

B.Sc., INFORMATION TECHNOLOGY

Syllabus

Program Code: UIT

2023 - Onwards



MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with “A⁺” Grade by NAAC

PASUMALAI, MADURAI – 625 004

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS),

MADURAI – 625 004

B.SC INFORMATION TECHNOLOGY CURRICULUM

(For the students admitted from the academic year 2023-2024 onwards)

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
FIRST SEMESTER						
Part – I	Tamil / Alternative Course					
23UTAGT11	தமிழ் இலக்கிய வரலாறு - I	6	3	25	75	100
Part – II	English					
23UENGE11	General English - I	6	3	25	75	100
Part - III	Core Courses					
23UITCC11	Programming in C	5	5	25	75	100
23UITCP11	Programming in C Lab	5	5	25	75	100
Part - III	Elective Course					
23UELEA12	Digital Logic	4	3	25	75	100
Part IV	Non Major Elective					
23UITNM11	Fundamentals of Information Technology	2	2	25	75	100
Part IV	Foundation Course					
23UITFC11	Fundamentals of Computers	2	2	25	75	100
Total		30	23	175	525	700
SECOND SEMESTER						
Part – I	Tamil / Alternative Course					
23UTAGT21	தமிழ் இலக்கிய வரலாறு – II	6	3	25	75	100
Part – II	English					
23UENGE21	General English - II	6	3	25	75	100
Part - III	Core Courses					
23UITCC21	Java Programming	5	5	25	75	100
23UITCP21	Java Programming Lab	5	5	25	75	100
Part - III	Elective Course					
23UMTEA23	Statistical and Numerical Methods - I	4	3	25	75	100
Part IV	Non Major Elective					
23UITNM21	Basics of Internet	2	2	25	75	100
Part IV	Skill Enhancement course					
23UITSP21	Introduction to HTML Lab	2	2	25	75	100
Total		30	23	175	525	700

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
THIRD SEMESTER						
Part – I	Tamil / Alternative course					
23UTAGT31	தமிழக வரலாறும் பண்பாடும்	6	3	25	75	100
Part – II	English					
23UENGE31	General English - III	6	3	25	75	100
Part - III	Core courses					
23UITCC31	Relational Database Management System	5	5	25	75	100
23UITCP31	RDBMS - Lab	5	5	25	75	100
Part - III	Elective course					
23UELEA31	Basics of Nano Technology	4	3	25	75	100
Part - IV	Skill Based courses					
23UITSC31	Advanced Excel	1	1	25	75	100
23UITSP31	Office Automation Lab	2	2	25	75	100
Part - IV	Mandatory course					
23UEVSG41	Environmental Studies	1	-	-	-	-
Total		30	22	175	525	700
FOURTH SEMESTER						
Part – I	Tamil / Alternative course					
23UTAGT41	தமிழும் அறிவியலும்	6	3	25	75	100
Part – II	English					
23UENGE41	General English - IV	6	3	25	75	100
Part - III	Core courses					
23UITCC41	.Net Programming	5	5	25	75	100
23UITCP41	.Net Programming Lab	4	4	25	75	100
Part - III	Elective course					
23UMTEA42	Optimization Techniques	4	3	25	75	100
Part - IV	Skill Based courses					
23UITSC41	Web Desiging	2	2	25	75	100
23UITSP41	Multimedia Lab	2	2	25	75	100
Part - IV	Mandatory course					
23UEVSG41	Environmental Studies	1	2	25	75	100
Total		30	24	200	600	800

Course Code	Title of the Course	Hrs	Credi ts	Maximum Marks		
				Int	Ext	Total
FIFTH SEMESTER						
Part - III	Core courses					
23UITCC51	Python Programming	5	4	25	75	100
23UITCP51	Python Programming - Lab	5	4	25	75	100
23UITCC52	Operating systems	5	4	25	75	100
Part - III	Core project					
23UITPR51	Project with Viva - Voce	5	5	25	75	100
Part - III	Elective courses - I					
23UITEC51	Big Data Analytics	4	3	25	75	100
23UITEC52	Human Computer Interaction					
23UITEC53	Cryptography					
Part - III	Elective courses - II					
23UITEC54	IoT and its Applications	4	3	25	75	100
23UITEC55	Fuzzy Logic					
23UITEC56	Artificial Intelligence					
Part - IV	Mandatory course					
23UVLEG51	Value Education	2	2	25	75	100
23UITIN51	Internship Report	-	2	25	75	100
Total		30	27	200	600	800
SIXTH SEMESTER						
Part - III	Core courses					
23UITCC61	Data Mining	6	4	25	75	100
23UITCP61	Data Mining Lab	6	4	25	75	100
23UITCC62	Data Communication and Networking	6	4	25	75	100
Part - III	Elective courses - I					
23UITEC61	Grid Computing	5	3	25	75	100
23UITEC62	Enterprise Resource Planning					
23UITEC63	Agile Project Management					
Part – III	Elective courses - II					
23UITEC64	Robotics and its Applications	5	3	25	75	100
23UITEC65	Artificial Neural Networks					
23UITEC66	Cyber Forensics					
Part - IV	Skill course					
23UITSP61	Software Testing Lab	2	2	25	75	100
Part - V	Extension activities					
23UNCET61, 23UNSET61, 23UPEET61, 23URRET61, 23UYRET61, 23UHFET61, 23UEOET61 & 23UHRET61	N.C.C, N.S.S, Physical Education, R.R.C, Y.R.C, Health and Fitness Club, ECO Club & Human Rights Club	-	1	25	75	100
Total		30	21	175	525	700
Grand total		180	140	1100	3300	4400

FIFTH SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Python Programming			
Course Code	23UITCC51	L	P	C
Category	Core	5	-	4
COURSE OBJECTIVES:				
➤ Understand the concepts of Python programming. ➤ To apply the OOPs concept in PYTHON programming. ➤ To impart knowledge on demand and supply concepts ➤ Learn to solve basic programming problems. ➤ To improve data visualization using Python programming.				
UNIT - I Basics of Python Programming:				15
History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.				
UNIT - II Control Statements:				15
Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.				
UNIT - III Functions:				15
Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.				
UNIT - IV Lists:				15
Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.				
UNIT - V Python File Handling:				15
Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Reema Thareja, “Python Programming using problem solving approach”, First Edition, 2017, Oxford University Press.
- Dr. R. Nageswara Rao, “Core Python Programming”, First Edition, 2017, Dream tech Publishers.

BOOKS FOR REFERENCES:

- VamsiKurama, “Python Programming: A Modern Approach”, Pearson Education.
- Mark Lutz, ”Learning Python”, Orielly.

WEB RESOURCES:

- ❖ <https://www.programiz.com/python-programming>
- ❖ <https://www.guru99.com/python-tutorials.html>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		15 %	No Changes Made			New Course	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Outline the basic concepts in python language.								K1 to K4	
CO2	Interpret different looping and conditional statements in python language								K1 to K4	
CO3	Apply the various data types and identify the usage of control statements, loops, functions and Modules in python for processing the data								K1 to K4	
CO4	Analyze and solve problems using basic constructs and techniques of python.								K1 to K4	
CO5	Assess the approaches used in the development of interactive application.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:

UNIT	Python Programming	HRS	PEDAGOGY
I	History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.	15	PPT,ICT & Chalk & Talk
II	Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.	15	PPT,ICT & Chalk & Talk
III	Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.	15	PPT,ICT & Chalk & Talk
IV	Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.	15	PPT,ICT & Chalk & Talk
V	Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)						
Formative Examination - Blue Print						
Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Python Programming - Lab			
Course Code	23UITCP51	L	P	C
Category	Core Practical	-	5	4

COURSE OBJECTIVES:

- Understand the fundamentals of programming using Python, such as Variables, data types, control structures, and functions.
- Learn how to use Python libraries and modules to solve problems.
- Practice writing Python code to solve real-world problems and build basic applications.
- Gain experience with common programming paradigms, such as object-oriented programming and functional programming.
- Understand best practices for debugging and testing code.

S. No. List of Exercises

1. Program using variables, constants, I/O statements in Python.
2. Program using Operators in Python.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions.
7. Program using Recursion.
8. Program using Arrays.
9. Program using Strings.
10. Program using Modules.
11. Program using Lists.
12. Program using Tuples.
13. Program using Dictionaries.
14. Program for File Handling.

Total Lecture Hours

75

BOOKS FOR STUDY:

- Reema Thareja, “Python Programming using problem solving approach”, First Edition, 2017, Oxford University Press.
- Dr. R. Nageswara Rao, “Core Python Programming”, First Edition, 2017, Dream tech Publishers

BOOKS FOR REFERENCES:

- VamsiKurama, “Python Programming: A Modern Approach”, Pearson Education.
- Mark Lutz, ”Learning Python”, Orielly.

WEB RESOURCES:

- ❖ <https://www.programiz.com/python-programming>
- ❖ <https://www.guru99.com/python-tutorials.html>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓	
Changes Made in the Course	Percentage of Change		-	No Changes Made		✓	New Course		-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the significance of control statements, loops and functions in creating Simple programs.								K1 to K4	
CO2	Interpret the core data structures available in python to store, process and sort the data.								K1 to K4	
CO3	Develop the real time applications using python programming language.								K1 to K4	
CO4	Analyze the real time problem using suitable python concepts.								K1 to K4	
CO5	Assess the complex problems using appropriate concepts in python.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	3	2
WEIGHTAGE	15	14	11	15	11	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	73	67

LESSON PLAN:

	Python Programming Lab	HRS	PEDAGOGY
	1. Program using variables, constants, I/O statements in Python. 2. Program using Operators in Python. 3. Program using Conditional Statements. 4. Program using Loops. 5. Program using Jump Statements. 6. Program using Functions. 7. Program using Recursion. 8. Program using Arrays. 9. Program using Strings. 10. Program using Modules. 11. Program using Lists. 12. Program using Tuples. 13. Program using Dictionaries. 14. Program for File Handling.	75	Demo & Examples

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Syntax & Semantics	Program ming principle s	Concept Applicati ons	Coding & Implementat ion	Debugging & Output
CI A	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K4				5	
	CO5	K5					5
Question Pattern CIA I & II		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level CIA I & CIA II

Distribution of Marks with K Level Criteria										
	K Level	Syntax & Seman tics		Program ming principl e s	Con cept App licat ion s	Coding	Debuggin g & Output	Total Marks	% of (Marks withou t choice)	Cons olidat e of %
C I A I	K1	5					5	20	20	
	K2		5				5	20	20	
	K3			5			5	20	20	
	K4				5		5	20	20	
	K5					5	5	20	20	
	Marks	5	5	5	5	5	25	100	100	

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
	Cos	K Level	Syntax & Semantics	Program ming principles	Concept Applicati ons	Coding & Implementat ion	Debugging & Output
	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K4				15	
	CO5	K5					15
Question Pattern	No. of Questions to be asked		2	2	2	2	2
	No. of Questions to be answered		2	2	2	2	2
	Marks for each question		2.5	7.5	7.5	7.5	7.5
	Total Marks for each section		15	15	15	15	15

Distribution of Marks with K Level								
K Level	Syntax & Seman tics	Program ming principl es	Con cept App licat ion s	Coding	Debuggin g & Output	Total Marks	% of (Marks without choice)	Consolid ate of %
K1	15				15		20	20
K2		15			15		20	20
K3			15		15		20	20
K4			15		15		20	20
K5				15	15		20	20
Marks	15	15	15	15	75		100	100

