# Master of Computer Applications (MCA) FIRST YEAR SCHEME & SYLLABUS (I and II Semester) 2024



# **ST JOSEPH ENGINEERING COLLEGE**

AN AUTONOMOUS INSTITUTION

Vamanjoor, Mangaluru - 575028

# ΜΟΤΤΟ

Service and Excellence

# VISION

To be a global premier Institution of professional education and research

# MISSION

- Provide opportunities to deserving students of all communities, the Christian students in particular, for quality professional education
- Design and deliver curricula to meet the national and global changing needs through student-centric learning methodologies
- Attract, nurture and retain the best faculty and technical manpower
- Consolidate the state-of-art infrastructure and equipment for teaching and research activities
- Promote all-round personality development of the students through interaction with alumni, academia and industry
- Strengthen the Educational Social Responsibilities (ESR) of the Institution



# ST JOSEPH ENGINEERING COLLEGE

An Autonomous Institution Vamanjoor, Mangaluru - 575028

Affiliated to VTU – Belagavi & Recognized by AICTE New Delhi NBA – Accredited: B.E.(CSE, ECE, EEE, ME and CIV) & PG (MBA and MCA) NAAC – Accredited with A+

# MCA SCHEME & SYLLABUS 2024 (With effect from 2024-25)

**Master of Computer Applications** 

# FIRST YEAR

(I and II Semester)

# AUTONOMY AND ACCREDITATION

St Joseph Engineering College (SJEC) is an Autonomous Institute under Visvesvaraya Technological University (VTU), Belagavi, Karnataka State, and is recognized by the All-India Council for Technical Education (AICTE), New Delhi. SJEC is registered under the trust "Diocese of Mangalore, Social Action Department".

The SJEC has been conferred Fresh Autonomous Status from the Academic Year 2021-22. The college was granted autonomy by the University Grants Commission (UGC) under the UGC Scheme for Autonomous Colleges 2018 and conferred by VTU. The UGC Expert Team had visited the college on 28-29 November 2021 and rigorously assessed the college on multiple parameters. The fact that only a handful of engineering colleges in the state have attained Autonomous Status adds to the college's credibility that has been on a constant upswing. Autonomy will make it convenient for the college to design curricula by recognizing the needs of the industry, offering elective courses of choice and conducting the continuous assessment of its students.

At SJEC, the Outcome-Based Education (OBE) system has been implemented since 2011. Owing to OBE practised at the college, SJEC has already been accredited by the National Board of Accreditation (NBA). Five of the UG programs, namely Computer Science & Engineering, Mechanical Engineering, Electronics and Communication Engineering, Electrical & Electronics Engineering and Civil Engineering and two of the PG programs, namely, MBA and MCA programs, have accreditation from the NBA.

Also, SJEC has been awarded the prestigious A+ grade by the National Assessment and Accreditation Council (NAAC) for five years. With a Cumulative Grade Point Average (CGPA) of 3.39 on a 4-point scale, SJEC has joined the elite list of colleges accredited with an A+ grade by NAAC in its first cycle. The fact that only a small percentage of the Higher Education Institutions in India have bagged A+ or higher grades by NAAC adds to the college's credibility that has been on a constant upswing.

The college is committed to offering quality education to all its students, and the accreditation by NAAC and NBA reassures this fact. True to its motto of "Service and Excellence", the college's hard work has resulted in getting this recognition, which has endorsed the academic framework and policies that the college has been practicing since its inception. The college has been leveraging a flexible choice-based academic model that gives students the freedom to undergo learning in respective disciplines and a transparent and continuous evaluation process that helps in their holistic development.

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## **ABOUT THE DEPARTMENT**

The Master of Computer Applications (MCA) program, established in 2008 with an intake of 60 students, offers a two-year course approved by the All India Council for Technical Education (AICTE) and is an Autonomous Institution affiliated to Visvesvaraya Technological University (VTU), Belgaum, Karnataka. The MCA program is accredited by National Board of Accreditation (NBA) in the year 2024.

The Computer Applications department at St. Joseph Engineering College, Vamanjoor, Mangaluru emphasizes core courses that delve into design and analysis techniques for the software development across diverse application domains. Additionally, students gain insights into the workings of computers and networks. The program also offers elective courses from emerging fields technologies, such as Artificial Intelligence, Cloud Technologies, Cyber Security, Big Data Analytics, Internet of Things, and Drone Technologies etc, allowing students to explore their individual interests. Greater emphasis will be given on application development to better prepare the students for the industry. Currently the department works with an intake of 120 students.

## **DEPARTMENT VISION**

To be recognized as a department with research environment empowering computer professionals with a strong sense of service and human values at the core.

# **DEPARTMENT MISSION**

- Inculcate professional behavior with strong ethical values and innovative research capabilities among faculty and students.
- To meet the global needs and challenges through training of professionals who can work with interest to support the society.
- Encourage faculty to have continuous progress in their teaching skills and self-development.

# PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates will be able to:

- Have appreciation for, Professional and Ethical responsibilities through strong commitment to values.
- Acquire essential fundamentals and adopt techniques and skills to critically identify, formulate and solve computational problems
- Effectively design, develop and manage computer applications, using modern tools and techniques.
- Develop confidence for self-education and innovative entrepreneurship.

### **PROGRAM OUTCOMES (POs)**

**PO1 Foundation Knowledge:** Apply knowledge of mathematics, programming logic and coding fundamentals for solution architecture and problem solving.

**PO2 Problem Analysis:** Identify, review, formulate and analyse problems for primarily focussing on customer requirements using critical thinking frameworks.

**PO3 Development of Solutions:** Design, develop and investigate problems with as an innovative approach for solutions incorporating ESG/SDG goals.

**PO4 Modern Tool Usage:** Select, adapt and apply modern computational tools such as development of algorithms with an understanding of the limitations including human biases.

**PO5 Individual and Teamwork:** Function and communicate effectively as an individual or a team leader in diverse and multidisciplinary groups. Use methodologies such as agile.

**PO6 Project Management and Finance:** Use the principles of project management such as scheduling, work breakdown structure and be conversant with the principles of Finance for profitable project management.

**PO7 Ethics:** Commit to professional ethics in managing software projects with financial aspects. Learn to use new technologies for cyber security and insulate customers from malware.

**PO8 Life-long learning:** Change management skills and the ability to learn, keep up with contemporary technologies and ways of working.

	I Semester MCA – Scheme of Teaching and Examination												
						Teaching Hours/Week			Examination				
Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Theory Lecture	L Tutorial	ъ Practical	Duration in hours	CIE Marks	SEE Marks	Total Marks	Credits
1	PCC	24MCA101	Computer Fundamentals and Operating System	MCA	MCA	03	-	-	03	50	50	100	03
2	PCC	24MCA102	Data Structures with Algorithms	MCA	MCA	03	-	-	03	50	50	100	03
3	IPCC	24MCA103	Introduction to Web Technologies	MCA	MCA	02	-	02	03	50	50	100	03
4	PCC	24MCA104	Database Management Systems	MCA	MCA	03	-	-	03	50	50	100	03
5	BSC	24MCA105	Discrete Mathematics and Statistics	MATHS	MCA	02	02	-	03	50	50	100	03
6	PCC	24MCL106	Data Structures with Algorithms Laboratory	MCA	MCA	01	-	02	03	50	50	100	02
7	PCC	24MCL107	Database Management Systems Laboratory	MCA	MCA	01	-	02	03	50	50	100	02
8	SDC	24ITM108	Industry-Oriented Training- I (Mathematical Skills)	MATHS	-	-	02	-	02	50	-	50	-
9	NCMC	24AEC109	Research Methodology & IPR (Online)	MCA	-	-	01		-	50	-	50	-
					Total	15	05	06	23	450	350	800	19
* Bri	dge Course	s for students w	ith Non-Computer Science and Non-Mathematics	background sh	all be conduc	cted with 2	hours pe	r week c	ulminatin	g with a	structure	d assess	ment
proce	ess.												

Note: PCC: Professional Core Course, IPCC: Integrated Professional Core Course, PEC: Professional Elective Course; BSC: Basic Science Course, SDC: Skill Development								
Course; INT =Internship, NCMC: Non Credit Mandatory Course, AEC: Ability Enhancement Course								
Definition of Credit:	One hour Lecture (L) per week per semester - 1 Credit. Two hour Tutorial (T) per week per semester - 1 Credit							
Demintion of Credit.	The hour becaute (L) per week per sentester – refeat, r wo-nour r utoriar (r) per week per sentester – r eredit							
	Two-hour Practical/Laboratory (P) per week per semester = 1 Credit							

	II Semester MCA - Scheme of Teaching and Examination												
							Teaching Hours/Week			Examination			
SI. No	SI. Course and Course No Code C		Course Title	l'eaching Department	'aper Setting Soard	Theory Lecture	Tutorial	Practical	)uration in Iours	CIE Marks	EE Marks	<b>Fotal Marks</b>	Credits
1	PCC	24MCA201	Software Engineering and Testing			L 03	Т	Р		50	50	100	03
1	IPCC	24MCA201	Computer Networks	MCA	MCA	02	-	02	03	50	50	100	03
2	PCC	24MCA203	Data Analytics using Python	MCA	MCA	03	_	-	03	50	50	100	03
3	PCC	24MCA204	Enterprise Java	MCA	MCA	03	-	-	03	50	50	100	03
4	PEC	24MC205X	Specializations 1	MCA	MCA	03	-	-	03	50	50	100	03
5	PEC	24MC206X	Specializations II	MCA	MCA	03	-	-	03	50	50	100	03
6	PCC	24MCL207	Data Analytics using Python Laboratory	MCA	MCA	01	-	02	03	50	50	100	02
7	PCC	24MCL208	Enterprise Java Laboratory	MCA	MCA	01	-	02	03	50	50	100	02
8	SDC	24AEC209	Ability Enhancement Course with Seminar -1	MCA	MCA	-	-	02	03	50	50	100	01
9	SDC	24ITP210	Industry Oriented Training II (Problem Solving Skills)	СОМ	-	-	02	-	02	50	-	50	-
					Total	19	02	08	26	450	400	850	23

Specializations	1: Networks and Security	Specializations II: Software and Applications				
24MC205A	Ethical Hacking	24MC206A	Devops			
24MC205B	Cyber Security	24MC206B	Software Architecture			
24MC205C	Cryptography and Network Security	24MC206C	Enterprise Resource Planning			
24MC205D	Network and Linux Administration	24MC206D	Mobile Application Development			
24MC205E	Blockchain Technology	24MC206E	Parallel Computing			
24MC205F	Mobile and Wireless Security	24MC206F	Salesforce Administrator			

	III Semester MCA - Scheme of Teaching and Examination												
				Teaching Hours/Week		Teaching Hours/Week Examination							
SI. No.	Course and Course Code		Course Title	eaching epartment	aper Setting oard	Theory Lecture	Tutorial	Practical	uration in ours	IE Marks	EE Marks	otal Marks	Credits
				ĔĂ	ã ă	L	Т	Р	р Д	C	IS	T	
1	IPCC	24MCA301	Advances in Web Technologies	MCA	MCA	02	-	02	03	50	50	100	03
2	PCC	24MCA302	Programming using C#.NET	MCA	MCA	03	-	-	03	50	50	100	03
3	PEC	24MC303X	Specializations III	MCA	MCA	03	-	-	03	50	50	100	03
4	PCC	24MCL304	Programming using C#.NET Laboratory	MCA	MCA	01	-	02	03	50	50	100	02
5	SDC	24MCP305	Project Work	MCA	MCA	-	-	16	03	50	50	100	11
			Total			11	00	20	18	300	300	600	22

Specializations III: Advanced Technologies and Intelligence							
24MC303A	Machine Learning						
24MC303B	Introduction to Generative AI						
24MC303C	Deep Learning Fundamentals						
24MC303D	Introduction to Drone Technologies						
24MC303E	Artificial Intelligence of Things						
24MC303F	Big Data Analytics						

	IV Semester MCA - Scheme of Teaching and Examination																
	Course and Course Code Code Course Title									Teach	ing Hou	rs/Week		Examir	nation		
SI. No.			Course Title	Teaching Department	aper Setting oard	Theory Lecture	f Tutorial	Practical	uration in ours	IE Marks	EE Marks	otal Marks	redits				
			ΗQ	2 A	L	Ĩ	P	Q 4	C	S	F	0					
1	SDC	24AEC401	MOOCs (Online Courses 12 Weeks duration)	MCA	Any MO Departmen between I S	Any MOOC topic (Choices are given by the Department) with minimum 12 weeks to be completed - 100 between I Sem to IV Sem)				100	04						
2	SDC	24MCS402	Technical Seminar	МСА	-	-	-	-	02	100	-	100	02				
3	INT 24INT403 Research Internship/Industry Internship/ Startup Internship		-	-	-	-	-	03	50	50	100	10					
Tota	Total					00	00	00	05	150	50	300	16				

		Semester-wise credit distribution						
Sl. No.	Course Area	Ι	II	III	IV			
1.	BSC	03	-	-	-			
2.	PCC	13	13	5	-			
3.	IPCC	03	03	3	-			
4.	PEC	-	06	3	-			
5.	SDC	-	01	11	6			
6.	INT	-	-	-	10			
Total		19	23	22	16			

# FIRST SEMESTER

COMPUTER FUNDAMENTALS AND OPERATING SYSTEM										
Course Code	24MCA101	CIE Marks	50							
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50							
Credits	03	Exam Hours	03							
Course Learning Objectives:										
1. To realize the concepts of computer system organization.										
2. To get the basic insights of	of operating system	ns.								
3. To analyze process mana	gement in the oper	ating system.								
5. To describe detection and prevention deadlock techniques										
6. To describe memory management techniques in operating system										
Module-1 8Hrs										
Binary Systems and Combinational Logic Digital Computers and Digital Systems, Binary Numbers,										
Number Base Conversion, Octal and Hexadecimal Numbers, subtraction using r's and r-1										
complements, Binary Storage and Registers, Binary Logic, Digital Logic Gates, Basic structure of										
computers.										
Module-2 8Hrs										
Introduction to Operating Systems, What operating systems do, Operating System Structure, Operating										
System Operations, Operating S	ystem Services, S	System Calls, Types	of System Calls, System							
Programs, Process Management:	Process concept,	process state, proce	ess control block, Process							
Scheduling.										
Module-3			8Hrs							
Process Scheduling: Basic Conce	epts, Scheduling	Criteria, Scheduling	Algorithms, - FCFS, SJF,							
Priority Scheduling, Round Robi	n Scheduling. Syr	Priority Scheduling, Dound Dokin Scheduling, Synchronization Deckaround, The Critical Section								
Priority Scheduling, Kound Kobin Scheduling, Synchronization Background, The Critical Section										
Philosophers Problem using Semaphores										
Philosophers Problem using Sema	Problems of Sync phores.	hronization: Readers	-Writers Problem, Dining							
Philosophers Problem using Semaj Module-4	Problems of Sync phores.	hronization: Readers	-Writers Problem, Dining 8Hrs							
Philosophers Problem using Sema Module-4 Deadlocks: System model, Deadl	Problems of Sync phores. ock Characterizati	chronization: Readers	-Writers Problem, Dining 8Hrs dling deadlocks, Deadlock							
Philosophers Problem using Sema Module-4 Deadlocks: System model, Deadl Prevention, Deadlock Avoidance, 1	Problems of Sync phores. ock Characterizati Deadlock Detectio	chronization: Readers ion, Methods for han n and Recovery from	Writers Problem, Dining           8Hrs           dling deadlocks, Deadlock							
Problem, Semaphores, Classic F Philosophers Problem using Semaj Module-4 Deadlocks: System model, Deadl Prevention, Deadlock Avoidance, Module-5	Problems of Sync phores. ock Characterizati Deadlock Detectio	chronization: Readers	Writers Problem, Dining 8Hrs dling deadlocks, Deadlock Deadlock. 8Hrs							
Philosophers Problem using Semaj Module-4 Deadlocks: System model, Deadl Prevention, Deadlock Avoidance, T Module-5 Memory Management Strategies	Problems of Sync phores. ock Characterizati Deadlock Detectio : Basic Hardward	ion, Methods for han n and Recovery from e, Swapping, Contig	-Writers Problem, Dining 8Hrs dling deadlocks, Deadlock Deadlock. 8Hrs uous Memory Allocation,							
Philosophers Problem using Semaj         Module-4         Deadlocks: System model, Deadl         Prevention, Deadlock Avoidance, 1         Module-5         Memory Management Strategies         Segmentation, Paging, Virtual	Problems of Sync phores. ock Characterizati Deadlock Detectio : Basic Hardward Memory Manag	ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background,	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page							
Philosophers       Problem using Semaj         Module-4       Deadlocks: System model, Deadl         Prevention, Deadlock Avoidance, Improvement and the segment algorithms: FIFO, LI	Problems of Sync phores. ock Characterizati Deadlock Detectio : Basic Hardward Memory Manag RU, Optimal Page	chronization: Readers ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background, Replacement Algorith	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page         m.							
<ul> <li>Problem, Semaphores, Classic F</li> <li>Philosophers Problem using Semaphores</li> <li>Module-4</li> <li>Deadlocks: System model, Deadl</li> <li>Prevention, Deadlock Avoidance, T</li> <li>Module-5</li> <li>Memory Management Strategies</li> <li>Segmentation, Paging, Virtual</li> <li>Replacement algorithms: FIFO, LI</li> </ul>	Problems of Sync phores. ock Characterizati Deadlock Detectio : Basic Hardward Memory Manag RU, Optimal Page	chronization: Backgro ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background, Replacement Algorith	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page         im.							
<ul> <li>Problem, Semaphores, Classic F</li> <li>Philosophers Problem using Semaphores</li> <li>Module-4</li> <li>Deadlocks: System model, Deadl</li> <li>Prevention, Deadlock Avoidance, T</li> <li>Module-5</li> <li>Memory Management Strategies</li> <li>Segmentation, Paging, Virtual</li> <li>Replacement algorithms: FIFO, LI</li> <li>Course Outcomes: At the end of the second seco</li></ul>	Problems of Sync phores. ock Characterizat Deadlock Detectio : Basic Hardward Memory Manag RU, Optimal Page he course the stude	chronization: Backgro ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background, Replacement Algorith	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page         m.							
Problem, Semaphores, Classic F         Philosophers Problem using Semaphores         Module-4         Deadlocks: System model, Deadl         Prevention, Deadlock Avoidance, F         Module-5         Memory Management Strategies         Segmentation, Paging, Virtual         Replacement algorithms: FIFO, LI         Course Outcomes: At the end of t         24MCA101.1         Realize the cond	Problems of Sync phores. ock Characterizati Deadlock Detectio : Basic Hardward Memory Manag RU, Optimal Page he course the stude epts of computer s	ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background, Replacement Algorith ent will be able to:	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page         m.							
Problem, Semaphores, Classic F         Philosophers Problem using Semaphores         Module-4         Deadlocks: System model, Deadl         Prevention, Deadlock Avoidance, T         Module-5         Memory Management Strategies         Segmentation, Paging, Virtual         Replacement algorithms: FIFO, LI         Course Outcomes: At the end of t         24MCA101.1       Realize the conc         24MCA101.2       Get the basic inst	Problems of Sync phores. ock Characterization Deadlock Detection : Basic Hardward Memory Manag RU, Optimal Page the course the stude repts of computer stights of operating	chronization: Backgro ion, Methods for han n and Recovery from e, Swapping, Contig gement: Background, Replacement Algorith ent will be able to: system organization. systems.	Sund, The Critical Section         -Writers Problem, Dining         8Hrs         dling deadlocks, Deadlock         Deadlock.         8Hrs         uous Memory Allocation,         Demand Paging, Page         im.							

