

K.K. Wagh Institute of Engineering Education and Research, Nashik

# Curriculum F.Y. MCA w.e.f.: AY 2024-2025



## K.K.Wagh Institute of Engineering Education and Research, Nashik (Autonomous) Master of Computer Application Details of Course Structure (2024): Semester - I F.Y.M.C.A.

Course Code	Course Type	Title of Course	Teach H	ung Sc rs./wee	heme ek	Evaluation Scheme and Marks				Credits						
			ТН	TU	PR	In Sem	End Sem	CCE	TW	TU	PR	Total	ТН	TU	PR*	Total
2409501		Discrete Mathematics	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409502	MC	Data Structures and Algorithms	3	-	4	20	60	20	25	-	50	175	3	-	2	5
2409503		Software Engineering and Testing	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409504		Java Programming	1	1	2	-	-	20	25	25	-	70	1	1	1	3
2409505A		Cloud Computing	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409505B	ME	UI-UX Design	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409505C		Augmented Reality and Virtual Reality	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409506	VSEC	Mobile App Development /Animation	1	-	2	-	-	50	25	-	-	75	1	-	1	2
2409507	RM	Research Methodology	3	-	-	-	60	20	-	-	-	80	3	-	-	3
Total			17	1	8	80	300	170	75	25	50	700	17	1	4	22

Note: Credits are as per the Teaching Scheme. \* Credits for 'PR' head are linked with 'TW' marks.



### K.K.Wagh Institute of Engineering Education and Research, Nashik (Autonomous) Master of Computer Application Details of Course Structure (2024): Semester - II F.Y.M.C.A.

Course Code	Course Type	Title of Course	Teach Hi	ing Scl rs./wee	neme k	Evaluation Scheme and Marks					Credits					
			ТН	TU	PR	In Sem	End Sem	CCE	TW	TU	PR	Total	ТН	TU	PR*	Total
2409511		Artificial Intelligence	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409512		Database System and SQL	3	-	4	20	60	20	25	-	25	150	3	-	2	5
2409513		Web Technologies	3	-	4	20	60	20	25	-	25	150	3	-	2	5
24095114		Python Programming	-	1	2	-	-	-	25	25	-	50	-	1	1	2
2409515A		Cyber Security	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409515B	ME	Operating System	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409515C		Operation Research	3	-	-	20	60	20	-	-	-	100	3	-	-	3
2409516	HSSM	Management Information System	2	-	-	-	30	20	-	-	-	50	2	-	-	2
2409517	OJT	On Job Training/ Industry Internship	-	-	-	-	-	-	50	-	50	100	-	-	2	2
		Total	14	1	10	80	270	100	125	25	100	700	14	1	7	22
Multiple Entry-Exit Guidelines:			<ul> <li>The student can exit from the course after completion of first year and awarded the PG Diploma certificate with level 6 of NHEQF. To avail PG Diploma certificate the student must comply the following requirements</li> <li>1. Credit Requirements: The student must earn a total of 44 credits from the prescribed courses of Semester -I and Semester-II of FYMCA</li> <li>2. Course Completion: The student must successfully complete at least one MOOC in subjects Blockchain Technology and Business Intelligence and Analysis equivalent to 4 credits</li> </ul>													

Note: Credits are as per the Teaching Scheme. \* Credits for 'PR' head are linked with 'TW' marks



F. Y. M.C.A. Pattern 2024 Semester: I									
	24	09501: Discrete Mathem	natics						
Teaching	Scheme:	Credit Scheme:	Examination Scheme	:					
Theory :	03 hrs/week	03	InSem Exam : 20Ma Continuous Comprel Evaluation : 20Ma EndSom Exom: 60M	arks iensive arks orks					
Prerequis	site Courses, if any: Nil		Liusem Exam. oom	a1 K5					
Course O 1. To de 2. To stu 3. To lea 4. To int Course O	bjectives: velop logical thinking and it udy use of set, relation and f arn fundamental counting pr troduce basic concepts of gr utcomes: On completion of	as application to computer unction models to solve p inciple, permutation and aphs and trees	r science practical problems combinations be able to–						
		Bloom's Level							
C01	Understand discrete obj world problems logical	Understand discrete objects, relationship among them and Solve real world problems logically by using set and induction approaches.							
CO2	Demonstrate an underst	02-Understand							
CO3	Apply counting princip reasoning to solve prob	03-Apply							
CO4	Apply concepts of grap	h theory in practical situa	tions	03-Apply					
CO5	Analyze problems in co	mputer science using tree	2	04-Analyze					
		COURSE CONTENT	S						
Unit I	Set Theory and Pro	positional Logic	07hrs	COs Mapped - CO1					
Set Theor Introduction Sets: intro inclusion/e Proposition Translating	Set Theory Introduction: History of mathematics as related to discrete structure, motivations for discrete Structure, Sets: introduction, combination of sets, finite and infinite sets, uncountable infinite sets, Principle of nclusion/exclusion (addition principle) Propositional Logic-Introduction, Propositional Equivalences, Application of Propositional Logic- Translating English Sentences, Proof by Mathematical Induction								
Unit II	Relations and	l Function	07hrs	COs Mapped – CO2					
Relations: equivalenc algorithm, Functions functions, Unit III	Relations: Definitions, properties of binary relation, Applications of relation, Relation representation, equivalence relation, partial ordering relations, Hasse diagram, closure of relations, Warshalll's ilgorithm, Functions: Subjective, Injective and Bijective functions, Inverse Functions and composition of functions, The Pigeonhole PrincipleUnit IIIPermutation and Combination07hrsCOs Mapped –								

			1					
			CO3					
Permu	tations and Combinations: Rules of sum and products,	counting principle, per	rmutations,					
combin	ations, generations of permutations and combinations		Τ					
Unit I	V Graph Theory	08hrs	COs Mapped – CO4					
Graph	s : Basic terminology, Types of graph, Graph representa	tion, Graph isomorphis	m, paths and					
Circuits Case St	s, shortest path in weighted graphs, Hamiltonian and Eul tudy-Web Graph	erian paths and circuits	s, Graph coloring,					
Unit	V Trees	07hrs	COs Mapped - CO5					
Trees	: Introduction, rooted trees, path length in rooted trees	, prefix codes and opt	timal prefix codes,					
binary	binary search trees, tree traversals, spanning trees, minimal spanning trees, Kruskal's and Prim's							
algoritł	nms for minimal spanning tree							
	Text Books							
1.	N. Biggs, "Discrete Mathematics", 3rd Edition, Oxford	University Press, ISBN	0 –19					
850	0717 -8.							
2.	C. L. Liu, "Elements of Discrete Mathematics", TMH, I	SBN 10:0-07-066913-9	9					
	Reference Books							
1	Kenneth H. Rosen, "Discrete Mathematics and its Appli	cations", Tata McGraw	v-Hill,					
	ISBN 978-0- 07-288008-3, 7th Edition.							
2	Sriram P & Steven S, "Computational Discrete Mathem	atics", Cambridge Univ	versity					
	Press, ISBN 13: 978-0-521-73311-3							
3	J. Tremblay, Manohar R., "Discrete Mathematical S	structures with application	tion to Computer					
	Science", Tata McGraw-Hill, 2002 ISBN 0-07-463113-	6						

Strength of CO-PO Mapping											
		РО									
	1	2	3	4	5	6	7	8			
CO1	3	3	2	-	-	-	-	2			
CO2	3	2	-	-	-	-	-	1			
CO3	3	3	3	2	-	-	-	2			
CO4	3	3	3	3	_	_	_	2			
CO5	3	3	3	3	-	-	-	2			

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course							
Sr. No.	Components for Continuous Evaluation	Marks Allotted						
1	Assignments - 1 on unit 1	4						
2	Quiz - 1 on unit 2	4						
3	Open Book Test on unit 3	4						
4	Assignments - 2 on unit 4	4						
5	Quiz - 2 on unit 5	4						



	F. Y. M.C.A.							
	Pattern 2024 Semester: 1 2400502: Data Structures and Algorithms							
Toophing So	407302	Credit Schome:	Algorithms Evamination Schoma	•				
Teaching Sc	meme:	Creat Scheme:	Examination Scheme	•				
Theory: 03	hrs/week	03	InSem Exam: 20Mar	ks				
Practical : 0	4 hrs/week	02	Continuous Comprehensive					
			Evaluation: 20Marks					
			Practical Exam: 50M	arks Iarks				
			Term Work · 25Marl	141 N3				
Prerequisite	Courses, if any: Nil		Term Work. 25Mar					
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							
Course Obje	ectives:							
1. To study	the representation, struc	tural constraints, implem	entation and application	ns of basic data				
structure	2S	1 1						
2. To devel	lop the ability to analyze	algorithms	liastions					
$\frac{5}{4}$ To under	intear and nonlinear data	ing techniques and their app	applications					
5. To study	applications of Data Str	ucture in solving real life	e problems					
Course Outo	comes: On completion of	the course, students wil	l be able to-					
Course Outcomes								
<u> </u>		Course Outcomes						
01	CO1 Demonstrate use of sequential data structures - array and linked list							
CO2	Implement stack and queu	e data structures for real ag	pplication	3-Apply				
CO3	Use non linear data struct	ure for solving problem of	various domain	3-Apply				
CO4	Apply various searching a	and sorting techniques		3-Apply				
CO5	Analyze algorithms using	time and space complexity	I	4-Analyze				
		COURSE CONTENT	ſS					
Unit I D	Data Structures and Alg	orithm fundamentals	08hrs	COs Mapped -				
				CO5				
Algorithms: I	Introduction to Algorithr	ns, Analysis of Algorith	ms, Space complexity,	Time complexity,				
Asymptotic r	notation- Big-O, Theta a	and Omega. Introduction	n to data structures, A	bstract Data types				
(ADT), Line	ar data structures using	g sequential organization	on: Concept of seque	ntial organization,				
Concept of Li	inear data structures, arra	ys as ADT, Multidimens	sional arrays, Storage re	presentations (row				
major and col	lumn major). Application	of array in sparse matrix	x representation, addition	on and transpose				
Unit II	Linked	Lists	07hrs	COs Mapped - CO1				
Concept of lin	nked organization, singly	linked list, doubly linke	d list, circular linked list	t and operations				
Unit III	Starks and		<b>07hrs</b>	COs Manned -				
	Stacks allu	Zucuco	0/1115	CO2				
Concept of st	Concept of stack and queues as ADT, Implementation of stacks using sequential and linked							
-			_					

organization, linear queue, circular queue using sequential and linked organization, Priority Queue, Deque, Application of stack for expression conversion, evaluation, recursion and backtracking Application of queue in job scheduling

Unit IV	Trees and Graphs	07hrs	COs Mapped –
			CO3

Introduction, concepts and basic terminologies. Sequential & Linked representation of trees and graphs. Algorithm for tree and graph traversals, Applications of trees and graphs

Unit V	Searching and Sorting	07hrs	COs Mapped –
			CO4
Sequentia	l hinary and Fibonacci search General concepts: sor	t order sort stability eff	ficiency and

Sequential, binary and Fibonacci search. General concepts: sort order, sort stability, efficiency and passes, Internal and external sorting, Bubble sort, Quick sort, Merge sort, Heap sort

#### **Text Books**

1. Horowitz E., Sahani S., "Fundamentals of Data structures in C"

2. Y. Langsam, M. Augenstin, A. Tannenbaum, "Data Structures using C and C++", 2nd Edition, Prentice Hall of India, 2002, ISBN-81-203-1177-9

#### **Reference Books**

1. A. Aho, J. Hopcroft, J. Ulman, "Data Structures and Algorithms", Pearson Education, 1998, ISBN-0-201-43578-0

2. G A V Pai, "Data Structures and Algorithms" , McGraw-Hill Companies, ISBN -9780070667266

Strength of CO-PO Mapping										
	РО									
	1	2	3	4	5	6	7	8		
CO1	3	2	2	2	-	-	-	1		
CO2	3	3	3	2	-	-	-	2		
CO3	3	3	3	3	-	-	-	2		
CO4	3	3	3	2	-	-	-	2		
CO5	3	3	2	2	-	-	-	2		

Guidelines for Continuous Comprehensive Evaluation of Theory Course							
Sr. No.	r. No. Components for Continuous Evaluation						
1	Assignments - 1 on unit 1	4					
2	Quiz - 1 on unit 2	4					
3	Open Book Test on unit 3	4					
4	Assignments - 2 on unit 4	4					
5	Quiz - 2 on unit 5	4					

	List of Laboratory Experiments / Assignments						
Sr. No.	Laboratory Experiments / Assignments	CO					
		Mapped					
1	Write a program to represent sparse matrix using array and perform simple and fast transpose	CO1					
2	Write a menu-driven program that utilizes a singly linked list to handle	CO1					
	operations such as adding, removing, and displaying books, as well as						
	searching for specific books and counting the total number of books						
	available.	0.01					
3	Write a menu driven program which will maintain a list of car models, their	COI					
	price, name of the manufacture, engine capacity etc. as a doubly linked list.						
	I ne menu should make provisions for inserting information pertaining to new						
	car models, delete obsolete models, update data such as price besides						
	by the client and listing all details given a car model						
1	Write a program to implement stack as an ADT. Use this ADT to perform	CO2					
4	expression conversion and evaluation (Infix – Postfix)	02					
5	Write a program to manage customer support tickets. Utilize a circular queue	CO2					
5	implemented using arrays to handle incoming support requests. Each ticket	02					
	represents a customer support request ensuring memory-efficient						
	management Implement features for ticket submission processing and						
	displaying the current queue status						
6	Write a program that reads a list of names and telephone numbers from user	CO3					
Ũ	and insert into a BST tree. Once the tree has been built, present the user with	000					
	a menu that allows him to search the list for a specified name, insert new						
	name, delete an existing name or print the entire phone list.						
7	Write a program to create graph, use the map of your city as the graph.	CO3					
	Represent graph using adjacency list/adjacency matrix and perform Depth						
	First Search and Breadth First Search.						
8	Write a program to represent a graph of your city using adjacency matrix	CO3					
	/adjacency list. Nodes should represent the various areas in the city and links						
	should represent the distance between them. Find the shortest path of your						
	college from your home using Dijkstra's algorithm						
9	Write a program to create student database. Database contains different fields	CO4					
	of student like Roll No, Name and percentage. Search a particular student						
	according to roll number using binary search.						
10	Write a program to arrange list of students to find out first ten toppers from a	CO4					
	class using Bubble sort. (refer the student database given in assignment 10)	~ ~ .					
11	Write a program to sort a list of sales data for a retail company. Each record	CO4					
	represents a sale and contains the following information: sales ID, customer						
	name, product name, quantity sold, and total sale amount. sort the sales data						
	algorithm / Quick sort method						
	Guidelines for Laboratory Conduction						
1 Use of a	open source software is encouraged						
2 Instruct	or should identify and set one assignment beyond the scope of syllabus						
2. Instructor should identify and set one assignment beyond the scope of syllabus.							
	Cuidelines for Student's Lab Journal						
1	Guiucines for Student's Lay Journal						

1. The laboratory assignments are to be submitted by student in the form of journal.

2. Journal consists of certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, assessor's sign, Theory-Concept in brief, algorithm, flowchart, conclusion.).