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Operating Systems			
Course Code	23UITCC52	L	P	C
Category	Core	5	-	4
COURSE OBJECTIVES:				
➤ To Learn concepts of operating systems ➤ To Learn the mechanisms of OS to handle processes ➤ To Study of various mechanisms involved in memory management techniques ➤ To Gain knowledge of deadlocks prevention and detection techniques ➤ To Analyse disk management functions and techniques				
UNIT - I Introduction:				15
Introduction: Definition of Operating System - OS Structures: OS Services - System Calls - Virtual Machine - Process Management: Process Concept - Process Scheduling - Operation on Processes - Co-operating Processes - Inter-process Communication				
UNIT - II CPU Scheduling and its process:				15
CPU Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Process Synchronization: The Critical Section Problem - Semaphores - Classical Problems of Synchronization - Critical Regions				
UNIT - III Deadlocks:				15
Deadlocks: System Model - Deadlock characterization – Methods for Handling Deadlocks Deadlock Prevention - Deadlock avoidance- Deadlock Detection - Recovery from Deadlock				
UNIT - IV Storage management:				15
Storage management: Memory management - Swapping – Contiguous Memory allocation. Paging - Segmentation –Segmentation with Paging –Virtual memory: Demand paging - Page replacement – Thrashing Mass-Storage Structure: Disk Structure- Disk scheduling.				
UNIT - V File-System Interface:				15
File-System Interface: File Concept-File Attributes-File Operations – Access Methods: Sequential Access - Direct Access –Directory Structure: Single-Level Directory- Two –Level Directory-Tree-Structured Directories- Introducing Shell Programming – Linux General Purpose Commands-Process Oriented Commands – Communication Oriented Commands				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2012), —Operating System Concepts, 9th edition, Wiley Student Edition.
- B.Mohamed Ibrahim, (2005), —Linux Practical Approach, Firewall Media

BOOKS FOR REFERENCES:

- Milan Milenkovic (2003), —Operating System Concepts and Design, McGraw Hill.
- Andrew S. Tanenbaum, (2001), —Modern Operating Systems, 2nd Edition, Prentice Hall of India
- Deital and Deital (1990), —Introduction to Operating System, Pearson Education.
- William Stallings (1997), —Operating Systems, Prentice Hall of India.

WEB RESOURCES:

- ❖ http://www.tutorialspoint.com/operating_system/
- ❖ <http://www.reallylinux.com/docs/files.shtml>
- ❖ http://www.tutorialspoint.com/operating_system/os_linux.html

Nature of Course	EMPLOYABILITY			SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓	
Changes Made in the Course	Percentage of Change		10 %	No Changes Made		-	New Course		-
* Treat 20 % as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Gain knowledge of history of operating systems								K1 to K4	
CO2	Understand design issues associated with operating systems								K1 to K4	
CO3	Gain knowledge of various process management concepts including scheduling, synchronization, deadlocks								K1 to K4	
CO4	Understand concepts of memory management including virtual memory								K1 to K4	
CO5	Understand issues related to file system interface and implementation, disk management ,Be familiar with protection and security mechanisms								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	2	2	2
CO 2	2	3	2	2	2	2
CO 3	2	3	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	3	3	2	2	2	2
WEIGHTAGE	12	14	11	11	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	80	93	73	73	63	63

LESSON PLAN:

UNIT	Operating Systems	HRS	PEDAGOGY
I	Introduction: Definition of Operating System - OS Structures: OS Services - System Calls - Virtual Machines - Process Management: Process Concept - Process Scheduling - Operation on Processes - Co-operating Processes - Inter-process Communication	15	PPT,ICT & Chalk & Talk
II	CPU Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Process Synchronization: The Critical Section Problem - Semaphores - Classical Problems of Synchronization - Critical Regions	15	PPT,ICT & Chalk & Talk
III	Deadlocks: System Model - Deadlock characterization – Methods for Handling Deadlocks Deadlock Prevention - Deadlock avoidance-Deadlock Detection - Recovery from Deadlock	15	PPT,ICT & Chalk & Talk
IV	Storage management: Memory management - Swapping – Contiguous Memory allocation. Paging – Segmentation – Segmentation with Paging –Virtual memory: Demand paging - Page replacement – Thrashing. Mass-Storage Structure: Disk Structure-Disk scheduling.	15	PPT,ICT & Chalk & Talk
V	File-System Interface: File Concept-File Attributes-File Operations – Access Methods: Sequential Access – Direct Access –Directory Structure: Single-Level Directory- Two –Level Directory-Tree-Structured Directories- Introducing Shell Programming – Linux General Purpose Commands-Process Oriented Commands – Communication Oriented Commands	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked		4	4	4
		No. of Questions to be answered		4	2	2
		Marks for each question		1	5	8
		Total Marks for each section		4	10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		10	5
Marks for each question			1		1	8
Total Marks for each section			10		10	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions		PART – A		(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Project with Viva -Voce			
Course Code	23UITPR51	L	P	C
Category	Core	5	-	5

COURSE OBJECTIVES:

- To develop an ability to design and implement software.
- To select individually Commercial or Technical Projects based on Application Development and Technologies.
- To know the technologies, they can develop the software
- To Facilitate experiential learning.
- To do Real time projects.

S. No.	PHASES	Hrs
1.	Title	
2.	Synopsis	
3.	Introduction	
4.	Module description	
5.	Existing and proposed system	
6.	Data Flow Diagram	
7.	System Flow Diagram	
8.	Entity Relationship Diagram	
9.	Form Design	
10.	Database Design	
11.	Testing	
12.	Implementation	
13.	Form Design	
Total Lecture Hours		75

BOOKS FOR STUDY:

- Richard Fairley, Software Engineering, Tata McGraw Hill, 2016
- Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.

WEB RESOURCES:

- ❖ <https://www.programiz.com/python-programming>
- ❖ <https://www.guru99.com/python-tutorials.html>

Nature of Course	EMPLOYABILITY			✓	SKILL ORIENTED			ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓	
Changes Made in the Course	Percentage of Change			-	No Changes Made			✓	New Course		-
* Treat 20 % as each unit (20*5=100%) and calculate the percentage of change for the course.											

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Design and implement a software with a good aesthetic sense of designing and latest technical know-how's.								K1 to K4	
CO2	Project one that involves practical work for understanding and solving problems in the field of computing.								K1 to K4	
CO3	To familiar with any software and develop tools								K1 to K4	
CO4	To develop a software or application.								K1 to K4	
CO5	To create applications using Languages.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	3	2	3	3	3
CO 2	3	3	2	3	2	3
CO 3	2	3	2	2	3	2
CO 4	3	2	3	3	3	3
CO 5	3	2	3	2	2	3
WEIGHTAGE	14	13	12	13	13	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93.33	86.67	80	86.67	86.67	93.33

LESSON PLAN:			
Module	Project and Viva voce Phases	HRS	PEDAGOGY
I	1. Title	75	Practical & live implementation
	2. Synopsis		
	3. Introduction		
II	4. Module description		
	5. Existing and proposed system		
III	6. Data Flow Diagram		
	7. System Flow Diagram		
	8. Entity Relationship Diagram		
IV	9. Form Design		
	10. Database Design		
V	11. Implementation		
	12. Testing		

Learning Outcome Based Education & Assessment (LOBE)							
Formative Examination - Blue Print							
Articulation Mapping – K Levels with Course Outcomes (COs)							
Internal	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Report
CIA	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K4				5	
	CO5	K5					5
Question Pattern CIA I & II		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level CIA I									
	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Report	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	5					5	20	20
	K2		5				5	20	20
	K3			5			5	20	20
	K4				5		5	20	20
	K5					5	5	20	20
	Marks	5	5	5	5	5	25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments.

Summative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Debugging & Output
	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K4				15	
	CO5	K5					15
Question Pattern	No. of Questions to be asked		2	2	2	2	2
	No. of Questions to be answered		2	2	2	2	2
	Marks for each question		2.5	7.5	7.5	7.5	7.5
	Total Marks for each section		15	15	15	15	15

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**DEPARTMENT OF INFORMATION TECHNOLOGY****FOR THOSE WHO JOINED IN 2023-2024 AND AFTER**

Course Name	Big Data Analytics			
Course Code	23UITEC51	L	P	C
Category	Elective	4	-	3
COURSE OBJECTIVES:				
➤ Understand the Big Data Platform and its Use cases, Map Reduce Jobs ➤ To identify and understand the basics of cluster and decision tree ➤ To study about the Association Rules, Recommendation System ➤ To learn about the concept of stream ➤ Understand the concepts of NoSQL Databases.				
UNIT - I Evolution of Big data:				12
Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating — The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value -Understanding Big Data Storage — A General Overview of High-Performance Architecture — HDFS — MapReduce and YARN — Map Reduce Programming Model				
UNIT - II Advanced Analytical Theory and Methods:				12
Advanced Analytical Theory and Methods: Overview of Clustering — K-means — Use Cases — Overview of the Method — Determining the Number of Clusters — Diagnostics — Reasons to Choose and Cautions. - Classification: Decision Trees — Overview of a Decision Tree — The General Algorithm — Decision Tree Algorithms — Evaluating a Decision Tree — Decision Trees in R — Naïve Bayes — Bayes? Theorem — Naïve Bayes Classifier				
UNIT - III Advanced Analytical Theory and Methods:				12
Advanced Analytical Theory and Methods: Association Rules — Overview — Apriori Algorithm — Evaluation of Candidate Rules — Applications of Association Rules — Finding Association& finding similarity — Recommendation System: Collaborative Recommendation- Content Based Recommendation — Knowledge Based Recommendation- Hybrid Recommendation Approaches.				
UNIT - IV Introduction to Streams Concepts:				12
Introduction to Streams Concepts — Stream Data Model and Architecture — Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics				
UNIT - V NoSQL Databases :				12
NoSQL Databases : Schema-less Models?: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores — Tabular Stores — Object Data Stores — Graph Databases Hive — Sharding —Hbase — Analyzing big data with twitter — Big data for E-Commerce Big data for blogs — Review of Basic Data Analytic Methods using R.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

BOOKS FOR REFERENCES:

- David Loshin, “Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph”, Morgan Kaufmann/Elsevier Publishers, 2013
- Andrew S. Tanenbaum, (2001), —Modern Operating Systems, 2nd Edition, Prentice Hall of India
- EMC Education Services, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley publishers, 2015.
- William Stallings (1997)

WEB RESOURCES:

- ❖ <https://www.simplilearn.com>
- ❖ https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		-	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			✓
Changes Made in the Course	Percentage of Change		15 %	No Changes Made		-	New Course		-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:**K LEVEL**

After studying this course, the students will be able to:

CO1	On completion of this course, students will Work with big data tools and its analysis techniques.	K1 to K4
CO2	Analyze data by utilizing clustering and classification algorithms.	K1 to K4
CO3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	K1 to K4
CO4	Perform analytics on data streams.	K1 to K4
CO5	Learn NoSQL databases and management.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	-	-	S	S				
CO2	M	-	S	M	S	S				
CO3	S	S	S	M	M	M				
CO4	S	S	M	M	M	S				
CO5	S	M	M	S	S	S				

S- STRONG**M – MEDIUM****L - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	3	3
CO 2	3	3	2	3	3	3
CO 3	3	3	3	3	3	2
CO 4	3	3	2	3	3	3
CO 5	3	3	2	3	3	2
WEIGHTAGE	15	14	11	15	15	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93.33	73.33	100	100	86.66