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year		
Textb	ooks					
1.	Operating System ConceptsAbraham Silberschatz, Peter Baer Galvin, Greg GagneWiley – India			8th Edition, 2017		
2.	Digital Logic and Computer Design.	M.Morris Mano	Pearson education	3 <sup>rd</sup> Edition, 2023		
3.	Computer Organization	Carl Hamacher, Zvonko Vranesic Safwat Zaky	Tata McGraw- Hill	5th Edition, 2011		
Refe	rence Books					
1.	Operating Systems – A Concept Based Approach	D M Dhamdhere	Tata McGraw – Hill	2 <sup>nd</sup> Edition, 2002		

# Web links/Video Lectures/MOOCs

1. <u>https://www.coursera.org/learn/os-power-user</u>: Introductions to Operating Systems

2. <u>https://onlinecourses.nptel.ac.in/noc21\_cs88/preview</u> : Operating system Fundamentals

### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)								
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
24MCA101.1	3							2	
24MCA101.2	3	2							
24MCA101.3		3	-	3				2	
24MCA101.4		3	2	2			-		
24MCA101.5		2	3		3	3		2	
24MCA101.6		2	3	2		2		3	

DATA STRUCTURES WITH ALGORITHMS							
Course Code		24MCA102	CIE Marks	50			
Teaching Hours/	Week (L:T:P)	(3:0:0)	SEE Marks	50			
Credits		03	Exam Hours	03			
Credits03Exam Hours03Course Learning Objectives:1.To use the concepts of Stack2.To use the concepts Queue, Lists, Trees and Hashing3.To describe concepts and algorithms for searching and sorting.4.To appraise efficiency of algorithms in terms of asymptotic notations for the given problem.5.Apply decrease and conquer and greedy algorithms in problem solving.6.Build solutions for real world problems using concepts of data structuresModule-18 HrsClassification of Data Structures: Primitive and Non- Primitive, Linear and Nonlinear; Data structure Operations, Stack: Definition, Representation, Operations and Applications: Polish and reverse polish expressions, Infix to postfix conversion, evaluation of postfix expression, infix to prefix, postfix to infix conversion.Module-28 HrsRecursion - Factorial, GCD, Fibonacci Sequence, Tower of Hanoi. Queue: Definition,							
Applications of (	Queues. Program	ming Examples.	•				
Module-	3			8 Hrs			
Linked List: Lim Dynamic (Heap) M Types of linked lis removing nodes fro Trees: Binary tree	fations of array femory Allocatic t. Singly Linked om a list, Linked Traversals and re	implementation, Me on, Memory manageme List : Operations- Lind implementations of sta- elated properties.	mory Management ent functions. Defin ked list as a data St acks, Header nodes	: Static (Stack) and ition, Representation, ructure, Inserting and			
Module-4	4			8 Hrs			
Introduction, Fund Fundamentals of A Asymptotic Notation Brute Force: Selec	damentals of the Algorithmic Probons and Basic eff tion Sort and Bul	e Analysis of Algori lem Solving, Importar iciency classes, Mather oble Sort, Sequential S	thm Efficiency, N nt Problem Types, 1 matical analysis of 1 earch.	otion of Algorithm, Analysis Framework, Recursive algorithms.			
Module-	5			8 Hrs			
Divide-and-Conquer: Mergesort, Quicksort, Binary Search Decrease-and-Conquer : Insertion Sort, Depth First and Breadth First Search, Topological sorting. Greedy Technique : Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm							
Course Outcome	s: At the end of t	he course the student v	will be able to:				
24MCA102.1	Apply the conc	epts of Stack and explo	ore its applications				
24MCA102.2	Apply the conc	epts of Queue and List	S				
24IVICA102.3	Describe conce	pis and algorithms for	searching and sorth	ng.			
24MCA102.4	given problem	iciency of algorithms	in terms of asympto	ouc notations for the			
24MCA102.5	Apply decrease	and conquer and gree	dy algorithms in pro	oblem solving.			
24MCA102.6	Build solutions	for real world problem	ns using concepts of	f data structures.			

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textb	ooks			
1	Introduction to the Design and Analysis of Algorithms	Anany Levitin	Pearson Education	3rd Edition, 2023
2	Programming in ANSI C	Balaguruswamy	McGraw Hill Education	8 <sup>th</sup> Edition, 2022
3	Data Structures Using C and C++	Yedidyah Langsam and Moshe J. Augenstein and Aaron M Tenanbanum	Pearson Education Asia	2 <sup>nd</sup> Edition, 2007
Refer	ence Books			
1	Data Structures	Seymour Lipschutz	McGraw Hill	Revised 1 <sup>st</sup> Edition, 2016
2	Fundamentals of Data Structures in C	Ellis Horowitz and SartajSahni	Universities Press	2 <sup>nd</sup> Edition, 2022

### Web links/Video Lectures/MOOCs:

1. Introduction to Data Structures: <u>https://nptel.ac.in/courses/106/102/106102064/</u>

2. Data Structures and Algorithms: <u>https://www.coursera.org/specializations/data-structures-algorithms</u>

### **Course Articulation Matrix**

Course	Program Outcomes (POs)							
Outcomes (COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MCA102.1	3	2						
24MCA102.2	3	2						
24MCA102.3	2	2						
24MCA102.4	2	3						
24MCA102.5	2	2	2					
24MCA102.6			2					2

Course Code	24MCA103	CIE Marks	50			
Teaching Hours/Week (L:T:P)	(2:0:2)	SEE Marks	50			
Credits 03 Exam Hours 03						
Course Learning Objectives: 1. To describe the basics of Web Technology 2. To understand the basics of JavaScrip 3. To implement interactive event driver 4. To demonstrate the applications of JavaScript 5. To apply Database concepts to the Web 6. To apply the Javascript, PHP and Myd Module-1 Web Programming Basics Web browsers, web servers, MIME, URI text markups, images, lists, tables and for XHTML. Working of World Wide Web Basics of Cascading Style Sheets	blogies. t. n documents using dynamic Jav vascript. eb Page using PHP and MySQ SQL concepts for real world ap L, HTTP Introduction to HTMI orms. Introduction to HTML5. : URL, URI, DNS and Web pr	vaScript. L. oplications. 8Hrs Lags, Basic syntax a Difference between otocols.	nd structure, h HTML and			
Introduction to CSS, Levels of CSS, Sel Div tags. Responsive Design.	lectors, Font, color and Text Pr	roperties, BOX Mod	el, Span and			
Module-2		8Hrs				
Data Types Object orientation and Java and expressions, Screen output and modification, Arrays, Functions, Const scripts. <b>The JavaScript Execution Environme</b> The Document Object Model, Elements Events from Body Elements, Handling Model, The navigator Object.	Script, general Syntactic chara keyboard input, Control st ructors, Pattern matching usin <b>nt</b> s Access in JavaScript, Events s Events from Text Box and p	cteristics, Primitives atements, Object c g regular expression and Event Handling password Elements,	, operations, reation and 1s, Errors in g , Handling The DOM2			
Module-3		8Hrs				
<b>Dynamic Documents with JavaScript</b> Introduction, Positioning Elements, Mov Dynamic Content, Stacking Elements, I Movement of Elements, Dragging and I	ving Elements , Element Visibi Locating the Mouse Cursor, R Dropping Elements.	lity, Changing Color eacting to a Mouse	rs and Fonts, Click, Slow			
Module-4		8Hrs				
Advanced Javascript Prototypes and Inheritance, Classes, Err iteration, Modules.	or handling, Promises, async/a	wait, Generators, ad	vanced			
Module-5		8Hrs				
<b>Introduction to PHP</b> Essentials of PHP- Installation of Web method. Regular Expressions-Cookies- and write from the file- PHP Filters-PHD	Server, XAMPP Configuration Sessions- Usage of Include a P. Introduction to Parsing PHP	ns PHP Forms- GET nd require statement -Mysgl. Introduction	and POST ts- File:read			

**INTRODUCTION TO WEB TECHNOLOGIES** 

Т

### LIST OF LABORATORY PROGRAMS

#### Part A

- 1. Create a Web Page for the admission department of your college using XHTML and HTML5 tags. Design all the necessary input fields to collect the information of the student. Apply different levels of style sheets for the Web Page.
- 2. Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible. Modify the above document so that when a text is moved from the top stacking position, it returns to its original position rather than to the bottom.
- 3. Develop and demonstrate using push/pop and shift/unshift operations in jquery
- 4. Demonstrate applications of recursion in JavaScript.
- 5. Demonstrate stack applications using JavaScript.
- 6. Develop multiple webpages with CSS for the student placement application, with a navigation bar in a separate php file and include it in all pages to navigate between them. Keep the navigation icon active based on the page being viewed.
- 7. Write a PHP program to insert name and age information entered by the user into a table created using MySQL, and to display the current contents of this table.
- 8. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table using PHP. Provide buttons to update and delete data for the same.

#### PART-B

1. Develop a web application (mini-project) using the languages and concepts learnt in the theory and exercises listed in part A with a good look and feel effects. Database connection needs to be implemented.

#### Note:

A team of two students must develop the mini project which will be evaluated for other assessments.

Course Outcomes: At the end of the course the student will be able to:							
24MCA103.1	To describe the basics of Web Technologies.						
24MCA103.2	To understand the basics of JavaScript.						
24MCA103.3	To implement interactive event driven documents using dynamic JavaScript.						
24MCA103.4	To demonstrate the applications of Javascript.						
24MCA103.5	To apply Database concepts to the Web Page using PHP and MySQL.						
24MCA103.6	To apply the Javascript, PHP and MySQL concepts for real world applications.						

Sl.No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition And year					
Textbooks									
1	Programming the World Wide Web	Robert W.Sebesta	Pearson education	4 <sup>th</sup> Edition, 2012					

2	HTML5 Black Book	DT Editorial Ssevices	Dreamtech Press India	2 <sup>nd</sup> Edition, 2016				
3	Eloquent JavaScript	Marijn Haverbeke	No Starch Press,US.	3 <sup>rd</sup> Edition 2018				
4	The HTML and CSS Workshop	Lewis Coulson	Packt Publishing, India	2019				
Refer	ence Books							
1.	Web Technologies	Uttam K Roy	Oxford University Press	2010				
2.	Web Programming, building internet applications	Chris Bates	Wiley	2 <sup>nd</sup> Edition, 2002				
3.	Bootstrap: Responsive Web Development	Jake Spurlock	O'Reilly Media	2014				
Web li	nks/Video Lectures/MOOCs		•					
Refere	nce Tutorial Link for Module 2, 3 a	and 4:						
1.	https://javascript.info							
2.	2. <u>https://www.youtube.com/watch?v=cM_AeQHzlGg</u>							
3.	3. <u>https://forum.freecodecamp.org/t/askjs-best-books-to-learn-advanced-javascript/563936</u>							
4.	. https://www.coursera.org/projects/dynamic-web-app-php-mysql							
5.	https://www.coursera.org/specializ	zations/web-applications						
6.	https://www.coursera.org/specializ	ations/full-stack-react						

### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)								
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	
24MCA103.1	-	2	-	-	-	-	-	-	
24MCA103.2	2	2	-	-	-	-	-	-	
24MCA103.3	2	2	-	-	-	-	-	-	
24MCA103.4	2	-	-	-	-	-	-	-	
24MCA103.5	-	2	2	2	-	2	-	2	
24MCA103.6	2	2	3	2	2	2	2	2	

#### Credits 03 Exam Hours 03 **Course Learning Objectives:** 1. To explain basic database concepts, applications, data models, schemas and instances. 2. To demonstrate the use of constraints and relational algebra operations. 3. To implement a database schema for a given problem domain. 4. To describe the basics of SQL and construct queries using SQL. 5. To emphasize the importance of normalization in databases. 6. To distinguish database storage structures and access techniques. **Module-1** 8Hrs Characteristics of Database approach, Actors on the Scene, Workers behind the scene, Advantages of using DBMS approach, A Brief History of Database Applications, Data models, schemas and instances, Three-schema architecture and data independence, Database languages and interfaces, the database system environment, Centralized and client-server architectures, Classification of Database Management systems. **Module-2** 8Hrs Structure of Relational Databases, Database Schema, Keys, Relational Query Languages, Relational Operations. Entity-Relationship Model: Conceptual Database using high level conceptual data models for Database Design, A Sample Database Application, Entity types, Entity sets Attributes and Keys Relationship types, Relationship Sets Functional Dependencies, Normal Forms- 1NF, 2NF, 3NF. **Module-3** 8Hrs SQL data definition and data types, specifying constraints in SQL, basic retrieval queries in SQL, Insert, update and delete statements in SQL, aggregate functions in SQL, group by and having clauses. Module-4 8Hrs Introduction to triggers in SQL, views in SQL, schema change statements in SQL, stored procedures and functions. **Module-5** 8Hrs Introduction to transaction processing, transaction and system concepts, desirable properties of transactions, transaction support in SQL. Concurrency control techniques: two-phase locking techniques, concurrency control based on timestamp ordering, multi version concurrency control techniques, validation concurrency control techniques. Recovery techniques: recovery concepts, recovery in multi database systems, database backup and recovery from catastrophic failures.

**DATABASE MANAGEMENT SYSTEMS** 

24MCA104

(3:0:0)

**CIE Marks** 

SEE Marks

50

50

Course Code

Teaching Hours/Week (L:T:P)

Course Outcomes: At the end of the course the student will be able to: **24MCA104.1** Apply the basic concepts of database management in designing the database for the given problem. 24MCA104.2 Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations. **24MCA104.3** Implement a database schema for a given problem domain. **24MCA104.4** Formulate SQL queries in Oracle to the given problem.

24MCA104.5 Apply normalization techniques to improve the database design to the given problem.24MCA104.6 Distinguish database storage structures and access techniques.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Tex	ktbooks			
1	Fundamentals of Database Systems	Elmasri and Navathe	Pearson	7th Edition, 2017
2	Database System Concepts	Silberschatz, Korth and Sudharshan	Tata McGraw Hill	7 <sup>th</sup> Edition, 2019
Refe	rence Books			
1	An Introduction to Database Systems	C.J. Date, A. Kannan, S. Swamynatham	Pearson Education	8 <sup>th</sup> Edition 2013
2	Database Management Systems	Majmudar Arun K, Bhattacharyya pritimoy	McGraw Hill	1 <sup>st</sup> Edition 2010

### Web links/Video Lectures/MOOCs

1. <u>https://coursera.org/learn/database-management</u>: Introduction to database Management System

2.<u>https://onlinecourses.nptel.ac.in/noc22\_cs91/preview</u>: Database Management System :By Prof. Partha Pratim Das, Prof. Samiran Chattopadhyay | IIT Kharagpur

Course Outcomes	Program Outcomes (POs)								
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
24MCA104.1	3	2							
24MCA104.2		2	3						
24MCA104.3			2	2					
24MCA104.4			2	2					
24MCA104.5			3	2					
24MCA104.6				2				2	

### **Course Articulation Matrix**

	DISCRETE MATHEMAT	ICS AND STATISTICS	5
Course :	24MCA105	CIE Marks	: 50
Credits: L:T:P	2:2:0	SEE Marks	: 50
<b>Total Hours</b> :	40	SEE Duration	: 3 Hrs
Course Learning	Objectives:		
<ol> <li>Use proposition</li> <li>Apply set theor</li> <li>Find relation be</li> <li>Fit a curve for g</li> <li>Apply probabilities</li> <li>Identify different</li> </ol>	al logic in knowledge representatio y in computer applications etween different sets given data points ity distributions in real life problem ent graphs and use it to generate pre	n 18 efix codes	
	Module-I		08 Hrs
<b>Fundamentals</b> of Basic Connectives and NOR, Logic	<b>f Logic:</b> s and Truth Tables, Logical Equival al Implications, Rules of inference.	ence: The laws of logic, Dua . Open Statement, Quantifier	lity, Logical NAND s.
	Module-II		08 Hrs
of relations, Funct Relations. <b>Statistical method</b> Correlation, coeffic Curve Fitting, Prince	ions, Composition and Inverse Fun Module– III s and Curve Fitting cient of correlations, rank correlat ciple of least square- to fit a straigh	ctions Digraph and Matrix of tion lines of regression-prin t line and parabola.	relation, Equivalence 08 Hrs ciple of least square.
	Module –IV		08 Hrs
<b>Random variable</b> Probability of an distributions, cont variables. Binomia	e and probability distribution event, Conditional probability, C inuous probability distributions, Ma al and Poisson distribution, norma	Concept of random variable ean, variance and Standard l distribution.	, discrete probability deviations of random
	Module-V		08 Hrs
<b>Graph Theory</b> Graphs and sub Coloring, Trees a	graphs, Graph Isomorphism, Verte nd Sorting, and Prefix Codes.	ex degree, Euler Graphs, F	Planar Graphs, Graph
Course Outcom	nes: At the end of the course the stu	dent will be able to:	
24MCA105.1	Apply knowledge of propositional	l logic in truth verification	
24MCA105.2	Demonstrate the application of dis	screte structures in different	fields of computer
24MCA105.3	Recognize relations in real life ap	oplications	
24MCA105.4	Correlate data points and fit curve	es for different data points	

Sl. No.	Title of the Book/ Research Papers	Name of the Author/s	Name of the Publisher	Edition and Year
Textb	ooks			
1	Discrete and Combinatorial Mathematics- An Applied Introduction	Ralph P. Grimaldi and B V Ramana	Pearson Education	5 <sup>th</sup> Edition, 2017
2	Fundamentals of Statistics	S.C. Gupta	Himalaya Publishing	6 <sup>th</sup> Edition, 2018
3	Soft Set Theory-Research Paper	P K Maji, R Biswas and A R Roy	Elsvier	2003
Refer	ence Books			
1	Discrete Mathematical Structures with Applications to Computer Science	J.P. Tremblay and R. Manohar	McGraw Hill	I <sup>st</sup> Edition, 2017
2	Discrete Mathematics and its Applications	Kenneth H. Rosen	Tata – McGraw Hill	7 <sup>th</sup> Edition, 2017
3	First Look at Graph Theory	John Clark and Darek Allan Holtan	World Scientific Publishers	1 <sup>st</sup> Edition 1993

