Ceri, Giuseppe Pelagatti, Distributed Databases: Principles and Systems, Mc Graw-Hill Computer
	Science Series.
E-References	
1	https://onlinecourses.nptel.ac.in/noc16_cs04/preview
2	https://www.coursera.org/learn/database-management-systems





WOMEN EMPOWERNENT	Elayampalayam, Tiruchengode-637 205.												
Programme	MCA	Programme Code	P	CA	Regulation	ons	2020-2021						
Department	M.C.A Semester												
	Periods Credit Maximum Marks												
Course Code	C	Course Name	per Week										
		ESE	Total										
20P3CA09	SCRIPTING LANGUAGES 4 0 0 4 25 75 100												
COURSE	To understand the various concepts of scripting languagesTo study the basics of Java Script, to understand												
OBJECTIVES	the latest trends i	the latest trends in Java script through AngularJS and to gain the knowledge in VBScript											
POs		PRO	GRAMME O	UTCOME									
PO 1	Apply knowledg	e of computing fundamental	s, computing	specialization,	mathematic	s, and o	domain						
		opriate for the computing spe			and concep	tualiza	ation of						
		ls from defined problems an											
PO 2		ite, research literature, and se											
		g fundamental principles of	mathematics,	computing scie	ences, and re	elevant	domain						
	disciplines	. 1		1 11 1									
PO 3	_	ate solutions for complex co			_								
		processes that meet specified societal, and environmental	needs with a	ppropriate cons	sideration to	r publi	c nealth and						
PO 4	-	sed knowledge and research	methods inclu	iding decign of	avnariments	c anals	reic and						
104		data, and synthesis of the in:			-	s, anary	sis and						
PO 5		lapt and apply appropriate te				ting too	ols to complex						
	ŀ	ties, with an understanding	=										
PO 6		commit to professional ethic			onsibilities,	and no	orms of						
	professional com	puting practice											
PO 7	Recognize the ne	eed, and have the ability, to	engage in inde	pendent learni	ng for contir	nual de	velopment as a						
	computing profe	ssional											
PO 8		wledge and understanding of	•			•	11.						
		as a member and leader in a	team, to man	age projects and	d in multidis	sciplina	ary						
	environments												
PO 9		fectively with the computing	•				•						
		ties by being able to compre		te effective rep	orts, design	docum	entation, make						
PO 10	_	ations, and give and understances assess societal, environment		otri logal and a	ultural icana	sa with	in local and						
PO 10	l .	and the consequential respor											
PO 11		vely as an individual and as a											
	environments	ory as an morvidual and as c	i incincer or i	ouder in diverse	o tourns una	111 111011	and serprinary						
PO 12		opportunity and using innov	ation to purs	ue that opportu	nity to create	e value	and wealth for						
	ł	f the individual and society a		11	•								
PO 13	To apply knowle	edge of computing to create	effective desig	gns and solution	ns for compl	ex pro	blems						
PO 14	To identify, anal	yse and synthesize scholarly	literature rela	ating to the fiel	d of Comput	ter Scie	ence						
PO 15	_	tific outlook that solves any	problem, enc	ompassing the	expected as	pectsof	market						
	demands												

COs	COURSE OUTCOME
CO 1	To Introduce the fundamental concepts of JavaScript
CO 2	To provide a foundation to use AngularJS tool for creating and executing dynamic web pages
CO 3	Learn to develop simple web application using AngularJS
CO 4	To explore various VBScript essentials
CO 5	To provide the basic knowledge to use web page tricks & error handling mechanisms
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	2
CO 1	2	PO 2	3
		PO 3	3
		PO 4	2
CO 2	3	PO 5	2
		PO 6	3
		PO 7	3
CO 3	3	PO 8	2
		PO 9	2
		PO 10	3
CO 4	2	PO 11	1
		PO 12	2
		PO 13	3
CO 5	3	PO 14	2
		PO 15	2

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	3	3	2	2	3	3	2	2	3	2	3	3
CO2	2	3	3	2	2	3	1	2	2	3	1	2	3	2	2
CO3	2	3	3	2	2	3	1	2	2	3	1	2	3	2	2
CO4	3	2	2	3	3	2	2	3	3	2	2	3	2	3	3
CO5	2	3	3	2	2	3	1	2	2	3	1	2	3	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the	Syllabus							
	Introduction to JavaScript	Periods	12					
TT T	Introduction to JavaScript-Inserting Java Script into HTML							
Unit - I	document-Variables-Keywords-Constants-Strings-Functions-Event handle	ing in Java Script	-Java script					
	Objects							
	Introduction to AngularJS	Periods	12					
Unit - II	Introduction to AngularJS: What is AngularJS-Download AngularJS-Benderick	efits of AngularJS	S-First AngularJ					
UIIIt - II	Script-Hello world! Program-Filters- Directives.							
	Event Handling, Modules & API Periods 12							
	Events: Click event- Double Click event- Mouse Events-Key Events-Copy & Cut event -Expressions							
Unit - III	String Expression- Number Expression- Object Expression- Array Expression- Using Expression. Module							
	& API: What is AngularJS module?- What is AngularJS API?-Creating S	Simple web applic	ation using					
	AngularJS.							
	Introducing VBScript	Periods	12					
Unit - IV	Introducing VBScript: What is VBScript?-Integrating VBScript and Your	webpages-Introd	ucing the					
Omt - IV	windows scripting host. VBScript Syntax-VBScript statements. VBScript	Built-in Objects						
	Webpage Tricks	Periods	12					
Unit V	Webpage Tricks: Managing VBScript Errors-Making status bar enhancen	nents-Performing	timed					
Unit - V operations-Controlling Frames with VBScript-Authenticating HTML Forms-A simple Registration								
	application							
	Total Periods	_	60					

Text Books						
1	Ray Rao, "Angular JS Programming for Beginners" 2015 Edition (Unit I,II&III)					
2	2 Jerry Lee Ford Jr., "Learn VBScript in a Weekend"-Premier development Press (Unit IV&V)					
References						
1	Kishori Sharan, "Scripting in Java-Integrating Groovy and JavaScript", Apress Publication					
2	Susane clark, Brain Matisk, "VBScript Programmer's Reference", Wrox Press					
E-References						
1	https://www.w3schools.com/js/default.asp					
2	https://www.tutorialspoint.com/javascript/index.htm					
3	https://www.tutorialspoint.com/angular4/index.htm					
4	https://www.tutorialspoint.com/vbscript/index.htm					





MEN EMPOWERMEN		Elayampalayam, Ti	rucnengo	oae-6	37 203.					
Programme	MCA	Programme Code		PCA Regulations				2020-2021		
Department		M.C.A			Semester			3		
			Perio	ds	Credit	Maximu	ım Mark	XS .		
Course Code	C	ourse Name	per We	eek						
			LT	P	С	CA	ESE	Total		
20P3CA10	BIG DA	BIG DATA ANALYSIS 4 0 0 4 25 75 100								
COURSE	To provide groun	nding in basic and advanced	methods	to bi	g data technolo	ogy and too	ols, inclu	ding		
OBJECTIVES	MapReduce and	=		•						
POs		PRO	GRAMM	E OU	JTCOME					
PO 1	Apply knowledg	e of computing fundamenta	ls, compu	ting s	pecialization,	mathematic	cs, and			
	domainknowledg	ge appropriate for the compu	iting spec	ializa	tion to the abs	traction an	d concep	tualization of		
	computing mode	ls from defined problems ar	nd require	ment	S					
PO 2	Identify, formula	te, research literature, and s	olve com	olex o	computing pro	blems reacl	hing			
	substantiatedcon	clusions using fundamental	principles	of n	nathematics, co	omputing so	ciences,	and relevant		
	domaindiscipline	es								
PO 3	Design and evalu	ate solutions for complex c	omputing	prob	lems, and desi	gn and eva	luate			
		ents, or processes that meet	-	need	s with appropr	iate conside	eration f	for public health		
		al, societal, and environmen								
PO 4		ed knowledge and research				_	-	sis		
		of data, and synthesis of th								
PO 5		apt and apply appropriate to	-			dern compu	uting too	ols to complex		
DO 6		ties, with an understanding				11. 111/1	1			
PO 6		commit to professional ethic	s and cyt	er re	guianons, resp	onsibilities	, and no	rms		
PO 7	_	omputing practice ed, and have the ability, to	angaga in	indo	nandant laarnii	ng for conti	inual da	valonment as a		
107	_		engage m	mue	pendem rearm	ing for conti	illual ue	veropinent as a		
PO 8		computing professional. Demonstrate knowledge and understanding of the computing and management principles and apply these t						d annly these to		
		wn work, as a member and l		•		•		a apply these to		
	multidisciplinary				-,	- • J • • • • • • • • • • • • • • • • • • •				
PO 9		fectively with the computing	g commu	nity, a	and with societ	ty at large,	about			
	complexcomputi	ng activities by being able t	o comprel	nend	and write effec	ctive report	ts, design	1		
	documentation, r	nakeeffective presentations.				•				
PO 10		assess societal, environment		safe	ty, legal, and c	ultural issu	es withi	n local and		
	global contexts, and the consequential responsibilities relevant to professional computing practice.									
PO 11	Function effective	ely as an individual and as	a member	or le	ader in diverse	e teams and	l in			
	multidisciplinary	multidisciplinaryenvironments								
PO 12		opportunity and using inno		oursu	e that opportu	nity to crea	te value	and wealth for		
		the individual and society								
PO 13		dge of computing to create								
PO 14		yse and synthesize scholarly								
PO 15	=	tific outlook that solves any	problem.	enco	ompassing the	expected as	spects of	f		
	marketdemands.									

COs	COURSE OUTCOME					
CO 1	Able to understand building blocks of Internet of Things and characteristics					
CO 2	Able to understand the introduction of Hadoop					
CO 3	Able to understand the concepts of Hadoop architecture					
CO 4	Able to understand Hadoop Ecosystem and YARN					
CO 5	Able to understand HIVE and HIVEQL.					
Pre-requisites						

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	2
CO 1	4	PO 2	2
		PO 3	2
		PO 4	3
CO 2	2	PO 5	3
		PO 6	4
		PO 7	2
CO 3	2	PO 8	3
		PO 9	3
		PO 10	4
CO 4	1	PO 11	3
		PO 12	4
		PO 13	1
CO 5	3	PO 14	2
		PO 15	4

CO / PO Mapping

COs						P	rogram	me Out	tcome ((POs)					
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	1	2	2	3	1	2	2	3	2	3	1	1	3
CO2	3	3	3	2	2	1	1	2	2	1	2	1	2	3	1
CO3	3	3	3	2	2	1	1	2	2	1	2	1	2	3	1
CO4	2	2	2	1	1	1	2	1	1	1	1	1	3	2	1
CO5	2	2	2	3	3	2	2	3	3	2	3	2	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	INTRODUCTION TO BIG DATA	Periods	12						
	Introduction - distributed file system - Big Data and its importance, Four Vs, Drivers for Big data, Big data								
Unit - I	analytics, Big data applications. Algorithms using map reduce, Matrix-Ve		-						
	Reduce.	•	• •						
	INTRODUCTION HADOP	Periods	12						
II!4 II	Big Data - Apache Hadoop & Hadoop EcoSystem - Moving Data in and o	out of Hadoop - U	nderstanding						
Unit - II	inputs and outputs of MapReduce - Data Serialization.								
	HADOOPP ARCHITECTURE Periods 12								
	Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write								
Unit - III	and Read., NameNode, Secondary NameNode, and DataNode, Hadoop M	IapReduce paradig	gm, Map and						
	Reduce tasks, Job, Task trackers - Cluster Setup - SSH & Hadoop Config	uration - HDFS A	dministering						
	-Monitoring & Maintenance								
	HADOOP ECOSYSTEM AND YARN	Periods	12						
Unit - IV	Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop	2.0 New Features	s- NameNode						
Ullit - I V	High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in Y	ARN.							
	HIVE AND HIVEQL, HB	Periods	12						
	Hive Architecture and Installation, Comparison with Traditional Database	e, HiveQL - Query	ing Data -						
Unit - V	Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBas	se concepts- Adva	inced Usage,						
	Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in mo	onitoring a cluster,	HBase uses						
	Zookeeper and how to Build Applications with Zookeeper.								
	Total Periods		60						

Text Books	
1	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN:
	9788126551071, 2015.
2	Chris Eaton, Dirk deroos et al., "Understanding Big data", McGraw Hill, 2012
3	Tom White, "HADOOP: The definitive Guide", O Reilly 2012
References	
1	Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013
2	Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
3	Jy Liebowitz, "Big Data and Business analytics", CRC press, 2013
E-References	
1	http://www.bigdatauniversity.com





OMEN EMPOWERMEN		Elayampalayam, Ti	rucnenge	oae-o	37 205.				
Programme	MCA	Programme Code		PCA Regulations				2020-2021	
Department		M.C.A			Semester			3	
			Perio	ds	Credit	Maximu	ım Mark	TS .	
Course Code	Course Name per Week								
			LT	P	С	CA	ESE	Total	
	Prof	Professional Ethics							
20P1CAE01		U SS101 111 2	. •		<u> </u>			100	
COURSE	Students gained	about the values in human s	ociety, so	cial i	ntegration, eth	ics and its v	values ar	nd Industrial	
OBJECTIVES	Standards.								
POs		PRO	GRAMM	E OU	JTCOME				
PO 1	Apply knowledg	e of computing fundamenta	ls, compu	ting s	pecialization,	mathematic	es, and d	lomain	
		opriate for the computing sp	•	_	•				
	computing mode	ls from defined problems ar	nd require	ment	S		_		
PO 2	Identify, formula	te, research literature, and s	olve comp	olex o	computing pro	blems reach	ning sub	stantiated	
	conclusions usin	g fundamental principles of	mathemat	ics, c	computing scie	ences, and r	elevant	domain	
	disciplines								
PO 3		ate solutions for complex c		-		_	•		
		processes that meet specified	d needs wi	th ap	propriate cons	sideration fo	or public	health and	
	•	ocietal, and environmental							
PO 4	1	ed knowledge and research				•	ts, analy	sisand	
DO 5		data, and synthesis of the in					·· ·	1 . 1	
PO 5	1	apt and apply appropriate to ties, with an understanding	-			dern compu	iting too	is to complex	
PO 6		commit to professional ethic				oncihilitiec	and no	rmsof	
100	professional com	=	s and cyo	CI IC	guiations, resp	onsionnes	, and no	imsoi	
PO 7	*	ed, and have the ability, to	engage in	inde	pendent learni	ng for conti	nual dev	velopment as a	
	computing profe	•	88-			8			
PO 8		wledge and understanding of	of the com	putir	ng and manage	ement princ	iples and	d apply these to	
	1	as a member and leader in a		-		-	•		
	environments.								
PO 9	Communicate ef	fectively with the computing	g commur	ity, a	and with socie	ty at large, a	about co	omplex	
	1	ties by being able to compre		write	e effective rep	orts, design	docume	entation, make	
		ations, and give and underst							
PO 10	1	assess societal, environment							
		global contexts, and the consequential responsibilities relevant to professional computing practice.							
PO 11	1	rely as an individual and as	a member	or le	ader in diverse	e teams and	in		
DO 12	multidisciplinary		-4*- 4		1		4 1	11.1 6	
PO 12	,	opportunity and using inno	-	oursu	e inat opportu	mity to creat	ie value	and wealth for	
PO 13		the individual and society added of computing to create		lacia	ne and colution	ns for comp	lav prob	Name	
PO 13 PO 14		yse and synthesize scholarly							
PO 14 PO 15		tific outlook that solves any						ncc.	
1013	ofmarketdemand		problem,	CHC	mpassing tile	expected as	эрссіз		
	omarketaemana	U .							