3. Program codes with sample output of all performed assignments are to be submitted as softcopy.

4. Course in-charge is highly encouraged to maintain soft copy of all the students assignments Guidelines for Term work Assessment

Continuous assessment of laboratory work is done based on overall performance of student. Each lab assignment assessment will assign marks based on rubrics. Suggested rubrics for overall assessment include-

Sr. No.	Components for Continuous Assessment	Marks Allotted
1	R1: Timely Submission	10
2	R2: Understanding	10
3	R3: Clarity of Journal Writing	10
	Total Marks:	30
Each assi	gnment will get 30 marks. Average of all assignme	ents is converted in to
total TW	marks	



F. Y. M.C.A. Pattern 2024 Semester: I 2409503: Software Engineering and Testing				
Teaching S	Scheme:	Credit Scheme:	Examination Schen	ne:
Theory : 0.	3 hrs/week	03	InSem Exam: 20M Continuous Comp Evaluation:20Mar EndSem Exam: 60	arks ehensive ks Marks
Prerequisit	te Courses, if any: Nil			
Course Obj 1. To defin 2. To descr 3. To train 4. To famil	jectives: le and highlight importance ribe the software project m software project managers liarize Project Managemer	e of software project mar anagement activities s and other individuals in at framework and Tools	nagement volved in software pr	roject
Course Ou	tcomes: On completion of	t the course, students will	be able to–	
		Course Outcomes		Bloom's Level
CO1	Identify process model	for software developmen	t	2-Understanding
CO2	Describe software requi	rements for a given appli	ication	3- Apply
CO3	CO3 Design a software system involves harnessing software metrics to 3-Apply			3-Apply
CO4	Use Software testing co	oncept using testing method	odologies	3-Apply
CO5	Implement software Au	tomation Testing concep	t using Testing Tools	3-Apply
		COURSE CONTENT	S	
Unit I	Fundamentals of Soft	ware Engineering	07hrs	COs Mapped - CO1
Introduction models: Wa An Agile vie Case Study:	to Software Engineering, terfall, Incremental Proces ew of Process, The Unified Agile Tools- JIRA	Types of Software, Softwar	ware Processes, Softwork of the second	vare life cycle urrent Models and
Unit II	Software Requireme	ents Engineering	07hrs	COs Mapped – CO2
Requirements Engineering Tasks, Kano Diagram, Processes in the requirement engineering, Eliciting requirements, Problem Analysis, Developing use cases, object oriented analysis, class-based modeling, Software Requirement and Specifications, behavioral and non-behavioral requirements, Software Prototyping <b>Case Study:</b> Study SRS of Smart Home Automation Systems				
Unit III	Design and	metrics	07hrs	COs Mapped – CO3
The Design Design, Use and Couplin Introduction Size Oriente Metrics, Info	Process, Design Concepts er Interface Design, WebA ag a to software metrics, Class ed Metrics, Halstead's Soft ormation Flow Metrics, an	, The Design Model, Arc pp Design, Cohesion & C sification of Software Me ware Metrics, Functional d Metrics for Maintenan	hitectural Design, Co Coupling, Classificati etrics Point (FP) Analysis, ce.	omponent-Level on of Cohesiveness Data Structure

Defining Software Scope and checking feasibility, Resources Management, Reusable Software Resources, Environmental Resources, Software Project Estimation and Decomposition Techniques

Unit IV	Software testing and Methodologies	08hrs	COs Mapped –
			CO4

Introduction to Software Testing: Definition and objectives, software testing life cycle model, Basics of identifying test scenarios

Test Planning and Preparation: Preparation of test plan documents, Writing effective test cases, Understanding the importance of test case management

Defect Management: Establishing a defect repository, Defect tracking and management processes White-Box Testing Methodologies: Introduction to white-box testing, Static testing techniques: humanbased and static analysis tools, Structural testing: unit/code functional testing, code coverage testing, code complexity testing

Black-Box Testing Methodologies: Introduction to black-box testing, Requirement-based testing, Positive and negative testing strategies, Boundary value analysis, Equivalence partitioning

Unit V	Automation Testing	07hrs	COs Mapped –
			CO5

Fundamentals of Automation Testing, Essential skills for automation testers, Scope and benefits of automation testing, Design and architecture considerations for automation

Test Automation Tools and Technologies: Requirements for selecting a test tool, Overview of UI automation tools: Cypress, Testcafe, Protractor, Case studies showcasing automation testing in practice Introduction to Selenium: Historical overview of the Selenium project, Overview of Selenium's tool suite: Selenium IDE, Selenium RC, Selenium WebDriver, Selenium Grid

**Text Books** 

1. Roger S Pressman, "Software Engineering: A Practitioner's Approach", McGraw-Hill, Seventh or Eighth Edition

2. Hans Van Vliet ,"Software Engineering: Principles and Practice", Wiley, Fourth Edition

 Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practices" Pearson.
 Adithya P.Mathur "Foundations of Software Testing – Fundamental Algorithms and Techniques", Pearson Education India, 2011

#### **Reference Books**

 Pankaj Jalote, "Software Engineering: A Precise Approach", Wiley India, ISBN: 9788126523115.
 Marchewka, "Information Technology Project Management", Wiley India, ISBN: 9788126543946
 Klaus Pohl and Chris Rupp "Requirements Engineering: Fundamentals, Principles, and Techniques", Springer, Second Edition

4.Norman Fenton and James Bieman ,"Software Metrics: A Rigorous and Practical Approach", CRC Press, Third Edition

5.Kshirasagara Naik, Priyadarshi Tripathy, "Software Testing and Quality Assurance", Wiley India 2012

6. Rajani & Oak, "Software Testing: Methodology, Tools and Processes" Tata McGraw-Hill, 2007

	Strength of CO-PO Mapping							
				POs				
	1	2	3	4	5	6	7	8
CO1	3	3	2	1	-	2	1	2
CO2	3	3	2	-	-	2	-	2
CO3	3	3	3	2	-	2	1	2
CO4	3	3	3	3	-	1	1	2
CO5	3	2	3	3	1	1	1	2

Gui	Guidelines for Continuous Comprehensive Evaluation of Theory Course			
Sr. No.	Sr. No. Components for Continuous Evaluation			
1	Assignments - 1 on unit 1	4		
2	Quiz - 1 on unit 2	4		
3	Quiz - 2 on unit 3	4		
4	Assignments - 2 on unit 4	4		
5	Micro Project	4		



2	F. Y. M.C.A. Pattern 2024 Semeste 409504: Java Program	er: I Iming		
	Credit Scheme:	Examination	Scheme	:
Theory : 01hr/week Tutorial : 01hr/week Practical : 02 hrs/week		Continuous Comprehensive Evaluation : 20Marks Term Work:25Marks Tutorial:25Marks		
s, if any: Basic	Programming Skills			
nming skills in Ja ot of decision-ma ted with real-life On completion of	ava Programming king and functions in Ja e examples of Java prog f the course students wil	iva ramming l be able to		
	<b>Course Outcomes</b>			Bloom's Level
<b>CO1</b> Describe object-oriented programming concept using Java including defining classes, invoking methods, Constructor using interface and package			2-Understand	
strate inheritanc	e and multi-threading co	oncept		3-Apply
interactive web	application using Java a	applet		3-Apply
Fundamenta	ls of Java Programmin	g	6 hrs	COs Mapped - CO1, CO2
ey features of Jav of a Java Progra ons, Defining a C and accessing me troduction to Pa ces	va programming languag m: Classes, Methods, Fi class: Declaration of field embers, Constructors and ckages and Interfaces: S	ge, Java Progra ields, Writing a ds and methods d Constructor ( structuring code	mming en Simple J s, Creatin Overloadi e using pa	nvironment: JDK, Java Program: g Objects: ng: Creating and ackages,
Advai	nced Class concepts		6 hrs	COs Mapped - CO1, CO2, CO3
norphism using N ating Threads by oncurrent execut Exception Hiera - Life cycle of drawing simple s	Method Overloading and y using extending the Th tion of threads rrchy, try-catch Blocks, y applet, Creation of ex geometry shapes in apple	d Method Over aread class and multiple try bl accutable apple et	riding impleme ocks and et, Run tl	nting the Runnable finally statement ne Applet, Passing
	Text Books			
wa Programming my, "Programmi r et al. "Java 2 F	g: Test Your Knowledge ng with Java – A Primer Programming", Black Bo Reference Books	e, Publisher TB r", Tata – McG ook, Dreamtech	D, Editio iraw-Hill 1 Press.	n TBD Publication, 4th
	2 <b>s, if any:</b> Basic I ming skills in Ja at of decision-ma ted with real-life on completion of be object-oriente g classes, invoki e istrate inheritance interactive web <b>Fundamenta</b> by features of Jav of a Java Progra ns, Defining a C ind accessing me troduction to Pa ces <b>Advan</b> horphism using N ating Threads by oncurrent execut Exception Hiera - Life cycle of drawing simple § wa Programming my, "Programming my,	Pattern 2024 Semest         Credit Scheme:         01       01         ck       01         ek       01         s, if any: Basic Programming Skills         uming skills in Java Programming         of decision-making and functions in Jated with real-life examples of Java prog         on completion of the course students wil         Course Outcomes         be object-oriented programming concept         g classes, invoking methods, Constructed         e         ustrate inheritance and multi-threading collister         interactive web application using Java a         Fundamentals of Java Programming         ey features of Java programming languag         of a Java Program: Classes, Methods, Fins, Defining a Class: Declaration of fiel         accessing members, Constructors and         troduction to Packages and Interfaces: Sizes         Advanced Class concepts         oorphism using Method Overloading and         ating Threads by using extending the The         oncurrent execution of threads         Exception Hierarchy, try-catch Blocks ,         - Life cycle of applet, Creation of exdrawing simple geometry shapes in appl         Text Books         va Programming: Test Your Knowledge         my, "Programming:	Pattern 2024 Semester: I         2409504: Java Programming         Credit Scheme:       Examination         01       Continuous         01       Continuous         ek       01       Evaluation :         rerm Work       Tutorial:25N         s, if any: Basic Programming       Tutorial:25N         ming skills in Java Programming       Tutorial:25N         of decision-making and functions in Java       ted with real-life examples of Java programming         on completion of the course students will be able to       Course Outcomes         be object-oriented programming concept using Java in g classes, invoking methods, Constructor using interfate       strate inheritance and multi-threading concept         interactive web application using Java applet       Fundamentals of Java Programming         Fundamentals of Java Programming       rege constructors and Constructor G troduction to Packages and Interfaces: Structuring code ces         Advanced Class concepts       norphism using Method Overloading and Method Overloading simple geometry shapes in applet         Life cycle of applet, Creation of executable apple drawing simple geometry shapes in applet         Text Books       reat a. "Java 2 Programming", Black Book, Dreamtecet Reference Books	Pattern 2024 Semester: I         2409504: Java Programming         Credit Scheme:       Examination Scheme         01       Continuous Comprete         ek       01       Evaluation : 20Mark         ek       01       Ferm Work:25Mark         s, if any: Basic Programming Skills       Term Work:25Marks         uning skills in Java Programming to of decision-making and functions in Java       ted with real-life examples of Java programming On completion of the course students will be able to         Course Outcomes       Course Outcomes         pe object-oriented programming concept using Java including g classes, invoking methods, Constructor using interface and e       6 hrs         strate inheritance and multi-threading concept       interactive web application using Java applet         Fundamentals of Java Programming       6 hrs         cy features of Java programming language, Java Programming e       of a Java Program: Classes, Methods, Fields, Writing a Simple J         nst, Defining a Class: Declaration of fields and methods, Creatin in daccessing members, Constructors and Constructor Overloadit troduction to Packages and Interfaces: Structuring code using p         ces       6 hrs         orophism using Method Overloading and Method Overriding ating Threads by using extending the Thread class and impleme oncurrent execution of threads         Exception Hierarchy, try-catch Blocks , multiple try blocks and - Life cycle of applet, Cr