LESSON PLAN:

UNIT	Big Data Analytics	HRS	PEDAGOGY
I	Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating — The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value -Understanding Big Data Storage — A General Overview of High-Performance Architecture — HDFS — MapReduce and YARN — Map Reduce Programming Model	12	PPT,ICT & Chalk & Talk
II	Advanced Analytical Theory and Methods: Overview of Clustering — K-means — Use Cases — Overview of the Method — Determining the Number of Clusters — Diagnostics — Reasons to Choose and Cautions. - Classification: Decision Trees — Overview of a Decision Tree — The General Algorithm — Decision Tree Algorithms — Evaluating a Decision Tree — Decision Trees in R — Naïve Bayes — Bayes? Theorem — Naïve Bayes Classifier	12	PPT,ICT & Chalk & Talk
III	Advanced Analytical Theory and Methods: Association Rules — Overview — Apriori Algorithm — Evaluation of Candidate Rules — Applications of Association Rules — Finding Association& finding similarity — Recommendation System: Collaborative Recommendation- Content Based Recommendation — Knowledge Based Recommendation- Hybrid Recommendation Approaches.	12	PPT,ICT & Chalk & Talk
IV	Introduction to Streams Concepts — Stream Data Model and Architecture—Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions.	12	PPT,ICT & Chalk & Talk

	Using Graph Analytics for Big Data: Graph Analytics		
V	NoSQL Databases : Schema-less Models?: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores — Tabular Stores — Object Data Stores — Graph Databases Hive — Sharding — Hbase — Analyzing big data with twitter — Big data for E-Commerce Big data for blogs — Review of Basic Data Analytic Methods using R.	12	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)						
Formative Examination - Blue Print						
Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Human Computer Interaction			
Course Code	23UITEC52	L	P	C
Category	Elective	4	-	3
COURSE OBJECTIVES:				
➤ To learn about the foundations of Human Computer Interaction. ➤ To learn the design and software process technologies. ➤ To learn HCI models and theories. ➤ To learn Mobile Ecosystem. ➤ To learn the various types of Web Interface Design.				
UNIT - I FOUNDATIONS OF HCI :				12
The Human: I/O channels – Memory - Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; - Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies.				
UNIT - II DESIGN & SOFTWARE PROCESS:				12
Interactive Design: - Basics – process – scenarios - Navigation: screen design Iteration and prototyping. - HCI in software process: - Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.				
UNIT - III MODELS AND THEORIES:				12
HCI Models: Cognitive models: - Socio-Organizational issues and stakeholder requirements Communication and collaboration models-Hypertext, Multimedia and WWW.				
UNIT - IV INTRODUCTION TO STREAMS CONCEPTS:				12
Introduction to Streams Concepts — Stream Data Model and Architecture — Stream Computing, Sampling Data in a Stream — Filtering Streams — Counting Distinct Elements in a Stream — Estimating moments — Counting oneness in a Window — Decaying Window — Real time Analytics Platform(RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics				
UNIT - V WEB INTERFACE DESIGN:				12
Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human -Computer Interaction", III Edition, Pearson Education, 2004 (UNIT I, II & III)
- Brian Fling, —"Mobile Design and Development", I Edition, O'Reilly Media Inc., 2009(UNIT-IV)
- Bill Scott and Theresa Neil, —Designing Web Interfaces, First Edition, O'Reilly, 2009. (UNIT-V)

BOOKS FOR REFERENCES:

- Shneiderman, "Designing the User Interface: Strategies for Effective Human-Computer Interaction", V Edition, Pearson Education.

WEB RESOURCES:

- ❖ <https://www.interaction-design.org/literature/topics/human-computer-interaction>
- ❖ https://link.springer.com/10.1007/978-0-387-39940-9_192
- ❖ https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓	
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the fundamentals of HCI.								K1 to K4	
CO2	Understand the design and software process technologies.								K1 to K4	
CO3	Understand HCI models and theories.								K1 to K4	
CO4	Understand Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design								K1 to K4	
CO5	Understand the various types of Web Interface Design.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M			S	S				
CO2	M		S	M	S	S				
CO3	S	S	S	M	M	M				
CO4	S	S	M	M	M	S				
CO5	S	M	M	S	S	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	3	3
CO 2	3	3	2	3	3	3
CO 3	3	3	3	3	3	2
CO 4	3	3	2	3	3	3
CO 5	3	3	2	3	3	2
WEIGHTAGE	15	14	11	15	15	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93.33	73.33	100	100	86.66

LESSON PLAN:

UNIT	Human Computer Interaction	HRS	PEDAGOGY
I	The Human: I/O channels – Memory - Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; - Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies	15	PPT,ICT & Chalk & Talk
II	Interactive Design: - Basics – process – scenarios - Navigation: screen design Iteration and prototyping. - HCI in software process: - Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design	15	PPT,ICT & Chalk & Talk
III	HCI Models: Cognitive models: - Socio-Organizational issues and stakeholder requirements Communication and collaboration models- Hypertext, Multimedia and WWW.	15	PPT,ICT & Chalk & Talk
IV	Mobile Ecosystem: Platforms, Application frameworks - Types of Mobile Applications: Widgets, Applications, Games - Mobile Information Architecture, Mobile 2.0, - Mobile Design: Elements of Mobile Design, Tools. - Case Studies.	15	PPT,ICT & Chalk & Talk
V	Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies.	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Articulation Mapping						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**DEPARTMENT OF INFORMATION TECHNOLOGY****FOR THOSE WHO JOINED IN 2023-2024 AND AFTER**

Course Name	Cryptography			
Course Code	23UITEC53	L	P	C
Category	Elective	4	-	3

COURSE OBJECTIVES:

- To understand the fundamentals of Cryptography.
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To design security applications in the field of Information technology

UNIT - I Introduction:	12
-------------------------------	-----------

Introduction: The OSI security Architecture – Security Attacks – Security Mechanisms – Security Services – A model for network Security.

UNIT - II Classical Encryption Techniques:	12
---	-----------

Classical Encryption Techniques: Symmetric cipher model – **Substitution Techniques:** Caesar Cipher – Monoalphabetic cipher – Play fair cipher – Poly Alphabetic Cipher – Transposition techniques – Stenography

UNIT - III Block Cipher and DES:	12
---	-----------

Block Cipher and DES: Block Cipher Principles – DES – The Strength of DES – **RSA:** The RSA algorithm

UNIT - IV Network Security Practices & Web Security:	12
---	-----------

Network Security Practices: IP Security overview - IP Security architecture – Authentication Header.
Web Security: Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.

UNIT - V Intruders:	12
----------------------------	-----------

Intruders – Malicious software – Firewalls.

Total Lecture Hours	60
----------------------------	-----------

BOOKS FOR STUDY:

- William Stallings, “Cryptography and Network Security Principles and Practices”.

BOOKS FOR REFERENCES:

- Behrouz A. Foruzan, “Cryptography and Network Security”, Tata McGraw-Hill, 2007.
 ➤ AtulKahate, “Cryptography and Network Security”, Second Edition, 2003, TMH.
 ➤ M.V. Arun Kumar, “NetworkSecurity”, 2011, First Edition, USP.

WEB RESOURCES:

- ❖ <https://www.tutorialspoint.com/cryptography/>
 ❖ <https://gpgtools.tenderapp.com/kb/how-to/introduction-to-cryptography>

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓	
Changes Made in the Course	Percentage of Change		10%	No Changes Made		-	New Course		-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:**K LEVEL**

After studying this course, the students will be able to:

CO1	Outline the basic concepts in python language.	K1 to K4
CO2	Interpret different looping and conditional statements in python language	K1 to K4
CO3	Apply the various data types and identify the usage of control statements, loops, functions and Modules in python for processing the data	K1 to K4
CO4	Analyze and solve problems using basic constructs and techniques of python.	K1 to K4
CO5	Assess the approaches used in the development of interactive application.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	2	3	2	3	2	2
CO 3	2	3	2	2	3	1
CO 4	1	2	2	1	3	2
CO 5	2	2	2	1	3	3
WEIGHTAGE	10	12	10	10	13	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	66.67	80	66.67	66.67	86.67	66.67

LESSON PLAN:

UNIT	Cryptography	HRS	PEDAGOGY
I	Introduction: The OSI security Architecture – Security Attacks – Security Mechanisms – Security Services – A model for network Security.	12	PPT,ICT & Chalk & Talk
II	Classical Encryption Techniques: Symmetric cipher model – Substitution Techniques: Caesar Cipher – Monoalphabetic cipher – Play fair cipher – Poly Alphabetic Cipher – Transposition techniques – Stenography	12	PPT,ICT & Chalk & Talk
III	Block Cipher and DES: Block Cipher Principles – DES – The Strength of DES – RSA: The RSA algorithm.	12	PPT,ICT & Chalk & Talk
IV	Network Security Practices: IP Security overview - IP Security architecture – Authentication Header. Web Security: Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.	12	PPT,ICT & Chalk & Talk
V	Intruders – Malicious software – Firewalls.	12	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked		4	4	4
		No. of Questions to be answered		4	2	2
		Marks for each question		1	5	8
		Total Marks for each section		4	10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	IoT and its Applications			
Course Code	23UITEC54	L	P	C
Category	Elective	4	-	3
COURSE OBJECTIVES:				
➤ Use of Devices, Gateways and Data Management in IoT. ➤ Design IoT applications in different domain and be able to analyze their performance ➤ Implement basic IoT applications on embedded platform ➤ To gain knowledge on Industry Internet of Things ➤ To Learn about the privacy and Security issues in IoT				
UNIT - I Introduction:				12
IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.				
UNIT - II M2M to IoT:				12
M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations				
UNIT - III IoT Architecture:				12
IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views				
UNIT - IV IoT Applications for Value Creations:				12
IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT for Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management				
UNIT - V Internet of Things Privacy:				12
Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security				
Total Lecture Hours				60

BOOKS FOR STUDY:

- Vijay Madiseti and Arshdeep Bahga, “Internet of Things: (A Hands-on Approach)”, Universities Press (INDIA) Private Limited 2014, 1st Edition

BOOKS FOR REFERENCES:

- Michael Miller, “The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World”, kindle version.
- Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, Apress Publications 2013, 1st Edition,.
- Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice" 4..Cuno Pfister, “Getting Started with the Internet of Things”, O’Reilly Media 2011.