COs	COURSE OUTCOME
CO 1	The students will understand various social issues, industrial standards, code of ethics and role of
	professional ethics in engineering field.
CO 2	Able to realize the importance of values.
CO 3	Able to understand ethics and its values.
CO 4	Able to understand about industry and industrialization.
CO 5	Able to give importance for human resources.
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of contention, 3-strong, 2-incutum, 1-weak)								
COs	KLs	POs	KLs					
		PO 1	2					
CO 1	3	PO 2	3					
		PO 3	3					
		PO 4	2					
CO 2	2	PO 5	4					
		PO 6	3					
		PO 7	4					
CO 3	3	PO 8	3					
		PO 9	3					
CO 4		PO 10	4					
	4	PO 11	2					
		PO 12	3					
		PO 13	4					
CO 5	4	PO 14	2					
		PO 15	4					

CO / PO Mapping

COs	Programme Outcome (POs)														
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	3	3	2	2	3	2	3	3	2	2	3	2	2	2
CO2	3	2	2	3	1	2	1	2	2	1	3	2	1	3	1
CO3	2	3	3	2	2	3	2	3	3	2	2	3	2	2	2
CO4	1	2	2	1	3	2	1	2	2	3	1	2	3	1	3
CO5	1	2	2	1	3	2	1	2	2	3	1	2	3	1	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Values in Human Society: Understanding of Values Periods									
	Values in Human Society: Understanding of Values Periods 12 Definition and Concepts-Culture and Value, Formation of Values: Socialization, Formation of Self and									
	Integration of Personality-Different theories. Types of Values: Societal	Values-Justice, Rul	es of Law,							
Unit - I	Democracy, Indian Constitution, Secularism, Psychological Values, Me	ntal Health. Aesthe	etic Values -							
	Perception and Appreciation of Beauty. Organizational Values: Relatio	nships, Obligations	, Rights.							
	Spiritual Values: Their role in our day to day life, Meaning of Good Life	e, Value Spectrum	of a Good Life							
	Spiritual Values.									
	Value Crisis in Contemporary Society	Periods	12							
	Importance of Values-Value crisis at the individual level, Societal Leve	l, Cultural Level, So	ocial							
Unit - II	Disorganization, Value crisis management. Ethics and Ethical Values: Canons of Ethics-Virtue of Ethics,									
Omi - m	Standardisation, codification, acceptance and application. Types of Ethics-Ethics of duty, Ethics of									
	Responsibility, Ethics of Moral Judgment, Work ethics and Quality of life at work.									
	Professional Ethics	Periods	12							
Unit - III	Overview - Ethics in Engineering Profession, Code of Professional Ethics, Organizational Ethics. Violation									
Omt - m	of code Ethics: Causes and consequences. Whistle blowing-famous whistle blowers-famous whistle									
	blowers.									
	Industry and Industrialization	Periods	12							
	Man and Machine Interaction, Problems of man machine interaction, Impact of assembly line and									
Unit - IV	automation, Industrial relations, Ethics and industrial Law: Institutionalizing ethics. Science, Technology									
Omt IV	and Engineering: Origin- Nature of scientific knowledge, Social Function of Science, Practical Application									
	of Science. Engineering as a profession: Engineering and Ethics. Renewable and non renewable resources									
	Energy crisis, Indian context, Sustainable development.	1								
	Environment & Eco friendly technology	Periods	12							
	Environment-Components of Environment. Human development and environment: Depletion of natural									
	resources-Environmental degradation, Fertilizers and plant protection chemicals, Impact of									
Unit - V	industrialization, Impact of urbanization, Impact of Energy Generation. Pollution and Pollution Control:									
	Water Pollution, Water Quality Parameters, Air Pollution. Eco-Friendly technologies: Implementation,									
	Impact of assessment, Strategies to meet the challenges, Eco-Friendly Technology (EFT), Green									
	Technology in industry. Ethics & Management of Human Resources: Ecological Ethics-Depletion of Nor									
	renewable natural resources.									
	Total Periods		60							

Text Books	
1	Values of Ethics in Business and Profession, Samita Manna, Suparna Chakraborti, PHI Learning Private
	Limited, 2010.
2	Ethics and the Conduct of Business, John R. Boatright, 5th Edition, Pearson Education 2007.
References	
1	Business Ethics-An Indian Perspective, P.S. bajaj, Raj Agrawal, Biztantra, 2004.
E-References	
1	https://www.physio-pedia.com
2	www.eng.ufl.edu

Signature of BOS Chairman





EMPOWERME		Elayampalayam, 11	i ucheng	oue-u	37 203.				
Programme	MCA	Programme Code	PCA Regulations					2020-2021	
Department		M.C.A		1					
Course Code	C	ourse Name	per W	Periods Credit per Week			num Mar		
	_		L T	_	С	CA	ESE		
20P1CAE02	E-0	COMMERCE	4 (0 0	4	25	75	100	
COURSE OBJECTIVES	To learn about co	urrent marketing trend using	E-comn	nerce	techniques in l	Internet an	d Extran	et and payment	
POs		PRO	GRAMN	ИЕ OU	JTCOME				
PO 1	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements								
PO 2	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines								
PO 3	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental								
PO 4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions								
PO 5	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations								
PO 6	Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice								
PO 7	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional								
PO 8	•	wledge and understanding on a member and leader in a							
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand								
PO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice								
PO 11	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments								
PO 12	Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large								
PO 13	To apply knowledge of computing to create effective designs and solutions for complex problems								
PO 14	To identify, anal	yse and synthesize scholarly	literatui	e rela	ting to the field	d of Comp	uter Scie	ence	
PO 15	To develop scientific outlook that solves any problem, encompassing the expected aspectsof market demands								

COs	COURSE OUTCOME
CO 1	Students would be able to understand Electronic Commerce, Business Models Identifying Electronic
	Commerce Opportunities
CO 2	Students would understand E-Business Technology and Web Server and E-Mail Technologies
CO 3	Able to understand Trends in E-Business Law and Taxation
CO 4	Able to understand Web Hosting and E-Business Software and Online Security Issues
CO 5	Student understand about Online Payment Systems and Internet Technologies
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of correlation, 3-strong, 2-inection, 1-weak)										
COs	KLs	POs	KLs							
		PO 1	2							
CO 1	2	PO 2	3							
		PO 3	3							
		PO 4	1							
CO 2	3	PO 5	2							
		PO 6	1							
		PO 7	2							
CO 3	3	PO 8	3							
		PO 9	2							
		PO 10	1							
CO 4	4	PO 11	2							
		PO 12	3							
		PO 13	1							
CO 5	3	PO 14	2							
		PO 15	2							

CO / PO Mapping

COs		Programme Outcome (POs)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	2	3	2	1	2	3	2	3	2	2	3	3
CO2	2	3	3	1	2	1	2	3	2	1	2	3	1	2	2
CO3	2	3	3	1	2	1	2	3	2	1	2	3	1	2	2
CO4	1	2	2	1	1	1	1	2	1	1	1	2	1	1	1
CO5	2	3	3	1	2	1	2	3	2	1	2	3	1	2	2

ourse Assessment Methods
irect
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
direct
1. Course End Delivery

Content of the	Syllabus							
	The Second wave of Global E-Business	Periods	12					
Unit - I	Introduction- Electronic Commerce: The second wave-Business Models,	Revenue Models	and Business					
Ullit - I	Processes- Advantages and Disadvantages of Electronic commerce- Ident	tifying Electronic	Commerce					
	Opportunities- Internet Nature of Electronic Commerce							
	E-Business Technology Basics	Periods	12					
	Introduction- The Internet and The World Wide Web- Packet switched N	etworks- Internet	Protocols-					
Unit - II	Markup Languages and the web- Intranets and Extranets- Internet Connec	ction Options - Int	ernet2 and the					
	Semantic Web. Web Server and E-Mail Technologies: Introduction- Web Server Basics-Software for Web							
	Servers-Electronic Mail (E-mail).							
	E-Business Law and Taxation	Periods	12					
Unit - III	Introduction- The Legal Environment of Electronic Commerce- Use and Protection of Intellectual Property							
Omt - m	in Online Business- Online Crime, Terrorism, and Welfare- Ethical issues- Taxation and Electronic							
	Commerce.							
	Web Hosting and E-Business Software	Periods	12					
	Introduction - Web Hosting Alternatives - Basic Functions of Electronic Commerce Software - Advance							
Unit - IV	Functions of Electronic Commerce Software. Online Security: Introduction- Online Security Issues							
	Overview - Security for Client Computers- communication Channel Security - Security for Server							
	Computers- Organizations that Promote computer Security.							
	Online Payment Systems	Periods	12					
Unit - V	Introduction- Online Payment Basics- Payment Cards- Electronic Cash- Electronic Wallets- Stored Value							
Omt - v	Cards- Internet Technologies and the Banking Industry- Criminal Activity	y and Payment Sy	stems: Phishing					
	and Identity Theft							
	Total Periods		60					

Text Books	
1	Gary P.Schneider "E-Commerce: Strategy, Technology and Implementation, 9th Edition, Cengage Learning
	India Private Limited 2012
2	Kamalesh K.Bajaj, Debjani Neg, "E-Commerce the Cutting Edge of Business", TMH, 2000
References	
1	S. Jaiswal, "Doing Business on the Internet E-Commerce", Galgotia, 2002
E-References	
1	www.referenceforbusiness.com
2	cyber.law.harvard.edu/olds/ecommerce/library
3	https://www2.isye.gatech.edu/~pinar/ecom.html





OMEN EMPOWERMEN		Elayampalayam, 1	irucnengode-o	37 205.	T						
Programme	MCA	Programme Code	PC	PCA Regulations							
Department		M.C.A		Semester			1				
			Periods	Credit	Maxim	um Mark	S				
Course Code		Course Name	per Week								
			L T P	С	CA	ESE	Total				
20P1CAE03	BUSINE	BUSINESS INTELLIGENCE 4 0 0 4 25 75 100									
COURSE											
OBJECTIVES POs		PRO	OGRAMME OU	JTCOME							
PO 1	Apply knowledg	e of computing fundamenta	als, computing s	pecialization,	mathemati	ics, and d	omain				
	knowledge appro	opriate for the computing sp	pecialization to	the abstraction	n and conce	eptualizat	ion of				
		ls from defined problems a									
PO 2		te, research literature, and	•			_					
	•	g fundamental principles of	f mathematics,	computing scient	ences, and	relevant c	lomain				
	disciplines										
PO 3	1	ate solutions for complex of	1 01		U	•					
		processes that meet specifie	-	propriate cons	sideration f	or public	health and				
DO 4	-	societal, and environmental		1: 1 : 0	· •						
PO 4	1	ed knowledge and research			-	•	sis and				
PO 5	_	data, and synthesis of the in lapt and apply appropriate t					le to complay				
103	•	ties, with an understanding	=		dem comp	uting too	is to complex				
PO 6		commit to professional ethi			onsibilities	s and nor	rms of				
100	professional com	_	es una ey ser re	Surations, resp	onsionnes	s, una nor	1115 01				
PO 7		eed, and have the ability, to	engage in inde	pendent learni	ng for cont	inual dev	elopment as a				
	computing profe	•		L	C		1				
PO 8		wledge and understanding	of the computin	ng and manage	ement princ	ciples and	apply these t				
	ones own work,	as a member and leader in a	a team, to mana	ge projects an	d in multid	isciplinar	y				
	environments.										
PO 9	Communicate ef	fectively with the computing	g community,	and with socie	ty at large,	about co	mplex				
		ties by being able to compr		e effective rep	orts, design	n docume	ntation, make				
		ations, and give and unders									
PO 10	•	assess societal, environmen									
		and the consequential response									
PO 11	•	rely as an individual and as	a member or le	ader in divers	e teams and	d in multi	disciplinary				
DC 15	environments.				•						
PO 12		opportunity and using inno	=	e that opportu	nity to crea	ate value	and wealth fo				
DO 12		the individual and society		1 1	C	.1	1				
PO 13		dge of computing to create									
PO 14		yse and synthesize scholarl									
PO 15	demands	tific outlook that solves any	y problem, enco	impassing the	expected a	spectsof	шагкет				
	demands										

COs	COURSE OUTCOME
CO 1	Describe the steps and stages involved in Business Intelligence Solutions.
CO 2	Identify business requirements and develop project management plan for BI Projects.
CO 3	Identify and apply suitable analytical techniques to design business problems.
CO 4	Apply the concepts of Data Extraction, Transformation and loading for Data Integration
CO 5	Describe Balanced Scorecard, Enterprise Dash Board and Enterprise Reporting Techniques
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	2
CO 1	2	PO 2	1
		PO 3	2
		PO 4	3
CO 2	2	PO 5	2
		PO 6	4
		PO 7	3
CO 3	3	PO 8	3
		PO 9	2
		PO 10	3
CO 4	3	PO 11	3
		PO 12	2
		PO 13	3
CO 5	2	PO 14	2
		PO 15	3

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	3	2	3	1	2	2	3	2	2	3	2	3	2
CO2	3	2	3	2	3	1	2	2	3	2	2	3	2	3	2
CO3	2	1	2	3	2	2	1	3	2	3	3	2	3	2	3
CO4	2	1	2	3	2	2	1	3	2	3	3	2	3	2	3
CO5	3	2	3	2	3	1	2	2	3	2	2	3	2	3	2

ourse Assessment Methods
irect
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
direct
1. Course End Delivery