1. Kathy Sierra and Bert Bates: Head First Java, O'Reilly Media, 2nd Edition-2005

- 2. Herbert Schildt: Java: The Complete Reference, McGraw-Hill Education, 11th Edition-2018
- 3. Joshua Bloch: Effective Java, Addison-Wesley Professional, 3rd Edition-2017

Strength of CO-PO Mapping								
		PO						
	1	2	3	4	5	6	7	8
CO1	3	2	2	2	-	-	-	2
CO2	3	3	3	2	-	-	-	2
CO3	3	2	3	3	2	1	-	2

	Guidelines for Continuous Comprehensive Evaluation	
Sr. No.	Components for Continuous Evaluation	Marks Allotted
1	Assignment -1 on unit 1	5
2	Quiz-1 on Unit 2	5
3	Micro Project	10

List of Tutorial			
Sr. No.	List of Tutorial Assignments	СО	
		Mapped	
1	Write a java program to implement a small project to understand the basic concept of OOP	CO1	
2	Design and implement a class concept with default, parameterized, and copy constructors, along with member functions to accept and display information.	CO1	
3	Design and implement a class concept with constructors along with operator overloading.	CO1	
4	Design a system for maintaining information of any real life problem. Implement inheritance concept in it	CO2	
5	Write a program to create multiple threads and demonstrate how two threads communicate with each other.	CO2	
6	Create an applet to showcase web application operations. When any button is pressed, the corresponding operation is performed and the result is displayed in Brower.	CO3	

List of Laboratory Experiments / Assignments					
Sr. No.	Laboratory Experiments / Assignments	СО			
		Mapped			
1	Write a program in Java to manage a library system with classes representing books and library members. Each book has data fields for its title, author, publication year, and availability status. Members have data fields for their name, ID, and borrowed books. The methods include functions to borrow and return books, as well as to check the availability of a book. Create instances of books and library members, and simulate borrowing and returning books. Display the borrowing status of each book and member.	CO1			
2	Write a program in Java program using constructor to create a simple banking application. The program should allow users to create multiple bank accounts, each with a unique account number, name of the account holder, and initial balance. Users should be able to perform operations such as deposit, withdrawal, and balance inquiry on their accounts. Provide a menu-driven interface for users to interact with the banking application.	CO1			
3	Develop a program in Java for managing a student database system. Design a base class named "Student" with data members such as name, date of birth, blood group, and contact address. Another base class named "PhysicalAttributes" consists of data members for height and weight. Finally, a base class named "InsuranceInfo" holds the insurance policy number. The derived class "StudentRecord" contains additional data members for telephone numbers and driving license number. Implement a menu-driven program to perform operations such as building a master table, displaying records, inserting new entries, deleting entries, editing records, and searching for a specific record.	CO2			
4	Develop a program in Java to manage a university's faculty database. Design a base class named "Employee" with data members such as employee ID, name, and salary. Create derived classes named "Professor" and "Staff" inheriting from the Employee class. The Professor class should have additional data members such as department and research interests, while the Staff class should include details like designation and years of service. Implement methods to display the details of each employee type. Use polymorphism and exception handling concept in the program	CO2			
5	Write a Java Program to demonstrate multi threading concept. Consider two threads are communicating with each other is the "Producer- Consumer" problem. One thread (the producer) generates data or tasks and puts them into a shared buffer, while another thread (the consumer) consumes these tasks from the buffer and processes them.	CO2			
6	Develop a Java applet for a simple quiz game. The applet should display a question along with multiple-choice answers. The user should be able to select an answer by clicking on a button corresponding to each option. After selecting an answer, the user should click a "Submit" button to check if their answer is correct. If the answer is correct, display a message indicating success; otherwise, display a message indicating failure.	CO3			
	<b>Guidelines for Laboratory Conduction</b>				

1. Use of open source software is encouraged.

2. Instructor should identify and set one assignment beyond the scope of syllabus.

3.Operating System recommended :- Windows / Open source Linux or its derivative

#### **Guidelines for Student's Lab Journal**

1. The laboratory assignments are to be submitted by student in the form of journal.

2. Journal consists of certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, assessor's sign, Theory-Concept in brief, algorithm, flowchart, conclusion.).

3. Program codes with sample output of all performed assignments are to be submitted as softcopy.

4. Course in-charge is highly encouraged to maintain softcopy of all the students assignments

#### **Guidelines for Term work Assessment**

Continuous assessment of laboratory work is done based on overall performance of student. Each lab assignment assessment will assign marks based on rubrics. Suggested rubrics for overall assessment include-

Sr. No.	<b>Components for Continuous Assessment</b>	Marks Allotted			
1	R1: Timely Submission	10			
2	R2: Understanding	10			
3	R3: Clarity of Journal Writing	10			
	Total Marks: 30				
Each assignment will get 30 marks. Average of all assignments is converted in to					
total TW	marks				



F. Y. M.C.A. Pattern 2024 Semester: I 2409505A: Elective I: Cloud Computing						
Teaching	Scheme:	Credit Scheme:	Examination Scheme:			
Theory :	03 hrs/week	03	InSem Exam: 20M Continuous Comp Evaluation:20Ma EndSem Exam: 60	Aarks orehensive rks OMarks		
Prerequi	site Courses, if any: Nil					
Course O 1. To 2. To 3. To Course C	<b>bjectives:</b> illustrate fundamentals of c have comprehensive knowl use various cloud computin <b>Putcomes:</b> On completion of	loud computing edge of cloud computing g platforms, tools and clo f the course, students will	bud based applications be able to-	ons		
	1	Course Outcomes		Bloom's Level		
C01	Understand the differen	t cloud computing enviro	onment	2 - Understand		
CO2	Understand virtualization	Understand virtualization technology & Cloud Architecture				
CO3	Use of various cloud pla	atforms		3 - Apply		
CO4	Demonstrate and develo	3 - Apply				
CO5 Illustrate advance techniques in Cloud Computing 3 - A				3 - Apply		
		COURSE CONTENT	Ś			
Unit I	Fundamental of Cl	oud Computing	07hrs	COs Mapped - CO1		
Defining a	cloud, vision of cloud com	puting, cloud computing	reference model, ch	aracteristics and		
Unit II	Virtualization and (	Cloud Computing, Com	<b>07hrs</b>	COs Mapped –		
	Archite	cture		CO2		
Virtualiza Virtualiza Type of cl	tion, Taxonomy of virtualization, Cloud Architecture: Clouds, Reference Model –Iaa	ation techniques, Virtualiz oud computing logical ar as, PaaS, SaaS, Amazon E	zation and Cloud co chitecture, Cloud Sy EC2	omputing, Types of ystem architecture,		
Unit III	Cloud Pla	tforms	07hrs	COs Mapped – CO3		
Amazon Web Services (AWS): Components, Amazon Simple Database, Amazon Storage System, Amazon Database services (Dynamo DB) Microsoft Cloud Services: Azure core concepts, SQL Azure, Windows Azure Platform Appliance Google App Engine: Architecture and core concepts, Application life cycle						
Unit IV	Cloud Tools and	Applications	08hrs	COs Mapped – CO4		
Containers technology: Docker, Kubernetes, Serverless Computing, Orchestration, Build and release, Continuous Integration & Delivery – Jenkins, Automate Configuration Management – Ansible, Case study: Spotify using Docker						
Unit V	Cloud Se	curity	07hrs	COs Mapped – CO5		

Security challenges, Threat Agents - Anonymous Attacker, Malicious Service Agent, Trusted Attacker, Malicious Insider Cloud Security Threats - Traffic Eavesdropping, Malicious Intermediary, Denial of Service, Insufficient Authorization, Virtualization Attack, Overlapping Trust Boundaries, Common Attacks

Economics of Cloud ,Challenges in Cloud, Fog Computing, Edge Computing, Mobile Cloud Computing ,Business Transformation with Google Cloud, Superpowers of Cloud

#### **Text Books**

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education, ISBN-13:978-1-25-902995-0

2. Rajkumar Buyya, Christian Vecchiola, "Mastering Cloud Computing Foundations and Applications Programming", Morgan Kaufmann, 2nd Edition, 2013.

3. A. Srinivasan, J. Suresh, "Cloud Computing: A Practical Approach for Learning and Implementation", Pearson, ISBN: 978-81-317-7651-3

4. Viktor Farcic, "The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline with

Containerized Microservices", CreateSpace Independent Publishing Platform; 1st edition

#### **Reference Books**

1. Rajkumar Buyya, "Cloud Computing Principles and Paradigms", Wiley

2. Ricardo Puttini, Thomas Erl, Zaigham Mahmood, ,"Cloud Computing: Concepts, Technology and Architecture", Prentice Hall, 1st Edition, 2013

3. Zaigham Mahmood, "Cloud Computing: Challenges, Limitations and R&D Solutions", Springer International Publishing, 1st edition, 2014

4. Dr. Kris Jamsa, "Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models,

Mobile, Security and more", Wiley Publications, ISBN:978-0-470-97389-9

5. Anthony Velte, Robert Elsenpeter, Toby J. Velte, "Cloud Computing: A Practical Approach", 2010, The McGraw Hill.

6. Shahid Latif, Subra Kumarswamy, Tim Mather, "Cloud Security and Privacy", Oreilly, ISBN-13: 978-81-8404-815-5

7. Jennifer Davis and Katherine Daniels, "Effective DevOps: Building a Culture of Collaboration, Affinity, and Tooling at Scale", O'Reilly Media, Inc., ISBN: 978-1-491-92630-7

8. Sanjeev Sharma and Bernie Coyne, "DevOps for Dummies", John Wiley & Sons, Inc., 2nd IBM Limited Edition, ISBN: 978-1-119-04705-6

Strength of CO-PO Mapping								
		РО						
	1	2	3	4	5	6	7	8
CO1	3	2	2	2	-	-	-	2
CO2	3	2	2	2	-	-	-	2
CO3	3	3	3	3	1	1	-	2
CO4	3	3	3	3	2	2	1	2
CO5	3	3	3	3	-	1	1	3

	Guidelines for Continuous Comprehensive Evaluation							
Sr. No.	<b>Components for Continuous Evaluation</b>	Marks Allotted						
1	Assignment -1 on unit 1	4						
2	Quiz-1 on Unit 2	4						
3	Assignment - 2 on unit 3	4						
4	Group Presentation	4						
5	Quiz-2 on Unit 5	4						



		F. Y. M.C.A. Pattern 2024 Semeste	r: I					
	2409505B: Elective I: UI/UX Design							
Teaching	Scheme:	Credit Scheme:	Examination Scheme	:				
Theory :	03 hrs/week	03	InSem Exam: 20Mar Continuous Compreh Evaluation: 20Marks EndSem Exam: 60Ma	ks aensive arks				
Prerequis	site Courses, if any: Nil							
Course O 1. To lea 2. To str 3. To ac	<b>bjectives:</b> arn the factors that determin udy the usable software-ena hieve efficient, effective, an	ne how people use techno abled user-interfaces and safe interaction	logy					
Course O	Putcomes: On completion o	of the course, students will	l be able to–					
		Course Outcomes		Bloom's Level				
C01	Describe user interface	and user experience prine	ciples	1-Knowledge				
CO2	Explore strategies for r	nanaging design projects		2-Understand				
CO3	Recognize the quality of	of service and data visuali	zation	2- Understand				
CO4	Examine the data-drive	en UI designs and user exp	periences	3-Apply				
CO5	Test the usability of a c	lesign through usability e	valuations	4-Analyze				
	I	COURSE CONTENT	CS					
Unit I	Fundamenta	l of UI/UX	07hrs	COs Mapped - CO1				
The Huma human psy Introduction measures, principles to UX des	in –I/P, O/P channels, Hum vchology on to User experience and u Universal Usability, Chara and theories of good design ign. Applications of UX de	an Memory, thinking, em user interaction-Usability cteristics of graphical and n, User Experience- Conce asign	otion, individual differe of interactive systems, g web user interfaces, gu ept of UX, Trends in U2	ence (diversity), goals and idelines, X, 6 Stages used				
Unit II	Design I	Process	08hrs	COs Mapped – CO2				
Managing design processes, organizational design to support usability, pillars of design, development methodologies, Human considerations in Design, Usability- principles to support usability, assessment in the design process, Usability problems, practical measures of usability, objective measures of usability, golden rules of interface design, Evaluating Interface Design –Introduction, Expert reviews, Usability testing. Acceptance tests, Legal issues								
Unit III	II Interaction Styles (07hrs) COs Mapped CO3							
Direct manipulation and virtual environment, Develop system menus and navigation schemes-Structure of menus, Function of menus, content of menus, phrasing the menu, navigating menus, kinds of graphical menus, form fill-in and dialog boxes, command-organization, functionality, strategies and structure, naming and abbreviations, interaction devices, collaboration and social media participation								
Unit IV	Implementation suppo Cont	ort and Screen Based rols	07hrs	COs Mapped – CO4				

#### Implementation support:

Support, training and learning, requirement of user support, element of windowing systems, Individual window design, multiple window design, command organization strategies command menus, natural languages in computer

#### Screen Based Controls:

Selection control-Radio buttons, check boxes, list boxes, Read-only controls- text boxes, Operable controls - buttons, slider, tab, scroll bar, clear text and messages, text for web pages, Graphics, icons and images, Presentation controls-Static text fields, Group boxes, column headings, tool tips, progress indicators

Unit V	Design Issues	07hrs	COs Mapped -
			CO5

Quality of service- Models of response time impacts, user productivity, variability in response time, Balancing function and fashion- Error messages, display design, web page design, window design, color, Information visualization – data type by task taxonomy, challenges for information visualization, societal and individual impact of user interface