Additional Resources: Weblinks/MOOCs				
Correlation and Regression -https://www.youtube.com/watch?v=fNLeogEjMmM				
Probability Distributions- https://www.youtube.com/watch?v=6x1pL9Yov1k				
Mathematical Logic- <u>https://nptel.ac.in/courses/128106032</u>				
Graph theory-https://archive.nptel.ac.in/courses/111/106/111106102/				

## **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8
24MCA105.1	2	1	-	-	-	-	-	1
24MCA105.2	1	1	-	-	-	-	-	1
24MCA105.3	2	1	-	-	-	-	-	1
24MCA105.4	2	1	-	-	-	-	-	1
24MCA105.5	2	1	-	-	-	-	-	1
24MCA105.6	2	1	-	-	-	-	-	1

# DATA STRUCTURES WITH ALGORITHMS LAB

Course Code	24MCL106	CIE Marks	50		
Teaching Hours/Week (L:T:P)	(1:0:2)	SEE Marks	50		
Credits 02 Exam Hours 03					
<ul> <li>Course Learning Objectives:</li> <li>1. Familiarize the knowledge of various types of data structures, operations and algorithms.</li> <li>2. Implement and analyze the performance of Stack and its applications.</li> <li>3. Implement and analyze Queue, Lists operations.</li> <li>4. Implement and analyze Trees and graphs.</li> <li>5. Implement the sorting algorithm.</li> <li>6. Suggest and apply appropriate data structures for solving computing problems.</li> </ul>					
	PART - A				
1. Write a C program to Impleme Search.	ent the following search	ing techniques a. L	inear Search Binary		
<ul><li>2. Write a C program to implement the following sorting algorithms using user defined functions:</li><li>a. Bubble sort (Ascending order)</li><li>b. Selection sort (Descending order).</li></ul>					
<ul><li>3.Write a C Program implement S</li><li>a. Push an Element on to Stack</li><li>b. Pop an Element from Stack</li></ul>	STACK with the followi	ng operations			
4. Implement a Program in C	for converting an Infix E	Expression to Postfi	x Expression.		
5. Implement a Program in C	for evaluating a Postfix	Expression.			
6. Write a C Program implement QUEUE with the following operations: a. enqueue b. dequeue					
<ul> <li>7. Write a C program to simulate the working of a singly linked list providing the following operations:</li> <li>a. Insert at begin</li> <li>b. Delete from the end</li> <li>c. Delete a given element</li> <li>d. Display</li> </ul>					
PART - B					
1. Obtain the Topological ordering	ng of vertices in a given	graph with the help	of a C program		
2. Check whether a given graph i	s connected or not using	the DFS method us	ing C programming		
3. From a given vertex in a weighted connected graph, find shortest paths to other vertices Using Dijkstra's algorithm (C programming)					
4. Find Minimum Cost Spannin ( C programming)	ng Tree of a given undir	ected graph using l	Kruskal's algorithm		

5. Implement a merge sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

<b>Course Outcomes:</b> At the end of the course the student will be able to:				
24MCL106.1 Implement searching and sorting techniques.				
24MCL106.2	Implement Stack in various applications.			
24MCL106.3	Implement Queue and List operations.			
24MCL106.4	Implement decrease and conquer algorithms.			
24MCL106.5	Implement and analyze the sorting algorithms.			
24MCL106.6	Apply appropriate data structures for solving computing problems.			

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textb	ooks			
1	Introduction to the Design and Analysis of Algorithms	Anany Levitin	Pearson Education,	3rd Edition, 2023
2	Programming in ANSI C	Balaguruswamy	McGraw Hill Education	8 <sup>th</sup> Edition, 2022
3	Data Structures Using C and C++	Yedidyah Langsam and Moshe J. Augenstein and Aaron M Tenanbanum,	Pearson Education Asia	2 <sup>nd</sup> Edition, 2007
Refer	ence Books			
1	Data Structures	Seymour Lipschutz, Schaum's Outlines	McGraw Hill	Revised 1 <sup>st</sup> Edition, 2015
2	Fundamentals of Data Structures in C	Ellis Horowitz and SartajSahni,	Universities Press	2 <sup>nd</sup> Edition, 2022

### **Course Articulation Matrix**

Course Outcomes			Prog	gram Ou	tcomes (]	POs)		
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MCL106.1	3	2						
24MCL106.2	3	2						
24MCL106.3	3	2						
24MCL106.4	2	2						
24MCL106.5	2	2						
24MCL106.6	3	2						2

DATABASE MANAGEMENT SYSTEMS LABORATORY				
Course Code	24MCL107	<b>CIE Marks</b>	50	
Teaching Hours/Week (L:T:P)	(1:0:2)	SEE Marks	50	
Credits	02	Exam Hours	03	

### **Course Learning Objectives:**

1. To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework

2. Design entity relationship and convert entity relationship diagrams into

RDBMS and formulate SQL queries on the respect data

3. To facilitate a good formal foundation on the relational model of data

4. To implement a database schema for a given problem domain

5. To demonstrate SQL and procedural interfaces to SQL comprehensively

6. To introduce systematic database design approaches covering conceptual design, logical design and an overview of physical design .

Instructions for the Exercises:

1. Draw an ER diagram based on a given scenario with various Constraints

- 2. Create Relational Database Schema based on the scenario using Mapping Rules
- 3. Perform the given queries using any RDBMS Environment
- 4. Suitable tuples have to be entered so that queries are executed correctly
- 5. The results of the queries may be displayed directly

# 1)Create the following tables by specifying Primary keys, Foreign keys and solve the following queries.

BRANCH (Branchid, Branchname, HOD)

STUDENT (USN, Name, Address, Branchid, sem)

BOOK (Bookid, Bookname, Authorid, Publisher, Branchid)

AUTHOR (Authorid, Authorname, Country, age)

BORROW (USN, Bookid, Borrowed\_Date)

### **Execute the following Queries:**

i. List the details of Students who are all studying in  $2^{nd}$  sem MCA.

ii. List the students who are not borrowed any books.

iii. Display the USN, Student name, Branch\_name, Book\_name, Author\_name,

Books\_Borrowed\_Date of 2nd sem MCA Students who borrowed books.

iv. Display the number of books written by each Author.

v. Display the Book names in descending order of their names.

### 2) Consider the following schema:

# STUDENT (USN, name, date\_of\_birth, branch, mark1, mark2, mark3, total, GPA) Execute the following queries:

i. Update the column total by adding the columns mark1, mark2, mark3.

ii. Find the GPA score of all the students.

iii. Find the students who were born on a particular year of birth from the date\_of\_birth column.

iv. List the students who are studying in a particular branch of study.

v. Find the maximum GPA score of the student branch-wise.

vi. Find the students whose name starts with the alphabet

# 3)Design an ER-diagram for the following scenario, Convert the same into a relational model and then execute the following queries.

Consider a Cricket Tournament "SJEC Premier League" organized by SJEC. In the tournament there are many teams contesting each having a Teamid, Team\_Name, City, a coach. Each team is uniquely identified by using Teamid. A team can have many Players and a captain. Each player is

uniquely identified by Playerid, having a Name, and multiple phone numbers, age. A player represents only one team. There are many Stadiums to conduct matches. Each stadium is identified using Stadiumid, having a stadium\_name, Address (involves city, area\_name, pincode). A team can play many matches. Each match is played between the two teams in the scheduled date and time in the predefined Stadium. Each match is identified uniquely by using Matchid. Each match won by any of the one team that also wants to record in the database. For each match man\_of\_the match award given to a player.

### **Execute the following Queries:**

i. Display the youngest player (in terms of age) Name, Team name, age in which he belongs of the tournament.

ii. List the details of the stadium where the maximum number of matches were played.

iii. List the details of the player who is not a captain but got the man\_of \_match award at least in two matches.

iv. Display the team details of who won the maximum matches.

4) A country wants to conduct an election for the parliament. A country has many constituencies. Each constituency is identified uniquely by Constituency\_id, having the Name, belongs to a state,Number\_of\_voters. A constituency can have many voters. Each voter is uniquely identified by using Voter\_id, having the Name, age, address (involves Houseno,city,state,pincode). Each voter belongs to only one constituency. There are many candidates contesting in the election. Each candidates are uniquely identified by using candidate\_id, having Name, phone\_no, age, state. A candidate belongs to only one party. There are many parties. Each party is uniquely identified by using Party\_id, having Party\_Name,Party\_symbol. A candidate can contest from many constituencies under a same party. A party can have many candidates from the same party. A constituency can have many contesting candidates belongs to different parties. Each voter votes only one candidate of his/her constituency.

### **Execute the following queries:**

i. List the details of the candidates who are contesting from more than one constituency which are belongs to different states.

ii. Display the state name having maximum number of constituencies.

iii. Create a stored procedure to insert the tuple into the voter table by checking the voter age. If voter's age

Is at least 18 years old, insert the tuple into the voter else display "Not an eligible voter"

iv. Create a stored procedure to display the number\_of\_voters in the specified constituency. Where the constituency name is passed as an argument to the stored procedure.

v. Create a TRIGGER to UPDATE the count 'Number of voters' of the respective constituency in 'CONSTITUENCY' table, after inserting tuple into the 'VOTERS' table.

5) Design an ER diagram for the following scenario, Convert the same into a relational model, normalize Relations into a suitable Normal form and then execute the following queries.

A country can have many Tourist places . Each Tourist place is identified by using tourist\_place\_id, having a name, belongs to a state, Number of kilometers away from capital city of that state, history. There are many tourists who visit tourist places every year. Each tourist is identified uniquely by using Tourist\_id, having a Name, age, Country and multiple email id. A tourist visits many Tourist places, it is also required to record the visted\_date in the database. A tourist can visit a Tourist place many times at different dates. A Tourist place can be visited by many tourists either in the same date or at different dates.

### **Execute the following queries:**

i. List the state name which is having maximum number of tourist places

ii. List details of Tourist place where maximum number of tourists visited

iii. List the details of tourists visited all tourist places of the state

iv. Display the details of the tourists visited at least one tourist place of the state but visited all states tourist places

v. Display the details of the tourist place visited by the tourists of all country.

Course Outcome	Course Outcomes: At the end of the course the student will be able to				
24MCL107.1 Design entity-relationship diagrams to solve simple database applications					
24MCL107.2	Implement a database schema for a given problem domain.				
24MCL107.3	Convert entity relationship diagrams into RDBMS.				
24MCL107.4	Formulate SQL queries in Oracle.				
24MCL107.5	Apply normalization techniques to improve the database design.				
24MCL107.6	Build database for any given problem.				

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Te	xtbooks			
1	Fundamentals of Database Systems	Elmasri and Navathe	Pearson	7th Edition, 2017
2	Database System Concepts	Silberschatz, Korth and SudharshanTata McGraw Hill		7 <sup>th</sup> Edition, 2019
Ref	ference Books			
1	An Introduction to Database Systems	C.J. Date, A. Kannan, S. Swamynatham:	Pearson education,	8 <sup>th</sup> Edition 2013
2	Database Management Systems	Majmudar Arun K, Bhattacharyya pritimoy	McGraw-Hill	3 <sup>rd</sup> Edition 2010

### **Course Articulation Matrix**

Course	Program Outcomes (POs)								
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
24MCL107.1		2	3						
24MCL107.2		3	2						
24MCL107.3			2	2					
24MCL107.4			2	2				2	
24MCL107.5			2	2					
24MCL107.6			2					3	

Algebra: Identities	; BODMAS Rule; Logarithms; Indices; Number Series; Simple Interest and		
Module-2	t. 4 Hours		
<b>Time and Work:</b> Fa <b>Time and Distance:</b> Speeds; Boats and S	acts and Formulae; Group work; Pipes and Cisterns. Basics of Time, Speed and Distance; Average journey speed; Relative Streams.		
Module-3	4 Hours		
Average, Percentage and Depreciation; F Profit and Loss: Pro-	e, Age problems: Average; Concept of percentage, Results on Population Problems on ages. ofit and Loss formulae; Percentage of profit and loss, Discount.		
Module-4	4 Hours		
<b>Permutations, Com</b> Random Experimen <b>Ratio, Proportion,</b> Proportion; Variation	<b>binations, Probability:</b> Factorial Notation; Permutations; Combinations; nt; Probability of Occurrence of events. <b>Partnership:</b> Ratio; Ratio in terms of Percentage, Proportion, Mean on; Partnership.		
Module-5	4 Hours		
<b>Geometry:</b> Pythagoras theorem - Heights and Distances; Area; Volume; Surface Area. <b>Clock and Calendar:</b> Problems related to clocks; Calendars; odd days; leap year; Day of the week related to Odd days.			
<b>Course Outcomes:</b>	At the end of the course the student will be able to:		
24ITM108.1	Apply the basic concepts of quantitative abilities related to the Number system.		
24ITM108.2	Evaluate time related problems by knowing the relationship between time/speed/distance or time/work.		
24ITM108.3	Apply the concepts of average, percentage, appreciation and depreciation in real life problems		
24ITM108.4	Solve application problems involving permutations and combinations.		
24ITM108.5	Apply Ratio and Proportion concepts to solve the partnership problems where people share the ownership.		
24ITM108.6	Apply the geometrical concepts in real- world applications.		
	28		

## INDUSTRY ORIENTED TRAINING – I (MATHEMATICAL SKILLS)

24ITM108

(0:2:0)

-

To equip the students with basic concepts and tools of Mathematics to solve placement

To enhance the problem solving skills and improve the basic mathematical skills to help

Number System: Various types of Numbers; Tests of Divisibility; HCF and LCM; Roots and

**CIE Marks** 

SEE Marks

Exam Hours

50

-

2

4 Hours

Course Code

Teaching Hours/Week (L:T:P)

Credits

students prepare for competitive examinations.

**Course Learning Objectives:** 

1.

2.

aptitude papers.

Module-1

Squares.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textb	ooks			
1	Quantitative Aptitude for Competitive Examinations	Dr R S Aggarwal	S. Chand & Company LTD	44 <sup>th</sup> Edition, 2018
2	Quantitative Aptitude for Competitive Examination	R.K Tyagi	MTG Learning Media	First Edition, 2018

## **Course Articulation Matrix**

Course	Program Outcomes (POs)							
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24ITM108.1				2			1	
24ITM108.2		3						
24ITM108.3				2			1	
24ITM108.4		3						2
24ITM108.5				2			1	
24ITM108.6		3						3

# **RESEARCH METHODOLOGY AND IPR**

Course Code	24AEC109	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:1:0)	SEE Marks	-
Credits	-	Exam Hours	-

### **Course Learning Objectives:**

- 1. Identify suitable research methods and articulate research steps for any given problem
- 2. Define the problem statement, perform a literature survey and suggest appropriate solutions
- 3. Test the problem and perform experimental design with the samplings
- 4. Schedule data collection from various sources to segregate primary and secondary data.
- 5. Analyze the results obtained and build on the discussions.
- 6. Apply CopyRight Act/Patent Act/Cyber Law/Trademark concepts and develop conclusions.

### Module-1

**Research Methodology:** Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.

### Module-2

Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration.

Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed.

### Module-3

**Research Design:** Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs.

Design of Sample Surveys: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs

### Module-4

Data Collection: Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method.

Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout.

Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.

### Module-5

Intellectual Property Law Basics, Types of Intellectual Property, Agencies Responsible for Intellectual Property Registration, International Organizations, Agencies, and Treaties, The Increasing Importance of Intellectual Property Rights.

<b>Course Outcomes:</b> At the end of the course the student will be able to:					
24AEC109.1	Identify the suitable research methods and articulate the research steps in a				
	proper sequence for the given problem.				

# 5Hrs

5Hrs

5Hrs

5Hrs

5Hrs

24AEC109.2	Carry out literature surveys, define the problem statement and suggest suitable solutions for the given problem.
24AEC109.3	Analyze the problem and conduct experimental design with the samplings.
24AEC109.4	Perform the data collection from various sources, segregate the primary and secondary data.
24AEC109.5	Analyze the results obtained and build on the discussions.
24AEC109.6	Apply some concepts/sections of CopyRight Act /Patent Act /Cyber Law/ Trademark to the given case and develop – conclusions.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Te	xtbooks			
1	Research Methodology: Methods and Techniques	C.R. Kothari, Gaurav Garg	New Age International	4th Edition, 2022
2	Research Methodology, a Step-by- Step Guide for Beginners	Ranjit Kumar	SAGE Publications Ltd	4th Edition, 2014
3	Intellectual Property, The Law of Trademarks, Copyrights, Patents, and Trade Secrets	Deborah E. Bouchoux	Cengage learning	4th Edition, 2018
Refer	ence Books	•	•	
1	Research Methods: The Concise Knowledge Base	William Trochim	Atomic Dog Publishing	2nd Edition 2006
2	Intellectual Property Rights	Radhakrishnan R	New Delhi , Excel Books(P) Ltd	2017

### Web links/Video Lectures/MOOCs

- 1. Research Methodology: <u>https://onlinecourses.nptel.ac.in/noc23\_ge36/preview</u>
- 2. Intellectual Property Law Specialization: <u>https://www.coursera.org/specializations/introduction-intellectual-property</u>

### **Course Articulation Matrix**

Course Outcomes	es Program Outcomes (POs)							
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8
24AEC109.1		2		2				
24AEC109.2		2						
24AEC109.3		2						
24AEC109.4			2					
24AEC109.5								2
24AEC109.6							2	

MATI	HEMATICS (BRIDO	E COURSE)		
Course Code	24MCA110	CIE Marks	100	
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	-	
Credits		Exam Hours	-	
<b>Course Learning Objectives:</b> Course objectives: The mandatory basic concepts of Sets, Relations, Theory.	learning course viz., Mather Logic, Matrices & Deterr	natics Bridge Course ninants, Sequences of	for MCA aims to provide & Series and Probability	
Module-1			8Hrs	
Introduction. Representation of sets, Types of Sets, Finite set, Infinite set, equivalent set, disjoint set, Subset, Power set. Venn diagram. Set operations: Union, Intersection, Complement of a set, Difference, Symmetric Difference. Laws of set theory. Cartesian product of sets, Relations, and properties.				
Module-2 8Hrs				
Logic Statement, Propositions, Connectives, Basic Logic Operations: Conjunction, Disjunction, Negation, Implication and Double Implication. Truth table, Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.				
Module-3			8Hrs	
Matrix Introduction, Types of matrices, Scalar multiplication, Addition of matrices, Product of matrices. Transpose of a matrix, Symmetric and Skew Symmetric matrix, Rank of a matrix, Determinant of a matrix. Singular matrix.				
Module-4		8]	Hrs	
Introduction, Sequences, Series, Arithmetic Progression, Sum of Finite number of terms in A.P, Arithmetic Means, Geometric Progression, sum to n terms of G.P, Geometric Mean, relation between A.M and G.M.				
Module-5		8	Hrs	
Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability – classical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.				