Content of the S	Syllabus								
	INTRODUCTION TO BUSINESS INTELLIGENCE	Periods	12						
	Business Intelligence Definition- BI Decision Support Initiatives- Develo	pment Approache	s: Traditional						
TT'4 T	Development Approach, Cross Organizational Development Approach - I	Engineering Stage	s and the						
Unit - I	Development Steps - Parallel Development Tracks - BI Project Team Stru	ucture. Business C	ase Assessment:						
	Business Justification Business Drivers- Business Analysis Issues- Cost-F	Benefit Analysis- I	Risk						
	Assessment- Business Case Assessment Activities- Deliverable.								
	BI PROJECT PLANNING AND REQUIREMENTS DEFINITION	Periods	12						
	Project Planning: Managing the BI Project-Defining the BI Project-Planning	ing the BI Project	-Project						
Unit - II	Planning Activities-Deliverables- Roles. Project Requirements Definition	: General Busines	s Requirements-						
	Project Specific Requirements - Project Requirements Definition Activities	es - Deliverables-	Roles						
	DATA ANALYSIS AND APPLICATION PROTOTYPING	Periods	12						
	Data Analysis: Business Focused Data Analysis - Top-Down Logical Data Modeling- Bottom Up Source								
Unit - III	Data Analysis- Data Cleansing- Data Analysis Activities Application Prototyping: Purposes of Prototyping-								
	Best Practices for Prototyping- Types of Prototypes- Building Successful	Prototypes- Appli	cation						
	Prototyping Activities								
	EXTRACT/TRANSFORM/LOAD DESIGN AND DEVELOPMENT	Periods	12						
	ETL Design: Implementation Strategies- Preparing for the ETL Process- Designing the Extract Programs -								
Unit - IV	Designing the Transformation Programs- Designing the Load Programs-Designing the ETL Process Flow-								
Omt - 1 v	Evaluating ETL Tools- ETL Design Activities ETL Development: Source Data Transformation -								
	Reconciliation- Peer Reviews- ETL Testing- Formal Test Plan ETL Deve	lopment Activitie	S						
MEASURES, MI	ETRICS, KPIs PERFORMANCE MANAGEMENT AND ENTERPRISE R	EPO R ETINGS IN B	I 12						
	Understanding Measures and Performance- Terminologies-Attributes of good metrics-SMART test-Supply								
Unit - V	Chain Associated with metrics-"Fact-Based Decision Making" and KPIs-KPI Usage-Sources of Business								
Omt - V	Metrics and KPIs-Connecting the Dots:Measures to Business Decisions E	Metrics and KPIs-Connecting the Dots:Measures to Business Decisions Enterprise Reporting Perspectives							
	-Common Report Layout Types-Balanced Scorecard-Dashboard- Balance	ed Scorecard vs. D	ashboard.						
	Total Periods		60						

Text Books	
1	Larissa Terpeluk Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle for
	Decision-support Applications", Addison-Wesley Professional, 2003
2	. RN Prasad and Seema Acharya ,"Fundamentals of Business Analytics", Second Edition, Wiley India,2016
References	
1	David Loshin, "Business Intelligence", Second Edition, Elsevier Science and Technology, 2012
2	Mike Biere, "Business Intelligence for the Enterprise", Pearson, 2010.
E-References	
1	https://searchbusinessanalytics.techtarget.com/definition/business-intelligence-BI
2	https://www.udemy.com/course/the-business-intelligence-analyst-course-2018/
3	https://www.guru99.com/business-intelligence-definition-example.html





NOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.												
Programme	MCA	Programme Code	Programme Code PCA Regulations										
Department		M.C.A		Semester			3						
Course Code	(Course Name	Periods per Week	Credit	Maximu								
			L T P	С	CA	ESE	Total						
20P1CAE04	Enterpris	e Resource Planning	4 0 0	4	25	75	100						
COURSE													
OBJECTIVES POs	PROGRAMME OUTCOME												
PO 1	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domainknowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.												
PO 2	substantiatedcon	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.											
PO 3	systems,compon	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health andsafety, cultural, societal, and environmental consi											
PO 4	Use research-bas	sed knowledge and research of data, and synthesis of t	n methods inclu		=	-	/sis						
PO 5	Create, select, ac	lapt and apply appropriate ties, with an understanding	techniques, reso	ources, and mo			ols to complex						
PO 6	Understand and	commit to professional ethi			onsibilities,	and no	orms						
PO 7	Recognize the no computing profe	eed, and have the ability, to ssional.	engage in inde	pendent learni	ng for conti	nual de	velopment as a						
PO 8	·	owledge and understanding wn work, as a member and renvironments.	-	-	-	-	d apply these to						
PO 9	ł	fectively with the computing ties by being able to compresentations.	-		-		=						
PO 10	1	assess societal, environmer and the consequential response											
PO 11	_	vely as an individual and as											
PO 12	Identify a timely	opportunity and using innofithe individual and society	=	e that opportu	nity to creat	te value	and wealth for						
PO 13		edge of computing to create		ns and solution	ns for comp	lex pro	blems						
PO 14	To identify, anal	yse and synthesize scholar	ly literature rela	ting to the fiel	d of Compu	ter Scie	ence.						
PO 15	To develop scier marketdemands.	tific outlook that solves an	y problem, enc	ompassing the	expected as	pects o	f						

COs	COURSE OUTCOME
CO 1	To comprehend the technical aspects of ERP systems
CO 2	To relate ERP system implementations
CO 3	To understand the steps and activities in the ERP life cycle
CO 4	To be able to identify and describe typical functionality in an ERP system
CO 5	To relate to ERP system implementations
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	3
CO 1	3	PO 2	3
		PO 3	2
		PO 4	2
CO 2	3	PO 5	2
		PO 6	2
		PO 7	2
CO 3	2	PO 8	3
		PO 9	3
		PO 10	3
CO 4	4	PO 11	3
		PO 12	3
		PO 13	2
CO 5	2	PO 14	4
		PO 15	2

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	2	2	2	2	2	3	3	3	3	3	2	2	2
CO2	3	3	2	2	2	2	2	3	3	3	3	3	2	2	2
CO3	2	2	3	3	3	3	1	2	2	2	2	2	3	1	3
CO4	2	2	1	1	1	1	1	2	2	2	2	2	1	3	1
CO5	2	2	3	3	3	3	1	2	2	2	2	2	3	1	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Introduction to ERP	Periods	12								
	Enterprise An Overview-Introduction to ERP-Basic ERP concepts-Risks of ERP- Benefits of ERP.ERP										
Unit - I	and Technology: ERP and Related Technologies-Business Intelligence, B	usiness Process R	eengineering								
	(BPR)-Data Warehousing,-Data Mining-O LAP- SCM.										
	ERP Implementation Periods										
	Implementation challenges-ERP implementation strategies- ERP implem	entation lifecycle	- Implementatio								
Unit - II	Methodology-Vendors and Consultants-Contracts with Vendors-Consultants and Employees-Training and										
	education-Project Management and Monitoring-Success and failure factors of an ERP implementation										
	The Business modules	Periods	12								
Unit - III	Business modules of an ERP Package-Finance- Manufacturing-Human Resources-Plant										
Omt - m	Maintenance-Materials Management-Quality										
	The ERP Market	Periods	12								
Unit - IV	ERP market Place and market place dynamics- SAP AG- Oracle corporation-People soft-JD Edwards-										
	QAD IncSSA global.										
	ERP present and future	Periods	12								
Unit - V	Turbo Charge the ERP System- EAI- ERP and E-business- ERP and Internet and WWW- Future Directions										
	and trends in ERP.										
	Total Periods		60								

Text Books	
1	Alexis Leon, "ERP Demystified", Second Edition, Tata McGraw Hill, New Delhi, 2008
References	
1	Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000.
2	Ashim Raj Singla, "Enterprise Resource Planning", 2008, Cengage Learning India Pvt. Limited, New Delhi
E-References	
1	www.imc.com
2	www.webopeda.com
3	www.umsl.edu
4	www.oracle .com
5	www.informit.com

Signature of BOS Chairman





MEN EMPOWERMEN		Elayampalayam, Ti	rucnengo	oae-o	37 205.									
Programme	MCA	Programme Code		PCA Regulations										
Department	M.C.A Semester													
			Perio	ds	Credit	Maximu	ım Mark	S						
Course Code	C	ourse Name	per We	eek		•								
			LT	P	С	CA	ESE	Total						
20P2CAE05	Mol	oile Computing	4 0	0	4	25	75	100						
COURSE	students gain the	tudents gain the knowledge to develop the capabilities in the area of mobile applications and computing												
OBJECTIVES	echnologies with latest networking trends.													
POs	PROGRAMME OUTCOME													
PO 1	Apply knowledg	e of computing fundamenta	ls, compu	ting s	pecialization,	mathematic	es, and d	omain						
	knowledge appro	priate for the computing sp	ecializatio	n to	the abstraction	and conce	ptualizat	tion of						
	computing mode	ls from defined problems ar	nd require	ment	S									
PO 2	Identify, formula	te, research literature, and s	olve comp	olex o	computing pro	blems reach	hing sub	stantiated						
	1	g fundamental principles of	mathema	tics, c	computing scie	ences, and r	elevant o	domain						
	disciplines													
PO 3		ate solutions for complex c		-		_	•							
		processes that meet specified	d needs wi	ith ap	propriate cons	sideration fo	or public	health and						
	-	ocietal, and environmental												
PO 4		ed knowledge and research				•	ts, analy	sisand						
DO 5	-	data, and synthesis of the in												
PO 5		apt and apply appropriate to	-			dern compu	iting too	is to complex						
PO 6		ties, with an understanding commit to professional ethic				onsibilities	and not	rmsof						
100	professional com	=	s and cyo	CI IC	guiations, resp	onsionnics	, and noi	illisoi						
PO 7	-	ed, and have the ability, to	engage in	inde	nendent learni	ng for conti	nual dev	velonment as a						
107	computing profes		ongage m	mac	pondoni rodini	ing for conti	iraar ac ,	cropinent us u						
PO 8		wledge and understanding	of the com	putir	ng and manage	ement princ	iples and	d apply these to						
		as a member and leader in a				•								
	environments.				- 1		•							
PO 9	Communicate ef	fectively with the computing	g commur	nity, a	and with socie	ty at large, a	about co	mplex						
	computing activi	ties by being able to compre	ehend and	write	e effective rep	orts, design	docume	entation, make						
	effective present	ations, and give and underst	and											
PO 10	Understand and a	assess societal, environment	al, health,	safe	ty, legal, and c	cultural issu	es withi	n local and						
		and the consequential respon												
PO 11	ł	ely as an individual and as	a member	or le	ader in diverse	e teams and	in multi	idisciplinary						
	environments.													
PO 12		opportunity and using inno	-	oursu	e that opportu	nity to creat	te value	and wealth for						
DO 12		the individual and society		1		C	1 1	1						
PO 13		dge of computing to create												
PO 14		yse and synthesize scholarly						nce.						
PO 15	ofmarketdemand	tific outlook that solves any	problem,	CHCC	mpassing the	expected as	specis							
	omarketaemana	9												

COs	COURSE OUTCOME
CO 1	After completion of the course the student will be able to use the features of mobile computing.
CO 2	Able to realize the revolution networking.
CO 3	Able to understand building blocks of network.
CO 4	Able to understand mobile application languages.
CO 5	Able to utilize the languages and its usages in mobile environment.
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	3
CO 1	2	PO 2	3
		PO 3	4
		PO 4	4
CO 2	3	PO 5	2
		PO 6	3
		PO 7	2
CO 3	2	PO 8	4
		PO 9	2
		PO 10	3
CO 4	3	PO 11	3
		PO 12	4
		PO 13	4
CO 5	4	PO 14	2
		PO 15	3

CO / PO Mapping

COs		Programme Outcome (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO3	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO4	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO5	2	2	3	3	1	2	1	3	1	2	2	3	3	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Introduction to Mobile computing	Periods	12					
Unit - I	Mobile communication - Mobile computing - Mobile computing architecture - Mobile devices. Mobile							
UIII - I	computing technology: GSM, SMS, GPRS, CDMA and 3G.							
	Wireless LAN	Periods	12					
Unit - II	Introduction - Wireless LAN advantages - IEEE 802.11 standards - Wirele	ess LAN architect	ure - Mobility					
Ullit - II	wireless LAN - Deploying wireless LAN - Mobile Ad Hoh networks and sensor networks - Wireless LAN							
	security - WIFI versus 3G.							
	Mobile IP Network Layer	Periods	12					
Unit - III	IP and Mobile IP network layers - Packet delivery and Handover management - Location management -							
Omt - m	Registration - Tunneling and Encapsulation - Route optimization - Dynan	nic Host Configur	ation Protocol.					
	Mobile Transport Layer	Periods	12					
Unit - IV	Conventional TCP/IP Transport layer protocols - Indirect TCP - Snooping TCP Mobile TCP - Other							
Ullit - I V	methods of TCP - Layer transmission for mobile networks - TCP over 2.5G/3G Mobile networks.							
	Mobile application languages and Operating Systems Periods 12							
Unit - V	J2ME - Palm OS - Windows CE -Symbian OS - Linux for Mobile devices	S.						
	Total Periods 60							

Text Books	
Text Books	
1	Computer Networks: A Systems Approach, 4th edition, by Larry L. Peterson, Bruce S. Davie, Publisher
	Elsevier/Morgan Kaufmann.
2	MPLS: Next Steps, by Bruce S. Davie, Adrian Farrel, Publisher: Morgan Kaufmann.
References	
1	Metro Ethernet, by Sam Halabi, Publisher: Cisco Press
2	Emerging Optical Network Technologies, by Krishna M. Sivalingham, Suresh Subramaniam, Publisher:
	Springer
3	Computer Networks, by A. S. Tanenbaum, Publisher: Prentice Hall;
4	Emerging Optical Network Technologies, by Krishna M. Sivalingham, Suresh Subramaniam, Publisher:
	Springer
5	Mesh Based Survivable Networks, by Wayne Grover, Publisher: Prentice Hall.
E-References	
1	www.doc.ic.ac.uk
2	www.humanergology.com
3	www.ncbi.nlm.nih.gov
4	www.ijarcsse.com
5	https://www.interaction-design.org





WOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.									
Programme	MCA	Programme Code		P	ions	2020-2021				
Department		M.C.A			Semester			2		
			Perio	ds	Credit	Maximu	ım Marl	CS		
Course Code	C	Course Name	per W	eek						
			L T	P	С	CA	ESE	Total		
20P2CAE06	Adv	Advanced Networks 4 0 0 4 25 75 100								
COURSE OBJECTIVES		this course is to introduce st ling of the networking resea				-		-		
POs		PRO	GRAMM	IE OU	JTCOME					
PO 1	domainknowledg	e of computing fundamental ge appropriate for the compu ls from defined problems an	iting spec	ializa	tion to the abs			ptualization of		
PO 2		tte, research literature, and solutions using fundamental es.		-			-	and relevant		
PO 3	systems,compon	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health andsafety, cultural, societal, and environmental consi								
PO 4	Use research-bas	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions								
PO 5	Create, select, ac	lapt and apply appropriate te	chniques	, reso	urces, and mo			ols to complex		
PO 6	Understand and	commit to professional ethic omputing practice.				onsibilities	, and no	orms		
PO 7	_	eed, and have the ability, to	engage in	inde	pendent learning	ng for conti	inual de	velopment as a		
PO 8	Demonstrate knowledge and understanding of the computing and management principles and apply these to one \tilde{A} φ \hat{a} , \neg \hat{a} , φ s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments									
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, makeeffective presentations.									
PO 10		Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.								
PO 11	_	vely as an individual and as a						- -		
PO 12	Identify a timely	opportunity and using innoting the individual and society a		pursu	e that opportu	nity to crea	te value	and wealth for		
PO 13		edge of computing to create		desig	ns and solution	ns for comp	olex prol	blems.		
PO 14	To identify, anal	yse and synthesize scholarly	literatur	e rela	ting to the field	d of Compu	ıter Scie	ence.		
PO 15	To develop scier marketdemands.	ntific outlook that solves any	problem	, enco	ompassing the	expected as	spects o	f		