#### **Text Books**

- 1. Creative Tim, "Fundamentals of Creating a Great UI/UX", 1st Edition
- Jon Yablonski, "Laws of UX: Using Psychology to Design Better Products & Services", O'REILLY Publication
- 3. Jenifer Tidwell, Charles Brewer, Aynne Valencia "Designing Interfaces: Patterns for Effective Interaction Design", O'REILLY Publication

#### **Reference Books**

- 1. Shneiderman, Plaisant, Cohen, Jacobs, "Designing the User Interface-Strategies for Effective Human Computer Interaction", 5<sup>th</sup> Edition PEARSON Publication
- 2. Wilbert O. Galitz "The Essential Guide to User Interface Design", 2<sup>nd</sup> Edition, WILEY Publication
- 3. Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, "Human–Computer Interaction, 3<sup>rd</sup> Edition,
- 4. Alan Coopen, "The essentials of interaction"

Strength of CO-PO Mapping								
		РО						
	1	2	3	4	5	6	7	8
CO1	3	-	2	2	-	-	-	2
CO2	-	3	3	-	2	2	-	2
CO3	3	3	-	3	-	-	-	-
CO4	3	2	3	3	-	-	-	3
CO5	3	3	3	3	2	-	-	2

Guidelines for Continuous Comprehensive Evaluation						
Sr. No.	<b>Components for Continuous Evaluation</b>	Marks Allotted				
1	Assignment -1 on unit 1	4				
2	Quiz-1 on Unit 2	4				
3	Assignment - 2 on unit 3	4				
4	Group Presentation	4				
5	Quiz-2 on Unit 5	4				



	2409505C • Electi	F. Y. M.C.A. Pattern 2024 Semester ve I: Augmented Reality	r: I y and Virtual Reality				
Teaching	Scheme:	Credit Scheme:	Examination Scheme:	:			
Theory :(	03 hrs/week	03	In Sem Exam: 20Mar Continuous Assessme End Sem Exam:60Ma	rks ent: 20Marks arks			
Prerequis	site Courses, if any: Nil		I				
Course O 1. To lea 2. To ur 3. To ur 4. To lea	bjectives: arn basics of computer graph iderstand how VR systems v iderstand how AR systems v arn AR and VR techniques	nics and animation york and list the application york and list the application	ions of VR ions of AR				
Course O	futcomes: On completion of	Course, students will	be able to-	Bloom's Loval			
C01	Explain fundamentals of	f computer vision comp	uter graphics and	2-Understand			
	human-computer intera	human-computer interaction techniques related to VR/AR					
<b>CO2</b> Equip students with knowledge of augmented history, concepts, and hardware, to enable ther reality experiences			v, covering its definition, reate diverse augmented	2-Understand			
CO3	Use marker-based and m	arker-less approaches for a	ugmented reality	3-Apply			
CO4	Articulate system compo	nents and interface modality	ies in virtual reality	3-Apply			
CO5	Use input and output inter	rfaces in virtual reality		3-Apply			
		COURSE CONTENT	S				
Unit I	Computer (	Fraphics	08hrs	COs Mapped - CO1			
Definition Color CR drawing al Animation Animation	, Application, Pixel and Fran Γ Monitors ,Conversion of I Igorithm, Polygon Filling- S n – What is Animation, Uses n-2D and 3D Animation, Bas	me buffer, Raster and Ra ine- DDA algorithm of can line polygon filling a of animation, Types of A sics Principles of animati	ndom Scan display, dis line drawing, Bresenha Ilgorithm Animation, Graphic An on, Techniques of anim	play devices-CRT, m's line and circle imation, Computer ation			
Unit II	Augmented	COs Mapped – CO2					
Augmente Augmente Reality Ex Augmente Displays – Processors	ed Reality -Introduction, his ed Reality Concepts- Workin sperience ed Reality Hardware: - Audio Displays, Haptic Dis s – Role of Processors, Proce	tory and applications of ag principle of Augment splays, Visual Displays, a essor System Architectur	augmented reality ed Reality, Ingredients and Other sensory displ e, Processor Specificati	of an Augmented ays ons and Sensors			
	Augmenteu Kean	iy rechniques	0/1115	CO3			

Marker-based approach- Introduction to marker-based tracking, types of markers- Template markers, 2D barcode markers, imperceptible markers, marker camera pose and identification,

Marker-less approach- Computer Vision for Augmented Reality - Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection, Simultaneous Localization and Mapping, Outdoor Tracking

Unit IV	Virtual Reality	07hrs	COs Mapped –
			CO4

Concepts of Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality

Unit V	Virtual World Representation	07hrs	COs Mapped –
			CO5

Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner. Output -- Visual /Auditory / Haptic Devices, Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Menu, Object Grasp.

case study: GHOST (General Haptics Open Software Toolkit) software development toolkit

**Text Books** 

1. Steven M. LaValle, "Virtual Reality", Cambridge University Press, 2016

2.William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design ", (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002

3. Allan Fowler, "AR Game Development", 1<sup>st</sup> Edition, A press Publications, 2018, ISBN 978-1484236178

#### **Reference Books**

1. Alan B Craig, William R Sherman and Jeffrey D Will," Developing Virtual Reality Applications: Foundations of Effective Design", Morgan Kaufmann, 2009.

2.Schmalstieg / Hollerer ,"Augmented Reality: Principles & Practice" , Pearson Education India; 1<sup>st</sup> edition (12 October 2016),ISBN-10: 9332578494

3.Burdea, G. C. and P. Coffet.," Virtual Reality Technology", 2<sup>nd</sup> Edition. Wiley-IEEE Press, 2003/2006 4.Alan B. Craig," Understanding Augmented Reality, Concepts and Applications", Morgan Kaufmann, 2013.

Strength of CO-PO Mapping								
		РО						
	1	2	3	4	5	6	7	8
CO1	3	2	1	2	1	-	1	2
CO2	2	2	1	2	1	-	1	3
CO3	2	3	3	3	2	1	1	2
CO4	2	2	2	3	2	1	1	2
CO5	2	2	2	3	2	1	1	2

Guidelines for Continuous Comprehensive Evaluation						
Sr. No.	<b>Components for Continuous Evaluation</b>	Marks Allotted				
1	Assignment -1 on unit 1	4				
2	Quiz-1 on Unit 2	4				
3	Assignment - 2 on unit 3	4				
4	Group Presentation	4				
5	Quiz-2 on Unit 5	4				



F. Y. M.C.A. Pattern 2024 Semester: II 2409506: Mobile App Development									
Teaching Sch	ieme:			Credit	Schem	ne: Ex	xaminat	tion Schem	e:
Practical : 04	hrs/week				02	T P	ermWo ractical	rk: 25Mar Exam: 50N	ks Marks
Prerequisite	Prerequisite Courses, if any:Object Oriented Programming								
Course Object 1. To explore 2. To study Us 3. To understa 4. To Understa Course Outco	etives: various conser Interfact nd Data M and how to omes: On a	ncepts of e (UI) D lanagemo integrat completi	f android Design and ent and the netwo ion of th	1. nd Imple Storage. rk conne e course	ementati ectivity	on:. into And ts will be	roid app	lications.	
		-		Course	Outcor	mes			Bloom's Level
C01	Demonstra	ate the ir	terface	designin	g using	various	widgets		2-Apply
CO2	Implemen	t databas	se conne	ctivity in	n androi	id	0		3-Apply
CO3	Implemen	t various	android	l librarie	s				3-Apply
CO4	Implemen	t differei	nt types	of mana	gers in a	android			3-Apply
	<u> </u>			Те	extBook	KS			1
<ol> <li>Mobile</li> <li>Mobile</li> <li>Mobile</li> <li>Androi</li> </ol>	Computir Computir d Applicat	ng: Prasa ng: Raj k tion Dev	nt Pattn amal, O elopmer	aik, Raji xford nt: Carm <b>Refe</b>	ib Mall, en Dele renceBa	PHI Put	olication	INDIA	
1 Mobile	Commun	ications	I Schill	er Addi	tion We	ours eslev Put	lication		
2. GSM S	System Eng	gineering	g A.Meh	irotra, A	ddition	Wesley I	Publicati	ion	
3. Unders	standing W	AP M. I	Heijden,	M. Tay	lor, Arte	ech Hous	se Public	ation	
4. Profess	sional And	roid App	olication	Develoj	pment V	Wrox Pul	blication	s, Reto Mei	ier
<ol> <li>Opadnyaya, Mobile Computing, Springer</li> <li>Sams teach yourself Android application development, Lauren Dercy and Shande Conder, Sams publishing</li> <li>Mobile Computing: Asoke K Talukdar, Roopa R, Yayagal, TataMcGrawHill</li> </ol>									
8. Princip	les of Mol	oile Com	puting,	Hansma	ann, Me	erk, Nick	lous, Sto	ober, Spring	er, second edition
		Strei	ngth of <b>(</b>	CO-PO N	Mapping	<u>y</u>			
PO									
	1	2	3	4	5	6	7	8	
CO1	3	2	3	3	-	-	-	2	
CO2	3	2	3	3	-	-	-	2	
CO3	3	-	3	3	-	-	-	2	
CO4	3	2	3	3	-	-	-	2	

List of Laboratory Experiments / Assignments					
Sr. No.	Laboratory Experiments / Assignments				
		Mapped			
	Develop an Android application using controls like Button, TextView,	<b>CO1</b>			
1	EditText for designing a calculator having basic functionality like				
	Addition, Subtraction, Multiplication, and Division.				
2	Create a Login page with Username and Password. Validation of password	CO2			
Z	should happen using database.				
	Develop a simple application with one Edit Text so that the user can write	CO3			
3	some text in it. Create a button called "Convert Text to Speech" that				
	converts the user input text into voice.				
4	Develop an application that makes use of Notification Manager.	<b>CO4</b>			
5	Develop a native application that uses GPS location information.	<b>CO4</b>			

#### **Guidelines for Laboratory Conduction**

1. Use of open source software is encouraged.

2. Instructor should identify and set one assignment beyond the scope of syllabus.

3.Operating System recommended :- Windows / Open source Linux or its derivative

#### Guidelines for Student's Lab Journal

1. The laboratory assignments are to be submitted by student in the form of journal.

2. Journal consists of certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, assessor's sign, Theory-Concept in brief, algorithm, flowchart, conclusion.).

3. Program codes with sample output of all performed assignments are to be submitted as softcopy.

4. Course in-charge is highly encouraged to maintain softcopy of all the students assignments Guidelines for Term work Assessment

Continuous assessment of laboratory work is done based on overall performance of student. Each lab assignment assessment will assign marks based on rubrics. Suggested rubrics for overall assessment include-

Sr. No.	<b>Components for Continuous Assessment</b>	Marks Allotted			
1	R1: Timely Submission	10			
2	R2: Understanding	10			
3	R3: Clarity of Journal Writing	10			
	Total Marks:	30			
Each assignment will get 30 marks. Average of all assignments is converted in to					
total TW marks					



		F. Y. M.C.A. Pattern 2024 Semester: I 2409507: Research Methodology	,			
Teaching	Scheme:	Credit Scheme:	Examination Sc	Examination Scheme:		
Theory : 03 hrs/week03Continuous Comprehensive Evaluation:20Marks EndSem Exam: 60Marks						
Prerequis	site Courses, if any: N	lil				
Course O           1. To get           2. To lea           3. To gai	<b>bjectives:</b> acquainted research co rrn various formulation n practical experience	oncept of research task in collecting, analyzing, and interpret	ting research data	L		
Course O	Outcomes: On complet	ion of the course, students will be abl	le to-			
		<b>Course Outcomes</b>		Bloom's Level		
CO1	CO1 Describe the basic principles of research approaches					
CO2	CO2Develop the skills for identification of research problem formulation					
CO3	CO3 Develop proficiency in selecting appropriate research designs and 3-Ap methods for different research questions.					
CO4	Use Experimental and non-experimental research designs 3-A					
CO5 Enhance critical thinking and analytical skills through the evaluation of research literature.				3-Apply		
		COURSE CONTENTS				
Unit I	Introd	luction to Research	07hrs	COs Mapped - CO1		
Research ( research, c collection,	Concept: meaning, obj conceptual, theoretical, sampling and sample	ectives, motivation; Types of research applied and experimental research), design	h, approaches (de Methods and tecl	scriptive nniques of data		
Unit II	Formula	tion of Research Task	07hrs	COs Mapped – CO2		
Formulatio	on of Research Task: L	iterature Review: importance and me	ethods, sources, f	ield study,		
laboratory experiments, critical analysis of already generated facts, hypothetical proposal for future development and testing, selection of research task, prioritization of research, introduction to hypothesis testing						
Unit III	Mode	Modeling and Simulation 07hrs				
Mathemat modeling graphs. Sin formulatio Experimen guidelines	ical Modelling and Sin with ordinary different mulation concept, type on of model based on sin ntal Modeling: Definiti for designing experim	nulation: Concept of modeling, classi ial equations, differential equations, j s (quantitative, experimental, comput mulation. on of experimental design, examples ents.	fication of mathe partial differentia ter, statistical),pro , single factor exp	matical models, l equations, ocess of periments,		
Unit IV	General model of pro desig	cess and Process optimization and gned experiments	07hrs	COs Mapped – CO4		

General model of process: Input factors/variables, Output parameters/ variables, controllable/ uncontrollable variables, dependent/independent variables, compounding variables, extraneous variables and experimental validity

Process optimization and designed experiments: methods for study of response surface, First order design, Determining optimum combination of factors, determination of steepest ascent, Taguchi approach to parameter design