<b>Course Outcome</b>	Course Outcomes: At the end of the course the student will be able to:				
24MCA110.1	Widen the knowledge of Basic concepts in Set Theory and Apply the fundamentals of set theory and Relations to the given problem				
24MCA110.2	Understand mathematical reasoning to read, comprehend and construct mathematical arguments				
24MCA110.3	Understand the Basic Concepts in Matrices and Formulate the problems in Matrix expression				
24MCA110.4	Determine the sum of the first n terms of an arithmetic and Geometric series				
24MCA110.5	Get the basic concepts of probability and find the probability of simple and compound events				
24MCA110.6	Develop basic mathematics challenge using a programming language				

### Web Link

•http://.ac.in/courses.php?disciplineID=111

•http://www.class-central.com/subject/math(MOOCs)

http://academicearth.org/VTU EDUSAT PROGRAMME-20

### FUNDAMENTALS OF PROGRAMMING (BRIDGE COURSE)

Course Code		24MCA111	CIE Marks	50
Teaching (L:T:P)	Hours/Week	(0:2:0)	SEE Marks	-
Credits		0	Exam Hours	_

### **Course Learning Objectives:**

1.To understand the structure, memory organization, design of the various functional units and components of computers.

- 2. To gain the knowledge about the basics of programming structure and module.
- 3. To study the concept of decision-making statements, loop controlling structures and arrays.
- 4. To learn the concept of structure and execute programs on structures.
- 5. To gain knowledge about pointers and execute the programs using pointers.
- 6. To learn the concept of logic gates and its applications in solving some societal/industrial problems

### **Module-1**

Basic Structure of Computer Hardware and Software, Computer Types, Functional Units, Basic Operational Concepts, Bus structure, Software, Performance, Multiprocessing and Multi computers, Machine Instruction: Memory Locations and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Interrupts.

#### **Module-2**

### C Programming: decision making, control structures and arrays

Decision making with if statement, simple if statement, the if..else statement, nesting of if..else statements, the else..if ladder, the switch statement, the ?: operator, the goto statement, the break statement, programming examples. The while statement, the do...while statement, the for statement, nested loops, jumps in loops, the continue statement, programming examples. one dimensional and two dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of above types of arrays.

### Module-3

### Structures

Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures within structures, structures and functions, Unions, size of structures.

### **Module-4**

#### **Pointers**

Pointers in C, Declaring and accessing pointers in C, pointers in C++, Pointer as function arguments, Dynamic Allocation Operators new and delete, Initializing Allocated Memory, Allocating Arrays, Allocating Objects. Overloading, overloading operators.

#### **Module-5**

Binary Systems and Combinational Logic, Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, subtraction using r's and r-1 complements, Binary Code, Binary Storage and Registers, Binary Logic, Integrated Circuits, Digital Logic Gates.

4 Hrs

4 Hrs

4 Hrs

4 Hrs

4 Hrs

<b>Course Outcome</b>	Course Outcomes:				
At the end of the	course the student will be able to:				
24MC A 111 1	Describe the structure, memory organization, design of the various functional units				
24MCA111.1	and components of computers.				
24MCA111.2	Explain the basics of programming structure and module.				
24MCA 111 2	Demonstrate the concept of decision making statements, loop controlling structures.				
24MCA111.5	Execute simple programs, programs using arrays and structures.				
24MCA1114	Explain the concepts of functions and subroutine, execute the programs				
2 1010/11/11	Explain the concepts of functions and subformine, execute the programs.				
24MCA111.5	Explain the pointer concepts and execute the programs using pointers.				
24MCA111.6	Explain the applications of logic gates in solving some societal/industrial problems.				

Sl. No.	Title of the Book	Name of the Author	Name of the Publisher	Edition and Year								
Textbooks												
1	Programming in ANSI C	Balaguruswamy	Tata McGraw Hill	6th Edition, 2012								
2	Let us C	Yashwant Kanetkar	BPB Publications	18th Edition, 2022								
3	Computer Organization	Carl Hamacher, Zvonko Vranesic, Safwat Zaky	Tata McGraw- Hill	5th Edition, 2022								
Reference Books												
1	C : The Complete Reference	Herbert Schildt	McGraw Hill Education	4th Edition, 2017								
2	Digital Logic and Computer Design	M.Morris Mano	Pearson	2023								

### Web links/Video Lectures/MOOCs

- 1. Introduction: to Programming: <u>https://www.coursera.org/learn/programming-introduction</u>
- 2. Computer Organization: <u>https://nptel.ac.in/courses/106103068</u>

### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)									
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
24MCA111.1	2				2					
24MCA111.2	2	2								
24MCA111.3	2	2								
24MCA111.4	2	2								
24MCA111.5	2	2								
24MCA111.6	2							2		
# **Second Semester**

SOFTWARE ENGINEERING AND TESTING							
Course Code	24MCA201	CIE Marks	50				
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50				
Credits	03	Exam Hours	03				
Course Learning Objectives:1.To get insight on IEEE/ACM code of software engineering ethics.2.To describe requirement engineering.3.To analyze different requirements using UML tools.4.To discuss UML based object and class concepts.5.To apply Software Testing concepts.6.Apply correct process models for software development.							
Module-1			8Hrs				
Introduction: Professional Software Development Attributes of good software, software engineering diversity, IEEE/ACM code of software engineering ethics, case studies. Software Process and Agile Software Development Software Process models: waterfall, incremental development, reuses oriented, Process activities; coping with change, The Rational Unified Process. Agile Methods, Plan-Driven and Agile Development.							
Module-2			8Hrs				
Requirement Engineering: Fu document, Requirements s elicitation and analysis, Requi	nctional and non-functiona pecification, Requiremen irement validation, Require	al requirements, The ts engineering pro- ement management.	Software requirements ocesses, Requirement				
Module-3		8rs					
Object orientation and OO development. OO features, OO themes. Modeling as design Technique: Modeling: The three models. Object and class concepts, Link and associations concepts, Generalization and inheritance, A sample class model. Navigation of class models. <b>Advanced objects and class concepts</b> ; Associations ends; N-array association; Aggregation, composition, Abstract class, Multiple inheritance, metadata, constraints, derived data, packages.							
Module-4			8Hrs				
<ul> <li>State modeling: Events, States, Transitions and Conditions. State Diagram: State diagram behavior,</li> <li>Advanced State Modeling: Nested state diagram, Nested states, signal generalization, concurrency,</li> <li>A sample state model.</li> <li>Interaction modeling: Use Case models. Sequence models. Activity models.</li> </ul>							
Module-5 8Hrs							
WIODUIE-5SHrsIntroduction to Testing, The Six Essentials of Software Testing, Software Testing Fundamentals, Black-Box and White-Box Testing, Basic path Testing, Control Structure testing. Testing Strategies : Strategic Approach to Software testing- VV Model, Organizing for Software testing, A software testing Strategy for conventional architectures, A software testing Strategy for Object Oriented architectures, Criteria for completion of testing							

Course Oute	Course Outcomes: At the end of the course the student will be able to:				
24MCA201.1 Get insight on IEEE/ACM code of software engineering ethics.					
24MCA201.2	Describe requirement engineering.				
24MCA201.3	Analyze different requirements using UML tools.				
24MCA201.4	Discuss UML based object and class concepts.				
24MCA201.5	Apply Software Testing concepts.				
24MCA201.6	Apply correct process models for software development.				

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	tbooks	I		I
1	Software Engineering	Ian Sommerville	Pearson Edition Ltd	9 <sup>th</sup> Edition 2011
2	Software Engineering	PankajJalote	Wiley India Pvt Ltd	2 <sup>nd</sup> Edition 2010
3	Object Oriented Modeling and Design with UML	Michel Blaha, James Rumbaugh	Pearson	2 <sup>nd</sup> Edition 2007
4	Software Engineering- A Practitioner's Approach	Roger S Pressman	Mc Graw Hill	7 <sup>th</sup> Edition 2006
Refere	ence Books			
1	Object oriented software engineering	Stephan R. Schach	Tata McGraw Hill	2 <sup>nd</sup> Edition 2007
2	Applying UML and Patterns	Craig Larman	Pearson Education	3rd Edition 2005

### Remote Laboratory Link

1. http://vlabs.iitkgp.ernet.in/se/

Web links/Video Lectures/MOOCs

1. https://nptel.ac.in/courses/106/105/106105182/ Software Engineering

2. <u>https://www.coursera.org/learn/os-power-user</u> : Software Testing and Automation Specialization

### **Course Articulation Matrix**

(COs)	Program Outcomes								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
24MCA201.1							2	2	
24MCA201.2						2	2		
24MCA201.3				2	2				
24MCA201.4				2	2				
24MCA201.5		2					2		
24MCA201.6					2	2	2		

Course	e Learning Objectives:						
1.	To provide an introducti	ion to the OSI and T	CP/IP layers.				
2.	To gain an understanding	To gain an understanding of the roles of data link control protocols.					
3.	3. To develop the ability to explain the network layers working principles.						
4.	4. To provide a comprehensive introduction to analyze the transport layer functionalities.						
5.	To familiarize various ne	twork security and a	pplications.				
6.	To Analyze the basic error	or detection technique	ues and reliable transmissi	ion.			
Module	e-1			6 Hrs			
Applica	ations, Requirements, Netw	ork Architecture, Pe	erformance.				
Module	e-2			6 Hrs			
Encodir Reliable	ng (NRZ, NRZI, Manche e Transmission.	ester, 4B/5B), Fram	ning-PPP, HDLC, SONE	ET, Error Detection,			

### Module-3

Course Code

Credits

Teaching Hours/Week(L:T:P)

Internetworking and Advanced Internetworking Switching and Bridging- Datagrams, Virtual Circuit Switching, Basic Internetworking (IP), Routing – Network as a graph, Distance Vector.

#### Module-4

End-to-End Protocols and Congestion Control Simple Demultiplexer (UDP), Reliable Byte Stream (TCP), Queuing Disciplines, TCP Congestion Control.

#### Module-5

Network Security

Cryptographic Building Blocks - Principles of cipher, Symmetric Key Cipher, Public Key cipher, Firewalls.

### LIST OF LABORATORY PROGRAMS

#### **PART-A**

#### Implement the following Computer Networks concepts using C/C++

- 1. Write a program for a distance vector algorithm to find a suitable path for transmission.
- 2. Using TCP/IP sockets, write a client-server program to make the client send the file name and to make the server send back the contents of the requested file if present.
- 3. Write a program for Hamming code generation for error detection and correction.
- 4. Write a program for congestion control using leaky bucket algorithm.

#### **PART-B**

#### (Simulate the following Computer Networks concepts using any network simulators)

- 1. Simulate a three nodes point to point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
- 2. Simulate the network with five nodes n0, n1, n2, n3, n4, forming a star topology. The node n4 is at the center. Node n0 is a TCP source, which transmits packets to node n3 (a TCP sink) through the node n4. Node n1 is another traffic source, and sends UDP packets to node n2

**CIE Marks** 

**SEE Marks** 

Exam Hours

24MCA202

(2:0:2)

03

6 Hrs

50

50

03

6 Hrs

6 Hrs

through n4. The duration of the simulation time is 10 seconds.

3. Simulate to study transmission of packets over Ethernet LAN and determine the number of packets drop destination.

<b>Course Outcom</b>	<b>Course Outcomes:</b> At the end of the course the student will be able to:					
24MCA202 .1	Apply the basic concepts of networking and to analyze different parameters such as bandwidth, delay, throughput of the networks for the given problem.					
24MCA202.2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication.					
24MCA202.3	Analyze the networking concepts of TCP/IP for wired and wireless components.					
24MCA202.4	Identify the issues of Transport layer to analyze the congestion control mechanism.					
24MCA202.5	Design network topology with different protocols and analyze the performance.					
24MCA202.6	Analyze the basic error detection techniques and reliable transmission.					

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Tex	tbooks			
1	Computer Networks A Systems Approach	Larry L Peterson and Bruce S Davie	Morgan Kaufmann Publishers	5th Edition, 2012
Refe	erence Books			
1	Computer Networking – A Top-Down Approach Featuring the Internet	James F. Kurose, Keith W. Ross	Pearson Education	Fifth Edition, 2009
2	Computer and Communication Networks	Nader. F. Mir	Pearson Prentice Hall Publishers	Second Edition, 2010
3	Computer Networks: An Open Source Approach	Ying-Dar Lin, Ren- Hung Hwang, Fred Baker	McGraw Hill Publisher	2012
4	Data Communication and Networking	Behrouz A. Forouzan	Tata McGraw – Hill	Fourth Edition, 2011

### Web links/Video Lectures/MOOCs/papers

- 1. https://www.coursera.org/learn/computer-networking
- 2. https://www.coursera.org/specializations/computer communication

Course	Program Outcomes (POs)							
Outcomes (COs)	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO 8
24MCA202 .1	2				2			
24MCA202.2		2					2	
24MCA202 .3			2			2		
24MCA202 .4		2			2			
24MCA202 .5	2				2			
24MCA202 .6		2					2	



DATA ANALYTICS USING PYTHON							
Course Code	24MCA203	CIE Marks	50				
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50				
Credits	03	Exam Hours	03				
Course Learning Objectives:							
1. To apply fundamenta	l Python programming c	oncepts.					
2. To implement Python	collection objects and f	unctions.					
3. To apply object-orien	ted programming conce	pts in Python. lata structures for d	lata analycic				
5. To implement data lo	ading and wrangling in l	Python.	iata analysis.				
6. To implement the dat	a visualization tools mat	plotlib and seabor	n.				
Module-1		<u>*</u>	08Hrs				
<b>Python Basic Concepts and Programming:</b> Interpreter – Program Execution – Statements – Expressions – Flow Controls – Functions - Numeric Types – Sequences - Strings, Parts of Python Programming Language, Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() Function and Is Operator, Control Flow Statements, The if Decision Control Flow Statement, The ifelse Decision Control Flow Statement, The ifelifelse Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments							
Module-2			08Hrs				
<b>Python Collection Objects, Cl</b> Operations, Accessing Characters Methods, Formatting Strings, List Lists, Built-In Functions Used o reading and writing files, Class D	asses: Strings- Creating in String by Index Num as-Creating Lists, Basic I on Lists, List Methods. efinition – Constructors	ng and Storing S nber, String Slicing List Operations, Inc Sets, Tuples and – Inheritance – Ov	trings, Basic String g and Joining, String dexing and Slicing in Dictionaries. Files: verloading				
Module-3			08Hrs				
Introduction to Numpy and Pandas :Numpy: Understanding data types in python, basics of Numpy arrays, computation on NumPy arrays: universal function. (refer chapter 2 from python data science handbook)         Pandas: Introducing to pandas data structure, essential functionally, summarizing and computing descriptive statistics, handling missing data.(refer chapter 5 from python for data Analytics).							
Module-4			08Hrs				
<b>Data Loading and Data Wrangling:</b> Reading and writing data in text format, interacting with databases, combining and merging data sets, reshaping and pivoting, data transformation(refer chapter 6 and 7 from python for data Analytics.)							
Module-5 08Hrs							
Widule-5         08Hrs           Visualization with Matplotlib, and Seaborn: General Matplotlib tips, simple line plots, simple scatter plots, visualizing errors, density and contour plots, histograms, binning and density, customizing plot legends and colorbars, customizing matplotlib, visualization with seaborn. (refer chapter 4 from python data science handbook)							

Course Outcomes: At the end of the course the student will be able to:				
24MCA203.1	Apply fundamental Python programming concepts.			
24MCA203.2	Implement Python collection objects and functions.			
24MCA203.3	Apply object oriented programming concepts in Python.			
24MCA203.4	Apply numpy array functions and pandas data structures for data analysis.			
24MCA203.5	Implement data loading and wrangling in Python.			
24MCA203.6	Implement the data visualization tools matplotlib and seaborn.			

Sl. No	Title of the Book	Name of the Author/sName of the Publisher		Edition and Year	
Tex	tbooks				
1	Think Python: How to Think Like a Computer Scientist	Allen B. Downey	Shroff/O'Reilly	2 <sup>nd</sup> Edition, Updated for Python 3,2016	
2	An Introduction to Python	Guido van Rossum, Fred L. Drake Jr	Network Theory Ltd	Revised Edition for Python 3.2 2011	
3	Python Data Science Handbook: Essential tools for working with data	ols for Jake VanderPlas O'Reilly Me Inc.		1 <sup>st</sup> Edition 2016	
4	PYTHON Programming: using problem solving approach	Reema Thareja	Oxford Uni- Press	1st Edition 2018	
Ref	erence Books				
1	Programming Python	Mark Lutz	O'Reilly Media	4 <sup>th</sup> Edition 2010	
2	Python 3 for Absolute Beginners	Tim Hall and J-P Stacey	Apress	1 <sup>st</sup> Edition 2009	
3	Beginning Python: From Novice to Professional	Magnus Lie Hetland	Apress	2 <sup>nd</sup> Edition 2005	
4	Beginning Python Visualization Crafting Visual Transformation Scripts	ShaiVaingast	Apress	2 <sup>nd</sup> Edition 2014	

- 1. **Python for Applied Data Science:** <u>https://www.coursera.org/learn/python-python-for-applied-data science-ai</u>
- 2. Python for Data Visualization: <u>https://www.coursera.org/learn/python-for-data-visualization</u>

Course Outcomes	Program Outcomes (POs)							
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
24MCA203.1	3	2						
24MCA203.2	2	2						
24MCA203.3	2	2						
24MCA203.4	2	2						
24MCA203.5			2					2
24MCA203.6				3				2

E	ENTERPRISE JAVA				
Course Code	24MCA204	CIE Marks	50		
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50		
Credits	03	Exam Hours	03		
<ul> <li>Course Learning Objectives:</li> <li>1. To apply the concepts of class and inheritance for a problem and interfaces.</li> <li>2. To create and analyze the application using Packages, Exceptions and Multithreading.</li> <li>3. Describe the concepts Event handling and Java network classes.</li> <li>4. Create Database connection for the Java applications and the implementation of servlets.</li> <li>5. Use JSP tags in creating web applications.</li> <li>6. Develop enterprise applications using Java Beans concepts for the given problem.</li> </ul>					
Module-1		8Hr	S		
<ul> <li>Introduction to JAVA: Introducing classes: Class fundamentals; Declaring objects; Assigning object reference variables; Introducing methods; Constructors; The this keyword, Method Overloading, Overloading Constructors, Understanding Static, Introducing Nested and Inner Classes.</li> <li>Inheritance: Inheritance Basics, Member Access, and Inheritance, Constructors and Inheritance, Using Super to Call Superclass constructors, using Super to Access Superclass Members, creating a Multilevel Hierarchy, Order of execution of constructors in Inheritance, Method Overriding, Using Abstract Classes, Using final.</li> <li>Interfaces: Interface Fundamentals, Creating an Interface, Implementing an Interface, Using</li> </ul>					
Module-2		8Hrs			
<ul> <li>Packages: Package Fundamentals, Paimport.</li> <li>Exception Handling: The Exception Consequences of an Uncaught Exception nested try block, throwing an Exception Multithreaded programming: Java multiple threads; Using is Alive() and j</li> </ul>	ackages and Mem on Hierarchy, Ex ion, Multiple catc n, using finally, usi Thread model; M oin(); Synchroniza	ber Access, Importing acception Handling Fu h clauses, catching sub ing throws. ain thread; Creating a tion; Interthread comm	Packages, Static ndamentals, The class Exceptions, thread; Creating unication.		
Module-3		8H	rs		
<b>Event Handling:</b> Two Event Handling Mechanisms, The Delegation Event Model, Events Event Sources, Event Listeners, Event Classes- The MouseEventClass, Event Listener Interfaces-The Mouse Listener Interface, the MouseMotionListener Interface, Delegation Event Model Handling Mouse Events. <b>Networking:</b> Networking basics: Java and the net; InetAddress; TCP/IP client sockets; URL: URLConnection; TCP/IP server sockets; Datagrams.					
Module-4 8Hrs					
Module-48HrsJDBC: JDBC objects: Concept of JDBC; JDBC driver types; JDBC packages; Brief overview of the JDBC process; Database connection; Statement objects - prepared Statement, ResultSet.Servlets: Background; Life cycle of a Servlet; Simple Servlet; Servlet API; javax.servlet package; Reading Servlet parameter; javax.servlet.http package; Handling HTTP requests and responses; Using Cookies_session tracking					

#### Module-5

#### 8Hrs

**Java Server Pages (JSP):** Introduction to JSP: Overview of JSP: JSP Technology, Need of JSP, Benefits of JSP, Advantages of JSP, Basic Syntax, Invoking Java code with JSP Scripting Elements, The JSP Page directive, Including Files and Applets in JSP Pages using JavaBeans components in JSP documents.