COs	COURSE OUTCOME
CO 1	Able to Understand the concepts of network and data link
	layerAbletorealizetherevolutionofInternetinMobileDevices,Cloud&SensorNetworks•Able to understand
	building blocks ofInternet of Things and characteristics
CO 2	Able to understand the network layer and unicast routing
CO 3	Able to understand Transport and Application Layer
CO 4	Able to understand the High Speed Networks and Congestion Control.
CO 5	Able to understand TCP and ATM Congestion Control.
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2	2/1 indicates the strength of corre	nation, 3-strong, 2-medium, 1-w	(Cak)
COs	KLs	POs	KLs
		PO 1	1
CO 1	2	PO 2	2
		PO 3	3
		PO 4	4
CO 2	3	PO 5	2
		PO 6	3
		PO 7	4
CO 3	1	PO 8	3
		PO 9	1
		PO 10	2
CO 4	4	PO 11	3
		PO 12	4
		PO 13	1
CO 5	2	PO 14	2
		PO 15	4

CO / PO Mapping

COs						P	rogram	me Ou	tcome ((POs)					
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	3	2	1	3	2	1	2	2	3	2	1	2	3	1
CO2	1	2	3	2	2	3	2	3	1	2	3	2	1	2	2
CO3	3	2	1	1	2	1	1	1	3	2	1	1	3	2	1
CO4	1	1	2	3	1	2	1	2	1	1	2	3	1	1	3
CO5	2	3	2	1	3	2	1	2	2	3	2	1	2	3	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
indirect
1. Course End Delivery

Content of the S	Syllabus								
	Networks:	Periods	12						
	Standards and Administration - Protocol Layering - OSI model -TCP/IP protocol suite. Transmission								
Unit - I	- Guided Media - Unguided Media. Data Link Layer: Introduction - Link	Layer Addressing	-Error Detection						
OIIIt - I	and Correction - Introduction - Types of Errors - Redundancy - Detection	Vs Correction - C	Coding. DLC						
	services - Framing - Flow Control and Error control - Connectionless and	Connection Orien	nted						
	Network Layer	Periods	12						
Unit - II	Network Layer Services - Packet Switching - Network Layer Performanc	e- Internet Protoco	ol (IP) -						
Omt - H	Datagram Format - Fragmentation - Options - Security of IPv4 Datagrams- Unicast Routing : Introduction -								
	Routing Algorithms.								
	Transport and Application Layer	Periods	12						
Unit - III	Introduction to Transport Layer - Transport-Layer Protocols - Introductio	n to Application I	ayer - Standard						
	Client-Server Protocols								
	Speed Networks and Congestion Control	Periods	12						
	Frame Relay Networks - Asynchronous transfer mode - ATM Protocol A	rchitecture, ATM	Logical						
Unit - IV	Connections, ATM Cells - ATM Service Categories - AAL - High Speed	LAN's: Fast	Ethernet, Gigabit						
	Ethernet, Fiber Channel - Wireless LANs - Queuing Analysis- Queuing M	Models - Single Se	rver Queues.						
	TCP and ATM Congestion Control	Periods	12						
	TCP Flow control - TCP Congestion Control - Retransmission Timer Man	nagement - Windo	ow management						
Unit - V	- Performance of TCP over ATM. Traffic and Congestion control in ATM	1 - Requirements	- Attributes -						
	Traffic Management Frame work - Traffic Control - ABR traffic Manage	ement.							
	Total Periods 60								

Text Books	
1	Behrouz A. Forouzan, "Data Communication and Networking", 5th Edition, Tata McGraw Hill, 2013.
2	Stallings, William., "High Speed Networks and Internets: Performance and QoS", Second Edition, Pearson
	Education, 2002
References	
1	Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", 5th Edition, Pearson Education,
	2011
2	Larry L. Peterson and Peter S. Davie, "Computer Networks", 5th Edition, Elsevier, 2012.
3	Tanenbaum Andrew S., "Computer Networks", 5th Edition, Prentice Hall of India, New Delhi, 2013.
E-References	
1	http://developer.android.com/develop/index.html
2	https://docs.docker.com
3	www.microchip.com
4	www.sanfoundry.com
5	www.oxfordreference.com





WOMEN EMPOWERMENT	Elayampalayam, Tiruchengode-637 205.															
Programme	MCA	Programme Code		PCA Regulations												
Department		M.C.A		Semester							Semester			Semester 3		
Course Code	C	Periods Credit Maximum Marks Course Name per Week														
20P2CAE07	Cryptograph	LTPCCAESETotalCryptography and Network Security40042575100														
COURSE	1 -	verview of computer system	and the v	ariou	ıs network topo	ologies and	d securi	ty measures for								
OBJECTIVES	secured access of	f our data.														
POs			GRAMM													
PO 1	knowledge appro	e of computing fundamenta opriate for the computing sp ls from defined problems ar	ecializatio	n to	the abstraction											
PO 2	•	te, research literature, and s g fundamental principles of														
PO 3	components, or p	ate solutions for complex corocesses that meet specified ocietal, and environmental		-	•	-	•									
PO 4	Use research-bas	ed knowledge and research data, and synthesis of the in				•	its, anal	ysisand								
PO 5	Create, select, ad	apt and apply appropriate to	chniques,	reso	urces, and mod		uting to	ols to complex								
PO 6	Understand and o	commit to professional ethic puting practice.	s and cyb	er reş	gulations, respo	onsibilities	s, and no	ormsof								
PO 7	Recognize the ne	sed, and have the ability, to	engage in	inde	endent learnin	ng for cont	inual de	evelopment as a								
PO 8	Demonstrate knowledge and understanding of the computing and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.															
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand															
PO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.															
PO 11		rely as an individual and as														
PO 12	•	opportunity and using inno the individual and society		ursu	e that opportur	nity to crea	ite value	e and wealth for								
PO 13		dge of computing to create		esig	ns and solution	s for comp	plex pro	blems								
PO 14	-	yse and synthesize scholarly						ence								
PO 15	To develop scien ofmarketdemand	tific outlook that solves any s	problem,	enco	ompassing the o	expected a	spects									

COs	COURSE OUTCOME
CO 1	After completion of the course the student will be able to understand the Physical Medium of network with topologies.
CO 2	Abletorecognizetransformation techniques in images
CO 3	AbletounderstandbuildingblocksInternet Protocols and its usage
CO 4	Able to understand various encryption and decryption techniques.
CO 5	Able to know about firewall and intrusion concepts
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2	71 maleates the strength of corre	ation, 3-strong, 2-medium, 1-w	(Cuk)				
COs	KLs	POs	KLs				
		PO 1	2				
CO 1	3	PO 2	3				
		PO 3	2				
		PO 4	4				
CO 2	3	PO 5	3 3				
		PO 6	3				
CO 3		PO 7 2					
	2	PO 8	3				
		PO 9	4				
		PO 10	3				
CO 4	4	PO 11 4					
		PO 12	2				
		PO 13	3				
CO 5	2	PO 14	4				
		PO 15	3				

CO / PO Mapping

COs						P	rogram	me Ou	tcome ((POs)					
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO2	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO3	3	2	3	1	2	2	1	2	1	2	1	3	2	1	2
CO4	1	2	1	3	2	2	1	2	3	2	3	1	2	3	2
CO5	3	2	3	1	2	2	1	2	1	2	1	3	2	1	2

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model	
2. Assignment	
3. End Semester Examinations	
Indirect	
1 Course End Delivery	

	Networking	Periods	12						
Unit - I	Types of Physical Medium - Topologies - Wireless Networking: Wireless Protocols. Data Link Layer:								
Unit - I	Layered Data Link Protocols - SLIP and PPP-MAC and ARP. Network L	ayer: Routing							
	Risks-Addressing-Fragmentation-Security.								
	Internet Protocol	Periods	12						
	IP Addressing-ICMP-Security options. Transport Layer: Common Protoc	ols-Transport Lay	er						
Unit - II	Functions-Gateways. TCP: Connection Oriented Protocols-TCP Connections-UDP. Session Layer: Session								
Omt - m	State Machine-Session and Stacks. SSL: SSL Functionality-Certificates. SSH: SSH and Security-SSH								
	Protocols. STMP: Email Goals- Common Servers. HTTP: HTTP Goals-URL.								
	Security	Periods	12						
	Importance-Threat Models-Concepts-Common Mitigation Methods. Network theory: Standards								
Unit - III	Bodies-Network Stacks-Multiple Stacks-Layers and Protocols-Common Tools. Cryptography: Securing								
	Information-Necessary Elements-Authentication and Keys-Cryptography and								
	Randomness-Hashes-Ciphers-Encryption-Steganography.								
	Data Encryption	Periods	12						
Unit - IV	Classical Encryption Techniques-Block Ciphers and the Data Encryption Standards- Symmetric Ciphers.								
Ollit - I v	Principles of Public Key Cryptosystems and RSA Algorithm-Key Management.								
	Authentication	Periods	12						
Unit - V	Message Authentication and Hash Function-Digital Signatures and Authe	ntication Protocol	s-Email						
Omt - V	Securityâ€"Web Security-Intrusion-Firewall.								
	Total Periods 60								

Text Books	
1	Neal Krawetz, Introduction Network Security, India Edition, Thomson Delmar
	Learning.2007(Unit-I:5.1,5.4,7.2,8.3,9,10,11.2,11.3,11.5,11.9,
	unit-II:12.1,12.2,12.4,14.1,14.2,14.3,15.1,15.2,15.7,16.2,16.3, 19.2,19.3,20.1, 20.2,22.2, 23.1,23.2,
	UnitIII:1.1,1.2,1.3,1.4,3.1,3.2,3.3,3.4,3.5,4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8).
2	William Stallings, Cryptography and Network Security, Prentice-Hall of India,4th edition,2007, (Unit-IV:
	2,3,6,9,10, Unit-V: 11,13,15,17,18,20).
References	
1	K.Pachghare, Cryptography and Information Security, PHI Learning Private Limited 2009.
2	Andrew S. Tanenbaum, Computer Networks, PHI 4th edition . 2009.
E-References	
1	williamstallings.com
2	www.sanfoundry.com
3	www.amazon.in
4	www.uptu.ac.in
5	www.ibm.com





Programme MCA Programme Code PCA Regulations 2020-2020
Course Code Course Name Periods Credit Maximum Marks Periods Credit Periods Credit Description Periods Credit Description Periods Periods Periods Periods Description Periods Pe
Course Code Course Name per Week
L T P C CA ESE Total
COURSE Students gain the skills to exploit the capabilities of information security. Understand with a modern OBJECTIVES Students gain the skills to exploit the capabilities of information security. Understand with a modern security technologies such as firewalls, VPNs, intrusion detection system. POS
Information Security
OBJECTIVES security technologies such as firewalls, VPNs, intrusion detection system. POS PROGRAMME OUTCOME PO 1 Apply knowledge of computing fundamentals, computing specialization, mathematics, and domainknowledge appropriate for the computing specialization to the abstraction and conceptualization computing models from defined problems and requirements PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
OBJECTIVES security technologies such as firewalls, VPNs, intrusion detection system. POS PROGRAMME OUTCOME PO 1 Apply knowledge of computing fundamentals, computing specialization, mathematics, and domainknowledge appropriate for the computing specialization to the abstraction and conceptualization computing models from defined problems and requirements PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
PO 1 Apply knowledge of computing fundamentals, computing specialization, mathematics, and domainknowledge appropriate for the computing specialization to the abstraction and conceptualization computing models from defined problems and requirements PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
domainknowledge appropriate for the computing specialization to the abstraction and conceptualization computing models from defined problems and requirements PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
domainknowledge appropriate for the computing specialization to the abstraction and conceptualization computing models from defined problems and requirements PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
PO 2 Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
disciplines PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
PO 3 Design and evaluate solutions for complex computing problems, and design and evaluate
systems, components, or processes that meet specified needs with appropriate consideration for public h
andsafety, cultural, societal, and environmental
PO 4 Use research-based knowledge and research methods including design of experiments,
analysisandinterpretation of data, and synthesis of the information to provide valid conclusions.
PO 5 Use research-based knowledge and research methods including design of experiments,
analysisandinterpretation of data, and synthesis of the information to provide valid conclusions.
PO 6 Understand and commit to professional ethics and cyber regulations, responsibilities, and
normsofprofessional computing practice.
PO 7 Recognize the need, and have the ability, to engage in independent learning for continual development a
acomputing professional.
PO 8 Demonstrate knowledge and understanding of the computing and management principles and apply the
toones own work, as a member and leader in a team, to manage projects and in multidisciplinaryenvironments.
PO 9 Communicate effectively with the computing community, and with society at large, about
complex computing activities by being able to comprehend and write effective reports, design
documentation, makeeffective presentations, and give and understand
PO 10 Understand and assess societal, environmental, health, safety, legal, and cultural issues within local
andglobal contexts, and the consequential responsibilities relevant to professional computing practice
PO 11 Function effectively as an individual and as a member or leader in diverse teams and in
multidisciplinaryenvironments
PO 12 Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth
forthe betterment of the individual and society at large
PO 13 To apply knowledge of computing to create effective designs and solutions for complex problems
PO 14 To identify, analyse and synthesize scholarly literature relating to the field of Computer Science
PO 15 To develop scientific outlook that solves any problem, encompassing the expected aspectsof market
demands

COs	COURSE OUTCOME
CO 1	Understand the risk related to information security & system development life cycle.
CO 2	Describe the plan for security
CO 3	Analyze various security technology
CO 4	Describe intrusion detection and prevention.
CO 5	Understand the implementation of security and change management.
Pre-requisites	Basic Knowledge about Network and Computer Security.