WEB RESOURCES:

- ❖ <https://www.simplilearn.com>
- ❖ <https://www.javatpoint.com>
- ❖ <https://www.w3schools.com>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP		-	
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		✓	New Course		-	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Work with big data tools and its analysis techniques								K1 to K4	
CO2	Analyze data by utilizing clustering and classification algorithms.								K1 to K4	
CO3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.								K1 to K4	
CO4	Perform analytics on data streams								K1 to K4	
CO5	Learn NoSQL databases and management								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:

UNIT	Internet of Things and its Applications	HRS	PEDAGOGY
I	IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.	12	PPT,ICT & Chalk & Talk
II	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations	12	PPT,ICT & Chalk & Talk
III	IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views	12	PPT,ICT & Chalk & Talk
IV	IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT for Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management	12	PPT,ICT & Chalk & Talk

V	Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security	12	PPT,ICT & Chalk & Talk
----------	--	-----------	---------------------------------------

Learning Outcome Based Education & Assessment (LOBE)						
Formative Examination - Blue Print						
Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**DEPARTMENT OF INFORMATION TECHNOLOGY****FOR THOSE WHO JOINED IN 2023-2024 AND AFTER**

Course Name	Fuzzy Logic			
Course Code	23UITEC55	L	P	C
Category	Elective	4	-	3
COURSE OBJECTIVES:				
➤ To understand the basic concept of Fuzzy logic ➤ To learn the various operations on relation properties ➤ To study about the membership functions ➤ To learn about the Defuzzification and Fuzzy Rule-Based System ➤ To learn the concepts of Applications of Fuzzy Logic.				
UNIT - I Introduction :				12
Introduction to Fuzzy Logic- Fuzzy Sets- Fuzzy Set Operations, Properties of Fuzzy Sets, Classical and Fuzzy Relations: Introduction-Cartesian Product of Relation-Classical Relations-Cardinality of Crisp Relation.				
UNIT - II Operations on Crisp Relation:				12
Operations on Crisp Relation-Properties of Crisp Relations-Composition Fuzzy Relations, Cardinality of Fuzzy Relations-Operations on Fuzzy Relations-Properties of Fuzzy Relations-Fuzzy Cartesian Product and Composition-Tolerance and Equivalence Relations ,Crisp Relation				
UNIT - III Membership Functions :				12
Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, construction and inference, temporal model, hidden Markov model.				
UNIT - IV Defuzzification :				12
Defuzzification: Introduction, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods, Fuzzy Rule-Based System: Introduction, Formation of Rules, Decomposition of Rules, Aggregation of Fuzzy Rules, Properties of Set of Rules				
UNIT - V Applications of Fuzzy Logic :				12
Applications of Fuzzy Logic: Fuzzy Logic in Automotive Applications, Fuzzy Antilock Brake System-Antilock-Braking System and Vehicle Speed-Estimation Using Fuzzy Logic				
Total Lecture Hours				60

BOOKS FOR STUDY:

- S. N. Sivanandam, S. Sumathi and S. N. Deepa-Introduction to Fuzzy Logic using MATLAB, Springer-Verlag Berlin Heidelberg 2007.

BOOKS FOR REFERENCES:

- Guanrong Chen and Trung Tat Pham- Introduction to Fuzzy Sets, Fuzzy Logic and Fuzzy Control Systems
- Timothy J Ross , Fuzzy Logic with Engineering Applications

WEB RESOURCES:

- ❖ <https://www.javatpoint.com/fuzzy-logic>
- ❖ <https://www.guru99.com/what-is-fuzzy-logic.html>

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-	
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the basics of Fuzzy sets, operation and properties								K1 to K4	
CO2	Apply Cartesian product and composition on Fuzzy relations and use the tolerance and Equivalence relations.								K1 to K4	
CO3	Analyze various fuzzification methods and features of membership Functions.								K1 to K4	
CO4	Evaluate defuzzification methods for real time applications.								K1 to K4	
CO5	Design an application using Fuzzy logic and its Relations								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67
LESSON PLAN:						
UNIT	Fuzzy Logic				HRS	PEDAGOGY
I	Introduction to Fuzzy Logic- Fuzzy Sets- Fuzzy Set Operations, Properties of Fuzzy Sets, Classical and Fuzzy Relations: Introduction-Cartesian Product of Relation-Classical Relations-Cardinality of Crisp Relation.				12	PPT,ICT & Chalk & Talk
II	Operations on Crisp Relation-Properties of Crisp Relations-Composition Fuzzy Relations, Cardinality of Fuzzy Relations-Operations on Fuzzy Relations-Properties of Fuzzy Relations-Fuzzy Cartesian Product and Composition-Tolerance and Equivalence Relations, Crisp Relation.				12	PPT,ICT & Chalk & Talk
III	Membership Functions: Introduction, Features of Membership Function, Classification of Fuzzy Sets, Fuzzification, Membership Value Assignments, Intuition, Inference, Rank Ordering				12	PPT,ICT & Chalk & Talk
IV	Defuzzification: Introduction, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods, Fuzzy Rule-Based System: Introduction, Formation of Rules, Decomposition of Rules, Aggregation of Fuzzy Rules, Properties of Set of Rules				12	PPT,ICT & Chalk & Talk
V	Applications of Fuzzy Logic: Fuzzy Logic in Automotive Applications, Fuzzy Antilock Brake System-Antilock-Braking System and Vehicle Speed-Estimation Using Fuzzy Logic.				12	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4	OR			
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4	OR			
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4	OR			
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4	OR			
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4	OR			
20. b)	Unit - V	CO5	K4				

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Artificial Intelligence			
Course Code	23UITEC56	L	P	C
Category	Elective	4	-	3
COURSE OBJECTIVES:				
➤ To learn various concepts of AI Techniques ➤ To learn various Search Algorithms in AI. ➤ To learn probabilistic reasoning and models in AI. ➤ To learn about the Markov Decision Process. ➤ To learn various types of Reinforcement learning.				
UNIT - I	Introduction :			12
Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree				
UNIT – II	Search Algorithms :			12
Search Algorithms: Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search				
UNIT - III	Probabilistic Reasoning :			12
Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, construction and inference, temporal model, hidden Markov model.				
UNIT - IV	Markov Decision process :			12
Markov Decision process: MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.				
UNIT - V	Reinforcement Learning :			12
Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning				
Total Lecture Hours				60

BOOKS FOR STUDY:

- Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning
- Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill

BOOKS FOR REFERENCES:

- Trivedi, M.C., “A Classical Approach to Artificial Intelligence”, Khanna Publishing House, Delhi
- Saroj Kaushik, “Artificial Intelligence”, Cengage Learning India, 2011
- David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010

WEB RESOURCES:

- ❖ **NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems**
- ❖ <https://nptel.ac.in/courses/106106140/>
- ❖ <https://nptel.ac.in/courses/106106126/>

Nature of Course	EMPLOYABILITY			-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change			20%	No Changes Made		-	New Course		-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the various concepts of AI Techniques.								K1 to K4	
CO2	Understand various Search Algorithms in AI.								K1 to K4	
CO3	Understand probabilistic reasoning and models in AI.								K1 to K4	
CO4	Understand Markov Decision Process								K1 to K4	
CO5	Understand various types of Reinforcement learning Techniques.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67
LESSON PLAN:						
UNIT	Artificial Intelligence				HRS	PEDAGOGY
I	Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree				12	PPT,ICT & Chalk & Talk
II	Search Algorithms : Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search				12	PPT,ICT & Chalk & Talk
III	Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.				12	PPT,ICT & Chalk & Talk
IV	Markov Decision process : MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.				12	PPT,ICT & Chalk & Talk
V	Reinforcement Learning : Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning				12	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4	OR			
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4	OR			
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4	OR			
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4	OR			
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4	OR			
20. b)	Unit - V	CO5	K4				

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Internship Report				
Course Code	23UITIN51	L	P	C	
Category	Summer Internship	-	-	2	

COURSE OBJECTIVES:

- To have a hand-on practice.
- To expose students for thinking about professional career by observing.
- To understand the working mechanism of ongoing work of industry.
- To obtain various types of skills throughout internship program.
- To facilitate experiential learning.

S. No.	PHASES	Hrs
	- Understanding of the world of work - Working principle – Organization - Concept understanding in par with the specialization - Learning about new tools - Experimentation and collection of data - Simulations and development of models - Preparation and presentation of reports	
Total Lecture Hours		-

Nature of Course	EMPLOYABILITY				SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change			-	No Changes Made		-	New Course		✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Get exposure to the industrial environment, which cannot be simulated in the classroom and hence creating competent professionals for the industry.								K1 to K4	
CO2	Get possible opportunities to learn, understand and sharpen the real time technical / managerial skills required at the job(s).								K1 to K4	
CO3	Gain experience in writing technical reports / projects and presentation of it.								K1 to K4	
CO4	Learn and gain exposure to the engineer’s responsibilities and ethics								K1 to K4	
CO5	Understand the social, economic and administrative considerations that influence the working environment of industrial organizations.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	L	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	3	2	3	3	3
CO 2	3	3	2	3	2	3
CO 3	2	3	2	2	3	2
CO 4	3	2	3	3	3	3
CO 5	3	2	3	2	2	3
WEIGHTAGE	14	13	12	13	13	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93.33	86.67	80	86.67	86.67	93.33
LESSON PLAN:						
	Summer Internship Report Phases				HRS	PEDAGOGY
	1. Understanding of the world of work 2. Working principle – Organization 3. Concept understanding in par with the specialization 4. Learning about new tools 5. Experimentation and collection of data 6. Simulations and development of models f reports				15 to 30 days	Inference and daily data report

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Understanding	Working principle	Concept Applications	Implementation	Inference & Report
CIA	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K4				5	
	CO5	K5					5
Question Pattern CIA I & II		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level CIA I

	K Level	Understanding	Working principle	Concept Applications	Implementation	Inference & Report	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	5					5	20	20
	K2		5				5	20	20
	K3			5			5	20	20
	K4				5		5	20	20
	K5					5	5	20	20
	Marks	5	5	5	5	5	25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments.

Summative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)

	Cos	K Level	Understanding	Working principle	Concept Applications	Implementation	Inference & Report
	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K4				15	
	CO5	K5					15
Question Pattern	No. of Questions to be asked	2	2	2	2	2	2
	No. of Questions to be answered	2	2	2	2	2	2
	Marks for each question	2.5	7.5	7.5	7.5	7.5	7.5
	Total Marks for each section	15	15	15	15	15	15

Distribution of Marks with K Level

K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidate of %
K1	15					15	20	20
K2		15				15	20	20
K3			15			15	20	20
K4				15		15	20	20
K5					15	15	20	20
Marks	15	15	15	15	15	75	100	100

SIXTH SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Data Mining			
Course Code	23UITCC61	L	P	C
Category	Core	6	-	4
COURSE OBJECTIVES:				
➤ To identify the underlying concepts and the fundamental data mining methodologies with the ability to formulate and solve problems. ➤ Determine the knowledge imbibed in the high dimensional system. ➤ Analyze the research interest towards advances in data mining. ➤ Illustrate algorithms for finding the hidden interesting patterns in data. ➤ Describe the overview of developing areas and visualization using Data Mining Tools.				
UNIT - I	Introduction:	18		
Introduction: Data Mining – Kinds of Data and Patterns to be Mined – Technologies used –Kinds of Applications are Targeted - Major Issues –Data objects and Attribute types – Basic statistical Descriptions of Data- Data Preprocessing : Data Cleaning – Data Integration - Data Reduction - Data Transformation.				
UNIT - II	Association Rules Mining:	18		
Association Rules Mining: Introduction – Frequent Itemset Mining Methods: Apriori Algorithm-Generating Association Rules from Frequent Itemsets-Improving the efficiency of Apriori-A Pattern – Growth Approach for mining Frequent Itemsets-Pattern Evaluation Methods.				
UNIT - III	Classification:	18		
Classification: Introduction –Basic concepts – Logistic regression - Decision tree induction–Bayesian classification, Rule–based classification-Model Evaluation and selection.				
UNIT - IV	Cluster Analysis:	18		
Cluster Analysis: Introduction-Requirements for Cluster Analysis - Partitioning Methods: The K-Mean method - Hierarchical Method: Agglomerative method - Density based methods: DBSCAN- Evaluation of Clustering: Determining the Number of Clusters – Measuring Clustering Quality.				
UNIT - V	Outlier Detection:	18		
Outlier Detection: Outliers and Outlier Analysis – Outlier Detection Methods - Data Visualization: Pixel-oriented visualization – Geometric Projection visualization technique- Icon-based-Hierarchical visualization-Visualizing complex data and relations				
Total Lecture Hours				90

BOOKS FOR STUDY:

- Jiawei Han, Micheline Kamber, Jian Pei, “Data Mining concepts and techniques”, 3rd Edition, Elsevier publication, 2012

BOOKS FOR REFERENCES:

- Ian H. Witten and Eibe Frank, (2005), “Data Mining: Practical Machine Learning Tools and Techniques (Second Edition)”, Morgan Kaufmann
- Arun K Pujari, “Data Mining Techniques”, 10 impression, University Press, 2008.
- Daniel T. Larose , Chantal D. Larose, "Data mining and Predictive analytics," Second Ed., Wiley Publication, 2015
- G.K. Gupta, “Introduction to Data mining with case studies”, 2nd Edition, PHI Private limited, New Delhi, 2011.