**Enterprise Java Beans:** Introduction to Java Beans; Advantages of Java Beans; Enterprise Java Beans; Session Java Bean; Entity Java Bean; Message-Driven Bean.

Course Outco	Course Outcomes: At the end of the course the student will be able to:			
24MCA204.1	Demonstrate a comprehensive understanding of object-oriented programming principles using Java, including classes, objects, and inheritance.			
24MCA204.2	Illustrate the usage of Packages, Implement Exceptions, and multithreading in building efficient applications.			
24MCA204.3	Implement the event-driven and java networking concepts.			
24MCA204.4	Build the Database connection for the Java applications and the implementation of servlets.			
24MCA204.5	Demonstrate the use of JSP tags in the web application.			
24MCA204.6	Develop enterprise applications using Java Beans concepts for the given problem.			

Sl.	Title of the Book	Name of the	Name of the	Edition and
No.		Author/s	Publisher	Year
Text	books			
1	Java Fundamentals, A	Herbert Schildt,	Tata Mc Graw	First Edition,
1.	Introduction	Dale Skrien	H111	2013
2	JAVA the Complete	Herbert Schildt	Tata McGraw	2019
2.	Reference		Hill	2017
	Java Server Programming	DT		
3.	Java EE 7 (J2EE 1.7),	EDITORIAL	Dreamtech Press	2014
	Black Book	SERVICES		
	Core Servlets and Java Server	Marty	Pearson	2nd
4.	Pages	Hall,Larry	Education	Edition, 2006
	I ages	Brown Core		
Refe	erence Books			
	EJB 3 Developer Guide, A		DACKT	Lat Edition
1	Practical Guide For	Michel	PACKI	
1.	Developers And Architects	Sikora	Publishing	2008.
	to the Enterprise Java Beans			
	The Java Complete		Toto MoCrowy	9 th Edition
2	Reference, Comprehensive	Herbert		$\delta$ in Edition,
۷.	coverage of the Java	Schildt	ПШ	2011
	Language			

3.	Java Programming	Hari Mohan Pandey	Pearson Education	First Edition 2012
4.	Java 6 Programming, Black Book	KoGenT	Dreamtech Press	2012
5.	Java 2 Essentials	Cay Horstmann	Wiley	Second Edition, 1999

1. https://www.udemy.com/course/jsp-servletfree

2. https://www.coursera.org/projects/introduction-to-javaprogramming-java-fundamental concepts

3. https://nptel.ac.in/courses/106/105/106105191/

4. https://www.coursera.org/projects/learn-programming-java

#### **Course Articulation Matrix**

Course Outcomes		Program Outcomes (POs)						
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MCA204.1	3	2						
24MCA204.2	3	2						
24MCA204.3	2	2						
24MCA204.4			2	2				
24MCA204.5	3		2	2				2
24MCA204.6				3				2

ETHICAL HACKING					
Course Code		24MC205A	CIE Marks	50	
Teaching Hour	rs/Week (L:T:P)	(3:0:0)	SEE Marks	50	
Credits		03	Exam Hours	03	
1. Understand and apply the principles of information security         2. Secure and manage system permissions         3. Assess and mitigate risks associated with remote access systems         4. Understand and apply security techniques         5. Implement secure web applications and countermeasures         6. Conduct wireless network security assessments         10 Hrs					
Casing the Esta	ablishment: What is foot p	rinting, Internet Foot	printing, Scanning, Enu	meration, basic	
banner grabbin	ng, Enumerating Common	Network services.		_	
Module-2			1	0 Hrs	
Securing perminent registry perminent Remote Access	ission: Securing file and for ssions. Securing service: s vs Local access, Remote	older permission, Usin Managing service per e access, Local access	ng the encrypting file, sy ermission, Unix: The ( s, After hacking root.	vstem, Securing Quest for Root,	
Module-3			10	Hrs	
Dial-up, PBX, PBX hacking, Lookup, Public	Voicemail and VPN hacki Voice mail hacking, VPN c Newsgroups, Service De	ing, Preparing to dial hacking, Network De etection, Network Vu	up, War-Dialing, Brute evices: Discovery Autor Inerability, Detecting L	Force Scripting nomous System ayer 2 Media.	
Module-4			10	Hrs	
Wireless Hack Tools that exp Firewall Iden Vulnerabilities Generic Dos A	ing: Wireless Foot printi loiting WEP Weakness, I atification-Scanning Thr b, Denial of Service Atta attacks, UNIX and Windo	ng, Wireless Scannin Denial of Services A ough firewalls, pa cks, Motivation of I ws DoS.	ng and Enumeration, G ttacks, Firewalls: Firew acket Filtering, Appl Dos Attackers, Types o	aining Access, valls landscape, ication Proxy of DoS attacks,	
Module-5			10	Hrs	
Remote Control Insecurities, Discovering Remote Control Software, Connection, Weakness.VNC, Advanced Techniques Session Hijacking, Back Doors, Trojans, Cryptography, Subverting the systems Environment, Social Engineering, Web Hacking, Web server hacking web application hacking, Hacking the internet Use, Malicious Mobile code, SSL fraud, E-mail Hacking, IRC hacking, Global countermeasures to Internet User Hacking.					
Course Outcor	<b>Course Outcomes:</b> At the end of the course the student will be able to:				
24MC205A.1	Demonstrate knowled grabbing to identify vu	ge of network scan ilnerabilities.	ning, enumeration, and	d basic banner	
24MC205A.2	Secure system files, fo	olders, and registry po	ermissions, and manage	e service access	
24MC205A.3	Identify and mitigate s using ethical hacking t	ecurity risks in dial- echniques.	up, PBX, voicemail, and	d VPN systems	
24MC205A.4	Perform wireless netw weak encryption and d	vork security analysi lenial of service attac	s and mitigate security ks.	y risks such as	

24MC205A.5	Analyze and counteract remote control insecurities, backdoors, and malicious					
	software in remote desktop and network environments.					
24MC205A.6	Secure web applications, email systems, and SSL communications by					
	understanding common attack vectors and applying effective countermeasures.					

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textb	pooks			
	Hacking Exposed 7:	Stuart McClure, Joel	Tata Mc Graw	3 <sup>rd</sup> Edition,
1	Network Security	Scambray and Goerge	Hill	2010
	Secrets & Solutions	Kurtz	Publishers	
2	Microsoft Windows	Bensmith, and Brian	Prentice Hall of	2 <sup>nd</sup> Edition,
Z	Security Resource Kit	Komer	India	2010
Refer	ence Books			
1	A Beginners Guide to	Rafay Baloch	CRC Press	1 <sup>st</sup> Edition,
1	Ethical Hacking	-		2015
	Gray Hat Hacking The	Allen Harper, Shon	McGraw-Hill	3 <sup>rd</sup> Edition,
2	Ethical	Harris, Jonathan Ness,	Osborne Media	2011
	Hackers Handbook	Chris Eagle	paperback	

- 1. Complete Ethical Hacking Bootcamp <u>https://www.udemy.com/share/103JJy/</u>
- 2. Ethical Hacking Essentials (EHE) <u>https://www.coursera.org/learn/ethical-hacking-essentials-ehe</u>
- 3. Ethical Hacking <u>https://onlinecourses.nptel.ac.in/noc22\_cs13/preview</u>

#### **Course Articulation Matrix**

Course Outcomes			Pro	ogram Out	comes (P	Os)		
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MC205A.1	2	2			2			
24MC205A.2	2		2		2			
24MC205A.3	2	2			2	2		
24MC205A.4	2							2
24MC205A.5	2							2
24MC205A.6	2	2			2	2		

CYBER SECURITY				
Course Code	24MC205B	CIE Marks	50	
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50	
Credits	03	Exam Hours	03	

### **Course Learning Objectives:**

- 1. Define the area of cybercrime and forensics.
- 2. Analyze the working of cyber security principles in designing the system.
- 3. Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.
- 4. Analyze the cybercrimes in mobile and wireless devices.
- 5. Investigate the influence of Block chain technology for the cyber security problem and evaluate its role.
- 6. Illustrate tools used in cyber forensic.

### Module-1

### Introduction to Cybercrime and Laws

Introduction, Cybercrime: Definition and Origins of the word, Cybercrime and information Security, Cyber criminals, Classifications of Cyber Crimes. How Criminals Plan Them – Introduction, How Criminals Plan the Attacks, Cybercafé and Cybercrimes, Botnets, Attack Vector, Cloud Computing.

### Module-2

Tools and Methods used in Cybercrime Introduction, Proxy Server and Anonymizers, Password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow.

### Module-3

Phishing and Identity Theft Introduction, Phishing – Methods of Phishing, Phishing Techniques, Phishing Toolkits and Spy Phishing. Identity Theft – PII, Types of Identity Theft, Techniques of ID Theft. Digital Forensics Science, Need for Computer Cyber forensics and Digital Evidence, Digital Forensics Life Cycle.

### Module-4

Mobile and Wireless Devices - Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

### Module-5

### Network Defense tools and block chain technology

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Intrusion Detection System, introduction to block chain technology (definition, tools used for implementation ) and its applications.

### 8Hrs

8Hrs

8Hrs

## 8Hrs

8Hrs

Course Outco	Course Outcomes: At the end of the course the student will be able to:			
24MC205B.1	Comprehend the Cybercrime and its origin			
24MC205B.2	Analyze the working of cyber security principles in designing the system.			
24MC205B.3	Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy			
24MC205B.4	Analyze the cybercrimes in mobile and wireless devices.			
24MC205B.5	Investigate the influence of Block chain technology for the cyber security problem and evaluate its role.			
24MC205B.6	Comprehend Digital Forensics.			

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	books	I	I	
1	Anti-Hacker Tool Kit (Indian Edition)	Mike Shema	Publication McGraw Hill.	4th Edition, 2014
2	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Nina Godbole and Sunit Belapure	Wiley	First Edition, 2023
Refe	rence Books			·
1	Computer Forensics and Cyber Crime: An Introduction	Marjie T. Britz	Pearson	Third Edition, 2013
2	Introduction to Computer Networks and Cyber Security	Chwan-Hwa (John) Wu,J. David Irwin	CRC Press	First Edition, 2014
3	Guide to Computer Forensics and Investigations -Cengage Learning	Bill Nelson, Amelia Phillips, Christopher Steuart	Course Technology Inc	Fourth Edition, 2014
4	Cybersecurity: Managing Systems, Conducting Testing, and Investigating Intrusions	Thomas J. Mowbray	John Wiley & Sons, Inc	First Edition, 2014

1. https://www.coursera.org/specializations/cyber-security

- 2. https://www.edx.org/course/introduction-to-cybersecurity
- 3. Introduction to Information Security I https://nptel.ac.in/courses/106106129

4. <u>https://www.youtube.com/@VTUeShikshanaProgramme/search?query=cyber%20security</u>

5. Block chain technology - <u>https://www.simplilearn.com/blockchain-certification-training-</u> <u>course</u>

Course Outcomes (COs)		Program Outcomes (POs)						
	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MC205B.1		2	2					
24MC205B.2		2	2	2				
24MC205B.3		2	2	2				
24MC205B.4		2	2	2			2	
24MC205B.5	2	2	2	2				
24MC205B.6		2	2	2				2

CRYPTOGRA	PHY AND NETW	ORK SECUR	ITY			
Course Code	24MC205C	CIE Marks	50			
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50			
Credits	03	Exam Hours	03			
<ul> <li>Course Learning Objectives:</li> <li>1. Implement encryption techniques for the given problem and analyze the results</li> <li>2. Design the cipher technique and analyze the functioning of cipher for any given problem</li> <li>3.Execute the public and private key-based cryptography algorithms and investigate the results of the algorithm based on the output</li> <li>4. Construct the cryptographic algorithms using programming languages for any given problem</li> <li>5. Develop security planning for the given case study with data classification, access control and</li> </ul>						
Module-1			8Hrs			
Introduction: OSI Security Archit Mechanism, model for Network Se Classical Encryption Technique: Transposition Techniques.	ecture, Security Attack curity. Symmetric Cipher Mo	s, Security Servic	es, Security Fechniques,			
Module-2			8Hrs			
<ul> <li>Block Ciphers, Data Encryption S</li> <li>Principles, The Data Encryption operation, Evaluation Criteria for A</li> <li>Encryption Round.</li> <li>Public Key Cryptography and K</li> <li>Principles of Public Key Crypto sy exchange.</li> </ul>	Block Ciphers, Data Encryption Standard and Advanced Encryption Standard Block Cipher Principles, The Data Encryption Standard, Block Cipher Design Principles and Modes of operation, Evaluation Criteria for AES, AES Cipher-Encryption and Decryption, Data Structure, Encryption Round. <b>Public Key Cryptography and Key Management:</b> Principles of Public Key Crypto system, RSA algorithm, Key management, Diffie Hellman Key exchange					
Module-3	Module-3 8Hrs					
Message Authentication and Hash Function: Authentication Requirement, Authentication Functions, Message Authentication Code, Hash Functions, Digital Signatures, Digital Signature Standard. Authentication Applications: Kerberos, X.509 Authentication Service						
Module-4			8Hrs			
Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME IP Security: IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations; Key Management.						
Module-5	Module-5 8Hrs					
Web Security: Web security Con Security (TLS); Secure Electronic ' System Security: Intruders, Intru- Types of Firewall and Firewall Con	siderations; Secure So Transaction (SET). sion Detection, Firewa nfiguration.	cket layer (SSL) Ill Design Princij	and Transport layer ples- Characteristics,			

Course Outcome	Course Outcomes: At the end of the course the student will be able to:					
24MC205C.1	Apply encryption techniques for the given problem and analyze the results.					
24MC205C.2	Design the Cipher technique and analyze the functioning of Cipher for the given problem.					
24MC205C.3	Implement the Public and Private key based cryptography algorithms and investigate the results of algorithms based on output.					
24MC205C.4	Design and implement the cryptographic algorithms using programming languages/tools for the given problem/context.					
24MC205C.5	Design the security planning for the given case study for data classification, access control and propose technical solutions, and submit the detailed report with plagiarism check.					
24MC205C.6	Describe how to maintain the Confidentiality, Integrity and Availability of data.					

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	books			
1	Cryptography and Network Security – Principles and Practices	William Stallings	Pearson Education	4th Edition 2009
Refe	rence Books			
1	Cryptography and Network Security	Behrouz A. Forouzan and Debdeep Mukhopadhyay	Tata McGraw- Hill	2nd Edition, 2010
2	Cryptography and Network Security	Atul Kahate	Tata McGraw-Hill	Third Edition, 2007

Course	Program Outcomes (POs)							
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MC205C.1	3	2						
24MC205C.2		3	2	2				
24MC205C.3			2	2				
24MC205C.4			2	2				
24MC205C.5					2	2	2	
23MC205C.6							2	2

# NETWORK AND LINUX ADMINISTRATION

Course Code	24MC205D	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03

### **Course Learning Objectives:**

1. Explain the evolution and architecture of UNIX/Linux systems

To Identify and modify file and directory attributes and permissions to ensure a secure 2. UNIX/Linux environment.

Utilize core UNIX commands to perform system navigation, user management, and file 3. operations.

4. To Manipulate text and file contents effectively using advanced commands.

5. Demonstrate proficiency in UNIX networking by configuring interfaces and performing basic network troubleshooting

6. To implement basic Unix commands.

### **Module-1**

Introduction, overview of LINUX and UNIX: history, features, components, Architecture, Open Source Software, Distributions: UBUNTU, FEDORA, SOLARIS, AIX

### Module-2

File Systems, System Directories, Listing File Attributes, Listing Directory Attributes, File Management, File Permissions, Absolute Paths, Relative Paths, The Security Implications, Changing File Permissions, Directory Permissions, Changing File Ownership.

### Module-3

General features of Unix commands/ command structure. Command arguments and options. Basic Unix commands such as echo, printf, ls, who, date, passwd, cal, Combining commands. Meaning of Internal and external commands. The type command: knowing the type of a command and locating it. The root login. Becoming the super user: su command.

### Module-4

Advanced UNIX commands: Text manipulation: awk,grep,sed,tr ;File operations: basename, ln, find, rsync ;System status and monitoring: last,w,uname; Process management: ptree, kill, nice; File system management: mount and unmount; File transfer: curl

### Module-5

Introduction to UNIX networking, Overview of networking in UNIX, importance of networking in UNIX systems, understanding network interfaces: Ethernet, wifi, loopback, basic networking commands: PING, trace route, netstat, ss, if config, IP

Course Outcomes: At the end of the course the student will be able to:				
24MC205D.1	Understand the basics of Linux and UNIX			
24MC205D.2	Explore about file system			
24MC205D.3	Analyze basic and advanced commands			
24MC205D.4	Apply text manipulation and file operations commands			

8Hrs

8Hrs

8Hrs

8Hrs

### 8Hrs

24MC205D.5	Evaluate system performance and network commands.
24MC205D.6	Implement basic UNIX/Linux commands and networking configurations for practical problem-solving.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	books			
1	UNIX and Shell Programming	Behrouz A. Forouzan, Richard F. Gilberg	Thomson Learning	1st Edition 2003
2	The Linux Administration: A Beginner's Guide	Wale Soyinka	McGraw Hill Education	6th Edition, 2012
Refe	rence Books			
1	UNIX Concepts and Applications	Das, Sumitabha.	Tata McGraw Hill	4th Edition, 2006

- 1. https://nptel.ac.in/courses/117106113
- https://www.emblogic.com/41/linux-network-administration
   https://www.geeksforgeeks.org/introduction-to-unix-system/

#### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)							
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MC205D.1	2							
24MC205D.2	2	2						
24MC205D.3			2					
24MC205D.4				2				
24MC205D.5				2				
24MC205D.6	2		2					

2: Medium 3: High 1: Low

### **BLOCKCHAIN TECHNOLOGY**

Course Code	24MC205E	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03

### **Course Learning Objectives:**

- 1. To demonstrate the basics of Blockchain concepts using modern tools/technologies.
- 2. To analyze the role of Blockchain applications in different domains including cybersecurity.
- 3. To evaluate the usage of Blockchain implementation/features for the given problem.
- 4. To exemplify the usage of bitcoins and its impact on the economy.
- 5. To analyze the application of specific block chain architecture for a given problem.
- 6. To demonstrate the working principles of bitcoin.