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2	Thidicates the strength of corre	iation, 3-strong, 2-medium, 1-w	(Cak)			
COs	KLs	POs	KLs			
		PO 1	3			
CO 1	2	PO 2	3			
		PO 3	4			
		PO 4	4			
CO 2	2	PO 5	2			
		PO 6	3			
CO 3		PO 7	2			
	3	PO 8	4			
		PO 9	2			
		PO 10	3			
CO 4	3	PO 11	3			
		PO 12	4			
		PO 13	4			
CO 5	4	PO 14	2			
		PO 15	3			

CO / PO Mapping

COs						P	rogram	me Ou	tcome ((POs)					
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO3	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO5	2	2	3	3	1	2	1	3	1	2	2	3	3	1	2

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model	
2. Assignment	
3. End Semester Examinations	
Indirect	
1 Course End Delivery	

	Introduction to Information Security	Periods	12					
	The History of Information Security- Key Information Security Concepts	-Critical Characte	eristics of					
Unit - I	Information- CNSS Security Model-Components of an Information Syste	m- Balancing Info	ormation					
	Security and Access- The Systems Development Life Cycle- The Security	Systems Develop	pment Life					
	Cycle-Investigation.							
	Need for Security	Periods	12					
	Threats- Attacks- Secure Software Development - Ethics and Information	security-Overvie	w of Risk					
Unit - II	Management-Risk Identification-Risk Assessment - Risk Control Strategies- Selecting Risk Control							
	Strategy - Qualitative versus Quantitative Risk Control Practices.							
	Planning for Security	Periods	12					
Unit - III	cy, Standards, and	d Practices -T						
Unit - III	Information Security Blueprint -Security Education, Training, and Awareness Program -Continuity							
	Strategies.							
	Firewalls and VPNs	Periods	12					
	Access Control -Firewalls -Firewall Processing Modes -Firewalls Categor	rized by Generation	on -Firewalls					
Unit - IV	Categorized by Structure-Firewall Architectures -Selecting the Right Firewall -Configuring and Managing							
	Firewalls-Content Filters -Protecting Remote Connections -Remote Access -Virtual Private Networks .							
	Intrusion Detection And Prevention Systems	Periods	12					
	Introduction-Intrusion Detection and Prevention Systems - Types of IDPS	S- IDPS Detection	Methods- ID					
Unit - V	Response Behavior- Selecting IDPS Approaches and Products- Strengths and Limitations of IDPSs-							
	Deployment and Implementation of an IDPS-Measuring the Effectiveness	s of IDPSs						
	Total Periods		60					

Text Books	
1	Michael E.Whitman, and Herbert J.Mattord, Principles of Information Security 4th edition, Cengage
	Learning 2012.
References	
1	Nozaki, Micki Krause, Tipton, Harold F, Information Security Management Handbook - 6th Edition CRC
	Press,2012
2	Hossein Bidgoli, Handbook of Information Security-Information Warfare; Social, Legal, and International
	Issues; and Security Foundations, John Wiley & Sons Inc. 2006
E-References	
1	https://onlinecourses.nptel.ac.in/noc15_cs03
2	https://onlinecourses.nptel.ac.in/noc16_cs01





OMEN EMPOWERMEN		Elayampalayam, Ti	ruchengo	oae-6	37 203.							
Programme	MCA	Programme Code		P	CA	Regulati	ions	2020-2021				
Department	M.C.A Semester											
			Perio	ds	Credit	Maximu	ım Mark	is .				
Course Code	C	ourse Name	per We	eek								
			LT	P	С	CA	ESE	Total				
20P3CAE10	So	Soft Computing 4 0 0 4 25 75 100										
COLIDGE	T 1 . 1	11: 4: 66 1	. 1 . 0	· N.T	137 . 1 . 1	. 1		. 1				
COURSE		To understand and brings the view of fundamentals of Neural Networks, back propagation networks, adaptive resonance theory, fuzzy logic and genetic algorithms.										
OBJECTIVES	adaptive resonan	ce theory, fuzzy logic and g	enetic aig	oritn	ms.							
POs		PRO	GRAMM	E OU	JTCOME							
PO 1	, ,,,	e of computing fundamental		_	•							
	domainknowledg	ge appropriate for the compu	iting spec	ializa	tion to the abs	traction and	d concep	otualization of				
		ls from defined problems an										
PO 2	-	te, research literature, and s	-	•			-					
		g fundamental principles of	mathema	tics, c	computing scie	ences, and re	elevant	domain				
	disciplines											
PO 3		ate solutions for complex co		•		_						
		ents, or processes that meet	-	need	s with appropr	iate conside	eration f	or public health				
		al, societal, and environmen										
PO 4		ed knowledge and research			•	-						
DO 5		pretation of data, and synthe						ns.				
PO 5		ed knowledge and research			•	-						
PO 6		pretation of data, and synthe commit to professional ethic						ns.				
PO 0		onal computing practice.	s and cyb	er re	guiations, resp	onsionnies,	, and					
PO 7	•	ed, and have the ability, to	engage in	inde	nendent learnii	ng for conti	nual des	zelonment as				
107	acomputing profe		ingage in	mucj	endent tearning	ing for conti	iiuai uc	reiopinent as				
PO 8		wledge and understanding of	of the com	mutir	ng and manage	ment princi	inles and	d apply these				
		, as a member and leader in		-	-	-	.pres uni	s apply these				
	multidisciplinary		, , ,									
PO 9	1 ,	fectively with the computing	g commur	nity, a	and with societ	ty at large, a	about					
	complexcomputing activities by being able to comprehend and write effective reports, design											
	documentation, makeeffective presentations, and give and understand											
PO 10		assess societal, environment				ultural issu	es withi	n local				
	andglobal contex	andglobal contexts, and the consequential responsibilities relevant to professional computing practice										
PO 11	Function effective	ely as an individual and as a	nember	or le	ader in diverse	e teams and	in					
	multidisciplinary	multidisciplinaryenvironments										
PO 12	Identify a timely	Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth										
		of the individual and societ	<u> </u>									
PO 13		dge of computing to create										
PO 14		yse and synthesize scholarly										
PO 15	_	tific outlook that solves any	problem,	enco	ompassing the	expected as	spectsof	market				
	demands											

COs	COURSE OUTCOME
CO 1	After completion of the course the student will get the knowledge about the fundamentals of Neural
	Networks.
CO 2	Able to realize the back propagation networks.
CO 3	Able to understand adaptive resonance theory
CO 4	Able to understand fuzzy logic concepts.
CO 5	Able to understand genetic algorithms concepts.
Pre-requisites	Basic Knowledge about Network and Computer Security.

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(5/2	(3/2/1 indicates the strength of correlation, 3-strong, 2-incutain, 1-weak)									
COs	KLs	POs	KLs							
		PO 1	3							
CO 1	2	PO 2	3							
		PO 3	4							
		PO 4	4							
CO 2	2	PO 5	2							
		PO 6	3							
		PO 7	2							
CO 3	3	PO 8	4							
		PO 9	2							
		PO 10	3							
CO 4	3	PO 11	3							
		PO 12	4							
		PO 13	4							
CO 5	4	PO 14	2							
		PO 15	3							

CO / PO Mapping

COs		Programme Outcome (POs)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO2	2	2	1	1	3	2	1	1	3	2	2	1	1	3	2
CO3	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3	3	2	2	2	3
CO5	2	2	3	3	1	2	1	3	1	2	2	3	3	1	2

Course Assessment Methods						
Direct						
1. Continuous Assessment Test I, II & Model						
2. Assignment						
3. End Semester Examinations						
Indirect						
1 Course End Delivery						

	Fundamentals of Neural Networks Periods 12										
	Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural		1-								
Unit - I	Architectures-Characteristics of Neural Networks-Learning Methods-Tax		Network								
	Architectures-History of Neural Network Research-Early Neural Network	-									
	domain.										
	Backpropagation Networks	Periods	12								
	Architecture of Backpropagation Network-Backpropagation Learning -ill	ustrations-applica	tions-Effect of								
Unit - II	Tuning Parameters of the Backpropagation Neural Network-Selection of	various parameter	rs in								
	Backpropagation rk-Variations of Standard Backpropagation algorithms.										
	Adaptive Resonance Theory Periods										
Unit - III	Introduction-classical ART networks-simplified ART architecture- ART1	- Architecture of	ART1-special								
Ullit - III	features of ART1-ART1 algorithm.ART2- Architecture of ART2- ART2	algorithmAppli	cations.								
	Fuzzy logic	Periods	12								
	Fuzzy Set Theory- Fuzzy Sets-Fuzzy Relations. Fuzzy Systems: Fuzzy Lo	ogic-Fuzzy Rule b	ased system -								
Unit - IV	Defuzzification Methods-Applications. Fuzzy Backpropagation Networks	s: LR-Type Fuzzy	Numbers-Fuzzy								
	Neuron-Fuzzy Backpropagation Architecture.										
	Genetic algorithms	Periods	12								
Unit - V	Fundaments of Genetic algorithms-Basic concepts-creation of Offsprings	-encoding-reprodu	action. Genetic								
UIII - V	modeling: Cross Over-Inversion and Deletion-Mutation Operator-Bit Wis	se Operators - PSC	D: Particle Swam								
	Optimization.										
	Optimization.										

Text Books	
1	Rajasekaran. S and Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, New
	Delhi-2005.
References	
1	Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2	Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, Wiley India, 2008.
E-References	
1	www.myreaders.info
2	www.springer.com
3	www.sciencedirect.com
4	www.elsevier.com
5	www.cs.berkeley.edu





MOMEN EMPOWERMER		Elayampalayam, Ti	rucnengo	oae-o	37 203.							
Programme	MCA	Programme Code		P	ons	2020-2021						
Department	M.C.A Semester											
			Perio	ds	Credit	Maximu	m Mark	XS .				
Course Code	C	Course Name per Week										
			LT	P	С	CA	ESE	Total				
	Clo	ud Compuging	4 0	0	4	25	75	100				
20P3CAE11												
COURSE	To understanding	g cloud computing and a sys	tematic k	nowl	edge of the fur	ndamental						
OBJECTIVES	1	nitecture, and security and to			•							
POs		-			JTCOME							
PO 1	Apply knowledg	e of computing fundamental	s compil	ting s	necialization	mathematic	es and					
	11 0	ge appropriate for the compu		_	•			otualization of				
	-	ls from defined problems ar				araction and	. conce	ordanization of				
PO 2		te, research literature, and s				blems reach	ning					
	,	clusions using fundamental	-				-	and relevant				
	domaindiscipline	-			,	1 0	ŕ					
PO 3	Design and evalu	ate solutions for complex c	omputing	prob	lems, and desi	gn and eval	uate					
	systems,compone	ents, or processes that meet	specified	need	s with appropr	iate conside	eration f	or public health				
	andsafety, cultur	al, societal, and environmen	tal									
PO 4	Use research-bas	ed knowledge and research	methods	inclu	ding design of	experiment	s, analy	sis				
	andinterpretation	of data, and synthesis of th	e informa	tion t	o provide vali	d conclusion	ns.					
PO 5		apt and apply appropriate to	-			dern compu	ting too	ols to complex				
		ties, with an understanding										
PO 6	ł	commit to professional ethic	s and cyb	er re	gulations, resp	onsibilities,	and no	rms				
20.5	_	omputing practice.										
PO 7	-	eed, and have the ability, to	engage in	inde	pendent learning	ng for conti	nual de	velopment as a				
DO 0	computing profes		C (1		1	,	. 1	1 1 1 .				
PO 8		wledge and understanding of		•		•	•	d apply these to				
	multidisciplinary	wn work, as a member and l	eader III a	tean	i, to manage p	rojects and	Ш					
PO 9		fectively with the computing	COMMU	nity s	and with societ	ty at large a	ahout					
		•		•				า				
	complexcomputing activities by being able to comprehend and write effective reports, design documentation, makeeffective presentations											
PO 10			al. health.	safe	tv. legal, and c	cultural issue	es withi	n local and				
1010	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.											
PO 11		ely as an individual and as a			-							
	multidisciplinaryenvironments											
PO 12		opportunity and using inno	vation to 1	oursu	e that opportu	nity to creat	te value	and wealth for				
	the betterment of	the individual and society a	at large.		-							
PO 13	To apply knowle	dge of computing to create	effective of	desig	ns and solution	ns for comp	lex prob	olems.				
PO 14	To identify, analy	yse and synthesize scholarly	literature	rela	ting to the field	d of Compu	ter Scie	nce.				
PO 15	To develop scien	tific outlook that solves any	problem,	enco	ompassing the	expected as	spects of	f				
	marketdemands.											

COs	COURSE OUTCOME
CO 1	Introduce the broad perceptive of cloud architecture and model
CO 2	Cloud computing fundamental issues, technologies, applications and implementations
CO 3	Understanding the key dimensions of the challenge of Cloud Computing
CO 4	Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft
	Azure and Amazon Web Services and other businesses cloud applications
CO 5	Provide sufficient knowledge foundation to enable further study and research
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of correlation, 3-strong, 2-inequality, 1-weak)									
COs	KLs	POs	KLs						
		PO 1	2						
CO 1	2	PO 2	4						
		PO 3	3						
		PO 4	3						
CO 2	3	PO 5	2						
		PO 6	2						
		PO 7	3						
CO 3	3	PO 8	2						
		PO 9	3						
		PO 10	3						
CO 4	2	PO 11	2						
		PO 12	3						
		PO 13	3						
CO 5	3	PO 14	2						
		PO 15	3						

CO / PO Mapping

COs		Programme Outcome (POs)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	1	2	2	3	3	2	3	2	2	3	2	2	3	2
CO2	2	2	3	3	2	2	1	2	3	3	2	3	3	2	3
CO3	2	2	3	3	2	2	1	2	3	3	2	3	3	2	3
CO4	3	1	2	2	3	3	2	3	2	2	3	2	2	3	2
CO5	2	2	3	3	2	2	1	2	3	3	2	3	3	2	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Introduction	Periods	12				
TT '. T	Defining cloud computing-Characteristics cloud model - cloud services -	examples- cloud b	ased services				
Unit - I	and applications - cloud concepts and technologies - Benefits - Limitation	s .					
	Cloud services and platforms	Periods	12				
II:4 II	Cloud services and platforms - Compute services - storage services - data	base services - ap	plication				
Unit - II	lesign.						
	Cloud storage	Periods	12				
Unit - III	Cloud storage - overview- Cloud storage provider - standards- applications - client- infrastructures -						
Omt - m	services - challenges before native file system - storage types - popular cloud storage for developers -						
	popular general purpose cloud storages						
	Software as a service	Periods	12				
Unit - IV	Software as a service - overview- driving forces - company offering - indu	istries software pl	us services -				
Ollit - IV	overview - mobile device integration - providers - Microsoft online.						
	Security issues	Periods	12				
	Security issues - cloud security - threats to cloud security - infrastructure	security - informa	tion security				
Unit - V	cloud security design -principles - cloud security management frameworks - security as a service - privacy						
	and compliance issues - popular cloud services - google cloud - mobile cloud computing - The Internet of						
	Things.						
	Total Periods		60				