WEB RESOURCES:

- ❖ <http://csed.sggs.ac.in/csedsites/default/files/WEKA%20Explorer%20Tutorial.pdf>
- ❖ <https://www.cs.auckland.ac.nz/courses/compsci367s1c/tutorials/IntroductionToWeka.pdf>

Nature of Course	EMPLOYABILITY			✓	SKILL ORIENTED			ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓	
Changes Made in the Course	Percentage of Change			10 %	No Changes Made			-	New Course		-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.											

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Outline the fundamentals and the principles of Data Mining								K1 to K4	
CO2	Apply suitable different preprocessing for data mining								K1 to K4	
CO3	Classify data-mining techniques based on the different applications								K1 to K4	
CO4	Analyze the various data mining algorithms with respect to functionality								K1 to K4	
CO5	Recommend appropriate data models for data mining techniques to solve real world to solve real world problems problems								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	-	-				
CO2	M	S	S	M	M	-				
CO3	M	M	S	S	M	S				
CO4	S	M	S	M	S	M				
CO5	S	S	S	S	S	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	2	2	2	3	2	2
CO 2	3	2	2	3	2	2
CO 3	3	3	2	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	3	3	2	2
WEIGHTAGE	14	13	13	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93	87	87	100	67	67

LESSON PLAN:

UNIT	Data Mining	HRS	PEDAGOGY
I	Introduction: Data Mining – Kinds of Data and Patterns to be Mined – Technologies used –Kinds of Applications are Targeted - Major Issues – Data objects and Attribute types – Basic statistical Descriptions of Data- Data Preprocessing : Data Cleaning – Data Integration - Data Reduction - Data Transformation.	18	PPT,ICT & Chalk & Talk
II	Association Rules Mining: Introduction – Frequent Itemset Mining Methods: Apriori Algorithm-Generating Association Rules from Frequent Itemsets-Improving the efficiency of Apriori-A Pattern – Growth Approach for mining Frequent Itemsets-Pattern Evaluation Methods.	18	PPT,ICT & Chalk & Talk
III	Classification: Introduction –Basic concepts – Logistic regression - Decision tree induction–Bayesian classification, Rule–based classification-Model Evaluation and selection.	18	PPT,ICT & Chalk & Talk
IV	Cluster Analysis: Introduction-Requirements for Cluster Analysis - Partitioning Methods: The K-Means method - Hierarchical Method: Agglomerative method - Density based methods: DBSCAN- Evaluation of Clustering: Determining the Number of Clusters – Measuring Clustering Quality.	18	PPT,ICT & Chalk & Talk
V	Outlier Detection: Outliers and Outlier Analysis – Outlier Detection Methods - Data Visualization: Pixel-oriented visualization – Geometric Projection visualization technique- Icon-based-Hierarchical visualization-Visualizing complex data and relations.	18	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked		4		4
		No. of Questions to be answered		4		2
		Marks for each question		1		5
		Total Marks for each section		4		10

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked				10	10	10
No. of Questions to be answered				10	5	5
Marks for each question				1	5	8
Total Marks for each section				10	25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Data Mining Lab			
Course Code	23UITCP61	L	P	C
Category	Core	-	6	4

COURSE OBJECTIVES:

- Understand the fundamentals of programming using Python, such as Variables, data types, control structures, and functions.
- Learn how to use Python libraries and modules to solve problems.
- Practice writing Python code to solve real-world problems and build basic applications.
- Gain experience with common programming paradigms, such as object-oriented programming and functional programming.
- Understand best practices for debugging and testing code.

S. No. List of Exercises

1. Understanding the data
2. Visualization Techniques
3. Data Preprocessing
 - a. Handling Missing Values
4. Data Reduction-Principal Component Analysis
5. Data Normalization-Min-Max, Z-score, Decimal Scaling
 - a. Association Rule Mining-Apriori Algorithm
6. Classification
7. Logistic Regression
 - a. Decision Tree
8. Naive Bayesian
9. Clustering
 - a. K-Means Clustering
10. DBSCAN
11. Agglomerative

Total Lecture Hours

90

BOOKS FOR STUDY:

- Jiawei Han, Micheline Kamber, Jian Pei, “Data Mining concepts and techniques”, 3rd Edition, Elsevier publication, 2012

WEB RESOURCES:

- ❖ <http://csed.sggs.ac.in/csedsites/default/files/WEKA%20Explorer%20Tutorial.pdf>
- ❖ <https://www.cs.auckland.ac.nz/courses/compsci367s1c/tutorials/IntroductionToWeka.pdf>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓	
* Treat 20 % as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the real time datasets for analysis								K1 to K4	
CO2	Apply suitable preprocessing for data mining task								K1 to K4	
CO3	Demonstrate data-mining techniques based on the different applications								K1 to K4	
CO4	Analyze the performance evaluation of various data mining algorithms								K1 to K4	
CO5	Prescribe appropriate data models for data mining techniques to solve real world problems								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	-	-				
CO2	M	S	S	M	M	-				
CO3	M	M	S	S	M	S				
CO4	S	M	S	M	S	M				
CO5	S	S	S	S	S	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	2	2	2	3	2	2
CO 2	3	2	2	3	2	2
CO 3	3	3	2	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	3	3	2	2
WEIGHTAGE	14	13	13	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93	87	87	100	67	67
LESSON PLAN:						
	Data Mining Lab				HRS	PEDAGOGY
	1. Understanding the data 2. Visualization Techniques 3. Data Preprocessing a. Handling Missing Values 4. Data Reduction-Principal Component Analysis 5. Data Normalization-Min-Max, Z-score, Decimal Scaling a. Association Rule Mining-Apriori Algorithm 6. Classification 7. Logistic Regression a. Decision Tree 8. Naive Bayesian 9. Clustering a. K-Means Clustering 10. DBSCAN 11. Agglomerative				90	Demo & Examples

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Syntax & Semantics	Program ming principle s	Concept Application s	Coding & Implementat ion	Debugging & Output
CIA	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K4				5	
	CO5	K5					5
Question Pattern CIA I & II		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level CIA I

	K Level	Syntax & Semantic s	Program ming principles	Concep t Applic ation s	Coding	Debuggin g & Output	Total Marks	% of (Marks without choice)	Cons olidat e of %
CIA I	K1	5					5	20	20
	K2		5				5	20	20
	K3			5			5	20	20
	K4				5		5	20	20
	K5					5	5	20	20
	Marks	5	5	5	5	5	25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
	Cos	K Level	Syntax & Semantics	Program ming principle s	Concept Application s	Coding & Implementat ion	Debugging & Output
	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K4				15	
	CO5	K5					15
Question Pattern		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	7.5	7.5	7.5	7.5
		Total Marks for each section	15	15	15	15	15

Distribution of Marks with K Level								
K Level	Synta x & Sema ntics	Progr am ming princi ples	Concept Applicati ons	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolid ate of %
K1	15					15	20	20
K2		15				15	20	20
K3			15			15	20	20
K4				15		15	20	20
K5					15	15	20	20
Marks	15	15	15	15	15	75	100	100



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Data Communication and Networking			
Course Code	23UITCC62	L	P	C
Category	Core	6	-	4
COURSE OBJECTIVES:				
➤ To focus on information sharing and networks. ➤ To introduce flow of data, categories of network, different topologies. ➤ To focus on different coding schemes. ➤ Brief the students regarding protocols and standards. ➤ To give a clear idea of signals, transmission media, errors in data communications and their correction, networks classes and devices, etc.				
UNIT – I Introduction:				18
Introduction: Data Communication-Networks: Distributed Processing-Network Criteria Physical Structures –Network Models-Categories of Network-Internetwork - The Internet Protocols and Standards – Network Models: Layers in the OSI Model - TCP/IP Protocol Suite.				
UNIT - II Data and Signals:				18
Data and Signals: Analog and Digital Data - Analog and Digital Signals – Performance - Digital Transmission: Transmission Modes – Multiplexing: FDM – WDM - Synchronous TDM -Statistical TDM - Transmission Media: Guided media - Unguided Media.				
UNIT - III Switching:				18
Switching: Circuit Switched Networks - Datagram Networks-Virtual Circuit Network - Error Detection and Correction: Introduction - Block Coding - Linear Block Codes - Cyclic Codes: Cyclic Redundancy Check - Checksum. Data Link Control: Framing - Flow Control and Error Control - Noiseless Channel: Stop-and-wait Protocol.				
UNIT - IV Wired LANs :				18
Wired LANs: Standard Ethernet-GIGABIT Ethernet-Wireless LAN: Bluetooth Connecting LANs: Connecting Devices: Passive Hubs-Repeaters-Active Hubs-Bridges-Two Layer Switches-Routers-Three layer Switches-Gateway-Network Layer: Internet Protocol: IPv4 –Ipv6-Transition from IPv4 to IPv6.				
UNIT - V Network Layer:				18
Network Layer: Delivery, Forwarding and Routing- Unicast Routing Protocols: Distance Vector Routing-Link state routing- Future & Current Trends in Computer Networks: 5G Network: Salient Features-Technology-Applications-Advanced Features-Advantages & Disadvantages-Internet of Things: key Features -Advantages & Disadvantages-IOT Hardware- IOT Technology and Protocols-IOT Common Uses-Applications-WiFi-WiMax Lifi- Lifi vs Wifi.				
Total Lecture Hours				90

BOOKS FOR STUDY:

- Behrouz and Forouzan,(2006), Data Communication and Networking, 4th Edition, TMH.
- Ajit Pal,(2014), Data Communication and Computer Networks, PHI

BOOKS FOR REFERENCES:

- Jean Walrand (1998), —Communication Networks, Second Edition, TataMcGraw Hill.

WEB RESOURCES:

- ❖ http://www.tutorialspoint.com/data_communication_computer_network/
- ❖ http://www.slideshare.net/zafar_ayub/data-communication-and-network-11903853
- ❖ <http://www.fretechbooks.com/data-communication-and-networks-f31.html>

Nature of Course	EMPLOYABILITY				SKILL ORIENTED		✓	ENTREPRENEURSHIP				
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL		✓	
Changes Made in the Course	Percentage of Change			5 %	No Changes Made			-	New Course			-
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.												