11						
Unit VAnalysis of Results and Report Writing08hrsCOs Mapp						
			CO5			
Analysis of Results (Parametric and Non parametric, Descriptive and Inferential Data): types of data,						
Non parar	Non parametric test, error analysis, analysis of variance, significance of variance, analysis of co-					
variance,	nultiple regression, Introduction to Analytical hierarchical	process, Factor ar	alysis, Cluster			
analysis, H	analysis, Fuzzy logic, testing linearity/ non linearity of model, testing adequacy of model					
Report W	Report Writing: types of report, layout of research report, interpretation of results, layout and format,					
style of w	style of writing, typing, references, pagination, tables, figures, conclusions, appendices					

#### Text Books

1. Research in Education, John W Besr & James V Kahn, Prentice Hall of India, New Delhi.

2. Theories of Engineering Experiments, Schank Fr, Tata McGraw Hill Publishing Ltd., New Delhi.

3. Experimental design by Cochran & Cocks, John Wielly & sons, New Delhi, 2005.

#### **Reference Books**

1. Research Methodology, C R Kothari, Wiley Eastern publishers, New Delhi, 10th edition, 2006.

2. Design of Experiments, Douglas Montgomary, 1995.

3. Formulation of Hypothesis, Willkinson K, P L Bhandarkar, Himalaya Publishing House, Mumbai, 2005.

Strength of CO-PO Mapping										
		РО								
	1	2	3	4	5	6	7	8		
CO1	3	2	-	1	-	-	1	2		
CO2	3	3	2	1	-	-	1	2		
CO3	3	3	3	1	-	2	1	2		
CO4	3	3	3	2	1	2	1	2		
CO5	3	3	3	1	-	-	1	3		

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course					
Sr. No.	Components for Continuous Evaluation	Marks Allotted				
1	Assignments - 1 on unit 1	4				
2	Quiz - 1 on unit 2	4				
3	Group Presentation	4				
4	Assignments - 2 on unit 4	4				
5	Quiz - 2 on unit 5	4				



F. Y. M.C.A. Pattern 2024 Semester: II							
	2409511: Artificial Intelligence						
Teaching	Scheme:	Credit Scheme:	Examination Scho	eme:			
Theory :	03 hrs/week	03	InSem Exam: 20Marks Continuous Comprehensive Evaluation: 20Marks		s ensive rks		
Prerequi	Prerequisite Courses, if any: Discrete Mathematics, Data Structure and Algorithms						
Course O 1. To in 2. To d agent 3. To le 4. To de 5. To un	bjectives: troduce basic principles, app evelop basic understanding s and knowledge representat arn various types of search a evelop understanding of plan nderstand Natural Language	proaches and application of building block of art tions. Ilgorithm useful for artific uning and learning metho Processing and Expert sy	of artificial intellige ificial intelligence cial intelligence. ds. /stems.	ence. in te	rms of intelligent		
Course (	<b>Dutcomes:</b> On completion of	f the course, students will	be able to-				
		Course Outcomes			Bloom's Level		
CO1	Describe fundamental concepts of artificial intelligence						
CO2	Apply basic principles to find solutions that require problem solving 3-Apply				3-Apply		
CO3	3 Use the core concepts of knowledge for decision making methods 3-Appl			3-Apply			
CO4	Use AI techniques for Logical Planning and explain learning methods			3-Apply			
CO5	Analyze the structures and processing and explain explain	algorithms of a techniq ert systems	ues related to lang	uage	4-Analyze		
		COURSE CONTENT	S				
Unit I	Fundamentals of Art	ificial Intelligence	07hrs	CO	s Mapped - CO1		
Introducti Application	on to Intelligent systems, co ons of AI, AI representation, ality, structure of agents.	ncept of Artificial Intell Intelligent agent - Envir	igence, Foundation onment, characteris	s of <i>L</i> stics,	AI, History of AI, behavior, concept		
Unit II	Search Tec	hniques	08hrs	CO	s Mapped – CO2		
Solving P Strategies deepening first sear Admissibi satisfactio <b>Unit III</b> Knowledge	roblems by Searching: Study Breadth-first search, Unifo depth-first search, Bidirect ch A* search: Minimizing lity and consistency, Opt n problem. Knowledge Rep re based Agents, First-Order	y and analysis of various rm-cost search, Depth-fi cional search Informed (1 the total estimated so imality of A*, Heuristi presentation	searching algorithm rst search, Depth li Heuristic) Search S plution cost, Cond ic Functions, Hill 07hrs Classical Planning	ns. U imite Strate lition clin <b>CO</b> ;	ninformed Search d search, Iterative gies: Greedy best s for optimality: nbing, Constraint s Mapped – CO3		
in the Rea calculus-c Introducti reasoning	al World, Definition of know onnectives, variables and on to non-monotonic logic	vledge, properties for kn quantification, Predic , TMS(truth maintenan	owledge representa cates and arguma ce system), Statist	ation ents, tical	system, predicate ISA hierarchy, and probabilistic		

Unit IV         Planning and Learning Methods	07hrs COs Mapped	- CO4			
Planning: Introduction: Search in planning, search	vs planning, planning as problem s	olving,			
components of a planning, Forward planning, Nonlinear	planning using constraint posting, Hiera	archical			
planning					
Learning: Introduction, Learning methods, Introduction	to Neural Networks, Working of a Neur	on, The			
basic components of ANN, Issues related to Neura	computation, Feedforward Networks	, Back			
propagation Algorithm, Applications of Neural Network	·				
Unit V Natural language processing and Expert sys	tems 07hrs COs Mapped	– CO5			
Natural Language Processing: Language Models,	Steps in NLP, Syntactic Analysis (P	arsing),			
Semantic interpretation, Discourse and pragmatic Pr	ocessing, Text Classification. Discour	se and			
pragmatic Processing, Implementation aspects of Syntact	c Analysis (Parsing)				
Expert Systems: What is Expert system, Utilization and	functionality of Expert system, Archited	cture of			
Expert system, Components of Expert system, Case study	based on Expert System				
Text Bool	s				
1. Peter and Norvig, "Artificial Intelligence: A Modern A	pproach", ISBN-0-13- 103805.				
Reference Books					
1. Elaine Rich, Kevin Knight and Nair, "Artificial Intelligence", ISBN-978-0-07- 008770-5, TMH.					
2. Saroj Kausik, "Artificial Intelligence", ISBN:- 978-81-315-1099-5, Cengage Learning.					
3. Padhy, "Artificial Intelligence and Intelligent Systems", Oxforfd University Press.					

Strength of CO-PO Mapping										
		РО								
	1	2	3	4	5	6	7	8		
CO1	3	2	1	2	1	-	-	2		
CO2	3	3	2	2	1	-	-	2		
CO3	3	2	3	2	1	-	1	2		
CO4	3	2	2	2	2	-	1	2		
CO5	3	2	2	2	2	-	1	2		

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course					
Sr. No.	<b>Components for Continuous Comprehensive Evaluation</b>	Marks Allotted				
1	Group Presentation	4				
2	Quiz - 1 on unit 2	4				
3	Assignments - 1 on unit 3	4				
4	Quiz - 2 on unit 4	4				
5	Assignments - 2 on unit 5	4				



	2409	F. Y. M.C.A. Pattern 2024 Semester 512: Database System a	r: II and SQL		
Teaching	Scheme:	Credit Scheme:	Examination Scheme	:	
Theory : Practical	03 hrs/week : 04 hrs/week	03 02	InSem Exam: 20 Marks Continuous Comprehensive Evaluation: 20 Marks EndSem Exam: 60 Marks Practical Exam: 25 Marks TermWork:25 Marks		
Prerequi	site Courses, if any: Discre	te Mathematics, Data Str	ructures and Algorithms	5	
<ol> <li>Course O</li> <li>To ur</li> <li>To ex</li> <li>To lex</li> <li>To in relatiin</li> <li>To lex</li> </ol>	<b>bjectives:</b> Inderstand the fundamental concepts the students to SQL and arm normal forms and its import troduce the concepts of Trans and recover arm different Databases Arch	oncepts of database mana ad PL/SQL portance asaction Processing and t very nitectures	agement system o present the issues and	l techniques	
Course C	Outcomes: On completion of	f the course, students wil	l be able to-		
		<b>Course Outcomes</b>		Bloom's Level	
CO1	Design ER-models for o	Design ER-models for database application			
CO2	Implement database queri	es using SQL / PLSQL dat	abase languages	3-Apply	
CO3	Apply normalization to th	e relational database design	n	3-Apply	
CO4	Explain Transaction Mana	agement concepts in real-ti	me application	2-Understand	
CO5	Analyze various database	architectures and technolo	gies	4-Analyze	
		COURSE CONTENT	ſS		
Unit I	Fundamentals of Databas	e Management System	(06hrs)	COs Mapped - CO1	
Introduction: Database Concepts, View of Data, Database System Architecture, Data Models, Database Design, ER Model: Entity, Attributes, Relationships, Constraints, Keys, ER Diagram, Extended E-R Features, converting E-R & EER diagram into tables, Relational Model: Database Schema, Keys, Relational Algebra					
Unit II	Unit II     SQL And PL/SQL     (08hrs)     COs Mapped       CO2			COs Mapped - CO2	
SQL: Cha Creating, Modificati membersh Views: Cr Cursors, T	racteristics and advantages, S Modifying, Deleting, Indexe on using SQL Insert, Upda ip, Tuple Variables, Set com eating, Dropping, Updating u riggers, Assertions, roles and p	SQL Data Types and Lite es, SQL DML Queries: te and Delete Queries, S aparison, Ordering of Tup using Views, PL/SQL: c privileges	rals, DDL, DML, SQL SELECT Query and Set Operations, Predicat les, Aggregate Function oncept of Stored Procee	Operators, Tables: clauses, Database es and Joins, Set s, Nested Queries, hures & Functions,	

Unit III	Relational Database Design	(07hrs)	COs Mapped – CO3
Relationa	Model: Basic concepts, Attributes and Domains, CODD	's Rules	
Relationa	Integrity: Domain, Referential Integrities, Enterprise Co	onstraints	
Database 1	Design: Features of Good Relational Designs, Normalization	ion, Functional Depende	encies, Inference
Rules, Ato	mic Domains and First Normal Form, Decomposition usin	g Functional Dependen	cies, Algorithms for
Decompos	Ition, 2NF, 3NF, BCNF, 4 NF		
Unit IV	Database Transactions	(07hrs)	COs Mapped – CO4
Transaction	n concepts, ACID properties , Concept of Schedule, Co	onflict Serializability, V	view serializability,
Cascadeles	s Schedules, Recoverable and Non recoverable Sch	edules, Concurrency	Control: Lock-Based
Protocols,	Deadlock Handling, Timestamp-Based Protocols, Recove	ery methods : Shadow-P	aging and Log-Based
Recovery,	Checkpoints		
Unit V	Advanced Databases	( <b>08hrs</b> )	COs Mapped – CO5
Database A	rchitectures: Centralized and Client-Server Architectures,	, 2 Tier and 3 Tier Archi	tecture
Parallel Da	tabases: Introduction, Parallel database architecture		
Distributed	Databases: Introduction, types of Distributed Databases	s, architecture, Distribu	ted Database Design:
Top down	design process, Bottom up design process		
Query Pr	ocessing : Query Processing, Query Optimization, Introd	uction of distributed Qu	ery Processing
	Text Books		
1. Silberso ISBN 0-0	hatz A., Korth H., Sudarshan S., "Database System C 7-120413-X, 6th edition	Concepts", McGraw H	ill Publishers,
2. Connal	y T, Begg C., "Database Systems", Pearson Educatio	n, ISBN 81-7808-861	-4
	Reference Books		
1. Elmasri Pearson Ec	R. and S. Navathe, "Database Systems: Models, Language ucation, 2013	es, Design and Applicat	ion Programming ",
2. C J Date	, "An Introduction to Database Systems", Addison-Wesle	y, ISBN: 02011447193.	
3. Raghu R	amakrishnan, "Database Management Systems", Fourth E	Edition, Tata Mc	
Graw Hill,	2010		
4. M Tame	r Ozsu, Patrick Valduriez, "Principles of Distributed Data	abase", Third Edition	

Strength of CO-PO Mapping									
		РО							
	1	2	3	4	5	6	7	8	
CO1	3	3	3	2	-	-	-	2	
CO2	3	3	3	3	-	-	-	2	
CO3	3	3	3	2	-	-	-	2	
CO4	3	3	2	3	_	-	-	2	
CO5	3	3	3	2	2	-	-	2	

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course					
Sr. No.	Sr. No. Components for Continuous Comprehensive Evaluation					
1	Assignments - 1 on unit 1	4				
2	Quiz - 1 on unit 2	4				
3	Open Book Test on unit 3	4				
4	Quiz - 2 on unit 4	4				
5	Assignments - 2 on unit 5	4				