Text Books	
1	Arshdeep Bahga, Vijay Madisetti "Cloud Computing A Hands-on Approach", university press, 2014.
2	Anthony T.Velte Toby J.Velte, Robert Elsenpeter, "Cloud Computing A Practical Approach", Mc Graw
	Hill Education, reprint 2016
3	Sandeep Bhowmik, "Cloud Computing", Cambridge University press, 2017
References	
1	Barrie Sosinsky "Cloud Computing Bible ", Wiley Publications, 2015 Reprint .
2	Ricardo Puttini, Thomas Erl, and Zaigham Mahmood, "Cloud Computing: Concepts, Technology &
	Architecture", Prentice-Hall, 2013
E-References	
1	www.sciencedirect.com
2	www.springer.com
3	www.webopedia.in
4	www.tutorialspoint.com
5	www.w3schools.com





	Elayampalayam, 11	ruchengo	de-6	37 205.			
MCA	Programme Code	PCA Regulations					2020-2021
	M.C.A			Semester			3
		Period	ls	Credit	Maxim	um Mar	ks
Course Name per Week							
	_		С	CA	ESE	Total	
INTER	NET OF THINGS	4 0	0	4	25	75	100
	•		tegra	tion of the phy	ysical worl	ld and th	ne cyberspace.
They are also abl	e to design & develop IOT	Devices.					
	PRO	GRAMM	E OU	TCOME			
Apply knowledg	e of computing fundamental	s, comput	ing s	pecialization,	mathemati	cs, and	
domainknowledg	ge appropriate for the compu	iting speci	aliza	tion to the abs	traction an	d conce	ptualization of
computing mode	ls from defined problems an	ıd requirei	nent	S			
Identify, formula	te, research literature, and s	olve comp	olex o	computing pro	blems reac	hing	
substantiatedcon	clusions using fundamental	principles	of m	athematics, co	omputing s	ciences,	and relevant
domaindiscipline	es.						
Design and evalu	ate solutions for complex comp	omputing	prob	lems, and desi	gn and eva	luate	
systems,compone	ents, or processes that meet	specified	needs	s with appropr	iate consid	leration	for public health
andsafety, cultur	al, societal, and environmen	tal					
Use research-based knowledge and research methods including design of experiments, analysis							
	1						
1					dern comp	uting to	ols to complex
1	=	s and cyb	er re	gulations, resp	onsibilities	s, and no	orms
	1 01			1 .1 .			
-		engage in	ındej	pendent learnii	ng for cont	inual de	evelopment as a
		£ 41	4:				
1	•		-		-	-	id apply these to
1		eauei iii a	tean	i, to manage pi	iojecis and	1 111	
		COMMUN	ity s	and with societ	v at large	about	
1			-				n
	-	_	iciia	una wine errec	жие терог	ts, desig	
	*		safe	ty legal and c	ultural issi	ues with	in local and
, ,							
_							
		vation to r	ursu	e that opportu	nity to crea	ate value	and wealth for
,		-		11	•		
To apply knowledge of computing to create effective designs and solutions for complex problems.							
To develop scien							
	INTER Students will be They are also able Apply knowledge domainknowledge computing mode Identify, formula substantiatedcome domaindisciplines Design and evaluate systems, components and after the computing activity. Use research-base and interpretation Create, select, and computing activity. Understand and computing professional computing	MCA Course Name INTERNET OF THINGS Students will be explored to the interconnect They are also able to design & develop IOT PRO Apply knowledge of computing fundamental domainknowledge appropriate for the comput computing models from defined problems and Identify, formulate, research literature, and substantiatedconclusions using fundamental domaindisciplines. Design and evaluate solutions for complex consists the meet and apply appropriate the computing activities, with an understanding of ofprofessional computing practice. Recognize the need, and have the ability, to computing professional. Demonstrate knowledge and understanding of one A¢â, ¬â,,¢s own work, as a member and I multidisciplinaryenvironments. Communicate effectively with the computing complexcomputing activities by being able to documentation, makeeffective presentations. Understand and assess societal, environment global contexts, and the consequential responsibility at timely opportunity and using innovate betterment of the individual and society at To apply knowledge of computing to create of To identify, analyse and synthesize scholarly To develop scientific outlook that solves any	MCA Programme Code M.C.A Course Name Period per We L T INTERNET OF THINGS A 0 Students will be explored to the interconnection and in They are also able to design & develop IOT Devices. PROGRAMMI Apply knowledge of computing fundamentals, comput domainknowledge appropriate for the computing speci computing models from defined problems and requirer Identify, formulate, research literature, and solve comp substantiatedconclusions using fundamental principles domaindisciplines. Design and evaluate solutions for complex computing systems, components, or processes that meet specified a andsafety, cultural, societal, and environmental Use research-based knowledge and research methods i andinterpretation of data, and synthesis of the informat Create, select, adapt and apply appropriate techniques, computing activities, with an understanding of the limi Understand and commit to professional ethics and cyb ofprofessional computing practice. Recognize the need, and have the ability, to engage in computing professional. Demonstrate knowledge and understanding of the com oneââ,¬â,çs own work, as a member and leader in a multidisciplinaryenvironments. Communicate effectively with the computing commun complexcomputing activities by being able to compreh documentation, makeeffective presentations. Understand and assess societal, environmental, health, global contexts, and the consequential responsibilities Function effectively as an individual and as a member multidisciplinaryenvironments Identify a timely opportunity and using innovation to p the betterment of the individual and society at large. To apply knowledge of computing to create effective of To identify, analyse and synthesize scholarly literature To develop scientific outlook that solves any problem,	MCA Programme Code M.C.A Periods per Week L T P INTERNET OF THINGS Apply knowledge of computing fundamentals, computing sodomainknowledge appropriate for the computing specializa computing models from defined problems and requirements identify, formulate, research literature, and solve complex of substantiated conclusions using fundamental principles of momaindisciplines. Design and evaluate solutions for complex computing prob systems, components, or processes that meet specified needs andsafety, cultural, societal, and environmental Use research-based knowledge and research methods include and interpretation of data, and synthesis of the information to Create, select, adapt and apply appropriate techniques, reso computing activities, with an understanding of the limitatio Understand and commit to professional ethics and cyber regofprofessional computing practice. Recognize the need, and have the ability, to engage in independent one A¢â, ¬â,,¢s own work, as a member and leader in a team multidisciplinaryenvironments. Communicate effectively with the computing community, a complex computing activities by being able to comprehend and communicate effectively with the computing community, a complex computing activities by being able to comprehend and commentation, makeeffective presentations. Understand and assess societal, environmental, health, safet global contexts, and the consequential responsibilities releves a function of the individual and as a member or lemultidisciplinary environments. Understand and assess societal, environmental, health, safet global contexts, and the consequential responsibilities releves the process of the individual and society at large. To apply knowledge of computing to create effective design to develop scientific outlook that solves any problem, encounter the process of the	N.C.A Semester	MCA	MCA Programme Code M.C.A Semester Periods Credit Maximum Mar Course Name Periods Credit Maximum Mar Periods Credit Maximum Mar Periods Credit Periods C

COs	COURSE OUTCOME
CO 1	Able to understand the application areas of IOT
CO 2	Able to realize the revolution of Internet in Mobile Devices, Cloud & SensorNetworks
CO 3	Able to understand building blocks of Internet of Things and characteristics
CO 4	Able to understand data analytics for IoT.
CO 5	Able to learn IoT by case studies.
Pre-requisites	

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs			
		PO 1	4			
CO 1	2	PO 2	2			
		PO 3	2			
		PO 4	3			
CO 2	2	PO 5	3			
		PO 6	4			
		PO 7	3			
CO 3	3	PO 8	3			
		PO 9	4			
		PO 10	3			
CO 4	3	PO 11	4			
		PO 12	4			
		PO 13	2			
CO 5	4	PO 14	2 2 3 3 4 3 4 3 4 3 4			
		PO 15	4 2 2 3 3 4 3 4 3 4 4 4 4 2 2			

CO / PO Mapping

COs						P	rogram	me Ou	tcome ((POs)					
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	3	3	2	2	1	2	2	1	2	1	1	3	3	2
CO2	1	3	3	2	2	1	2	2	1	2	1	1	3	3	2
CO3	2	2	2	3	3	2	1	3	2	3	2	2	2	2	3
CO4	2	2	2	3	3	2	1	3	2	3	2	2	2	2	3
CO5	3	1	1	2	2	3	2	2	3	2	3	3	1	1	2

ourse Assessment Methods
irect
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
direct
1. Course End Delivery

ntent of the	Syllabus							
	Introduction	Periods	12					
Unit - I	Introduction to Internet of Things, Physical design of IoT, Logical Design	of IoT, IoT enab	ling					
Unit - I	Technologies Domain Specifics of IoT, home automation, cities, Enviro	onment, Energy, R	Retails, Logistic					
	Agriculture, Industry, Health and Life style							
	IoT and M2M	Periods	12					
Unit - II	IoT and M2M - Difference between IoT and M2M,SDN and NFV for IO	Γ. IOT System ma	anagement wit					
UIII - II	NETCONF-YANG-Need for IOT system management, SNMP, Network	operator environn	nent,					
	NETCONF, YANG							
	Developing Internet of Things	Periods	12					
	IOT Platforms design methodology, Introduction, IOT Design methodology, Case study on IoT System on							
Unit - III	weather monitoring. IoT Systems logical design using Python, Introducti	on, Installing pyth	on, Python da					
	types and data structures, Control flow. Functions, Modules.							
	Packages	Periods	12					
	Packages, File handling, Date time operations, classes, Python packages of	of interest for IoT.	IoT physical					
Unit - IV	devices and end points, what is an IoT Device, Exemplary device: Raspbe	erry PI, about the l	ooard, Linux o					
	Raspberry PI, Raspberry PI interfaces, Other IoT devices.							
	Data analytics for IoT-Introduction	Periods	12					
Unit - V	Data analytics for IoT-Introduction, Apache Hadoop, Using Hadoop map	reduce for batch of	lata analysis.					
OIIIt - V	Case studies- Illustrating IoT design-Introduction, Home automation, cities	es, environment, a	griculture.					
	Total Periods		60					

Text Books	
1	Internet of Things - A Hands on Approach, Arsdeep Bahga & Vijay Mandisetti, 2014
2	Building the Internet of Things: Implement New Business Models, Disrupt, Maciej Kranz, Willey
	Publications, 2016
3	5. Designing the Internet of Things By Adrian McEwen, Hakim Cassimally, Willey Publications 2015.
References	
1	Internet of Things: Principles and Paradigmsby Rajkumar Buyya, Amir Vahid Dastjerdi morgan Kaufmann
	2014.
E-References	
1	http://internetofthingsagenda.techtarget.com
2	http://www.businessinsider.com/what-is-the-internet-of-things





WOMEN EMPOWERMENT		Elayampalayam, Ti	ruchengo	de-6	37 205.			
Programme	MCA	Programme Code		P(ions	2020-2021		
Department		M.C.A	Semester 3					
			Perio	ds	Credit	Maximu	ım Mar	ks
Course Code	C	ourse Name	per We	eek				
			L T	P	С	CA	ESE	Total
20P3CAE14	DATA MINING	G AND WAREHOUSING	4 0	0	4	25	75	100
COURSE	To introduce gen	eral techniques for analyzin	g comput	er alg	gorithms To lea	arn differer	nt algori	thm design
OBJECTIVES	techniques To u	nderstand the limitations of	Algorithn	ı pov	/er			
POs		PRO	GRAMM	E OU	TCOME			
PO 1	Apply knowledg	e of computing fundamental	s, compu	ting s	pecialization,	mathematic	cs, and	domain
	knowledge appro	priate for the computing spe	ecializatio	n to	the abstraction	and conce	ptualiza	ation
		dels from defined problems						
PO 2	· -	te, research literature, and s	_				_	
		g fundamental principles of	mathemat	ics, c	computing scie	nces, and r	elevant	
	domaindiscipline							
PO 3	-	ate solutions for complex co		_		_		C 11: 1 1.1
	•	ents, or processes that meet		needs	s with appropri	iate consid	eration	for public health
PO 4	andsafety, cultural, societal, and environmental							
PO 4	Use research-based knowledge and research methods including design of experiments, analysisandinterpretation of data, and synthesis of the information to provide valid conclusions							
PO 5		apt and apply appropriate te						
103	•	ties, with an understanding				acm compe	ating to	ois to complex
PO 6		commit to professional ethic				onsibilities	, and	
		onal computing practice	,	,	, ,		,	
PO 7	Recognize the ne	ed, and have the ability, to	engage in	inde	endent learnir	ng for conti	inual de	velopment as
	acomputing prof	essional.						_
PO 8	Demonstrate kno	wledge and understanding of	of the com	putir	g and manage	ment princ	iples an	d apply these to
	ones own work,	as a member and leader in a	team, to 1	nana	ge projects and	l in		
	multidisciplinary	environments.						
PO 9	•	fectively with the computing		-				
		ng activities by being able to	_			ctive report	s, desig	n
		nakeeffective presentations,						
PO 10		assess societal, environment						
DO 11	and global contexts, and the consequential responsibilities relevant to professional computing practice.							
PO 11	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinaryenvironments.							
PO 12		opportunity and using innov	vation to :	MITTELY.	a that opportur	nity to area	to volue	and woolth
1012			_		c mai opportui	nty to crea	ic value	and wealth
PO 13	for the betterment of the individual and society at large To apply knowledge of computing to create effective designs and solutions for complex problems							
PO 14		yse and synthesize scholarly						
PO 15		tific outlook that solves any						
	demands	, ,	. ′		1 0	1	•	

COs	COURSE OUTCOME
CO 1	Demonstrate an understanding of the importance of data mining and the basic concepts of data mining
CO 2	Organize and Prepare the data needed for data mining using pre preprocessing techniques
CO 3	Understand the various data mining classification methods on large sets
CO 4	Implementing the appropriate clustering or Frequent Pattern mining on large data sets.
CO 5	Apply the data mining techniques in large databases and also learn about trends in data mining
Pre-requisites	Basic concepts of database

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	2
CO 1	2	PO 2	3
		PO 3	2
		PO 4	3
CO 2	3	PO 5	2
		PO 6	3
		PO 7	2
CO 3	2	PO 8	3
		PO 9	3
		PO 10	4
CO 4	3	PO 11	3
		PO 12	2
		PO 13	4
CO 5	2	PO 14	3
		PO 15	3