### Module-1

Introduction to Blockchain, How Blockchain works, Blockchain vsBitcoin, Practical applications, public and private key basics, pros and cons of Blockchain, Myths about Bitcoin

### Module-2

Blockchain :Architecture, versions, variants, use cases, Life use cases of blockchain, Blockchain shared Database, Introduction to crypto currencies, Types, Applications.

#### Module-3

Concept of Double Spending, Hashing, Mining, Proof of work. Introduction to Merkel tree, Privacy, payment verification, Resolving Conflicts, Creation of Blocks

### Module-4

Introduction to Bitcoin, key concepts of Bitcoin, Merits and De Merits Fork and Segwits, Sending and Receiving bitcoins, choosing bitcoin wallet, Converting Bitcoins to Fiat Currency.

### Module-5

Introduction to Ethereum, Advantages and Disadvantages, Ethereumvs Bitcoin, Introduction to Smart contracts, usage, application, working principle, Law and Regulations. Case Study.

<b>Course Outcomes:</b> At the end of the course the student will be able to:					
24MC205E.1	Demonstrate the basics of Block chain concepts using modern tools/technologies.				
24MC205E.2	Analyze the role of block chain applications in different domains including cyber security.				
24MC205E.3	Evaluate the usage of Block chain implementation/features for the given problem				
24MC205E.4	Demonstrate the usage of bitcoins and its impact on the economy.				
24MC205E.5	Analyze the application of specific block chain architecture for a given problem				
24MC205E.6	Demonstrate the working principles of bitcoin				

8Hrs

8Hrs

8Hrs

8Hrs

8Hrs

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Tex	tbooks			
1	Beginning Blockchain: A Beginner's Guide to Building Blockchain Solutions	Arshdeep Bikramaditya Signal, Gautam Dhameja Priyansu Sekhar Panda	APress	1 <sup>st</sup> Edition 2018
2	Blockchain Applications: A Hands-On Approach	Bahga, Vijay Madisetti	Published By Arshadeep Bahga & Vijay Madisetti	1 <sup>st</sup> Edition 2017
3	Blockchain	Melanie Swan	OReilly	1 <sup>st</sup> Edition, 2015
Ref	erence Books			
1	Bitcoin and Cryptocurrency Technologies	Aravind Narayan. Joseph Bonneau, Princeton	O'Reilly	4th Edition, 2016
2	Bitcoin and Blockchain Basics: A non-technical introduction for beginners	Arthu.T Brooks	Arthu.T Brooks	1 <sup>st</sup> Edition 2019

- 1. https://www.coursera.org/specializations/blockchain
- 2. https://www.coursera.org/specializations/uci-blockchain

### **Course Articulation Matrix**

Course Outcomes				Program	m Outcor	nes (POs)					
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
24MC205E.1	2			2							
24MC205E.2		2					2				
24MC205E.3		2	2	2							
24MC205E.4		2						2			
24MC205E.5	2	2									
24MC205E.6							2	2			

1: Low 2: Medium 3: High

### MOBILE AND WIRELESS SECURITY

Course Code	24MC205F	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03

### **Course Learning Objectives:**

- 1. Familiarize with the issues and technologies involved in designing a wireless and mobile system that is robust against various attacks.
- Gain knowledge and understanding of the various ways in which wireless networks can be 2. attacked and tradeoffs in protecting networks.
- 3. Have a broad knowledge of the state-of-the-art and open problems in wireless and mobile security, thus enhancing their potential to do research or pursue a career in this rapidly developing area.
- 4. Learn various security issues involved in cloud computing.
- 5. Learn various security issues related to GPRS and 3G.

### **Module-1**

Security Issues in Mobile Communication: Mobile Communication History, Security - Wired Vs Wireless, Security Issues in Wireless and Mobile Communications, Security Requirements in Wireless and Mobile Communications.

#### Module-2

Security for Mobile Applications, Advantages and Disadvantages of Application – level Security. Security of Device, Network, and Server Levels: Mobile Devices Security Requirements, Mobile Wireless network level Security, Server Level Security. Application Level Security in Wireless Networks: Application of WLANs, Wireless Threats.

#### **Module-3**

Some Vulnerabilities and Attach Methods over WLANs, Security for 1G Wi-Fi Applications, Security for 2G Wi-Fi Applications, Recent Security Schemes for Wi-Fi Applications Application Level Security in Cellular Networks: Generations of Cellular Networks, Security Issues and attacks in cellular networks.

### Module-4

GSM Security for applications, GPRS Security for applications, UMTS security for applications, 3G security for applications, Some of Security and authentication Solutions. Application Level Security in MANETs: MANETs, Some applications of MANETs, MANET Features

### Module-5

Security Challenges in MANETs, Security Attacks on MANETs, External Threats for MANET applications, Internal threats for MANET Applications, Some of the Security Solutions. Ubiquitous Computing, Need for Novel Security Schemes for UC, Security Challenges for UC, and Security Attacks on UC networks, Some of the security solutions for UC.

<b>Course Outcomes:</b> At the end of the course the student will be able to:				
24MC205F.1	Understand and explain the fundamental differences between wired and wireless communication systems and the security requirements for wireless and mobile communications.			
24MC205F.2	Identify and describe the security challenges at device, network, and server levels, and analyze application-level security mechanisms for wireless networks.			

### 8 Hrs

### 8 Hrs

8 Hrs

8 Hrs

8 Hrs

24MC205F.3	Examine vulnerabilities and attacks in WLANs and cellular networks, and evaluate recent security schemes for Wi-Fi and cellular applications.
24MC205F.4	Design and recommend security strategies for GSM, GPRS, UMTS, and 3G applications by analyzing their unique security requirements and challenges.
24MC205F.5	Assess the security challenges, threats, and attacks in MANETs and propose robust security solutions for mobile ad hoc networks and ubiquitous computing systems.
24MC205F.6	Evaluate emerging security solutions and their effectiveness in addressing novel threats to wireless systems and ubiquitous computing environments.

SL No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	tbooks			
1	Wireless and Mobile Network Security	Pallapa Venkataram, Satish Babu	Tata Mc Graw Hill Publishers	1 <sup>st</sup> Edition, 2010
2	Fundamentals of Mobile and Pervasive Computing	Frank Adelstein, K.S.Gupta	Tata Mc Graw Hill Publishers	1 <sup>st</sup> Edition, 2005
Refe	erence Books			
1	Wireless Security Models, Threats and Solutions	Randall k. Nichols, Panos C. Lekkas	Tata Mc Graw Hill Publishers	1 <sup>st</sup> Edition, 2006
2	802.11 Security	Bruce Potter and Bob Fleck	O'Reilly Media, Inc.	1 <sup>st</sup> Edition, 2005
3	Wireless Internet Security – Architecture and Protocols	James Kempf	Cambridge University Press	1 <sup>st</sup> Edition, 2008

- 1. Wireless and Mobile Security https://www.coursera.org/learn/wireless-mobile-security
- 2. Mobile Security Essentials https://www.udemy.com/course/mobile-security-essentials
- 3. Certified Wireless Security Professional (CWSP) https://www.cwnp.com/cwsp
- 4. Securing Wireless and Mobile CompTIA Security+ https://www.youtube.com/watch?v=iAR6SgvtezY
- 5. Wireless Security: Lecture 1 Part 1 https://www.youtube.com/watch?v=omvcdpH-zx8
- 6. SANS SEC617: Wireless Penetration Testing and Ethical Hacking https://www.sans.org/cyber-security-courses/wireless-penetration-testing-ethical-hacking
- 7. Fundamentals of Mobile Computing and Security https://www.edx.org/course/fundamentals-of-mobile-computing-and-security
- 8. Cybersecurity and Mobile Networking https://www.futurelearn.com/courses/cybersecurity-and-mobile-networking

Course		Program Outcomes (POs)						
Outcomes								
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MC205F.1	2	2			2			
24MC205F.2	2		2					
24MC205F.3	2	2			2	2		
24MC205F.4	2							
24MC205F.5	2							2
24MC205F.6	2	2			2	2		

DEVOPS					
Course Code	24MC206A	CIE Marks	50		
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50		
Credits	03	Exam Hours	03		

#### **Course Learning Objectives:**

- 1. Understand overall structure of Devops with its Lifecycle.
- 2. Understand the different application managed service options in the cloud using LINUX.
- 3. Demonstrate DevOps workflow with GitLab learning Shell Script.
- 4. Discover practical skills of Continuous Integration to improve the speed, stability, Availability and security for software delivery capability.
- 5. Apply practical skills needed for integrating container.
- 6. Demonstrate a DevOps-based tool and explain its functionality, use cases, and how it integrates into the DevOps lifecycle.

#### Module-1

8Hrs

Introduction to Devops- What Is Devops, History of Devops, Devops, definition, DevOps Main Objectives, DevOps and Software Development, Life Cycle- Waterfall Model and Agile Model, Continuous Integration & Deployment- Jenkins, Containers and Virtual

Development- Docker and Vagrant, Configuration Management Tools-Ansible, Puppet and Chef.

## Module-2 8Hrs

Cloud Computing- What is Cloud? Evolution of Cloud Computing, IAAS (Infrastructure as a Service), SAAS (Software as a Service), PAAS (Platform as a Service), Private, Public and Hybrid Cloud, Public Clouds- Amazon Web Services, Microsoft Azure and Google Cloud Services.

Architectures for parallel and distributed computing - Parallel Vs Distributed computing, Elements of distributed computing, Technologies for distributed computing.

Module-3	8Hrs
LINUX Basic and Admin- Linux OS Introduction,	Importance of Linux in DevOps, Linux Basic
Command Utilities, Linux Administration and Enviro	onment Variables.
Command Utilities, Linux Administration and Enviro	onment Variables.

Shell Scripting - Introduction, Variables, Flow Controls, Loops, Functions, Lists, Manipulating Strings, Reading and Writing Files and Positional Parameters. Version Control- Overview of SVN, GIT Features, 3-Tree Architecture, GIT – Clone /Commit / Push, GIT Hub Projects, GIT Hub Management, GIT Rebase & Merge, Reset, Checkout ,GIT Clone, Fetch and Pull.

0 ,	0, ,	,	,	
Module-4			8Hrs	5
Continuous Integration	– Jenkins- Introduc	ction to Jenkins	, Continuous Integr	ation with Jenkins
,Configure Jenkins, Jenk	ins Management, Sc	heduling build J	obs - POLL SCM and	Build Periodically
ANSIBLE - Introduction	to Ansible, Infrastr	ucture Managem	ent, SSH Connection	in Ansible Master.

#### Module-5

8Hrs

Playbooks- Variables, Conditionals, Loops, Blocks, Handlers and Templates Docker- How to get Docker Image?, What is Docker Image, Working with Docker Containers- What is Container, Docker Engine, Creating Containers, with an Image, Working with Images and Docker Command Line Interphase.

Course Outco	Course Outcomes: At the end of the course the student will be able to:				
24MC206A.1	<b>206A.1</b> Get insight on the overall structure of Devops with its Lifecycle.				
24MC206A.2	Describe different application managed service options in the cloud using LINUX.				
24MC206A.3	Analyze DevOps workflow with GitLab learning Shell Script.				
24MC206A.4	Discuss practical skills of Continuous Integration to improve the speed, stability, Availability and security for software delivery capability.				
24MC206A.5	Apply design and planning concepts.				
24MC206A.6	Apply correct process models for software development.				

Sl. No.	Title of the Book	Name of the Author/s	me of the Name of the uthor/s Publisher				
Text							
1	Linux <sup>®</sup> Command Line and Shell Scripting Bible	Richard Blum Christine Bresnahan	John Wiley & Sons, Inc.	3 <sup>th</sup> Edition			
2	Practical DevOps – Joakim Verona, PACKT Publisher	PankajJalote	Wiley India Pvt Ltd	2 <sup>nd</sup> Edition 2010			
3	DevOps for Developers – Michael Huttermann, APress	Michel Blaha, James Rumbaugh	Pearon	2 <sup>nd</sup> Edition 2007			
4	Cloud Computing: Concepts, Technology & Architecture	Thomas Erl, Zaigham Mahmood, and Ricardo Puttini	PRENTICE HALL	2013			
Refe	Reference Books						
5	Pro Git	Scott Chacon and Ben Straub	Apress	2 <sup>nd</sup> Edition 2014			

1. DevOps Beginners to Advanced with Projects - 2023

https://www.udemy.com/course/decodingdevops/

2. Introduction to DevOps : <u>https://www.coursera.org/learn/intro-to-devops</u>

#### **Course Articulation Matrix**

Course Outcomes		Program Outcomes (POs)						
(COs)	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8
24MC206A.1	3	2			1			
24MC206A.2	2	2			3	1		
24MC206A.3		2	2		2			
24MC206A.4		2	2	2	1			
24MC206A.5	2	2	2		2	1		
24MC206A.6	2	2	3					1

SOFT	WARE ARCHITECT	URE		
Course Code	24MC206B	CIE Marks	50	
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50	
Credits	03	Exam Hours	03	
<ul> <li>Course Learning Objectives:</li> <li>1. Understand design patterns and</li> <li>2. Analyze system requirements f</li> <li>3. Apply structural design pattern</li> <li>4. Design interactive systems usir</li> <li>5. Develop distributed systems us</li> <li>6. Evaluate scalable and maintain</li> </ul>	l object-oriented developme or effective design. s to solve software problem ng the MVC architecture. ing client-server models. able design solutions.	nt. s.		
Module-1		8H	Irs	
<b>Introduction:</b> what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design.				
Module-2		8E	lrs	
Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation				
Module-3		8H	Irs	
<b>Design Pattern Catalog:</b> Structural patterns, Adapter, bridge, co	omposite, decorator, facade,	flyweight, proxy.		
Module-4		8H	rs	
<b>Interactive systems and the MVC architecture:</b> Introduction, The MVC architectural pattern, analyzing a simple drawing program, designing the system, designing of the subsystems, getting into implementation, implementing undo operation, drawing incomplete items, adding a new feature, pattern based solutions.				
Module-5		8H1	'S	
<b>Designing with Distributed Objects:</b> Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.				
Course Outcomes: At the end of t	he course the student will be	e able to:		
24MC206B.1 Understand the development.	fundamentals of design patt	erns and object-or	iented	

24MC206B.5	Design distributed object-oriented systems using client-server models and Java RMI.
24MC206B.6	Evaluate design patterns and architectures for scalable and maintainable solutions.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition And year
Tex	tbooks			
1.	Software Architecture in Practice	Bass, Len;Others	Pearson Education Pvt. Ltd.	4th Edition, 2021
2.	Pattern Oriented Software Architecture	Buschmann, Frank;Others	John Wiley & Sons Inc	1 <sup>st</sup> Edition 1996

Ref	ference books			
1.	Pattern Oriented Software Architecture	Frank Bachmann, RegineMeunier, Hans Rohnert	Universities press,	Volume 1, 1996
2.	Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis	William J Brown et al.	John Wiley	1998

- <u>https://onlinecourses.nptel.ac.in/noc22\_cs39/preview</u>
   <u>https://www.youtube.com/watch?v=k3hKLd7vYZ8</u>

### **Course Articulation Matrix**

Course Outcomes			Pro	ogram Ou	tcomes (I	POs)		
(COs)	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
24MC206B.1	2							
24MC206B.2	2	2						
24MC206B.3			2					
24MC206B.4				2				
24MC206B.5				2				
24MC206B.6	2		2					

	ENTERPRISE RESOURCE PLANNING				
Course Code		24MC206C	CIE Marks	50	
Teaching Hours/V	Veek (L:T:P)	(3:0:0)	SEE Marks	50	
Credits		03	Exam Hours	03	
Course Learning Objectives:         1. Examine the pros and cons of ERP, data warehousing/mining and OLAP         2. Test the implementation of ERP in the context of business         3. Implement ERP for different manufacturing prospective         4. Explain ERP marketing         5. Examine the design ERP with future e-commerce and internet         6. Examine how to modernize and integrate business processes and systems         Module-1       8Hrs         Introduction to ERP Overview, Benefits of ERP, ERP and Related Technologies, Business         Process Reengineering, Data Warehousing, Data Mining, On–line Analytical Processing,					
Module-2	lanagement.			8Hrs	
ERP Implementation: Implementation of Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring					
Module-3				8Hrs	
ERP Manufactu Material, MRP - PDM - Product	rring Prospective: MI Manufacturing Resou Data Management.	RP - Material Require arce Planning, DRP - D	ment Planning, 1 istributed Require	BOM - Bill Of ement Planning,	
Module-4 8Hrs				8Hrs	
ERP Market : E Solutions Comp	ERP Market : ERP Market Place, SAP AG, People Soft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD , System Software Associates.				
Module-5				8Hrs	
<b>ERP–Present</b> A ERP and Interne	<b>ERP–Present And Future :</b> Turbo Charge the ERP System, EIA, ERP and E–Commerce, ERP and Internet, Future Directions in ERP.				
Course Outcomes: At the end of the course the student will be able to:					
24MC206C.1	Analyze the pros and cons of ERP, Data warehousing/Mining and OLAP for the given problem/application.				
24MC206C.2	Analyze the implem organizations.	nentation of ERP in the	context of busine	ess of the different	

24MC206C.3	Analyze and apply ERP for different manufacturing prospective.
24MC206C.4	Explain ERP marketing with the help of a case study
24MC206C.5	Analyze the design ERP with future E-commerce and internet.
24MC206C.6	Describe how to modernize and integrate business processes and systems

Sl.	Title of the Book	Name of the	Name of the	Edition and
No.		Author/s	Publisher	Year
Text	books			
1	ERP Demystified	Alexis Leon	Tata McGraw Hill	Third Edition, 2014
2	Concepts in Enterprise Resource Planning	Concepts in EnterpriseJoseph A. Brady,esource PlanningEllen F. Monk, BretJ. Wangner		4th Edition 2012
Refe	rence Books			
1	Enterprise Resource Planning	Vinod Kumar Garg and N.K Venkata Krishnan	Prentice Hall	2nd Edition 2011

- 1. Introduction to ERP: <u>https://www.coursera.org/lecture/enterprise-systems/1-1b-introduction-to-enterprise-resource-planning-erp-LneSo</u>
- 2. Operations Management-ERP: <u>https://freevideolectures.com/course/4539/nptel-operations-management/60</u>

#### **Course Articulation Matrix**

Course Outcomes			Pro	gram Ou	tcomes (	POs)		
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MC206C.1	2	2						
24MC206C.2		2	2	2				
24MC206C.3				2		2		
24MC206C.4		2	2					
24MC206C.5		2	2	3				2
24MC206C.6				2		2		