	List of Laboratory Experiments / Assignments	
Sr. No.	Laboratory Experiments / Assignments	CO Mapped
1	Design any database with at least 4 entities and relationships between them. Draw suitable ER/EER diagram for the system.	CO1
2	Implement SQLDDL statements which demonstrate the use of SQL objects such as Table, View, Index, Sequence, different constraints etc with suitable example	CO1,CO2, CO3
3	Write at least 10 SQL queries on the suitable database application using SQL DML statements: Insert, Select, Update, Delete with operators(Arithmetic Operators, Logical Operators, Comparison Operator, Special Operator), functions (Number function, Aggregate Function, Character Function, Conversion Function, Date Function)	CO1,CO2, CO3
4	Implement Group By, Having clause and Order by clause with suitable example.	CO1,CO2, CO3
5	Design at least 10 SQL queries for suitable database application using SQL DML statements: all types of Join, Sub-Query and View.	CO1,CO2, CO3
6	<ul> <li>Study &amp; Implementation of PL/SQL</li> <li>Create table student(<u>Rollno</u>, name, percentage). Insert suitable records in the table.</li> <li>Write a PL/SQL block of code for the following requirements:- <ul> <li>Accept rollno from user</li> <li>Retrieve name and percentage of the students with rollno given by user.</li> <li>calculate grade of that student as per follows Percentage&gt;=80 then grade=A+ Percentage&gt;=70 and &lt;80 then grade=B+ Percentage&gt;=50 and &lt;70 then grade=B Percentage&gt;=40 and &lt;50 then grade=C Percentage below 40 then grade = fail</li> <li>print rollno, name, percentage and grade of student use appropriate control structure and exception handling</li> </ul> </li> </ul>	CO1,CO2, CO3
7	Write a PL/SQL block for following requirement and handle the exceptions. Roll no. of student will be entered by user. Attendance of roll no. entered by user will be checked in Student table. If attendance is less than 75% then display the message "Term not granted" and set the status in Student table as "D". Otherwise display message "Term granted" and set the status in Student table as "ND"	CO1,CO2, CO3
8	Study & Implementation of SQL Cursors. Consider following Employee schema. Employee(ID, Name, Age, Address, Salary) Write a PL/SQL block to increase salary of those employees having minimum salary by 5000. Display count of employees who got hike in	CO1,CO2, CO3

	salary. (use implicit cursor)								
9	Write an explicit cursor to		CO1,CO2,						
	i) display employee name, address ,salary along with a	ige category	CO3						
	(young or old)	c c .							
	ii) display count of young and old employees								
10	Write a Pl/SQL block to calculate gross salary on basis of	basic salary. If	CO1,CO2,						
	DA is 40% of basic ,HRA is 20% of basic and PF deduct	ion is 12% of	CO3						
	basic salary.								
	Gross salary=Basic Salary+DA+HRA-PF								
	Accept basic salary from user and pass it to function, func	tion will return							
	gross salary								
11	Create a transparent audit system for a table Employees us	sing trigger. The	CO1,CO2,						
	system must keep track of the records that are being delete	ed or updated.	CO3						
	When a record is deleted or modified in a employee table,	employee id and							
	and the date of operation are stored in the audit table, then	the delete or							
	update operation is allowed to go through								
	Guidelines for Laboratory Conductio	n							
1. Use o	of open source software is encouraged.								
2. Instru	actor should identify and set one assignment beyond the scope	e of syllabus.							
3.Opera	ting System recommended :- Windows / Open source Linux	or its derivative							
	<b>Guidelines for Student's Lab Journal</b>	l							
1. The l	aboratory assignments are to be submitted by student in the fo	orm of journal.							
2. Jouri	hal consists of certificate, table of contents, and handwritter	write-up of each	assignment						
(Title, O	Objectives, Problem Statement, Outcomes, Date of Comple	tion, assessor's si	gn, Theory-						
Concep	t in brief, algorithm, flowchart, conclusion.).								
3. Prog	gram codes with sample output of all performed assignment	ents are to be s	ubmitted as						
softcop	у.								
4. Cour	se in-charge is highly encouraged to maintain soft copy of all	the students assig	nments						
	Guidelines for Term work Assessmen	t							
Continu	ous assessment of laboratory work is done based on overall	performance of s	tudent. Each						
lab assi	ignment assessment will assign marks based on rubrics. S	Suggested rubrics	for overall						
assessment include-									
	Sr. No. Components for Continuous Assessment	Marks Allotte	d						
	1 R1: Timely Submission 10								
2 R2: Understanding 10									
	3 R3: Clarity of Journal Writing	10							
	Total Marks:	30							
	Each assignment will get 30 marks. Average of all assignme	nts is converted in	n to						
	total TW marks								



		F. Y. M.C.A. Pattern 2024 Semeste 2409513: Web Technol	er: II ogies	
Teaching So	cheme:	Credit Scheme:	Examination Scheme:	:
Theory :03 Practical : (	hrs/week )4hrs/week	03 02	InSem Exam: 20Mar Continuous Compreh Evaluation: 20Marks EndSem Exam:60Ma Practical Exam:25Ma TermWork:25Marks	ks nensive nrks arks
Prerequisite	e Courses, if any: Nil			
Course Obje 1. To lea 2. To be 3. To in 4. To us Course Out	ectives: arn the fundamentals of we ecome familiar with the C troduce XML and JSON se the Server side technolo comes: On completion of	veb essentials and markulient side technologies- concept in web applicat ogies in web developme f the course, students wi	up languages JavaScript in web develo ion nt Il be able to–	pment
		Course Outcomes		Bloom's Level
CO1	Explain the fundamenta Web applications	2-Understand		
CO2	Implement JavaScript c	3-Apply		
CO3	Use XML concept for p the data in web applicat	3-Apply		
CO4	Apply the server side te	3-Apply		
CO5	Apply the Alternative S	cripting Language for w	veb development	3-Apply
		COURSE CONTEN	TS	
Unit I	Scripting La	nguage-I	07hrs	COs Mapped - CO1
Introduction attributes, H paragraphs, 1 <b>Cascading S</b> Introduction texts, using f	to Web Technology, Hy HTML 5 and its essentia ine break, colors and font <b>Style Sheet:</b> to CSS, basic syntax and conts, borders and boxes, 1	pertext Markup Langu als, HTML5- Next Gen s, links, frames, lists, ta structure, background i margins, padding lists	age and its components neration of Web Develo bles, images and forms mages, colors and prope	, HTML tags and opment: Headings rties, manipulating
Unit II	Client-Side T	echnology	07hrs	COs Mapped – CO2
Exploring th Control Strue JavaScript-N	e features of JavaScript, ctures: ifelse, switch case (umber Properties. JavaSc	Programming fundame e, Loop Controls: for, w riptString Properties. Ja	ntals of JavaScript: vari hile, forin ,Functions at vaScript-Array Propertie	iables/ Data types, nd Dialog Boxes, es
Unit III	Scripting Languag	ge-II and JSON	07hrs	COs Mapped – CO3 And CO4
Exploring X documents, e What is JSO	ML, comparing XML ventity references, XML partity neferences, XML particular N and Working of JSON,	with HTML, advantage arser, Description of DT Create a JSON File, JS	es and disadvantages, s D ON Documentation: Do	structure of XML cumenting a JSON

elemen	element, acceptable values and element nesting, JSON Data types, JSON vs XML								vs XML	,	
Unit I	V	Sei	rver-Sid	le Tech	nology			07	hrs	C ( C (	Os Mapped – O4
Introdu	ction	to Web Deve	lopment	with P	HP, Th	e archite	cture o	f a web	applica	tion, st	ructure of PHP
applica	tion,	control stater	nents, s	trings a	and num	nbers, ai	rays, 1	function	s, file	handlin	g, cookies and
session	s. Des	ign a database	e in PHP	, use of	SQL w	ith MyS	<u>2L data</u>	abase			
Unit	V	Alterna	ative Sci	ripting	Langua	ges		08	Shrs	CO	Os Mapped – O5
ASP											
Introdu Importa <b>JSP</b>	ction ance's	to ASP, Hov of Form tag a	w ASP and how	Works, it work	, ASP ( s	Objects,	Install	ing on	Window	ws, San	nple Programs,
Introdu Tho N	ction	to JSP, Enviro ramowork	onment s	etup, Sy	yntax, S	tructure	of JSP,	and JSF	P Lifecy	cle.	
Web a	nnlica	tion fundame	entals	Forms	нтмі	forms	Web	Pages	Webfor	me de	SP NET MVC
ASP.N	ET fea	atures. ASP.N	ET lifec	vcle		1011115,		I ages,	webibi	1115, <i>T</i> 1	JI INLI MIVC,
<b>C</b> #		····, ···,									
Structu	re of <b>(</b>	C# Program, U	Jndersta	nding D	ata Typ	e, Variał	ole and	Typeca	sting.		
					Tex	t Books					
1. 2. 3.	<ol> <li>Marty Hall and Larry Brown, "Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001</li> <li>HTML5 covers css3, javascript, xml, xhtml, ajax, php and jquery, Black Book</li> <li>FanisProdromou, "Mastering Angular Reactive Forms: Build Solid Expertise in Reactive Forms using Form Control, Form Group, Form Array, Validators, Testing and more Real-World Use Cases" August 2021</li> </ol>										
					Refere	nce Boo	ks				
1.	Jeffre 2006.	y C. Jackson,	"Web	Fechnol	ogies-A	Compu	ter Sci	ence Pe	rspectiv	e", Pea	rson Education,
2.	CSS -	Definitive G	uide. By	Eric M	eyer, Or	reilly Pub	olicatio	n			
3.	Ralph : 9788	Moseley & N 8126538676	И. Т. Sa	valiya, ʻ	'Develog	ping Wel	b Appli	ications'	', Wiley	publica	ations, ISBN 13
4.	4. Robin Nixon, "Learning PHP, Mysql and Javascript with JQuery, CSS & HTML5", O'REILLY, ISBN: 13:978-93-5213-015-3										
5.	5. Developing Web Applications, 2Nd Ed, Ralph Moseley, M.T. Savaliya, Published by Wiley										
6.	Matth	ew Macdonal	d and R	obert St	andefer,	"ASP.N	ET Co	mplete l	Reference	ce", Tat	aMcGrawHills.
				Streng	gth of C	O-PO M	apping				]
		<b></b>				PC	)				•
			1	2	3	4	5	6	7	8	

CO1

CO2

CO3

CO4

CO5

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Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course					
Sr. No.	Sr. No. Components for Continuous Comprehensive Evaluation					
1	Assignments - 1 on unit 1	4				
2	Quiz - 1 on unit 2	4				
3	Assignments – 2 on unit 3	4				
4	Quiz - 2 on unit 4	4				
5	Micro Project	4				

	List of Laboratory Experiments / Assignments	
Sr. No.	Laboratory Experiments / Assignments	CO Mapped
1	Write an HTML code to display your CV on a web page	CO1
2	Design the following static web pages required for an online book store web site 1) HOME PAGE: The static home page must contain three frames 2) LOCINI PAGE	CO1
	<ul> <li>2) LOGIN PAGE</li> <li>3) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table</li> </ul>	
	4) REGISTRATION PAGE	
3	Implement a web page index.htm for any client website (e.g., a restaurant website project) using following: a. HTML syntax: heading tags, basic tags and attributes, frames, tables, images, lists, links for tout and images, forms ato	CO1
	h Liss of Internal CSS Inline CSS External CSS	
1	U. Use of Internal CSS, Infine CSS, External CSS	CO2
4	<ul> <li>Write <i>JavaScript</i> to validate the following fields of the Registration page.</li> <li>1. First Name (Name should contains alphabets and the length should not be less than 6 characters).</li> <li>2. Password (Password should not be less than 6 characters length).</li> <li>3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)</li> <li>4. Mobile Number (Phone number should contain 10 digits only).</li> <li>5. Last Name and Address (should not be Empty).</li> </ul>	02
5	<ul> <li>Develop and demonstrate JavaScript with POP-UP boxes</li> <li>and functions for the following problems:</li> <li>a) Input: Click on Display Date button using onclick() function</li> <li>Output: Display date in the textbox</li> <li>b) Input: A number n obtained using prompt</li> <li>Output: Factorial of n number using alert</li> </ul>	CO2
6	<ul> <li>Write an XML file which will display the Book information which includes the following:</li> <li>1) Title of the book</li> <li>2) Author Name</li> <li>3) ISBN number</li> <li>4) Publisher name</li> <li>5) Edition</li> <li>6) Price</li> </ul>	CO3
7	Write a program to design Cricket Scorecard website (Live score display) using XML AND JSON	CO3
8	<ul><li>Develop and demonstrate PHP Script for the following problems:</li><li>a) Write a PHP Script to find out the Sum of the Individual Digits.</li><li>b) Write a PHP Script to check whether the given number is Palindrome or not</li></ul>	CO4
9	<ul> <li>Write a program to calculate Electricity bill using functions in PHP Conditions:</li> <li>For first 50 units – Rs. 3.50/unit</li> <li>For next 100 units – Rs. 4.00/unit</li> <li>For next 100 units – Rs. 5.20/unit</li> <li>For units above 250 – Rs. 6.50/unit</li> </ul>	CO4
10	Write C# program to swap two numbers	CO5
11	Create windows c# application program for open file, save file, folder browser dialogue box	CO5
12	Write a program in ASP.net using drop down list.	CO5

#### **Guidelines for Laboratory Conduction**

1. Use of open source software is encouraged.

2. Instructor should identify and set one assignment beyond the scope of syllabus.

3.Operating System recommended :- Windows / Open source Linux or its derivative

#### **Guidelines for Student's Lab Journal**

1. The laboratory assignments are to be submitted by student in the form of journal.

2. Journal consists of certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, assessor's sign, Theory- Concept in brief, algorithm, flowchart, conclusion.).