CO / PO Mapping

COs	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	3	2	3	2	3	2	3	2	1	2	3	1	2	2
CO2	2	3	2	3	2	3	2	3	3	2	3	2	2	3	3
CO3	2	3	2	3	2	3	2	3	2	3	2	1	3	2	2
CO4	2	3	2	3	2	3	2	3	3	2	3	2	2	3	3
CO5	2	3	2	3	2	3	2	3	2	1	2	3	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	Introduction Periods									
	Data mining - Data mining functionalities - kinds of patterns can be mined - classification - major issues.									
Unit - I	Data warehouse - A multidimensional data model - Data warehouse archi	tecture - Data war	ehouse							
	implementation - From data warehouse to data mining.									
	Data pre-processing	Periods	12							
Unit - II	Data cleaning - Data Integration and Transformation - Data Reduction - Discredidation and concept									
OIIIt - II	hierarchy generation - Data mining primitives - Data mining Task.									
	Association Rule Mining	Periods	12							
	- Mining single dimensional Boolean association rules from transactional databases Classification and									
Unit - III	prediction - Issues regarding classification and prediction - Bayesian classification- Classification by Back									
	propagation - classification based on concepts from association rule mining.									
	Cluster Analysis	Periods	12							
I.I:4 IV	- A categorization of Major clustering methods - Partitioning methods- Hierarchical methods - Grid based									
Unit - IV	methods -Model based clustering methods - Density - based methods.									
	Applications and Trends in Data Mining	Periods	12							
Unit - V	- Data mining system products and Research prototypes - Additional themes on Data mining - Social									
UIIIt - V	Impacts of Data Mining - Trends in Data mining-Mining Spatial Databases - Mining Time-series and									
	sequence data - Mining the World wide web.									
	Total Periods		60							

Text Books	
1	1. Jaiwei Han, Michelien Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann
	Publishers an Imprint of Elsevier, 2001
References	
1	5. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2001
2	6. George M. Marakas, Modern Data warehousing, Mining and Visualization: core concepts, Printice Hall,
	First Edition, 2002.
3	7. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson, 2008.
4	8. Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2008.
E-References	
1	1. https://www.guru99.com/data-mining-tutorial.html
2	2. https://www.tutorialspoint.com/data_mining/
3	3. www.knowledge-management-tools.net/data-warehousing.html





WOMEN EMPOWERMEN		Elayampalayam, Ti	ruchengo	oue-6	3/ 205.					
Programme	MCA	Programme Code		PCA Regulations						
Department		M.C.A	Semester 3							
			Perio	ds	Credit	Maximu	m Marks	S		
Course Code	C	ourse Name	per We	eek						
			LT	P	С	CA	ESE	Total		
20P3CAE15	R PR	OGRAMMING	4 0	0	4	25	75	100		
COURSE	To Understand D	Pata Science and its applicat	ions, Intro	oduce	yourself to R	Programmi	ng and T	To Explore		
OBJECTIVES		s and statistics works in R			•		Ü	•		
POs		PRO	GRAMM	E OU	JTCOME					
PO 1	Apply knowledge	e of computing fundamental	s, compu	ting s	pecialization,	mathematic	s, and do	omain		
	knowledge appro	opriate for the computing sp	ecializatio	n to	the abstraction	and concep	otualizati	ion of		
	computing mode	ls from defined problems ar	d require	ment	S					
PO 2	Identify, formula	te, research literature, and s	olve com	plex o	computing pro	blems reach	ing subs	tantiated		
	conclusions using fundamental principles of mathematics, computing sciences, and relevant domain									
	disciplines									
PO 3	Design and evaluate solutions for complex computing problems, and design and evaluate systems,									
	components, or p	omponents, or processes that meet specified needs with appropriate consideration for public health and								
	safety, cultural, s	ocietal, and environmental								
PO 4		ed knowledge and research			•	-	s, analys	sis and		
	-	interpretation of data, and synthesis of the information to provide valid conclusions								
PO 5		apt and apply appropriate te	-			dern compu	ting tool	s to complex		
D O (ties, with an understanding								
PO 6		commit to professional ethic	s and cyb	er re	gulations, resp	onsibilities,	and nor	ms of		
DO 7	professional com			1	1 1	C	1 1.	.1		
PO 7	_	ed, and have the ability, to	engage in	ınaej	pendent learnii	ng for contil	nuai dev	elopment as a		
PO 8	Computing profes		of the cor	mutir	a and manage	mont princi	nlac and	apply these to		
108	Demonstrate knowledge and understanding of the computing and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary									
	environments									
PO 9		fectively with the computing	commin	nity. a	and with societ	tv at large, a	bout co	mplex		
	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make									
	effective presentations, and give and understand									
PO 10		assess societal, environment		safe	ty, legal, and c	ultural issue	es withir	local and		
		and the consequential respon								
PO 11	Function effective	ely as an individual and as a	nember	or le	ader in diverse	e teams and	in multi	disciplinary		
	environments									
PO 12	Identify a timely	opportunity and using inno-	vation to j	oursu	e that opportu	nity to creat	e value a	and wealth for		
	the betterment of	the individual and society a	at large							
PO 13		dge of computing to create								
PO 14		yse and synthesize scholarly								
PO 15	_	tific outlook that solves any	problem	enco	ompassing the	expected as	pectsof i	market		
	demands									

COs	COURSE OUTCOME
CO 1	The gain the knowledge in Overview of R and its installation
CO 2	To understand the concepts of Data In and Out of R
CO 3	To learn about the vectorized operations in R
CO 4	To understand the various control structures of R
CO 5	To acquire knowledge in scoping rules of R
Pre-requisites	Programming basics and Data Mining

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
		PO 1	2
CO 1	2	PO 2	3
		PO 3	2
		PO 4	4
CO 2	3	PO 5	3
		PO 6	3
		PO 7	2
CO 3	3	PO 8	3
		PO 9	4
		PO 10	3
CO 4	4	PO 11	4
		PO 12	2
		PO 13	3
CO 5	3	PO 14	4
		PO 15	3

CO / PO Mapping

COs	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	3	1	2	2	1	2	1	2	1	3	2	1	2
CO2	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO3	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3
CO4	1	2	1	3	2	2	1	2	3	2	3	1	2	3	2
CO5	2	3	2	2	3	3	2	3	2	3	2	2	3	2	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

ontent of the S	Syllabus									
	History and Overview of R	Periods	12							
	What is R? What is S? The S Philosophy - Back to R - Basic Features of	R - Free Software	- Design of th							
Unit - I	R System - Limitation of R - R Resources Getting Started with R: Installa	· ·								
	interface. R Nuts and Bolts: Entering Input - Evaluation - R Objects - Nut		_							
	Vectors - Mixing Objects - Explicit Coercion - Matrices - Lists - Factors	- Missing values -	- Data Frames							
	Names	T								
	Getting Data In and Out of R	Periods	12							
	Reading and Writing Data-Reading Data Files with read.table()-Reading	Č								
	alculating Memory-Requirements for R Objects-Using the readr Package-Using Textual and Binary									
Unit - II	Formats for Storing Data-Using dput() and dump()-Binary Formats-Interfaces to the Outside World-File									
	Connections-Reading Lines of a Text File-Reading From a URL Connection-Subsetting R									
	Objects-Subsetting a Vector-Subsetting a Matrix-Subsetting Lists-Subsetting Nested Elements of a									
	List-Extracting Multiple Elements of a List-Partial Matching-Removing NA Values.									
		Periods	12							
	Vectorized Operations-Vectorized Matrix Operations -Dates and Times-Dates in R Times in R-Operations									
Unit - III	on Dates and Times-Summary-Managing Data Frames with the dplyr package-Data Frames-The dplyr									
	Package-dplyr Grammar-Installing the dplyr package									
	-select()-filter()-arrange()-rename()-mutate()-group_by().									
	Control Structures and functions	Periods	12							
II:4 IV	Control Structures-if-else-for Loop-Nested for loops-while Loops-repeat Loops-next, break-									
Unit - IV	Functions-Functions in R- our First Function - Argument Matching-Lazy Evaluation The Argument									
	-Arguments Coming After the Argument.									
		Periods								
	Scoping Rules of R-A Diversion on Binding Values to Symbol-Scoping Rules-Lexical Scoping: Why Does									
Unit - V	It Matter?-Lexical vs. Dynamic Scoping- Optimization- lotting the Likelihood. Coding Standards for									
	R-Loop Functions-Looping on the Command Line-lapply()-sapply()-split()-Splitting a Data Frame-tapply									
	apply()-Col or Row Sums and Means-Other Ways to Apply-mapply().									
	Total Periods		60							

Text Books	
1	Roger D. Peng, "R Programming for Data Science", LeanPub, 2015. (e-Book
References	
1	Tony Fischetti, "Data Analysis with R", Paperback, PACKT Publications, 2015
2	Grolemund, Garrett, "Hands on Programming with R", O' Reilly Inc., 2015
E-References	
1	www.w3schools.com
2	www.tutorialspoint.com
3	www.geeksforgeeks.com





MEN EMPOWERMEN		Elayampalayam, Ti	ruchenge	vae-6	3/ 203.					
Programme	MCA	Programme Code	PCA Regulations 2020							
Department		M.C.A	Semester 3							
			Perio	ds	Credit	Maximu	m Marks	S		
Course Code	C	ourse Name	per W	eek	•					
			LT	P	С	CA	ESE	Total		
20P3CAE16	PYTHON	PROGRAMMING	4 0	0	4	25	75	100		
COURSE	To learn a dynan	nic, interpreted (Byte code-C	Compiled) and	high level pro	gramming la	anguage	and		
OBJECTIVES	_	arious concepts of Python p	-				0 0			
POs		PRO	GRAMM	E OU	JTCOME					
PO 1	Apply knowledge	e of computing fundamental	ls, compu	ting s	pecialization,	mathematic	s, and do	omain		
	knowledge appro	opriate for the computing sp	ecializatio	on to	the abstraction	and concep	otualizati	ion of		
	computing mode	ls from defined problems ar	nd require	ment	3					
PO 2	Identify, formula	te, research literature, and s	olve com	plex o	computing pro	blems reach	ing subs	stantiated		
	conclusions using fundamental principles of mathematics, computing sciences, and relevant domain									
	disciplines									
PO 3	Design and evaluate solutions for complex computing problems, and design and evaluate systems,									
	-	processes that meet specified	l needs w	ith ap	propriate cons	ideration fo	r public	olic health and		
		ocietal, and environmental								
PO 4		ed knowledge and research				-	s, analys	sis and		
PO 5	-	data, and synthesis of the in								
PO 5		apt and apply appropriate to	-			dern compu	ting tool	s to complex		
PO 6		ties, with an understanding commit to professional ethic				oncibilities	and nor	ms of		
100	professional com	-	s and cyt	ici ic	guiations, resp	onsionnies,	and nor	IIIS OI		
PO 7		eed, and have the ability, to	engage in	inde	nendent learnii	ng for conti	nual dev	elonment as a		
10,	computing profes		engage m	mac	Jendent Tearnin	ing for contin	iraar ac v	cropment us u		
PO 8		wledge and understanding of	of the con	nputir	ng and manage	ment princi	ples and	apply these to		
	ones own work, as a member and leader in a team, to manage projects and in multidisciplinary									
	environments									
PO 9	Communicate ef	fectively with the computing	g commu	nity, a	and with societ	ty at large, a	bout co	mplex		
	computing activities by being able to comprehend and write effective reports, design documentation, make									
	effective presentations, and give and understand									
PO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and									
	_	and the consequential respon								
PO 11		rely as an individual and as	a member	or le	ader in diverse	e teams and	in multi	disciplinary		
50	environments									
PO 12		opportunity and using inno		pursu	e that opportu	nity to creat	e value a	and wealth for		
DO 12		the individual and society a		J		C	1	1		
PO 13		dge of computing to create								
PO 14 PO 15		yse and synthesize scholarly								
1013	To develop scientific outlook that solves any problem, encompassing the expected aspectsof market demands									
	ucinanus									

COs	COURSE OUTCOME
CO 1	
CO 2	
CO 3	
CO 4	
CO 5	
Pre-requisites	

Knowledge Levels

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

00 / D	\ / T/T	3.6	
CO / Po) / KI	. Man	nıng
00,1	<i>O , </i>	1 TILLIP	P1115

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2	(5/2/1 indicates the strength of correlation, 5 strong, 2 incident, 1 weak)								
COs	KLs	POs	KLs						
		PO 1	2						
CO 1	2	PO 2	3						
		PO 3	3						
		PO 4	2						
CO 2	3	PO 5	2						
		PO 6	1						
		PO 7	3						
CO 3	3	PO 8	3						
		PO 9	2						
		PO 10	2						
CO 4	2	PO 11	1						
		PO 12	2						
		PO 13	3						
CO 5	3	PO 14	2						
		PO 15	2						

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs		Programme Outcome (POs)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	3	3	2	2	2	3	3	2	3	2	3	3
CO2	2	3	3	2	2	1	1	3	2	2	1	2	3	2	2
CO3	2	3	3	2	2	1	1	3	2	2	1	2	3	2	2
CO4	3	2	2	3	3	2	2	2	3	3	2	3	2	3	3
CO5	2	3	3	2	2	1	1	3	2	2	1	2	3	2	2

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model	
2. Assignment	
3. End Semester Examinations	
Indirect	
1 Course End Delivery	

	Introduction to Python	12							
	Python: Introduction - Python interpreter and interactive mode - Values &	Types - Variable	- Expressions						
Unit - I	and Statements - Assigning Values in Python, Variable Declaration, Mult	iple Assignment -	Operators -						
UIII - I	Types of Operators, Operator Precedence - Modules and Functions: Modu	ules, Function Def	inition and Use,						
	Defining a Function, Calling Function, Uses of Function, Advantages of Functions - Flow								
	Python Conditionals, Parameters & Arguments	Periods	12						
	Conditionals: Booleans Values and Operators - Operators - Operator Prec	edence - Decision	Making - if,						
Unit - II	if… Else, Ifâ€ Elifâ€ Else & Nested statements - Iteration - Fruitful Fu	nctions - Scope of	Variable - Glob						
Omt - II	and Local Variable in Function, Nonlocal Variable - Composition - Recur	rsion. Parameters	and Arguments:						
	Functions with No Arguments, Functions with Arguments, Functions with	h Return Value.							
	Strings in Python	12							
	Strings: String Slices - String are Immutable - String Functions and Method	ods - String Modu	le - Lists as						
Unit - III	- III Array. Lists: Accessing Elements in Lists Using Subscript Operator, List Operations, List Slice								
	Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters,	Deleting List Ele	ments, Python						
	Functions for List Operations, List Comprehension.								
	Tuples & Dictionaries Periods								
	Tuples: Advantages of Tuple Over List, Accessing Values, Updating Tup	les, Delete Tuple	Elements, Tuple						
Unit - IV	Assignment, Tuple Methods, Other Tuple Operations, Tuples As Return	Values, Built-in Fi	unctions with						
Cilit - I v	Tuple, Variable Length Arguments Tuples - Dictionaries: Built-in Diction	nary Functions and	l Methods,						
	Access update and Add Elements, Delete and Remove Elements, Sorting, Iterating through, Reverse								
	Lookup, Inverting a Dictionary, Memorization(Memos)								
	Files & Packages Periods 12								
Unit - V	Files: Reading and Writing, Format Operator, Command Line Arguments		•						
Onit - v	Exceptions. Modules: Writing Modules, Locating Modules. Packages: Sto	eps to create a Pyt	hon Package.						
	Total Periods		60						

Text Books	
1	Dr. S. Suresh kumar, "Problem Solving and Python Programming" Charulatha Publications, 2018.
References	
1	Python Essential Reference (4th Edition): David Beazley
2	Beginning Python: From Novice to Professional Beginning (Beginning From Novice to Professional) by
	Magnus Lie Hetland second edition)
3	Core Python Programming (2nd Edition): Wesley J Chun
E-References	
1	https://www.w3schools.com/python/
2	https://www.learnpython.org/
3	https://docs.python.org/3/tutorial/
4	http://www.tutorialspoint.com/python



VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)



Elayampalayam, Tiruchengode-637 205.