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Analyze the functioning of Data Communication and Computer Network.								K1 to K4	
CO2	Select relevant Transmission Media and Switching Techniques as per need.								K1 to K4	
CO3	Analyze the Transmission Errors with respect to IEEE standards.								K1 to K4	
CO4	Configure different TCP/IP services.								K1 to K4	
CO5	Implement relevant Network Topology using Networking Devices.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	M	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	S	S	S	S	M				
CO5	-	M	M	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	12	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	80	100	67	67

LESSON PLAN:

UNIT	Data Communication and Networking	HRS	PEDAGOGY
I	Introduction: Data Communication-Networks: Distributed Processing-Network Criteria Physical Structures –Network Models-Categories of Network-Internetwork - The Internet Protocols and Standards – Network Models: Layers in the OSI Model - TCP/IP Protocol Suite.	18	PPT,ICT & Chalk & Talk
II	Data and Signals: Analog and Digital Data - Analog and Digital Signals – Performance - Digital Transmission: Transmission Modes – Multiplexing: FDM – WDM - Synchronous TDM -Statistical TDM - Transmission Media: Guided media - Unguided Media.	18	PPT,ICT & Chalk & Talk
III	Switching: Circuit Switched Networks - Datagram Networks-Virtual Circuit Network - Error Detection and Correction: Introduction - Block Coding - Linear Block Codes - Cyclic Codes: Cyclic Redundancy Check - Checksum. Data Link Control: Framing - Flow Control and Error Control - Noiseless Channel: Stop-and-wait Protocol.	18	PPT,ICT & Chalk & Talk
IV	Wired LANs: Standard Ethernet-GIGABIT Ethernet-Wireless LAN: Bluetooth Connecting LANs: Connecting Devices: Passive Hubs-Repeaters-Active Hubs-Bridges-Two Layer Switches-Routers-Three layer Switches-Gateway-Network Layer: Internet Protocol: IPv4 –Ipv6-Transition from IPv4 to IPv6.	18	PPT,ICT & Chalk & Talk
V	Network Layer: Delivery, Forwarding and Routing- Unicast Routing Protocols: Distance Vector Routing-Link state routing- Future & Current Trends in Computer Networks: 5G Network: Salient Features-Technology-Applications-Advanced Features-Advantages & Disadvantages-Internet of Things: key Features -Advantages & Disadvantages-IOT Hardware- IOT Technology and Protocols-IOT Common Uses-Applications-WiFi-WiMax Lifi- Lifi vs Wifi.	18	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked		4	4	4
		No. of Questions to be answered		4	2	2
		Marks for each question		1	5	8
		Total Marks for each section		4	10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked				10	10	10
No. of Questions to be answered				10	5	5
Marks for each question				1	5	8
Total Marks for each section				10	25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Grid Computing			
Course Code	23UITEC61	L	P	C
Category	Elective	5	-	3
COURSE OBJECTIVES:				
➤ To learn the basic construction and application of Grid computing. ➤ To learn grid computing organization and their Role. ➤ To learn Grid Computing Anatomy. ➤ To learn Grid Computing road map. ➤ To learn various type of Grid Architecture.				
UNIT - I	Introduction			15
Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.				
UNIT - II	Grid Computing organization and their Roles:			15
Organizations Developing Grid Standards, and Best Practice Guidelines, Global Grid Forum (GCF), #Organization Developing Grid Computing Toolkits and Framework#, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.				
UNIT - III	Grid Computing Anatomy:			15
Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, construction and inference, temporal model, hidden Markov model.				
UNIT - IV	The Grid Computing Road Map:			15
Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.				
UNIT - V	Merging the Grid services Architecture with the Web Services Architecture:			15
Service-Oriented Architecture, Web Service Architecture, #XML messages and Enveloping#, Service message description Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I Organization.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Joshy Joseph and Craig Fellenstein, Grid computing, Pearson / IBM Press, PTR, 2004.

BOOKS FOR REFERENCES:

- Ahmer Abbas and Graig computing, A Practical Guide to technology and applications, Charles River Media, 2003.

WEB RESOURCES:

- ❖ https://en.wikipedia.org/wiki/Grid_computing
- ❖ https://link.springer.com/chapter/10.1007/978-1-84882-409-6_4
- ❖ <https://www.redbooks.ibm.com/redbooks/pdfs/sg246778.pdf>

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL			REGIONAL			NATIONAL		
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	To understand the basic elements and concepts of Grid computing.								K1 to K4	
CO2	To understand the Grid computing toolkits and Framework.								K1 to K4	
CO3	To understand the concepts of Anatomy of Grid Computing.								K1 to K4	
CO4	To understand the concept of service oriented architecture.								K1 to K4	
CO5	To Gain knowledge on grid and web service architecture.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	-	-				
CO2	M	S	S	M	M	-				
CO3	M	M	S	S	M	S				
CO4	S	M	S	M	S	M				
CO5	S	S	S	S	S	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	2	2	2	3	2	2
CO 2	3	2	2	3	2	2
CO 3	3	3	2	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	3	3	2	2
WEIGHTAGE	14	13	13	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93	87	87	100	67	67
LESSON PLAN:						
UNIT	Grid Computing				HRS	PEDAGOGY
I	Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.				12	PPT,ICT & Chalk & Talk
II	Grid Computing organization and their Roles: Organizations Developing Grid Standards, and Best Practice Guidelines, Global Grid Forum (GCF), #Organization Developing Grid Computing Toolkits and Framework#, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.				12	PPT,ICT & Chalk & Talk
III	Grid Computing Anatomy: The Grid Problem, The conceptual of virtual organizations, # Grid Architecture # and relationship to other distributed technology.				12	PPT,ICT & Chalk & Talk
IV	The Grid Computing Road Map: Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.				12	PPT,ICT & Chalk & Talk
V	Merging the Grid services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, #XML messages and Enveloping#, Service message description Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I Organization.				12	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4	OR			
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4	OR			
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4	OR			
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4	OR			
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4	OR			
20. b)	Unit - V	CO5	K4				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Enterprise Resource Planning			
Course Code	23UITEC62	L	P	C
Category	Elective	5	-	3

COURSE OBJECTIVES:

- To understand the basic concepts, Evolution and Benefits of ERP.
- To know the need and Role of ERP in logical and Physical Integration.
- Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management
- To train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth
- To aim at preparing the students technological competitive and make them ready to self-upgrade with the higher technical skills

UNIT - I ERP Introduction, Benefits, Origin, Evolution and Structure: 15

Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP, Components and needs of ERP, ERP Vendors; Benefits & Limitations of ERP Packages.

UNIT - II Need to focus on Enterprise Integration/ERP: 15

Information mapping; Role of common shared Enterprise database; System Integration, Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration. Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management.

UNIT - III ERP Marketplace and Marketplace Dynamics: 15

Market Overview, Marketplace Dynamics, the Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications. Cloud and Open Source, Management, Material Management, Financial Module, CRM and Case Study.

UNIT - IV ERP Implementation Basics 15

ERP implementation Strategy, ERP Implementation Life Cycle ,Pre- Implementation task, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees.

UNIT - V ERP & E-Commerce: 15

Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into or-ganizational culture. Using ERP tool: either SAP or ORACLE format to case study.

Total Lecture Hours	75
----------------------------	-----------

BOOKS FOR STUDY:

- Enterprise Resource Planning – Alexis Leon, Tata McGraw Hill.

BOOKS FOR REFERENCES:

- Enterprise Resource Planning – Diversified by Alexis Leon, TMH.
- Enterprise Resource Planning – Ravi Shankar & S. Jaiswal, Galgotia

WEB RESOURCES:

- ❖ https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm
- ❖ <https://www.saponlinetutorials.com/what-is-erp-systems-enterprise-resource-planning/>
- ❖ <https://www.guru99.com/erp-full-form.html>
- ❖ <https://www.oracle.com/in/erp/what-is-erp/>

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED			ENTREPRENEURSHIP		✓	
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:**K LEVEL**

After studying this course, the students will be able to:

CO1	Understand the basic concepts of ERP.	K1 to K4
CO2	Identify different technologies used in ERP	K1 to K4
CO3	Understand and apply the concepts of ERP Manufacturing Perspective and ERP Modules	K1 to K4
CO4	Discuss the benefits of ERP	K1 to K4
CO5	Apply different tools used in ERP	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	-	-				
CO2	M	S	S	M	M	-				
CO3	M	M	S	S	M	S				
CO4	S	M	S	M	S	M				
CO5	S	S	S	S	S	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	2	2	2	3	2	2
CO 2	3	2	2	3	2	2
CO 3	3	3	2	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	3	3	2	2
WEIGHTAGE	14	13	13	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93	87	87	100	67	67

LESSON PLAN:

UNIT	Enterprise Resource Planning	HRS	PEDAGOGY
I	ERP Introduction, Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP, Components and needs of ERP, ERP Vendors; Benefits & Limitations of ERP Packages.	15	PPT,ICT & Chalk & Talk
II	Need to focus on Enterprise Integration/ERP; Information mapping; Role of common shared Enterprise database; System Integration, Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration. Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Man-agement (PLM), LAP, Supply chain Management.	15	PPT,ICT & Chalk & Talk
III	ERP Marketplace and Marketplace Dynamics: Market Overview, Marketplace Dynamics, the Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications. Cloud and Open Source, Management, Material Management, Financial Module, CRM and Case Study.	15	PPT,ICT & Chalk & Talk
IV	ERP Implementation Basics, , ERP implementation Strategy, ERP Implementation Life Cycle ,Pre- Implementation task,Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees.	15	PPT,ICT & Chalk & Talk
V	ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into or-ganizational culture. Using ERP tool: either SAP or ORACLE format to case study.	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Articulation Mapping						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4				
OR							
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4				
OR							
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4				
OR							
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4				
OR							
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4				
OR							
20. b)	Unit - V	CO5	K4				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Agile Project Management			
Course Code	23UITEC63	L	P	C
Category	Elective	5	-	3

COURSE OBJECTIVES:

- Learning of software design, software technologies and APIs.
- Detailed demonstration about Agile development and testing techniques.
- Learning about Agile Planning and Execution.
- Learning of Agile Management Design and Quality Check.
- Detailed examination of Agile development and testing techniques.

UNIT - I Introduction: Modernizing Project Management: 15

Project Management Needed a Makeover – Introducing Agile Project Management. **Applying the Agile Manifesto and Principles:** Understanding the Agile manifesto – Outlining the four values of the Agile manifesto – Defining the 15 Agile Principles – Adding the Platinum Principles – Changes as a result of Agile Values – The Agile litmus test. **Why Being Agile Works Better:** Evaluating Agile benefits – How Agile approaches beat historical approaches – Why people like being Agile.

UNIT - II Being Agile Agile Approaches: 15

Diving under the umbrella of Agile approaches – Reviewing the Big Three: Lean, Scrum, Extreme Programming – Summary. **Agile Environments in Action:** Creating the physical environment – Low-tech communicating – High-tech communicating – Choosing tools. **Agile Behaviours in Action:** Establishing Agile roles – Establishing new values – Changing team philosophy.

UNIT - III Agile Planning and Execution Defining the Product Vision and Roadmap: 15

Agile planning – Defining the product vision – Creating a product roadmap – Completing the product backlog. **Planning Releases and Sprints:** Refining requirements and estimates – Release planning – Sprint planning. **Working Throughout the Day:** Planning your day – Tracking progress – Agile roles in the sprint – Creating shippable functionality – The end of the day. **Showcasing Work, Inspecting and Adapting:** The sprint review – The sprint retrospective. **Preparing for Release:** Preparing the product for deployment (the release sprint) – Preparing the operational support – Preparing the organization for product deployment - Preparing the marketplace for product deployment

UNIT - IV Agile Management Managing Scope and Procurement: 15

What's different about Agile scope management – Managing Agile scope – What's different about Agile procurement – Managing Agile procurement. **Managing Time and Cost:** What's different about Agile time management – Managing Agile schedules – What's different about Agile cost management – Managing Agile budgets. **Managing Team Dynamics and Communication:** What's different about Agile team dynamics – Managing Agile team dynamics – What's different about Agile communication – Managing Agile communication. **Managing Quality and Risk:** What's different about Agile quality – Managing Agile quality – What's different about Agile risk management – Managing Agile risk.