MOBILE APPLICATION DEVELOPMENT					
Course Code	24MC206D	CIE Marks	50		
Teaching Hours/Week	(3:0:0)	SEE Marks	50		
(L:T:P)					
Credits	03	Exam Hours	03		
<b>Course Learning Objectives:</b>					
1. Develop effective user interf	aces that leverage e	volving mobile devices	5.		
2. Develop an application using	g android SDK and	setting Kotlin in androi	d studio.		
3. Implement suitable methods	to integrate databas	ses and multimedia.			
4. Design and develop open sou	arce software based	mobile applications to	the given problem.		
5. Build and deploy competent	mobile applications	s to solve the industrial	societal Problems.		
6. Apply Kotlin concepts and	Android tools to	design, develop, and	test efficient mobile		
applications.					
Module-1	T . 1	1 1 1 T . 111 .1 A	8Hrs		
Introduction to Android Studio	Introduction to An	droid, Installing the And	droid SDK, Creating		
Android Virtual Devices, anatom	y of android studio	interface elements in a	ndroid studio.		
Introduction to Kotiin: what is	Kotlin?,Kotlin vs.	Java, Installing Kotlin,	Setting up Kotlin in		
Android Studio					
Module-2			8Hrs		
Android UI Design: ViewGroup, E	Basic Views				
Components of android: Activity, Services, Content Provider, BroadCast Receiver					
Personalize the appearance of	UI:Creating Custor	n Button with unique	shapes, colors, and		
sizes, creating custom backgrounds	s with shapes, color	s, gradients.			
Module-3			8Hrs		
Variables and Constants: Declari	ng variables,Data T	ypes,Conditional State	ments,Loops,Return		
& Break, Functions: Defining a fun	ction,Function para	meters and return types	s,Default parameters		
and named arguments. Lambda Ex	pressions:Lambda	syntax, Higher-order fui	nctions, Creating the		
First Android Project.					
Module-4			8Hrs		
<b>Exception Handling:Basic</b> try	-catch block, (	Catching specific ex	ceptions. <b>Throwing</b>		
<b>Exceptions</b> :throw keyword, Cust	om exception.Eve	nt Handling & Inter	nts: Intro to Event		
Handling, Handling Long Clic	ks, What Intents	are for, Implicit I	ntents & Explicit		
intent,Introduction to Fragments.	The UI Thread,	Threads and Runnab	les Graphics and		
Animation: Drawing graphics in A	Android, Creating A	nimation with Android			
Module-5			8Hrs		
Data Storage: Storing simple data,	Read and write a te	xt file to internal storag	e and external storage,		
Creating and using an SQLite datab	ase. <b>Multimedia</b> : P	laying music in the back	ground using Service,		
publishing android applications.					
Course Outcomes : At the end of	the course the stud	lent will be able:			

24MC206D.1	Demonstrate the concepts of variable, functions, lambda expression in Kotlin
24MC206D.2	Demonstrate the knowledge of Android tools by developing basic android Applications
24MC206D.3	To Design effective user interfaces by leveraging all basic views.
24MC206D.4	To Implement Exception handling and Event handling in building efficient applications.

24MC206D.5	To develop an Android application that incorporates intents and leverages animation and advanced design concepts for enhanced user experience.
24MC206D.6	Apply data storage techniques using internal and external storage, SQLite databases, and integrate multimedia features to develop functional mobile applications.

SI. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition And year			
Text	books						
1	Android Development with Kotlin	John Horton	Packt Publishing Ltd	1st Edition 2017			
2	Beginning Android Programming with Android Studio	DiMarzio J F	New Delhi , Wiely India	4th Edition 2017			
Refe	Reference Books						
1.	"Kotlin Programming: The Big Nerd Ranch Guide"	Josh Skeen, David Greenhalgh	Big Nerd Ranch Guides	2021,2 nd edition			
2.	Android Programming with Kotlin for Beginners	John Horton	Packt Publisher	2019,1 st Edition			

**<u>1. https://archive.nptel.ac.in/courses/106/106/106106156/</u> : Introduction to Modern Application Development** 

2. <u>https://onlinecourses.swayam2.ac.in/aic20\_sp02/preview</u> : Android app using Kotlin

Course Outcomes	Program Outcomes (POs)							
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MC206D.1	3	3			2			
24MC206D.2	3		3		2			
24MC206D.3	3	2			3			1
24MC206D.4		3	3	2				
24MC206D.5		3	3		3			
24MC206D.6	3		3		3			

### **Course Articulation Matrix**

	PARAL	LEL COMPUTI	NG					
Course Code		24MC206E	CIE Marks	50				
Teaching Hours/Wee	ek (L:T:P)	(3:0:0)	SEE Marks	50				
Credits		03	Exam Hours	03				
Course Learning O	bjectives:							
1. Understand the	e need of parallel pro	ogramming.						
2. Apply the MP	rules for distributed	l memory programmir	ng.					
3. Analyse the th	3. Analyse the thread programming.							
4. Develop the sh	ared memory progra	amming with openMP						
5. Implement the	parallel programs u	sing algorithms						
6. Use the paralle	l program algorithm	is in real world scenar	io					
Module-1			81	Hrs				
Introduction to Pa	rallel Computing.							
Need of Performan	ce, Building Parallel	Systems, Why to Writ	e Parallel Programs?	How to Write				
Parallel Programs?	Approach : Concurr	ent, Parallel, Distribut	ted					
Parallel Hardward	e and Parallel Softw	vare						
Background, Modi	fications to the von	Neumann Model, Par	allel Hardware, Para	allel Software,				
Input and Output,	Performance, Paral	lel Program Design a	and Writing and Ru	nning Parallel				
Programs			01	<b>T</b>				
Module-2			81	Hrs				
Getting Started, Th MPI Derived Data	ne Trapezoidal Rule types, A Parallel Sor	in MPI, Dealing with rting Algorithm	h I/O, Collective Co	ommunication,				
Module-3			8	Hrs				
Shared Memory F Processes, Threads Sections Busy-Wa	<b>Programming with</b> and Pthreads, Hello	<b>Pthreads:</b> , World program ,Mat	trix-Vector Multiplic					
Barriers and Cond Sharing and Thread	liting, Mutexes, Pr lition Variables, Re l-Safety	roducer-Consumer Sy ead-Write Locks, Cac	ynchronization and thes, CacheCoheren	cation, Critical Semaphores, ce, and False				
Barriers and Cond Sharing and Thread Module-4	iiting, Mutexes, Pr lition Variables, Re l-Safety	roducer-Consumer Sy ead-Write Locks, Cac	ynchronization and ches, CacheCoheren	cation, Critical Semaphores, ce, and False SHrs				
Barriers and Cond Sharing and Thread Module-4 Shared Memory I Rulem Scope of Va in OpenMP: Sortin and False Sharing a	iting, Mutexes, Pr lition Variables, Re l-Safety Programming with riables, The Reduction g, Scheduling Loops and Thread-Safety	roducer-Consumer Sy ead-Write Locks, Cac <b>OpenMP:</b> Introduct on Clause, The Paralle s, Producers and Cons	ion to OpenMP, Th I For Directive, More umers, Caches, Cach	Semaphores, ce, and False BHrs e Trapezoidal e About Loops ne-Coherence,				
Barriers and Cond Sharing and Thread Module-4 Shared Memory D Rulem Scope of Va in OpenMP: Sortin and False Sharing a Module-5	aiting, Mutexes, Pr lition Variables, Re l-Safety Programming with riables, The Reduction g, Scheduling Loops and Thread-Safety	roducer-Consumer Sy ead-Write Locks, Cac o <b>OpenMP:</b> Introduct on Clause, The Paralle s, Producers and Cons	ion to OpenMP, Th I For Directive, More umers, Caches, Cach	<ul> <li>cation, Critical Semaphores, ce, and False</li> <li>BHrs</li> <li>e Trapezoidal e About Loops ne-Coherence,</li> <li>BHrs</li> </ul>				
Barriers and Cond Sharing and Thread Module-4 Shared Memory I Rulem Scope of Va in OpenMP: Sortin and False Sharing a Module-5 6 Parallel Progra Search and Case St	iting, Mutexes, Pr lition Variables, Re l-Safety Programming with riables, The Reduction g, Scheduling Loops and Thread-Safety m Development a udies	roducer-Consumer Sy ead-Write Locks, Cac of <b>OpenMP:</b> Introduct on Clause, The Paralle s, Producers and Cons <b>nd Parallel Algorith</b>	ion to OpenMP, Th I For Directive, More umers, Caches, Cacl	<ul> <li>cation, Critical Semaphores, ce, and False</li> <li>8Hrs</li> <li>e Trapezoidal e About Loops ne-Coherence,</li> <li>8Hrs</li> <li>Solvers, Tree</li> </ul>				
Barriers and Cond Sharing and Thread Module-4 Shared Memory I Rulem Scope of Va in OpenMP: Sortin and False Sharing a Module-5 6 Parallel Progra Search and Case St Course Outcomes:	At the end of the co	ourse the student will b	ynchronization and ches, CacheCoheren ion to OpenMP, Th l For Directive, More sumers, Caches, Cach ms: Two N-Body	cation, Critical Semaphores, ce, and False 8Hrs e Trapezoidal e About Loops ne-Coherence, 8Hrs Solvers, Tree				
Barriers and Cond Sharing and Thread Module-4 Shared Memory I Rulem Scope of Va in OpenMP: Sortin and False Sharing a Module-5 6 Parallel Progra Search and Case St Course Outcomes: 24MC206E.1	At the end of the co	roducer-Consumer Sy ead-Write Locks, Cac <b>OpenMP:</b> Introduct on Clause, The Paralle s, Producers and Cons <b>nd Parallel Algorith</b> ourse the student will b of parallel programmi	ynchronization and ches, CacheCoheren ion to OpenMP, Th l For Directive, More umers, Caches, Cacl ms: Two N-Body be able to: ng.	<ul> <li>cation, Critical Semaphores, ce, and False</li> <li>8Hrs</li> <li>e Trapezoidal e About Loops ne-Coherence,</li> <li>8Hrs</li> <li>Solvers, Tree</li> </ul>				

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Tex	tbooks			
1	An Introduction to Parallel Programming	Peter s. Pacheco	Morgan Kaufmann Publishers	2011 Edition
Ref	erence Books			
1	Using OpenMP: Portable Shared Memory Parallel Programming	Gabriele Jost and Ruud van der Pas	The MIT Press	October 12, 2007
2	Using MPI - 2nd Edition: Portable Parallel Programming with the Message Passing Interface	William Gropp and Ewing Lusk	MIT Press	1999, 2nd Edition
3	Pthreads Programming: A Posix Standard for Better Multiprocessing	Dick Buttlar, Jacqueline Farrell & Bradford Nichols	Oreilly	1996, I Edition

Course								
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MC206E.1	1							
24MC206E.2				1				
24MC206E.3							2	
24MC206E.4							2	
24MC206E.5				1				
24MC206E.6							2	
SALESFORCE ADMINISTRATOR								
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Course Code	24MC206F	CIE Marks	50					
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50					
Credits	03	Exam Hours	03					
Summary of the Course:								
A Salesforce Administrator solves b	usiness problems by	customizing the Sales	sforce Platform. They					

A Salesforce Administrator solves business problems by customizing the Salesforce Platform. They build, configure, and automate technology solutions to deliver business value. Salesforce Administrators work with stakeholders to define system requirements and customize the platform. Most importantly, they enable users to get the most from Salesforce technology. A Salesforce Admin best understands how to make the platform work for their company's goals. Core responsibilities include supporting users, managing data, maintaining security standards, and delivering actionable analytics.

#### **Course Learning Objectives:**

- **1.** Help in collaborating with business and technical stakeholders to design, configure, and implement Salesforce.
- 2. Develop a mindset in solving business problems using the Salesforce Platform.
- 3. Proactively set up processes to manage and protect customer and business data.
- **4.** Hands on practice on provide reporting on a regular basis to help users and executives gain insights and make decisions from Salesforce data.
- 5. Learn how to create human-centered user experiences in Salesforce.
- 6. Understand how to Create, maintain, and enhance automated business processes.

# Module-18Hrse Salesforce Platform Basics: Get Started with the Salesforce Platform, Discover Use Cases for<br/>the Platform, Understand the Salesforce Architecture, Navigate Setup, Power Up with<br/>AppExchange. Prepare Your Salesforce Org for Users : Set Up the Exchange Rate, Update the<br/>Exchange Rate with ACM, Customize the Home Page, Create a Unique Account List View, Create<br/>Chatter Groups User Management: Add New Users, Control What Your Users Can Access.

**Customize an Org to Support a New Business Unit:** Manage User Access, Manage Chatter, Modify Your Data Model, Configure an Email Letterhead and Template, Automate Your Business Process Identity Basics: Get to Know Salesforce Identity, Get To Know Your Salesforce Identity Users, Learn the Language of Identity

8Hrs

**Data Security:** Overview of Data Security, Control Access to the Org, Control Access to Objects, Control Access to Fields, Control Access to Records, Create a Role Hierarchy, Define Sharing Rules.

**Permission Set Groups:** Get Started with Permission Set Groups, Create a Permission Set Group, Mute Permissions in Permission Set Groups Protect Your Data in Salesforce: Restrict Login Hours and IP Ranges, Create New Users and Allow a User to Delete Accounts, Set Organization-Wide Defaults and Create a Role Hierarchy, Create Sharing Rules, Set Up Account Teams.

**Protect Your Data in Salesforce:** Restrict Login Hours and IP Ranges, Create New Users and Allow a User to Delete Accounts, Set Organization-Wide Defaults and Create a Role Hierarchy, Create Sharing Rules, Set Up Account Teams.

**Data Modeling:** Understand Custom & Standard Objects, Create Object Relationships, Work with Schema Builder.

#### Module-3

8Hrs

**Lightning Experience Customization:** Set Up Your Org, Create and Customize Lightning Apps, Create and Customize List Views, Customize Record Highlights with Compact Layouts, Customize Record Details with Page Layouts, Create Custom Buttons and Links, Empower Your Users with Quick Actions.

**Customize a Salesforce Object:** Work with Standard and Custom Fields, Create Picklists and Field Dependencies, Create Lookup Filters, Create Formula Fields, Create Record Types, Create Account Page Layouts, Enable Account Field History Tracking, Create Validation Rules.

**Lightning App Builder:** Get Started with the Lightning App Builder, Build a Custom Home Page for Lightning Experience, Build a Custom Record Page for Lightning Experience and Salesforce Mobile App, Build an App Home Lightning Page, Work with Custom Lightning Components.

**Formulas and Validations:** Use Formula Fields, Implement Roll-Up Summary Fields, Create Validation Rules

Module-4

Service Cloud for Lightning Experience: Begin Your Customer Service Journey, Administer Service Cloud, Automate Case Management, Create Digital Engagement on Multiple Channels. Set Up the Service Console: Set Up the Lightning Service Console, Customize Your Lightning Service Console Pages, Add the Softphone Utility to Your App, Set Up Web Chats for Your Console.

**Create a Process for Managing Support Cases:** Create Support Processes, Create Record Types, Create an Escalation Rule Set Up Case Escalation and Entitlements: Create Support Processes, Create Case Queues and Assignment Rules, Create a Case Escalation Rule, Create an Automation with Flow Builder, Enable Entitlements and Set Up Service Contracts, Create an Entitlement Process, Create Service Contracts with Entitlements

Module-5

**Reports & Dashboards for Lightning Experience:** Introduction to Reports and Dashboards in Lightning Experience, Create Reports with the Report Builder, Format Reports, Visualize Your Data with the Lightning Dashboard Builder, Extend Your Reporting Strategy with AppExchange **Create Reports and Dashboards for Sales and Marketing Managers:** Create Report and Dashboard Folders, Create a Simple Custom Report, Filter Your Reports, Group and Categorize Your Data, Use Summary Formulas in Your Reports, Manage Reported Data, Visualize Your Data **Approve Records with Approval Processes:** Customize How Records Get Approved, Build an Approval Process Build a Discount Approval Process: Prepare Your Org, Create an Approval Process, Create Initial Submission Actions, Specify Final Approval and Rejection Actions **Build a Simple Flow:** Collect Contact Info from Your User, Check for a Matching Contact in Your Org, Branch the Flow, Create or Update a Contact Flow Builder Basics: Get Started with Automation, Go with the Flow, Meet Flow Builder, Learn About Flow Variables

<b>Course Outcome</b>	es: At the end of the course the student will be able to:
24MC206F.1	Understand how to manage changes to business processes, technology, and
	people with Salesforce.
24MC206F.2	Improve the efficiency of business operations by proactively undertaking
	regular process analysis and documentation.
24MC206F.3	Customize the user experience and manage profiles, permissions, roles, and
	groups with Salesforce.
24MC206F.4	Apply the Beginner's mind and continually stay up to date with new
	Salesforce technology and inspire others too
24MC206F.5	Manage the end-to-end implementation of Salesforce, including the overall
	strategy and day-to-day activities involved in administering Salesforce.
24MC206F.6	Develop and Application using Salesforce platform.

8Hrs

8Hrs

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Text	books			
1	Salesforce for Beginners: A step- by-step guide to optimize sales and marketing and automate business processes with the Salesforce platform	Sharif Shaalan and Timothy Royer	PACKT Publishers	2nd Ed, 2022
2	Salesforce CRM - The Definitive Admin Handbook: Build, configure, and customize Salesforce CRM and mobile solutions	Paul Goodey	PACKT Publisher	5th Ed, 2019
3	Learn Salesforce Lightning: The Visual Guide to the Lightning UI	Felicia Duarte, Rachelle Hoffman	Wiley Apress	2018
Refer	ence Books			
1	Salesforce Data Architecture and Management: A pragmatic guide for aspiring Salesforce architects and developers to manage, govern, and secure their data effectively	Ahsan Zafar	PACKT Publishers	2021

#### Web links/Video Lectures/MOOCs

• Use the Trailhead Platform: https://www.salesforce.com/blog/what-is-trailhead/

The Salesforce Administrator Trailmix :

• https://trailhead.salesforce.com/users/srebello7/trailmixes/salesforce-administrator-explorer

#### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)							
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24MC206F.1	2							
24MC206F.2		2						
24MC206F.3							2	
24MC206F.4				1		2		
24MC206F.5			2				2	
24MC206F.6			2		2			2

DATA ANALYTICS USING PYTHON LAB							
Course Code	24MCL207	CIE Marks	50				
Teaching Hours/Week (L:T:P)	(1:0:2)	SEE Marks	50				
Credits	02	Exam Hours	03				
Course Learning Objectives:							
1: Apply control structures to the	e given problems an	d write Python pro	ograms for search/sort on				
2. Implement object oriented p	rinciples in Python						
3: Implement string and file han	dling in Python						
4: Demonstrate data visualizatio	on using matplotlib a	nd seaborn for a g	iven problem				
5: Demonstrate regression mod	el for a given proble	m					
6: Demonstrate Time series and	lysis with Pandas						
	PART- A						
1. Write a python program to f	ind factorial of a num	ber using Recurs	ion.				
2. Write a Python program to p	erform linear search	U					
3. Write a Python program to	insert an element int	o a sorted list					
4. Write a python program usi	ng object oriented p	rogramming to de	emonstrate encapsulation,				
inheritance and overriding.							
5. Write a Python Script to che	ck whether the given	string is palindro	me or not.				
6. Write Python script to copy	file contents from on	e file to another.					
	Part- B						
1. Write a Python program tha	t creates a mXn integ	ger array and Print	s its attributes.				
2. Implement a python program	n to demonstrate the	following using n	umpy				
a) Array manipulation, Sear	ching, Sorting and sp	blitting.					
3 Implement a python program	n to demonstrate 1)	Importing Dataset	(x, 2) Cleaning the Data 3)				
Data frame manipulation us	sing Pandas.		is 2) Creaning the Data 3)				
4. Implement a python progr	am to demonstrate	Data visualizatio	n with various types of				
Graphs using matplotlib.			71				
5. Write a Python program to demonstrate the generation of linear regression models.							
6. Write a Python program to demonstrate the generation of logistic regression models using Python.							
7. Write a Python program to c	7. Write a Python program to demonstrate Time series analysis with Pandas.						
8. Write a Python program to c	lemonstrate Data Vis	ualization using S	eaborn.				
<ul> <li>Each student has to exec the Semester End Exami</li> </ul>	ute two programs- or nation.	ne from Part A and	d one from Part B during				
• Part A and Part B shall b	e given 50% weighta	ige each.					