MEN EMPOWERME		Elayampalayam, 11	i ucheng	oue-u	37 203.							
Programme	MCA	Programme Code		PCA Regulations								
Department		M.C.A		Semester								
Course Code	C	ourse Name	Perio		Credit	Maxim	um Marl	xs .				
		L T P C CA ESE Tota										
20P1CAJ01	SO	OFT SKILLS	4 (0	4	25	75	100				
COURSE OBJECTIVES		ents to the current needs of Space with the growth of IT for				•		and self				
POs		PRO	GRAMM	IE OU	TCOME							
PO 1	knowledge appro	e of computing fundamental opriate for the computing speals from defined problems are	ecializati	on to	the abstraction							
PO 2		te, research literature, and s g fundamental principles of		-			_					
PO 3	components, or p	nate solutions for complex corocesses that meet specified ocietal, and environmental		-		_	•					
PO 4	Use research-bas	ed knowledge and research data, and synthesis of the in				•	•	rsisand				
PO 5	Create, select, ad	apt and apply appropriate te	chniques	s, reso	urces, and mo			ols to complex				
PO 6	Understand and opposessional com	commit to professional ethic puting practice.	s and cy	ber re	gulations, resp	onsibilitie	s, and no	rmsof				
PO 7	Recognize the ne	eed, and have the ability, to essional.	engage ir	inde _l	endent learni	ng for con	tinual de	velopment as a				
PO 8	Demonstrate knowledge and understanding of the computing and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.											
PO 9	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand											
PO 10	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.											
PO 11	_	rely as an individual and as a										
PO 12		opportunity and using innoting the individual and society a		pursu	e that opportu	nity to crea	ate value	and wealth for				
PO 13	To apply knowle	dge of computing to create	effective	desig	ns and solution	ns for com	plex prol	olems				
PO 14	To identify, anal	yse and synthesize scholarly	literatur	e rela	ing to the field	d of Comp	uter Scie	nce.				
PO 15	To develop scientific outlook that solves any problem, encompassing the expected aspects of marketdemands											

COs	COURSE OUTCOME
CO 1	Articulate and enunciate words and sentences clearly and efficiently
CO 2	Read and analyze text and be able to summarize ideas in writing
CO 3	Demonstrate the ability to research topics and present them using various mediums, including written
	reports, group presentations, and multimedia projects
CO 4	Analyze how communication models impact the sender/receiver in various formats
CO 5	Assess your strength and weaknesses to better assist you in career development
Pre-requisites	

Knowledge Levels

1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)									
COs	KLs	POs	KLs						
		PO 1	3						
CO 1	2	PO 2	4						
		PO 3	2						
		PO 4	3						
CO 2	3	PO 5	3						
		PO 6	4						
		PO 7	3						
CO 3	3	PO 8	4						
		PO 9	4						
		PO 10	3						
CO 4	4	PO 11	2						
		PO 12	3						
		PO 13	4						
CO 5	2	PO 14	3						
		PO 15	2						

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Outcome (POs)														
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	1	3	2	2	1	2	1	1	2	3	2	1	2	3
CO2	3	2	2	3	3	2	1	2	2	3	2	3	2	3	2
CO3	3	2	2	3	3	2	1	2	2	3	2	3	2	3	2
CO4	2	3	1	2	2	3	2	3	3	2	1	2	3	2	1
CO5	2	1	3	2	2	1	2	1	1	2	3	2	1	2	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations
Indirect
1. Course End Delivery

	The Mind	Periods	5						
Unit - I	Positive thinking & Attitude, Motivation, Character Building, Self Esteem	n, Goal Setting.							
	Effective Communication	Periods	5						
Unit - II	English Conversation, Pronunciation, Voice Modulation, Stressing and stretching, Accent Improvisation,								
	Facial Expressions.								
	Effective Communication Periods								
II III	Effective Communication Body language, Writing skills. Business Etiqu ettes -Business Etiquettes Office								
Unit - III	Etiquettes, Phone Etiquettes, Dining Etiquettes, Party Etiquettes Corporate Look - Office Wear,								
	Meetings/Interviews, Business Presentations								
	Executive Skills	Periods	5						
Unit - IV	Writing a profile (Personal/ Company), Group Discussion, Facing an Interview, Business Presentation								
	Skills.								
	Special Corporate Skills	Periods	5						
Unit - V	Interpersonal Relationship, Leadership Qualities, Time Management, Stress Management.								
	Total Periods		25						

Text Books	
1	Enhancing Employability: Connecting Campus with Corporate: M.S. Rao
References	
1	Corporate Softskills : Sarvesh Gulati
2	The ACE of Soft Skills: Attitude, Communication and Etiquette for Success: Gopalaswamy Ramesh,
	Mahadevan Ramesh
E-References	
1	www.dupont.co.in/soft-skill-development‎.
2	www.wfskillscollege.org.
3	mass.educationalinnovation.org

Signature of BOS Chairman

OF THE PROPERTY.	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.										
Programme	MCA	Programme Code	PCA Regulations 2020-2							2020-21	
Department		M.C.A				Semester	l			I	
20P1CAP01	Design And An	alysis of Algorithms		Perioc er We		Credit	Maximum Mar		rks		
	Lau		L	Т	P	С	CA	ESI	Е	Total	
			4	0	0	2	40	60	100		
COURSE OBJECTIVES	 Apply different problem solving techniques to find a solution to a problem Analysis of implementing the various algorithms Propose an efficient algorithm for a problem 										
	LIST OF PRACTICALS										
1	To implement operations on Stacks										
2	To implemen	t operations on Queue	es								
3	To implemen	t operations on Binar	y Tr	ees							
4	To perform o	perations on Binary S	Searc	ch Tı	rees						
5	Implementati	on of Breadth First So	earc	h me	tho	ds					
6	Implementati	on of Depth First Sea	rch	meth	ods	8					
7	To implemen	To implement Binary search using Divide and Conquer method									
8	Implementati	on of Merge sort usin	ıg D	ivide	an	d Conquer	method				
9	To implemen	To implement Travelling salesman problem									
10	To implemen	t 8-Queens Problem									

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR **WOMEN (AUTONOMOUS)** Elayampalayam, Tiruchengode-637 205. **MCA** Programme Code **PCA** Regulations 2020-21 Programme M.C.A Ш Department Semester Periods Credit Maximum Marks per Week 20P1CAP02 Web Technologies Lab Т C CA ESE Total 0 0 4 2 40 60 100 COURSE Creating simple web pages, forms & CSS **OBJECTIVES** Implement working with cookies and sessions in PHP Connecting PHP and MySQL in real time applications LIST OF PRACTICALS 1 To create a simple web page for your department 2 To create simple forms using HTML To create a simple web page using Cascading Style Sheets 3 Implementation of cookies 4 Implementation of session tracking 5 Implementation of Students Feedbacks System using PHP and MySQL 6 7 Implementation of online registration form using PHP and MySQL 8 Implementation of Library Management System using PHP and MySQL 9 Implementation of Banking Transaction System using PHP and MySQL Webpage Kit Counters using Session 10 To create Simple Shopping Application 11 Implementation of Airline Reservation System PHP and MySQL. 12

TOTAL REPORTER	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.									
Programme	MCA	Programme Code		2020-21						
Department		M.C.A				II				
20P2CAP03	Advanced Java	Programming Lab	Periods Credit			Maxim	ks			
			L	L T P C		CA	ESE	E Total		
			4	0 0	2	40	60	100		
COURSE OBJECTIVES	 Design & develop core java applications such as packages, multithreading, exception handling, applets & event handling Design and develop network communications, JDBC & simple server side scripting programs using Servlets & JSP Design and develop database connectivity and simple web applications 									
		LIS	T OF	PRA	CTICALS	5				
1	Write a Program to prepare student mark list for at least 5 students and print the same using classes and objects									
2	Write a Progr	am to implement pack	kages	and ir	nterfaces					
3	Write a Progr	am to implement mul	tithrea	ading						
4	Write a progradefined except	ram to implement the otions	conc	ept of	Exception	Handlir	ng by	creating user		
5	Write a To in	plement applets								
6	Write a Progr	am to implement ever	nt han	dling						
7	Write a Progr	am to implement Swi	ng							
8	Write a Progr	am to implement RM	I							
9	Write a HTML to Servlet Applications									
10	Write a Creat	e a simple servlet prog	gram	to disp	olay cookie	's inforn	nation			
11	Develop an a the database	pplication to perform in JDBC	insert	, upda	te, retrieve	and dele	ete the	record from		
12	Designing on	line applications with	JSP							

STATE SECONDARIAN	VIVEKAN	TOV	CSO 9001,2008								
Programme	MCA	2	2020-21								
Department	M.C.A Semester								I		
20P2CAP04	Advanced Data System Lab	abase Management		riods Week	Credit	Maxim	um Maı	arks			
	7,000 20.0		1	T P	С	CA	ESI	Ξ	Total		
			4	0 0	2	40	60	١	100		
COURSE OBJECTIVES	 To know the basic commands in SQL To understand the DML ,DDL Statements To familiarize in the Data Schemes To understand and program in PL/SQL 										
	LIST OF PRACTICALS										
1	Basic SQL Queries i) DDL Statements ii) DML Statements										
2	Simple Queries using built in functions										
3	Simple Queri	ies Using set operation	ıs								
4	Database Schema for a customer-sale scenario Customer (Cust id: integer, cust_name: string) Item (item_id: integer, item_name: string, price: integer) Sale (bill_no: integer, bill_data: date, cust_id: integer, item_id: integer, qty_sold: integer) For the above schema, perform the following: a. Create the tables with the appropriate integrity constraints b. Insert around 10 records in each of the tables c. List all the bills for the current date with the customer names and item numbers. d. List the details of the customer who have bought a product which has a										
5	Database Schema for a Student Library scenario Student(Stud_no: integer, Stud_name: string) Membership (Mem_no: integer, Stud_no: integer) Book (book_no: integer, book_name:string, author: string) Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer) For the above schema, perform the following: a. Create the tables with the appropriate integrity constraints b. Insert around 10 records in each of the tables c. List all the student names with their membership numbers										

d. List all the issues for the current date with student and Book names
e. List the details of students who borrowed book whose author is CJDATE
Database Schema for a Employee-pay scenario employee(emp_id: integer, emp_name: string) department(dept_id: integer, dept_name: string) paydetails(emp_id: integer, dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date) payroll(emp_id: integer, pay_date: date) For the above schema, perform the following: a. Create the tables with the appropriate integrity constraints b. Insert around 10 records in each of the tables c. List the employee details department wise d. List all the employee names who joined after particular date e. List the details of employees whose basic salary is between 10,000 and 20,000
f. List the details for an employee_id=5
Write a PL/SQL program to implement trigger
Write a PL/SQL program to implement cursor
Write a PL/SQL program to prepare student mark list
Write a PL/SQL program to prepare employee pay bill

Signature of BOS Chairman

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VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR **WOMEN (AUTONOMOUS)** Elayampalayam, Tiruchengode-637 205. **MCA PCA** 2020-21 Programme Programme Code Regulations M.C.A Ш Department Semester Periods Credit Maximum Marks per Week 20P3CAP06 | Scripting Languages Lab T C CAESE Total 0 0 40 100 60 COURSE Create the JavaScript for creating dynamic web pages **OBJECTIVES** Develop the AngularJS code for simple applications Create the VBScript for creating webpages LIST OF PRACTICALS 1 Write a JavaScript code for Loan Calculation Write a JavaScript code for design a simple calculator 2 Implement Client Side Scripts for Validating Web Form Controls using JavaScript 3 4 Write a JavaScript code for Designing Quiz Application Use AngularJS to prepare student mark sheet 5 6 Use AngularJS to implement Banking System Use AngularJS to implement online purchase order form 7 Write a VBScript program for implementing simple registration form 8 Write a VBScript program for student marks sheet 9 Write a VBScript program employee payroll system 10



VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)



Elayampalayam, Tiruchengode-637 205.

NEW EMPONERY	,,,,									
Programme	MCA	Programme Code	PCA Regulations						2020-2	21
Department		M.C.A					III			
20P2CAPR01	Miniproject	Periods per Week			Credit	Maximum Marks				
		L	Т	Р	С	CA ES		E Tota	ıl	
		2	0	0	1	40 60		10	0	
COURSE	To dev	velop simple application	n nro	oiec	ts					
OBJECTIVES			•							
		To understand the importance of documentation								
	To gather knowledge about various UML diagrams									
	LIST OF PRACTICALS									

FIRST REVIEW: (10 Marks)

- 1. Problem Identification
- 2. Problem definition
- 3. Presentation

SECOND REVIEW:

(10 Marks)

- 1. Project Analysis
- 2. Design & Module description

FINAL REVIEW: (20 Marks)

- 1. DFD / ERD / System Flow Diagram (Whichever Applicable)
- 2. Coding and Implementation
- 3. Presentation
- 4. Final Project Report (with executable format including complete source code)

The Passing minimum shall be 50% out of 60 marks (30 Marks)



VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR **WOMEN (AUTONOMOUS)**



HOWEN EMICHERINEN	Elayampalayam, Tiruchengode-637 205.									
Programme	MCA	Programme Code			P	CA	Regulations		2	020-21
Department							IV			
20P4CAPR02	Core Course P				Periods Credit per Week		Maximum M		arks	
	Dissertation at	u viva voce	L	L T P		С	CA	ES	Е	Total
			0	0 0 0 18				15	0	200
COURSE OBJECTIVES	 To develop simple application projects To understand the importance of documentation To gather knowledge about various UML diagrams 									
		LIST OF PRACTICALS								

FIRST REVIEW: (10 Marks)

- 1. Problem Identification
- 2. Problem definition
- 3. Presentation

SECOND REVIEW:

(10 Marks)

- 3. Project Analysis
- 4. Design & Module description

FINAL REVIEW:

(30 Marks)

- 5. DFD / ERD / System Flow Diagram (Whichever Applicable)
- 6. Coding and Implementation
- 7. Presentation
- 8. Final Project Report (with executable format including complete source code)

The Passing minimum shall be 50% out of 60 marks (30 Marks)