UNIT - V Implementing Agile Building a Foundation:	15
Organizational and individual commitment – Choosing the right pilot team members – Creating and environment that enables Agility – Support Agility initially and over time. Being a Change Agent: Becoming Agile requires change – why change doesn't happen on its own – Platinum Edge's Change Roadmap – Avoiding pitfalls – Signs your changes are slipping. Benefits, Factors for Success and Metrics: Ten key benefits of Agile project management – Ten key factors for project success – Ten metrics for Agile Organizations.	
Total Lecture Hours	75

BOOKS FOR STUDY:
➤ Mark C. Layton, Steven J. Ostermiller, Agile Project Management for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018. ➤ Jeff Sutherland, Scrum – The Art of Doing Twice the Work in Half the Time, Penguin, 2014.
BOOKS FOR REFERENCES:
➤ Mark C. Layton, David Morrow, Scrum for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018. ➤ Mike Cohn, Succeeding with Agile – Software Development using Scrum, Addison-Wesley Signature Series, 2010.
WEB RESOURCES:
❖ www.agilealliance.org/resources

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		-	ENTREPRENEURSHIP		✓
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understanding of software design, software technologies and APIs using Agile Management.	K1 to K4
CO2	Understanding of Agile development and testing techniques.	K1 to K4
CO3	Understanding about Agile Planning and Execution using Sprint.	K1 to K4
CO4	Understanding of Agile Management Design, scope , Procurement, managing Time and Cost and Quality Check.	K1 to K4
CO5	Analysing of Agile development and testing techniques.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG				M – MEDIUM				L - LOW		

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:			
UNIT	Agile Project Management	HRS	PEDAGOGY
I	Project Management Needed a Makeover – Introducing Agile Project Management. Applying the Agile Manifesto and Principles: Understanding the Agile manifesto – Outlining the four values of the Agile manifesto – Defining the 15 Agile Principles – Adding the Platinum Principles – Changes as a result of Agile Values – The Agile litmus test. Why Being Agile Works Better: Evaluating Agile benefits – How Agile approaches beat historical approaches – Why people like being Agile.	15	PPT,ICT & Chalk & Talk
II	Diving under the umbrella of Agile approaches – Reviewing the Big Three: Lean, Scrum, Extreme Programming – Summary Agile Environments in Action: Creating the physical environment – Low-tech communicating – High-tech communicating – Choosing tools. Agile Behaviours in Action: Establishing Agile roles – Establishing new values – Changing team philosophy.	15	PPT,ICT & Chalk & Talk
III	Agile planning – Defining the product vision – Creating a product roadmap – Completing the product backlog. Planning Releases and Sprints: Refining requirements and estimates – Release planning –	15	PPT,ICT & Chalk & Talk

	Sprint planning. Working Throughout the Day: Planning your day – Tracking progress – Agile roles in the sprint – Creating shippable functionality – The end of the day. Showcasing Work, Inspecting and Adapting: The sprint review – The sprint retrospective. Preparing for Release: Preparing the product for deployment (the release sprint) – Preparing the operational support – Preparing the organization for product deployment - Preparing the marketplace for product deployment		
IV	What's different about Agile scope management – Managing Agile scope – What's different about Agile procurement – Managing Agile procurement. Managing Time and Cost: What's different about Agile time management – Managing Agile schedules – What's different about Agile cost management – Managing Agile budgets. Managing Team Dynamics and Communication: What's different about Agile team dynamics – Managing Agile team dynamics – What's different about Agile communication – Managing Agile communication. Managing Quality and Risk: What's different about Agile quality – Managing Agile quality – What's different about Agile risk management – Managing Agile risk.	15	PPT,ICT & Chalk & Talk
V	Organizational and individual commitment – Choosing the right pilot team members – Creating and environment that enables Agility – Support Agility initially and over time. Being a Change Agent: Becoming Agile requires change – why change doesn't happen on its own – Platinum Edge's Change Roadmap – Avoiding pitfalls – Signs your changes are slipping. Benefits, Factors for Success and Metrics: Ten key benefits of Agile project management – Ten key factors for project success – Ten metrics for Agile Organizations.	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K4		
OR					
16. b)	Unit - I	CO1	K4		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K4		
OR					
18. b)	Unit - III	CO3	K4		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Robotics and its Applications			
Course Code	23UITEC64	L	P	C
Category	Elective	5	-	3
COURSE OBJECTIVES:				
➤ To understand the robotics fundamentals ➤ Understand the sensors and matrix methods ➤ Understand the Localization: Self-localizations and mapping ➤ To study about the concept of Path Planning, Vision system ➤ To learn about the concept of robot artificial intelligence.				
UNIT - I	Introduction:			15
Introduction, brief history, components of robotics, classification, workspace, work-envelop, motion of robotic arm, end-effectors and its types, service robot and its application, Artificial Intelligence in obotics.				
UNIT - II	Actuators and sensors & Kinematics of robots:			15
Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot				
UNIT - III	Localization:			15
Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.				
UNIT - IV	Path Planning & Vision system:			15
Introduction, path planning-overview-road map path planning-cell decomposition path planning potential field path planning-obstacle avoidance-case studies Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations				
UNIT - V	Application:			15
Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space Applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Richared D.Klafter. Thomas Achmielewski and MickaelNegin, Robotic Engineering and Integrated Approach, Prentice Hall India-Newdelhi-2001
- Saeed B.Nikku, Introduction to robotics, analysis, control and applications, Wiley-India, 2 nd edition 2011

BOOKS FOR REFERENCES:

- Industrial robotic technology-programming and application by M.P.Groover et.al, McGrawhill2008
- Robotics technology and flexible automation by S.R.Deb, THH-2009

WEB RESOURCES:

- ❖ https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.htm
- ❖ <https://www.geeksforgeeks.org/robotics-introduction/>

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-	
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	To understand the robotics fundamentals								K1 to K4	
CO2	Understand the sensors and matrix methods								K1 to K4	
CO3	Understand the Localization: Self-localizations and mapping								K1 to K4	
CO4	To study about the concept of Path Planning, Vision system								K1 to K4	
CO5	To learn about the concept of robot artificial intelligence								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S									
CO2	M	S								
CO3				S		S				
CO4				S	S	M				
CO5			S			S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:

UNIT	Robotics and its Applications	HRS	PEDAGOGY
I	Introduction, brief history, components of robotics, classification, workspace, work-envelop, motion of robotic arm, end-effectors and its types, service robot and its application, Artificial Intelligence in Robotics.	15	PPT,ICT & Chalk & Talk
II	Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot	15	PPT,ICT & Chalk & Talk
III	Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.	15	PPT,ICT & Chalk & Talk
IV	Introduction, path planning-overview-road map path planning-cell decomposition path planning potential field path planning-obstacle	15	PPT,ICT & Chalk & Talk

	avoidance-case studies.Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations		
V	Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space Applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)						
Formative Examination - Blue Print						
Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	
				(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4	OR			
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4	OR			
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4	OR			
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4	OR			
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4	OR			
20. b)	Unit - V	CO5	K4				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Artificial Neural Networks			
Course Code	23UITEC65	L	P	C
Category	Elective	5	-	3
COURSE OBJECTIVES:				
➤ Understand the basics of artificial neural networks, learning process, single layer and multi-layer perceptron networks. ➤ Understand the Error Correction and various learning algorithms and tasks. ➤ Identify the various Single Layer Perception Learning Algorithm ➤ Identify the various Multi-Layer Perception Network ➤ Analyze the Deep Learning of various Neural network and its Applications.				
UNIT - I Artificial Neural Model- Activation functions:-				15
Artificial Neural Model- Activation functions- Feed forward and Feedback, Convex Sets, Convex Hull and Linear Separability, Non-Linear Separable Problem - Multilayer Networks. Learning Algorithms- Error correction - Gradient Descent Rules, Perception Learning Algorithm, Perception Convergence Theorem.				
UNIT - II Introduction, Error correction learning,				15
Introduction, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, credit assignment problem, Learning with and without teacher, learning tasks Memory and Adaptation.				
UNIT - III Single layer Perception: Introduction,				15
Single layer Perception: Introduction, Pattern Recognition, Linear classifier, Simple perception, Perception learning algorithm, Modified Perception learning algorithm, Adaptive linear combiner, Continuous perception, Learning in continuous perception. Limitation of Perception.				
UNIT - IV Multi-Layer Perception Networks:				15
Multi-Layer Perception Networks: Introduction, MLP with 2 hidden layers, Simple layer of a MLP, Delta learning rule of the output layer, Multilayer feed forward neural network with continuous perceptions, Generalized delta learning rule, Back propagation algorithm				
UNIT - V Deep learning- Introduction				15
Deep learning- Introduction- Neuro architectures building blocks for the DL techniques, Deep Learning and Recognition, Deep Convolutional Neural Networks, Recurrent Neural Networks (RNN), feature extraction, Deep Belief Networks, Restricted Boltzman Machines, Training of DNN and Applications.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Neural Networks A Classroom Approach- Satish Kumar, McGraw Hill- Second Edition.
- Neural Network- A Comprehensive Foundation”- Simon Haykins, Pearson Prentice Hall, 2nd Edition, 1999

BOOKS FOR REFERENCES:

- Artificial Neural Networks-B. Yegnanarayana, PHI, New Delhi 1998.

WEB RESOURCES:

- ❖ https://www.w3schools.com/ai/ai_neural_networks.asp
- ❖ https://en.wikipedia.org/wiki/Artificial_neural_network
- ❖ https://link.springer.com/chapter/10.1007/978-3-642-21004-4_12

Nature of Course	EMPLOYABILITY		-	SKILL ORIENTED		✓	ENTREPRENEURSHIP		-
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.									