<b>Course Outcomes:</b> At the end of the course the student will be able to:				
24MCL207.1	Apply basic python programming concepts with collection objects.			
24MCL207.2	Apply String and File handling in Python.			
24MCL207.3	Implement numpy and pandas libraries for data handling.			
24MCL207.4	Demonstrate regression model for a given problem.			
24MCL207.5	Demonstrate Time series analysis with Pandas.			
24MCL207.6	Demonstrate data visualization using matplotlib and seaborn libraries			

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year				
Text	Textbooks							
1	Think Python: How to Think Like a Computer Scientist	Allen B. Downey	Shroff/O'Reilly Publishers	2 <sup>nd</sup> Edition, Updated for Python 3,2016				
2	An Introduction to Python	Guido van Rossum and Fred L. Drake Jr	Shroff Publishers and Distributors	2011				
3	Python Data Science Handbook: Essential tools for working with data	Jake Vander plas	O'Reilly Media, Inc	1 <sup>st</sup> Edition 2016				
Ref	erence Books							
1	Programming Python	Mark Lutz	O'Reilly	4 <sup>th</sup> Edition 2010				
2	Python 3 for Absolute Beginners	Tim Hall and J- P Stacey	Apress	1 <sup>st</sup> Edition 2009				
3	Beginning Python: From Novice to Professional	Magnus Lie Hetland	Apress	2 <sup>nd</sup> Edition 2005				
4	BeginningPythonVisualizationCrafting VisualTransformationScripts	Shai Vaingast,	Apress	2 <sup>nd</sup> Edition 2014				

#### **Course Articulation Matrix**

Course Outcomes	Program Outcomes (POs)							
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8
24MCL207.1	3	2						
24MCL207.2	2	2						
24MCL207.3	2	2						
24MCL207.4			2	3				
24MCL207.5			2	2				
24MCL207.6			2	3				

ENTERPRISE JAVA LABORATORY					
Course Code	24MCL208	CIE Marks	50		
Teaching Hours/Week (L:T:P)	(1:0:2)	SEE Marks	50		
Credits	02	Exam Hours	03		
Course Learning Objectives:					
1. Implement the fundamental	concept of java progra	amming by writing exe	cutable programs.		
2. Solve the object oriented pri	nciples with the help	of java programs.			
3. Construct reusable and ef	ficient applications	using inheritance and	l multi-threading		
concepts of java and design	user friendly interfac	es.			
4. Use servlets and JSP tags an	d its services to deve	lop a web application			
5. Demonstrate the Database c	onnections for the Jav	va applications.			
6. Design enterprise application	s using different Java	Beans concepts for the	e given problem.		
1 Write a LAVA proc	PARIA	Constructor Overland	ing and Mathod		
1. White a JAVA plog	to demonstrate	Constructor Overload	ing and Method		
2 Write a IAVA pro	gram to implement I	nner class and demon	strate its Access		
protection.	grain to implement i	liner cluss and demon			
3. a) Write a JAVA prog	ram to demonstrate I	nheritance.			
b) Simple Program on Ja	va for the impleme	ntation of Multiple in	nheritance using		
interfaces to calculate the ar	ea of a rectangle and	triangle.	_		
4. Write a JAVA progra	am which has:				
a. A Class call	ed Account that crea	tes an account with R	s. 500 minimum		
balance, a deposit ()	method to deposit am	ount, a withdraw () me	thod to withdraw		
amount and also the	ows Less Balance E	exception if an accour	t holder tries to		
withdraw money wh	Ich makes the balance	e become less than Rs.	500.		
D. A Class called save withdrawal amo	Less_ Dalalice_ Exc	epuon which returns t	ne statement that		
c A Class which	th creates 2 accounts	both account deposit	money and one		
account tries to with	draw more money wh	ich generates a Less B	alance Exception		
and takes appropriate	e action for the same.		and a second second		
5. Write a JAVA prog	gram using Synchror	nized Threads, which	demonstrates the		
Producer Consumer concept					
6. Complete the followi	ng:				
a) Create a package name	ed shape.				
b) Create some classes in	the package represer	nting some common sh	apes like Square,		
Triangle, and Circle.	1 1 1				
c) Import and compile the	ese classes in other pi	rograms. <b>B</b>			
1 Write a IAVA Serv	let Program to imple	D ement a dynamic HTN	AL using Servlet		
(user name and Password sh	ould be accepted usin	g HTML and displayed	using a Servlet).		
2. Write a JAVA Servlet Program to implement and demonstrate GET and POST					
methods (Using HTTP Servlet Class).					
3. Write a JAVA Servlet Program using cookies to remember user preferences. Write					
a JSP Program to get student information through an HTML and create a JAVA Bean					
class, populate Bean, and dis	splay the same inform	nation through another	JSP.		
4. Write a JSP program	to implement all the	attributes of the page of	lirective tag.		
5. Write a JAVA Progr	am to insert data into	the Student DATAB	ASE and retrieve		
info based on particular que	ries (For example upo	late, delete, search, etc	)		

6. An EJB application that demonstrates Session Bean (with appropriate business logic).

7. An EJB application that demonstrates MDB (with appropriate business logic). **Note :-** Each student has to execute two programs- one from Part A and one from Part B during the Semester End Examination. Part A and Part B shall be given 50% weightage each

<b>Course Outcomes:</b> At the end of the course the student will be able to:				
24MCL208.1	Illustrate the object oriented principles with the help of java programs.			
24MCL208.2	Implement user defined exceptions.			
24MCI 208 3	Develop reusable and efficient applications using inheritance and multi-			
24WICL200.3	threading concepts of java as well as design user friendly interfaces.			
24MCI 208 4	Apply the concept of Servlet and its life cycle to create web applications and			
24101CL200.4	also demonstrate the JSP tags and its services to web applications.			
24MCL208.5	Build Database connection for the web applications.			
24MCL208.6	Develop application programs using Java beans concept.			

Sl.	Title of the Book	Name of the	Name of the	Edition and
N0.		Author	Publisher	Year
Tex	tbooks			
1	Java Fundamentals, A	Herbert Schildt,	Tata Mc Graw	First Edition,
	Comprehensive Introduction.	Dale Skrien	Hill	2013
2	JAVA the Complete Reference	Herbert Schildt	Tata McGraw	2019
			Hill	
3	Java Server Programming Java	DT Editorial	Dreamtech	2014
	EE 7 (J2EE 1.7), Black Book	Srvices	press	
Refe	rence Books			
1	Java Programming	Hari Mohan	Pearson	First Edition
		Pandey	Education	2012
2	Java 6 Programming, Black	KoGenT	Dreamtech	2012
	Book		Press	
3	Java 2 Essentials	Cay Horstmann	Wiley	Second
				Edition,1999

**Course Articulation Matrix** 

Course	Program Outcomes (POs)							
Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8
24MCL208.1	3	2						
24MCL208.2	3	2						
24MCL208.3	2	2						
24MCL208.4		3		3				
24MCL208.5	3		2	2				2
24MCL208.6				3				2

#### ABILITY ENHANCEMENT COURSE WITH SEMINAR -1

Course Code	24AEC209	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	-
Credits	1	Exam Hours	02

#### **Course Learning Objectives:**

- 1. To understand IoT fundamentals and interface sensors and actuators with microcontrollers.
- 2. To explore Smart Manufacturing, Digital Twins, and their applications.
- 3. To design automation tasks using UiPath software and analyze its applications in process automation.
- 4. To gain hands-on experience in digital manufacturing processes like 3D printing and CNC laser cutting.
- 5. To develop teamwork and effectively present project outcomes.

#### Module-1: Internet of things-Hardware/System Design (06 Hours)

Introduction to IOT fundamentals, Introduction to sensors, Difference between analog and digital sensors, Interfacing Temperature, Light and Humidity sensors with Arduino, Interfacing Motors with Arduino, Simple program to control actuator based on the analog sensor. Internet of Things.

Module-2: Smart Manufacturing and Robotic Process Automation (06 Hours)

**Smart Manufacturing and Digital Twins:** The concept of Smart Manufacturing, Digital Twins and its applications, In-Class Assignment: Explore the designs of Digital Twins, Homework Assignment: Analysing a Smart Manufacturing Case Study.

**Robotic Process Automation:** Understanding Robotic Process Automation (RPA), Types of robots and their applications, Human-robot collaboration, In-Class Assignment: Automating a Task with RPA, Homework Assignment: Researching Advances in Robotics.

#### Module-3: Digital Manufacturing processes (06 Hours)

Additive manufacturing using 3D printing- simple 3D modelling using TinkerCAD, use of slicing software and hands-on practice, Creating art drawing using artCAM and Lightburn softwares, Hands-on practice of CNC laser cutting and wood engraving machine, Hands-on practice of 3D Scanner

#### Module-4: Project Work (06 Hours)

Team Formation, Synopsis submission, Mid-Term Progress Review, Final Project Presentation.

**Course Outcomes:** At the end of the course the student will be able to:

24AEC209.1	Understand the fundamentals of the Internet of Things (IoT) and demonstrate the ability to interface sensors and actuators with microcontrollers for basic IoT applications.
24AEC209.2	Differentiate between analog and digital sensors and implement a program to control actuators based on sensor data.
24AEC209.3	Analyze the concept of Smart Manufacturing and Digital Twins, and apply the knowledge to explore the designs and applications of Digital Twins.
24AEC209.4	Understand the principles of Robotic Process Automation (RPA) and demonstrate automation of simple tasks using RPA.
24AEC209.5	Develop expertise in utilizing additive manufacturing tools such as 3D printers, slicing software, CNC laser cutters, wood engraving machines, and 3D scanners.
24AEC209.6	Develop a solution using emerging technologies for a real-world problem in teams.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year				
Text	books							
1	Internet of Things (A Hands-on-Approach)	Vijay Madisetti and Arshdeep Bahga	Orient Blackswan Private Limited	1 st Edition, 2015				
2	Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath	Alok Mani Tripathi	Packt Publishing	First Edition 2018				
Refe	rence Books							
1	Smart Manufacturing Technologies for Industry 4.0: Integration, Benefits, and Operational Activities	Edited By: Jayakrishna Kandasamy, Kamalakanta Muduli, V. P. Kommula, Purushottam L. Meena	CRC Press	First Edition 2022				
2	The Robotic Process Automation Handbook: A Guide to Implementing RPA Systems	Tom Taulli	Apress Berkeley, CA	2020				
	Web link	s/Video Lectures:						
Sm:	Smart Manufacturing and Digital Twins: <ol> <li>https://www.youtube.com/watch?v=nwFed03fS_s</li> <li>https://www.youtube.com/watch?v=ScmK-bKJ4MI</li> </ol> RPA and Robotics: <ol> <li>https://www.youtube.com/watch?v=9URSbTOE4YI</li> <li>https://www.youtube.com/watch?v=UEbw7dIOg0g</li> <li>https://www.uipath.com/resources/automation-case-studies</li> <li>https://www.ibm.com/products/robotic-process-automation/case-studies</li> </ol>							

#### **Course Articulation Matrix**

Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
24AEC209.1	2	-	2	2		-	-	3
24AEC209.2	-	-	-	-	-	-	-	-
24AEC209.3	-	-	-	3	2	-	-	-
24AEC209.4	-	-	-	-	3	-		-
24AEC209.5	-	-	-	-	-	-	-	-
24AEC209.6	-	-	2	-	3	-		-

INDUSTR	Y ORIENTEI	) TRAINING I	I (PROBLEM SO	LVING SKILLS)
Course Code		24ITP210	CIE Marks	50
Teaching Hours	Week (L:T:P)	(0:0:2)	SEE Marks	-
Credits		-	Exam Hours	-
<b>Course Learning</b>	Objectives:			
1.Know th	e components of	self-introduction		
2.Develop	resume with incl	usion of core comp	petencies	
3.Involve	and contribute in	group discussions		
4.Develop	effective commu	nication to succeed	d in professional caree	er
5.Know th	e etiquettes of dig	gital communication	on	
Module-1				2 Hrs
Self-Introduction	: Learn the Secr	et to Introducing	Yourself, Things to av	void when introducing you.
Activity: Video re	cord the self-intro	oduction.		
Essentials of gro	ooming: Creating	g the first impres	ssion, what does the	well-dressed professional
wear? Personal hy	giene and habits.			
Module-2				2 Hrs
Resume Writing Systems, Lists of Words- Action ve	: Purpose, Identi Competencies, V erbs, The Most Po Students have to s	Vriting Relevant Co Vriting Accomplis opular Resume Fo submit a copy of th	hment/ Objective Sta rmat, Other Popular I beir resume	tements, Finding the Right Resume Formats, Do's and
Module-3				2 Hrs
Group discussion	n: Types, process	, Evaluation criter	ia, Do's and Don'ts A	Activity: Group discussions
have to be held du	ring the training	sessions.		
Module-4				2 Hrs
Communicate Ef	fectively: Unders	standing common	interview questions, n	nastering the STAR method
for behavioral que	estions, answerin	g technical and no	on-technical questions	, responding confidently to
questions you do	on't know, handl	ing stress and ne	ervousness, practicing	g mock interviews, asking
insightful question	ns to the interview	ver, negotiation and	d salary discussion, fin	nal tips and follow-up.
Module-5		-	•	2 Hrs
Digital Right and	l Wrong: Virtual	Communication:	Agenda, being prepar	ed, Dressing appropriately,
background, Use	Microphone and	camera the right	way, restraining fro	m off tasks during virtual
meetings, protecti	ng confidential da	ata during online p	resentations, time man	nagement.
		Ť		
Course Outcome	es: At the end of t	he course the stude	ent will be able to:	
	Identify and ar	ticulate the essent	ial components requi	ired for an effective self-
24ITP210.1	introduction in k	and a stress	alzing avanta	

	introduction in business and networking events.
	Recognize and demonstrate the importance of appropriate professional attire for a
2411P210.2	successful career in the corporate sector.
2417D210.2	Develop a resume inclusive of core competencies, action verbs which are
24ITP210.3	compatible with Applicant Tracking Systems.
2417D210 4	Recognize the types, process and evaluation of Group Discussion and carry out
2411P210.4	effective group discussions.

24ITP210.5	Develop skills required for effective communication in interviews
24ITP210.6	Associate and be accustomed to the etiquettes to be followed during online meetings

Sources
1. English for Common Interactions in the Workplace: Basic Level: Coursera:
https://www.coursera.org/learn/english-common-interactions-workplace-basic-level
2. Personal Communication-Introduce Yourself With Confidence:
https://www.udemy.com/course/how-to-introduce-yourself/
3. Professionalism, Grooming and Etiquette: <u>https://www.edx.org/course/professionalism-</u>
grooming-and-etiquette
4. How to Write a Resume: <u>https://www.coursera.org/learn/how-to-write-a-resume#syllabus</u>
5. Group Discussion Strategies: <u>https://www.udemy.com/course/group-discussion-strategies/</u>
6. Communication Strategies for a Virtual Age: <u>https://www.coursera.org/learn/communication-</u>
strategies-virtual-age#syllabus
References
1. https://simplifytraining.com/course/personal-hygiene-and-good-grooming/
2. https://www.udemy.com/course/group-discussion-strategies/
3. <u>https://www.educba.com/course/group-discussion/</u>
4. https://getrafiki.ai/meetings/rules-of-virtual-meeting-etiquette-every-sales-professional-
should-follow/
5. https://thedigitalworkplace.com/articles/online-meeting-etiquette-for-attendees/

6. <u>https://rigorousthemes.com/blog/virtual-meeting-etiquette-guidelines-ground-rules/</u>

Course Outcomes	Program Outcomes (POs)								
(COs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
24ITP210.1					2			2	
24ITP210.2					2		1	2	
24ITP210.3					2			2	
24ITP210.4					2			2	
24ITP210.5					2		1	2	
24ITP210.6					2			2	

#### **Course Articulation Matrix**

# Core Values of the Institution

#### SERVICE

A Josephite will keep service as the prime goal in everything that is undertaken. Meeting the needs of the stakeholders will be the prime focus of all our endeavors.

#### EXCELLENCE

A Josephite will not only endeavor to serve, but serve with excellence. Preparing rigorously to excel in whatever we do will be our hallmark.

# ACCOUNTABILITY

Every member of the SJEC Family will be guided to deliver on assurances given within the constraints set. A Josephite will always keep budgets and deadlines in mind when delivering a service.

## **CONTINUOUS ADAPTATION**

Every member of the SJEC Family will strive to provide reliable and continuous service by adapting to the changing environment.

## COLLABORATION

A Josephite will always seek to collaborate with others and be a team-player in the service of the stakeholders.

# Objectives

- Provide Quality Technical Education facilities to every student admitted to the College and facilitate the development of all round personality of the students.
- Provide most competent staff and excellent support facilities like laboratory, library and internet required for good education on a continuous basis.
- Encourage organizing and participation of staff and students in in-house and outside Training programmes, seminars, conferences and workshops on continuous basis.
- Provide incentives and encouragement to motivate staff and students to actively involve in research-innovative projects in collaboration with industry and R&D centres on continuous basis
- Invite more and more number of persons from industry from India and abroad for collaboration and promote Industry-Institute Partnership.
- Encourage consultancy and testing and respond to the needs of the immediate neighbourhood.



# St Joseph Engineering College

Affiliated to VTU, Belagavi | Recognised by AICTE, New Delhi Accredited by NAAC with A+ Grade B.E. (CSE, ECE, EEE, ME, CIV), MBA & MCA Accredited by NBA, New Delhi

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