3. Program codes with sample output of all performed assignments are to be submitted as softcopy.

4. Course in-charge is highly encouraged to maintain soft copy of all the students assignments

#### **Guidelines for Term work Assessment**

Continuous assessment of laboratory work is done based on overall performance of student. Each lab assignment assessment will assign marks based on rubrics. Suggested rubrics for overall assessment include-

	1				
Sr. No.	Components for Continuous Assessment	Marks Allotted			
1	R1: Timely Submission	10			
2	R2: Understanding	10			
3	R3: Clarity of Journal Writing	10			
	Total Marks: 30				
Each assignment will get 30 marks. Average of all assignments is converted in to					
total TW marks					



F. Y. M.C.A. Pattern 2024 Semester: II 2409514: Python Programming						
Teaching Se	cheme:	Credit Scheme:	Examination Schen	ne:		
Tutorial : 01hr/week Practical : 02 hrs/week		01 01	Term Work:25Mar Tutorial :25Marks	rks		
Prerequisit	e Courses, if any:Nil					
Course Obj 1. To 2. To 3. To Course Out	ectives: acquire programming sk understand decision-mal explore libraries and dat comes: On completion o	ills in core Python king and functions in py abase operations in pyth f the course students wi	rthon 10n 11 be able to			
	Course Outcomes					
C01	Illustrate basic program	nming constructs in pyt	1-Knowledge			
CO2	Apply user defined fun	Apply user defined functions and file handling methods in python				
CO3	Apply data visualization	on and plotting techniqu	es	3-Apply		
CO4	Evaluate the data using	appropriate python lib	raries	5- Evaluate		
		Text Books				
1. Budd T A 2. Mark Lutz 3. Y. Daniel	, "Exploring Python", Mo z, "Learning Python", OʻI Liang, "Introduction to P	Graw-Hill Education, 1 Reilly, 4th Edition, 2013 rogramming Using Pytl	l st Edition, 2011. hon", Pearson, 1 st Editio	on, 2013		
	<i>C</i> ,	Reference Books	}	· · ·		
1. Ke Ed 2. A Ed 3. Re Pre	enneth A. Lambert, "The lition,2011. llen Downey, "Think Pythition,2015. ema Thareja, "Python Press, 1 st Edition, 2017.	Fundamentals of Pythor hon: How to Think Like ogramming using Probl	n: First Programs", Cen e a Computer Scientist' em Solving Approach"	ngage Learning, 1 <sub>st</sub> ', O'Reilly, 2 <sub>nd</sub> ', Oxford University		
4. Tony Gaddis, "Starting out with Python", Pearson, 3rd Edition, 2014						

Strength of CO-PO Mapping								
		РО						
	1	2	3	4	5	6	7	8
CO1	3	2	3	2	-	-	-	2
CO2	3	2	3	3	-	-	-	2
CO3	3	2	3	3	-	2	-	2
CO4	3	3	3	3	-	2	-	2

	List of Tutorial Assignments				
Sr. No.	Tutorial Assignments	CO Mapped			
1	Define classes and create objects in Python. Implement methods and attributes in classes.	<b>CO1</b>			
2	Load a dataset using pandas, perform basic data manipulation operations (e.g., filtering, sorting, grouping), and save the modified dataset to a new file.	CO1			
3	Create lists, sets, and dictionaries in Python and perform operations like adding elements, removing elements, and accessing elements.	CO1			
4	<b>c</b> onsider dataset of your on choice and implement different visualization techniques to represent data using python libraries.	CO2			
5	Implement program to use Scrapy Python Library for large scale web scrapping	CO2			
6	Implement program to Plot error bars on a line or scatter plot to represent uncertainty in data. Demonstrate how to customize error bars and visualize confidence intervals.	CO3			
7	Develop a web application for managing tasks where users can organize their daily activities. Users should be able to perform CRUD operations on tasks, including creating new tasks, viewing existing tasks, updating task details, and deleting tasks.	CO4			
8	Consider dataset of your own choice and implement employee salary analysis.	CO4			

List of Laboratory Experiments / Assignments					
Sr. No.	Laboratory Experiments / Assignments	CO Mapped			
1	Illustrate the development of a Python application utilizing various programming constructs and Object-Oriented Programming principles.	CO1			
2	Utilize Python's data structures and string manipulation functions to develop a program demonstrating proficiency in these concepts.	CO1			
3	Create a Python program that showcases file handling techniques and robust exception handling to effectively manage errors and manipulate files.	C01			
4	Analyze and visualize data using relevant Python libraries to gain insights and present findings effectively.	CO2			
5	Develop GUI based applications with database connectivity in Python.	CO2			
Guidelines for Laboratory Conduction					

1. Use of open source software is encouraged.

2. Instructor should identify and set one assignment beyond the scope of syllabus.

3.Operating System recommended :- Windows / Open source Linux or its derivative

#### **Guidelines for Student's Lab Journal**

1. The laboratory assignments are to be submitted by student in the form of journal.

2. Journal consists of certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, Date of Completion, assessor's sign, Theory-Concept in brief, algorithm, flowchart, conclusion.).

3. Program codes with sample output of all performed assignments are to be submitted as softcopy.

4. Course in-charge is highly encouraged to maintain softcopy of all the students assignments Guidelines for Term work Assessment

Continuous assessment of laboratory work is done based on overall performance of student. Each lab assignment assessment will assign marks based on rubrics. Suggested rubrics for overall assessment include-

Sr. No.	<b>Components for Continuous Assessment</b>	<b>Marks</b> Allotted
1	R1: Timely Submission	10
2	R2: Understanding	10
3	R3: Clarity of Journal Writing	10
	Total Marks:	30

Each assignment will get 30 marks. Average of all assignments is converted in to total TW marks



	24095	F. Y. M.C.A. Pattern 2024 Semester 15A: Elective II: Cvber	r: II : Security	
Teaching	g Scheme:	Credit Scheme:	Examination Sch	eme:
Theory :	03 hrs/week	03	InSem Exam: 201 Continuous Com Evaluation: 20M EndSem Exam: 6	Marks prehensive arks 0Marks
Prerequi	site Courses, if any: Discre	te Mathematics, Data Str	uctures and Algorit	hms
Course O 1. To u 2. To st 3. To u 4. To st Course O	<b>Objectives:</b> nderstand the basics of netwo udy Data Encryption Techniqu nderstand with issues in Secur udy attacks, Malicious Logic a	ork and information securies and Standards. Fity Management and Cyber and Countermeasures.	rity r Laws l be able to–	
		Course Outcomes		Bloom's Level
CO1	Identify the Policy and Mec	1-Knowledge		
CO2	Recognize the Attacks, Mal	1-Knowledge		
CO3	Classify Data Encryption Te	echniques		2-Undrestand
CO4	Describe the issues in Secur	ity Management and Cyb	ber Laws	2-Undrestand
CO5	Understand the methods for	Secure Communication		2-Undrestand
		COURSE CONTENT	ſS	
Unit I	Security Fun	damentals	07hrs	COs Mapped - CO1
An Overv and Mech Introducti Classifica	iew of Information Security: anism: Confidentiality, Integ on to Cyber Space, Cyber Se tion, Types of Malware and	The Basic Components, grity, Availability ecurity and Information S	Elements of Inforr	nation Security, Policy
Unit II	Data Encryption Techn	iques and Standards	08hrs	COs Mapped – CO3
Introducti Transposi operations Keys in D	on, Encryption Methods: tion Ciphers, Stenography s, Feistal Cipher, Data Encr ES Algorithms, Advance Er	Symmetric, Asymmetri applications and limit yption Standard (DES), acryption Standard (AES)	ic, Cryptography, ations, Block Cip Triple DES, DES ).	Substitution Ciphers hers and methods o Design Criteria, Weal
Unit III	Issues in Security Manage	ement and Cyber Laws	07hrs	COs Mapped – CO-
Overview Risk Con Protecting legal pers	, Risk identification, Risk A trol Practices. Risk Manage programs and data Cyberch pectives- Indian perspective	Assessment, Risk Contro ment. Laws and Ethics i rime and Information sec , Global perspective, Cat	ol Strategies, Quan in Information Secu curity, Classificatio regories of Cybercr	titative vs. Qualitative urity, Codes of Ethics n of Cybercrimes, The ime, Types of Attacks

a Social Engineering, Cyber stalking, Cloud Computing and C	ybercrime.	
Unit IV Key Management and Secure Communication	07hrs	COs Mapped – CO5
Public Key Infrastructure(PKI), X.509 Certificate, Needhar	n Schroeder algori	thm and Kerberos IP
Security: IPv6 and IPSec, Web Security: SSL, HTTPS, M	Aail Security: PGP	, S/MIME Firewall :
Different Types and Functionalities		
Unit V Attacks, Malicious Logic and Countermeasures	07hrs	COs Mapped – CO2
Phishing, Password Cracking, Key-loggers and Spywares, 7	ypes of Virus, Wo	orms, DoS and DDoS,
SQL injection, Buffer Overflow, Spyware, Adware and Ra	nsom ware. Antivi	rus and other security
measures Intrusion Detection System: IDS fundamentals, Diff	erent types of IDS.	Intrusion Prevention
Text Books		
1. William Stallings, "Computer Security: Principles and F	ractices", Pearson	6Ed, ISBN 978-0-13-
335469-0		
2. Nina Godbole, Sunit Belapure, "Cyber Security- Understan	nding Cyber Crimes	", Computer Forensics
and Legal Perspectives, Wiely India Pvt.Ltd, ISBN- 978-81-20	55-2179-1	
Reference Books		
1. Bruice Schneier, "Applied Cryptography- Protocols, Algor	ithms and Source c	ode in C", Algorithms,
Wiely India Pvt Ltd, 2nd Edition, ISBN 978-81-265-1368-0.		
2. CK Shyamala et el., "Cryptography and Security", Wiley In	dia Pvt. Ltd, ISBN-	978-81-265-2285-9.
3. Berouz Forouzan, "Cryptography and Network Security",	ΓMH, 2 edition, ISI	BN -978-00-707-0208-
0.		
4. Mark Merkow, "Information Security-Principles and Pra	ctices", Pearson Ec	l., ISBN- 978-81-317-
1288-7.		

Strength of CO-PO Mapping								
				P	C			
	1	2	3	4	5	6	7	8
CO1	3	2	1	2	1	-	3	2
CO2	3	3	2	2	1	-	3	2
CO3	3	3	3	3	1	-	3	2
CO4	2	3	2	2	2	-	3	3
CO5	3	3	2	3	1	-	3	3

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course				
Sr. No.	Components for Continuous Comprehensive Evaluation	Marks Allotted			
1	Assignments - 1 on unit 1	4			
2	Quiz - 1 on unit 2	4			
3	Group Presentation	4			
4	Quiz - 2 on unit 4	4			
5	Assignments – 2 on unit 5	4			



	240951	F. Y. M.C.A. Pattern 2024 Semeste 2B: Elective II: Operat	r: II ing System		
Teaching	Scheme:	Credit Scheme:	Examination Scher	ne:	
Theory :	03 hrs/week	03	InSem Exam: 20Marks Continuous Comprehensive Evaluation: 20Marks EndSem Exam: 60Marks		
Prerequis	site Courses, if any: Nil				
Course O 1. To int 2. To lea opera 3. To prove 4. To ge 5. To un Course O	bjectives: troduce basic concepts of sy arn and understand the conce ting system as pertaining wi ovide the knowledge of basi t familiar with different app iderstand structure and organ putcomes: On completion of	stem programming ept of operating system a th processes c concepts towards conc roaches of memory man nization of file system ar f the course, students wil	and management poli currency control and a agement ad disk management l be able to–	cies adopted by deadlock.	
		Course Outcomes			
<b>CO1</b> Describe the structure a		nd design of assemblers and compiler		1-Knowledge	
CO2	Interpret the understand management concept	ing of operating system	and process	2-Understand	
003	throughput of system	ss synchronization towar	as increasing	3-Apply	
CO4	Illustrate the mechanisn	ns adopted for memory r	nanagement	4-Analyze	
CO5	Differentiate file manag	ement and disk scheduli	ng methods	4-Analyze	
		COURSE CONTENT	ГS		
Unit I	System Prog	ramming	07hrs	Cos Mapped – CO1	
Componer assembly 1 structures assembler. Compiler semantic a	nts of System Software, As language, types of statemen used, Two-Pass Assembl Macro Processors: Concep : Introduction to Compile nalysis, intermediate code g	semblers: System progr at, Advanced assembler ers, One-Pass Assembler t and need, Features of Ners, Structure of compi generation, code optimiza	am and application directive, Structure of lers, Forward referent ASM (No design as ler – Lexical analy ation, code generation	program, Features of of an assembler, Data ence problem, Cross pects expected) vsis, syntax analysis,	
Unit II	Operating	Systems	08hrs	Cos Mapped – CO2	
Operating Systems, <sup>7</sup> StructureS Process M	Systems: Introduction, C Time sharing systems, Des ystem Calls, system program anagement : Process Conce	Deperating system functi ktop systems, Multipro n, interrupt mechanism . pt, Process states, Proce	ons, Batch systems, cessor systems, Rea ss control block, Thr	Multi-programming 1 Time Systems, OS eads, CPU scheduler,	

Preemptive and Non-preemptive Scheduling, Scheduling criteria, Types of scheduling algorithms: First Come First Served, Shortest Job Scheduling, Round Robin, Priority, Multilevel queue scheduling and