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Students will learn the basics of artificial neural networks with single layer and multilayer perceptron networks.								K1 to K4	
CO2	Learn about the Error Correction and various learning algorithms and tasks								K1 to K4	
CO3	Learn the various Perception Learning Algorithm								K1 to K4	
CO4	Learn about the various Multi-Layer Perception Network.								K1 to K4	
CO5	Understand the Deep Learning of various Neural network and its Applications								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG			M – MEDIUM					L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:

UNIT	Artificial Neural Networks	HRS	PEDAGOGY
I	Artificial Neural Model- Activation functions- Feed forward and Feedback, Convex Sets, Convex Hull and Linear Separability, Non-Linear Separable Problem - Multilayer Networks. Learning Algorithms- Error correction - Gradient Descent Rules, Perception Learning Algorithm, Perception Convergence Theorem.	15	PPT,ICT & Chalk & Talk
II	Introduction, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, credit assignment problem, Learning with and without teacher, learning tasks Memory and Adaptation.	15	PPT,ICT & Chalk & Talk
III	Single layer Perception: Introduction, Pattern Recognition, Linear classifier, Simple perception, Perception learning algorithm, Modified Perception learning algorithm, Adaptive linear combiner, Continuous perception, Learning in continuous perception. Limitation of Perception	15	PPT,ICT & Chalk & Talk
IV	Multi-Layer Perception Networks: Introduction, MLP with 2 hidden layers, Simple layer of a MLP, Delta learning rule of the output layer, Multilayer feed forward neural network with continuous perceptions, Generalized delta learning rule, Back propagation algorithm	15	PPT,ICT & Chalk & Talk
V	Deep learning- Introduction- Neuro architectures building blocks for the DL techniques, Deep Learning and Neocognitron, Deep Convolutional Neural Networks, Recurrent Neural Networks (RNN), feature extraction, Deep Belief Networks, Restricted Boltzman Machines, Training of DNN and Applications	15	PPT,ICT & Chalk & Talk

Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of. Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4				
OR							
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4				
OR							
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4				
OR							
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4				
OR							
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4				
OR							
20. b)	Unit - V	CO5	K4				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Cyber Forensics			
Course Code	23UITEC66	L	P	C
Category	Elective	5	-	3

COURSE OBJECTIVES:

- Understand the definition of computer forensics fundamentals
- To study about the Types of Computer Forensics Evidence
- Understand and apply the concepts of Duplication and Preservation of Digital Evidence
- Understand the concepts of Electronic Evidence and Identification of Data
- To study about the Digital Detective, Network Forensics Scenario, Damaging Computer Evidence

UNIT - I Computer Forensics Fundamentals: 15

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer. Forensics Technology: Types of Business Computer Forensic, Technology–Types of Military Computer Forensic Technology–Types of Law Enforcement–Computer Forensic. Technology–Types of Business Computer Forensic Technology

UNIT - II Computer Forensics Evidence and capture: 15

Computer Forensics Evidence and capture: Data Recovery: Data Recovery Defined, Data Back–up and Recovery, The Role of Back –up in Data Recovery, The Data –Recovery Solution. Evidence Collection and Data Seizure: Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Artefacts, Collection Steps, Controlling Contamination: The chain of custody.

UNIT - III Duplication and Preservation of Digital Evidence: 15

Duplication and Preservation of Digital Evidence: Processing steps, Legal Aspects of collecting and Preserving Computer forensic Evidence. Computer image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation

UNIT - IV Layer Computer Forensics Analysis: 15

Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool. Identification of Data: Time Travel, Forensic Identification and Analysis of Technical Surveillance Devices.

UNIT - V Reconstructing Past Events: 15

Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. Networks: Network Forensics Scenario, a technical approach, Destruction Of E–Mail, Damaging Computer Evidence, Documenting The Intrusion on Destruction of Data, System Testing.

Total Lecture Hours 75

BOOKS FOR STUDY:

- John R. Vacca, "Computer Forensics: Computer Crime Investigation", 3/E, Firewall Media, New Delhi, 2002.

BOOKS FOR REFERENCES:

- Nelson, Phillips Enfinger, Steuart, "Computer Forensics and Investigations" Enfinger, Steuart, CENGAGE Learning, 2004
- Anthony Sammes and Brian Jenkinson, "Forensic Computing: A Practitioner's Guide", Second Edition, Springer-Verlag London Limited, 2007.

WEB RESOURCES:

- ❖ <https://www.vskills.in>
- ❖ <https://www.hackingarticles.in/best-of-computer-forensics-tutorials/>

Nature of Course	EMPLOYABILITY			✓	SKILL ORIENTED		-	ENTREPRENEURSHIP		-	
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓	
Changes Made in the Course	Percentage of Change			-	No Changes Made			-	New Course		✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.											

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understand the definition of computer forensics fundamentals								K1 to K4	
CO2	Evaluate the different types of computer forensics technology.								K1 to K4	
CO3	Analyze various computer forensics systems								K1 to K4	
CO4	Apply the methods for data recovery, evidence collection and data seizure.								K1 to K4	
CO5	Gain your knowledge of duplication and preservation of digital evidence.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	S	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	M	S	S	M	S				
S- STRONG				M – MEDIUM				L - LOW		

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	2	2
WEIGHTAGE	15	14	11	15	10	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	67	67

LESSON PLAN:

UNIT	Cyber Forensics	HRS	PEDAGOGY
I	Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer Forensics Technology: Types of Business Computer Forensic Technology–Types of Military Computer Forensic Technology–Types of Law Enforcement–Computer Forensic Technology–Types of Business Computer Forensic Technology.	15	PPT,ICT & Chalk & Talk
II	Computer Forensics Evidence and capture: Data Recovery: Data Recovery Defined, Data Back-up and Recovery, The Role of Back –up in Data Recovery, The Data –Recovery Solution. Evidence Collection and Data Seizure: Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Artefacts, Collection Steps, Controlling Contamination: The chain of custody.	15	PPT,ICT & Chalk & Talk
III	Duplication and Preservation of Digital Evidence: Processing steps, Legal Aspects of collecting and Preserving Computer forensic Evidence. Computer image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation	15	PPT,ICT & Chalk & Talk
IV	Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool. Identification of Data: Time Travel, Forensic Identification and Analysis of Technical Surveillance Devices.	15	PPT,ICT & Chalk & Talk
V	Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. Networks: Network Forensics Scenario, a technical approach,	15	PPT,ICT & Chalk & Talk

	Destruction Of E-Mail, Damaging Computer Evidence, Documenting The Intrusion on Destruction of Data, System Testing.		
--	--	--	--

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K4)
AI	CO2	K1 – K4	2	K1,K2	2(K3)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K4)
AII	CO4	K1 – K4	2	K1,K2	2(K3)	2(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.6	7.2
	K2	2			2	3.6	
	K3		20		20	35.7	35.7
	K4			32	32	57.1	57.1
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K - LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1,K2	2 (K3)	2(K4)
2	CO2	K1-K4	2	K1,K2	2 (K3)	2(K4)
3	CO3	K1-K4	2	K1,K2	2 (K3)	2(K4)
4	CO4	K1-K4	2	K1,K2	2 (K3)	2(K4)
5	CO5	K1-K4	2	K1,K2	2 (K3)	2(K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.6	3.6
K2	5			5	3.6	3.6
K3		50		50	35.7	35.7
K4			80	80	57.1	57.1
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A	(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K3		
OR					
11. b)	Unit - I	CO1	K3		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K3		
OR					
13. b)	Unit - III	CO3	K3		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K3		
OR					
15. b)	Unit - V	CO5	K3		

Answer ALL the questions				PART – C		(5 x 8 = 40 Marks)	
16. a)	Unit - I	CO1	K4	OR			
16. b)	Unit - I	CO1	K4				
17. a)	Unit - II	CO2	K4	OR			
17. b)	Unit - II	CO2	K4				
18. a)	Unit - III	CO3	K4	OR			
18. b)	Unit - III	CO3	K4				
19. a)	Unit - IV	CO4	K4	OR			
19. b)	Unit - IV	CO4	K4				
20. a)	Unit - V	CO5	K4	OR			
20. b)	Unit - V	CO5	K4				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	Software Testing Lab			
Course Code	23UITSP61	L	P	C
Category	Skill	-	2	2

COURSE OBJECTIVES:

- Understand Software Testing Concepts
- Develop Test Case Design Skills
- Master Manual Testing Techniques
- Learn Test Automation
- Analyze Test Results and Reporting

S. No. List of Exercises

1. Program using for Login Functionality
2. Program Using Calculator
3. Program using Registration form
4. Program using simple banking application
5. Program using Executing Basic Selenium Script for Login
6. Program using Data-Driven Testing with Selenium (Using Excel or CSV)
7. Program using Dynamic Web Elements with Selenium
8. Creating a Simple Test Automation Framework (Selenium)
9. Basic Load Testing with jmeter
10. Program using Stress Testing a Web Application with jmeter
11. Program using Security Testing: SQL Injection Testing
12. Program using Cross-Site Scripting (XSS) Testing

Total Lecture Hours

30

BOOKS FOR REFREENCES:

- Boris Beizer ,Software Testing Techniques, 2nd edition, 1990
- Srinivasan Desikan, Software Testing: Principles and Practices
- Kshirasagar Naik and Priyadarshi Tripathy ,Software Testing and Quality Assurance: Theory and Practice

WEB RESOURCES:

- ❖ <https://www.testmo.com/resources/>
- ❖ <https://www.softwaretestinghelp.com/software-testing-exercises-to-test-your-skills/>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL			GLOBAL	✓
Changes Made in the Course	Percentage of Change		-	No Changes Made		-	New Course		✓	
* Treat 20 % as each unit (20*5=100%) and calculate the percentage of change for the course.										

COURSE OUTCOMES:									K LEVEL	
After studying this course, the students will be able to:										
CO1	Understanding the fundamental principles of software testing, including test case design, test execution, and defect management.								K1 to K4	
CO2	Interpret the practical experience using industry-standard testing tools such as Selenium, JUnit, and TestNG.								K1 to K4	
CO3	Develop the effective test cases for various types of testing, including functional, regression, and performance testing.								K1 to K4	
CO4	Analyze to develop skills to identify, document, and report bugs in software applications systematically.								K1 to K4	
CO5	Assess their ability to work in teams, collaborate on testing activities, and communicate findings clearly within the software development lifecycle.								K1 to K4	
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	S	S	-	-	-				
CO2	M	-	S	M	L	-				
CO3	M	M	S	S	S	-				
CO4	M	M	S	S	S	M				
CO5	-	S	S	S	M	S				
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	2	3	2	2
CO 2	3	3	2	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	2	3	2	2
CO 5	3	3	2	3	3	2
WEIGHTAGE	15	14	11	15	11	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93	73	100	73	67

LESSON PLAN:

Software Testing Lab	HRS	PEDAGOGY
1. Program using for Login Functionality 2. Program Using Calculator 3. Program using Registration form 4. Program using simple banking application 5. Program using Executing Basic Selenium Script for Login 6. Program using Data-Driven Testing with Selenium (Using Excel or CSV) 7. Program using Dynamic Web Elements with Selenium 8. Creating a Simple Test Automation Framework (Selenium) 9. Basic Load Testing with jmeter 10. Program using Stress Testing a Web Application with jmeter 11. Program using Security Testing: SQL Injection Testing 12. Program using Cross-Site Scripting (XSS) Testing	30	Demo & Examples

Learning Outcome Based Education & Assessment (LOBE)**Formative Examination - Blue Print****Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Syntax & Semantics	Program ming principle s	Concept Applicati ons	Coding & Implementat ion	Debug ging & Outpu t
CI A	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K4				5	
	CO5	K5					5
Question Pattern CIA I & II		No. of Questions to be asked	2	2	2	2	2
		No. of Questions to be answered	2	2	2	2	2
		Marks for each question	2.5	2.5	2.5	2.5	2.5
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level CIA I									
	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	5					5	20	20
	K2		5				5	20	20
	K3			5			5	20	20
	K4				5		5	20	20
	K5					5	5	20	20
	Marks	5	5	5	5	5	25	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application-oriented- Solving Problems

K4- Examining, analyzing, presenting and making inferences with evidence

CO5 will be allotted for individual Assignments, which carry five marks as part of the CIA component.

Summative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Debugging & Output
	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K4				15	
	CO5	K5					15
Question Pattern	No. of Questions to be asked		2	2	2	2	2
	No. of Questions to be answered		2	2	2	2	2
	Marks for each question		2.5	7.5	7.5	7.5	7.5
	Total Marks for each section		15	15	15	15	15

Distribution of Marks with K Level								
K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidate of %
K1	15					15	20	20
K2		15				15	20	20
K3			15			15	20	20
K4				15		15	20	20
K5					15	15	20	20
Marks	15	15	15	15	15	75	100	100