Multilevel	feedback queue scheduling						
Unit III	Concurrency Control and Deadlock	( <b>07hrs</b> )	Cos Mapped – CO3				
Concurrer requireme solutions.	Concurrency Control: Critical section problem, Concurrency and Race Conditions, Mutual exclusion requirements, Software and hardware solutions, Semaphores, Monitors, Classical IPC problems and solutions. Deadlock : Characterization, Detection, Recovery, Avoidance and Prevention						
Unit IV	Memory management	07hrs	Cos Mapped – CO4				
Memory	management: Contiguous and non-contiguous, Me	emory partitioning: Fi	ixed and Variable				
Partitionin	ng, Swapping and overlap swapping, Paging, Segn	nentation and Demand	l Paging, Memory				
Allocation	a: Allocation Strategies (First Fit, Best Fit, and Wor	st Fit),Page Replaceme	ent Policies (FIFO,				
LRU, Opt	imal, Other Strategies)						
Unit V	File Management and I/O Management	07hrs	Cos Mapped - CO5				
File Mar	nagement: Concept, Access methods, Director	y Structure, Protecti	ion, File system				
implemen performan	tation, Directory implementation, Allocation method ace. I/O Management : Disk structure , disk schedulin	s, Free space managem g	ent, efficiency and				
	Text Books						
1. John I	Donovan, "System Programming", McGraw Hill, ISB	N 978-0-07-460482-3	•				
2. 2. Silb 06333	erschatz, Galvin, Gagne, "Operating System Principl -0	es", 9 <sup>th</sup> Edition, Wiley,	, ISBN 978-1- 118-				
	Reference Books						
1. Dhamd 463579 –	here D., "Systems Programming and Operating Syste 4	ems", McGraw Hill, IS	BN 0 – 07 –				
2. Randal ISBN 10:	Bryant and David O'Hallaron, "Computer Systems: A 0-13-610804-0	A Programmer's Perspe	ective", Pearson,				
3. Stallings W., "Operating Systems", 6 <sup>th</sup> Edition, Prentice Hall, ISBN-978-81-317-2528-3.							
4. John. R 000-7	. Levine, Tony Mason and Doug Brown, "Lex and Y	acc", O'Reilly, 1998, I	SBN: 1- 56592-				

Strength of CO-PO Mapping								
				I	90			
	1	2	3	4	5	6	7	8
CO1	3	3	3	2	-	2	-	2
CO2	3	3	3	3	-	2	-	2
CO3	3	3	3	2	-	2	3	2
CO4	3	3	3	3	3	2	3	2
CO5	3	3	3	3	-	2	-	2

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course					
Sr. No.	Components for Continuous Comprehensive Evaluation	Marks Allotted				
1	Assignments - 1 on unit 1	4				
2	Quiz - 1 on unit 2	4				
3	Group Presentation	4				
4	Quiz - 2 on unit 4	4				
5	Assignments – 2 on unit 5	4				



	2409515	F. Y. M.C.A. Pattern 2024 Semeste 5C:Elective II: Operation	r: II on Research		
Teaching S	Scheme:	Credit Scheme:	Examination Scheme	:	
Theory : 03 hrs/week		03	InSem Exam: 20Mar Continuous Comprel Evaluation: 20Marks EndSem Exam: 60M	ks nensive arks	
Prerequisit	te Courses, if any: Nil				
Course Obj 1. To fam optimiz 2. To fam particul Course Ou	jectives: iliarize the students with t vation functions in an orga iliarize the students with v lar scenarios in industry for tcomes: On completion or	he use of practice orienten nization. various tools of optimization or better management of f the course, students wil	ed mathematical applica tion and simulation, as a various resources. 1 be able to–	tions for applicable in	
		<b>Course Outcomes</b>		Bloom's Level	
CO1	Apply LPP and Decisio	n Theory to solve the pro-	oblems	3-Арру	
CO2	Apply the concept of transition resources.	Apply the concept of transportation models to optimize available resources.			
CO3	Decide optimal strategi	es in conflicting situation	18.	3-Арру	
CO4	Implement the project r	nanagement techniques.		3-Арру	
CO5	Apply the technique to	minimize the process time		3-Арру	
		COURSE CONTENT	ГS		
Unit I	<b>Operation Resea</b>	rch Overview	(07hrs)	COs Mapped - CO1	
Introduction	: Definition, methodology	, Application, Features of	of OR models, Limitation	n	
Linear Prog	ramming Problem: Defin	ition, formulation LPP	Models, standard feasi	ble, basic feasible,	
optimal, inf Method	easible, Degeneracy. Gra	phical and simplex met	inods. Artificial basis i	echniques, Big M	
Unit II	Transportation & A	ssignment Model	(07hrs)	COs Mapped – CO2	
Formulation corner, Leas problem, De Transportati Unit IV: Ass assignment	of transportation model, 1 st Cost, Vogel's Approxim egeneracy in transportation on problems. Transshipmo signment Problem & Sche problem, Hungarian Meth	Basic feasible solution us ation Method) Optimalit problems, Variants in T ent problems. duling Formulation of th od to solve Assignment	sing different methods ( by Methods, Unbalanced Fransportation Problems he Assignment problem, Problem.	North-West l transportation , Applications of unbalanced	
Unit III	Games T	`heory	(07hrs)	COs Mapped – CO3	
Introduction solving gam	a, two -person zero sum ga the problems with mixed str	me, minimax and maxin rategies, Graphical and it	nin principle, saddle poi erative methods, solvin	nt, methods for g game by LP	

Method.			
Unit IV	Project Management	( <b>08hrs</b> )	COs Mapped – CO4

Network Models: Fulkerson's rule, concept and types of floats, CPM and PERT, Crashing Analysis and Resource Scheduling. Simulation: Introduction, Monte-Carlo Simulation method, Simulation of Inventory and Queuing Problems.

Unit	V		Q	ueu	in	g [	The	ory	a	nd	Se	quei	ncin	ıg N	Aod	lels				(07)	hrs)			CO CO	s Mappe 4	ed -
		<u>m</u> 1		T .		1	. •		、 <sup></sup>	•	<u>a</u> .		_		•	1	(1)	r	1 1/	ЪТ	•	>	1		1	

Queuing Theory: Introduction, Basis Structure, Terminology (Kendal's Notations) and Applications. Queuing Model M/M/1: /FIFO, M/M/c.

Sequencing models : Solution of sequencing Problem - Processing of n jobs through two machines, Processing of n jobs through three machines, Processing of two jobs through m Machines, Processing of n jobs through m Machines

#### **Text Books**

1. Taha H. A., "Operation Research and Introduction", McMillian, ISBN-0-02-418940-5

2. Paneerselvam, "Operations Research", Prentice Hall of India

3. Philips, Ravindram and Soleberg "Principles of Operations Research – Theory and Practice", PHI

#### **Reference Books**

1. Hiller and Libermann, "Introduction to Operation Research", McGraw Hill 5th edn.

2. S.D. Sharma, "Operations Research", Kedarnath, Ramnath & Co

3. J K Sharma, "Operations Research Theory and Application", Pearson Education Pvt Ltd ,2nd Edn, ISBN-0333-92394-4

4. Kanthi Swarup & others, "Operations Research", Sultan Chand and Sons.

Strength of CO-PO Mapping												
	РО											
	1	2	3	4	5	6	7	8				
CO1	3	3	3	2	-	2	-	2				
CO2	3	3	3	3	-	2	-	2				
CO3	3	3	3	2	-	2	3	2				
CO4	3	3	3	3	3	2	3	2				
CO5	3	3	3	3	-	2	-	2				

Guide	Guidelines for Continuous Comprehensive Evaluation of Theory Course							
Sr. No.	Components for Continuous Comprehensive Evaluation	Marks Allotted						
1	Assignments - 1 on unit 1	4						
2	Quiz - 1 on unit 2	4						
3	Case Study	4						
4	Quiz - 2 on unit 4	4						
5	Assignments – 2 on unit 5	4						



## K. K. Wagh Institute of Engineering Education and Research, Nashik

(Autonomous from Academic Year 2022-23)

	2409516	F. Y. M.C.A. Pattern 2024 Semester S:Management Information	:: II tion System				
Teaching	g Scheme:	Credit Scheme:	Examination Scheme:				
Theory :	02 hrs/week	02	Continuous Comprehensive Evaluation: 20Marks End Sem Exam:30Marks				
Prerequi	site Courses, if any:						
Course O 1. To 2. To 3. To Course O	<b>Objectives:</b> b) learn the concepts of inform b) get acquainted with IS Plan b) know knowledge of DSS, H <b>Dutcomes:</b> On completion of	nation system and role an ining and Functional Sub- Expert Systems and Busir f the course, students will	nd responsibilities of m system ness process re engineer l be able to–	anagement ing			
	1	Course Outcomes		Bloom's Level			
C01	Recall the basic compo capabilities of an inform	Recall the basic components of information systems and the capabilities of an information system.					
CO2	Identify the uses of plan organization based on t	Identify the uses of planning models and the various subsystem in a organization based on their functionality and interrelationship					
CO3	ystems, address current ct these challenges to	03-Apply					
		COURSE CONTENT	TS				
Unit I	Fundamental of Info	ormation Systems	07hrs	COs Mapped - CO1			
Informatic developme Managem system, I Professior <b>Competin</b> Definition forward co	on systems in organization a ent and Management, Role ent, Types of Information S Decision Support system, nal information system, Expe <b>ng with Information Techn</b> a, Effectiveness and efficie ontrol), Organization Model	nd their capabilities, Fou and process of managem Systems, Transaction Pro Executive Information ert Systems <b>ology Systems</b> ncy, Various Models, C , Strategic Planning Models	Indation concepts: Businent, Functions of a ma occessing system, Manan n system, Office inf Control in systems (For el, Management Control	ness Applications, nager, Methods of gement Reporting ormation system, eedback and Feed of Model			
Unit II	Planning and Funct	ional Subsystems	07hrs	COs Mapped – CO2			
IS Planni Types of j approache Functiona Marketing Research a	ng: planning, Traditional Strateg es: Traditional and Current so al subsystem: g and Sales, Finance and Ac and development	gy making, Assumptions cenario counting, Production, Hu	in traditional planning 1man Resources, Logis	, Various Planning tics and Inventory,			

Unit I	II Decision Support Systems and Business Process	08hrs	COs Mapped –					
	Enhancement		CO3					
Overview of Decision Support Systems (DSS) and Executive Information Systems (EIS): Capabilities								
and Mo	dels of DSS							
Compo	nents and Architecture of DSS, Classification and Build	ing of DSS						
Charact	eristics and Techniques of Group Decision Making: Are	chitecture and Applicati	ions of Group					
Decisio	n Support Systems (GDSS)							
Overvie	ew of Expert Systems (ES): Capabilities and Architectur	re of ES, Applications, I	Development, and					
Mainte	nance of ES							
Overvie	ew of Business Process Reengineering (BPR): Business	Processes and Process	Model,					
Identifying Delays in Business Processes, Integration of MIS in Business Process Optimization								
	Text Books							
1.	James A O'Brien and George M Marakas, "Manageme	ent Information System	s", 9 Edition, Tata					
	McGraw Hill, 2009.	-						
2.	James Obrien and George Maracus, "Management in	formation Systems", N	AcGrawHill India,					
	10 <sup>th</sup> edition,							
3.	Haag, Dawkins, "Management information Systems for 6 <sup>th</sup> edition	or Information Age", N	AcGrawHill India,					
	Reference Books							
1.	Ralph M Stair and George W Reynolds ,"Principle	s of Information Syste	ems", 12 Edition,					
	Thomson, 2015							
2.	S. Sadagopan, "Management Information Systems", 2nd	lEdition, PHI						
3.	Barbara McNurlin et al, "IS Management in practice", I	Pearson Education, 5th	edition,					
4.	Zwass, Vladimir, "Foundations of information systems"	'Irwin/McGraw Hill, 1	997					
5.	Laudon, Kenneth C., and Jane P. Laudon, "Manager	nent information system	ms: managing the					

5. Laudon, Kenneth C., and Jane P. Laudon. "Management information systems: managing the digital firm." New Jersey 8 (2004).

Strength of CO-PO Mapping											
	РО										
	1	2	3	4	5	6	7	8			
CO1	3	3	-	-	-	-	-	-			
CO2	3	3	3	2	-	-	-	-			
CO3	3	3	3	3	-	-	-	2			

Guidelines for Continuous Comprehensive Evaluation of Theory Course								
Sr. No.	Components for Continuous Comprehensive Evaluation	Marks Allotted						
1	Assignment-1 on unit 1	10						
2	Quiz-1 on unit 2	05						
3	Case Study	05						



F. Y. M.C.A. Pattern 2024 Semester: II 2409517: On Job Training/Industry Internship										
Teaching	Teaching Scheme:Credit Scheme:Examination Scheme:									
-		02	TermWork: 30Marks Oral Exam: 50Marks							
Course O 1. To pr 2. To in 3. To fo 4. To en expen 5. To ex Course O	<b>Objectives:</b> rovide students with an exper- neulcate Problem solving skill oster effective teamwork and on neourage students to build and rienced experts and mentors in xpose students with document <b>Dutcomes:</b> On completion of	ience in working on proj s and work culture of the collaboration skills d expand their profession n industry tation used in industry the course, students will	ects or working withite industry al network by interact	n industry ctive with						
		Course Outcomes		Bloom's Level						
CO1	Enhance the knowledge rela industry	ted to various tools and t	echnologies used in	3-Арру						
CO2	Make Use of tools used in ir	ndustry		3-Арру						
CO3	Solve complex problems			3-Арру						
CO4	Effectively communicate and collaborate with team members and 3-Appy mentors.									
CO5	Demonstrate the ability to p	repare documentation ne	eded in the SDLC	3-Арру						
	Guidelines for	On Job Training/Indus	stry Internship							
• Fa	culty advisors / mentors shal	l decide whether a stude	nt shall work on indu	stry internship or -II or earlier. The						

OJT may be carried out in physical or online form at the chosen industry.

- Student must start the OJT/Internship immediately after semester-I examination during the winter vacation or after semester-II examination during the summer vacation
- Student are expected to complete the IT related work/project within 60 hours assigned by
  organization (company/ industry/ consultancy/ institution)
- The internship work may involve the IT related assignment(s)/training OR the maintenance of existing project OR the design/development of new project OR equivalent work
- College should assign the mentors/guides for students to monitor the progress throughout the OJT
- Students have to submit the weekly progress report duly signed by the concern authorities of organization to the assigned mentor
- At the end of OJT, students should prepare the documentation and submit a report to the college in prescribed format
- After completion, the final presentation and documentation will be evaluated by the examination panel as per the Institute norms