

B.Sc., COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)

Syllabus

Program Code: UAI

2023-2024 onwards



MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with “A” Grade by NAAC

PASUMALAI, MADURAI – 625 004

**GUIDLINES FOR OUTCOME BASED EDUCATION WITH CHOICE BASED
CREDIT SYSTEM**

(FOR UG PROGRAM FROM 2023 -2024 ONWARDS)

ELIGIBILITY FOR ADMISSION

Candidates seeking admission to the UG Degree program must have passed the Higher Secondary Education (respective groups – Arts / Science) of the Government of Tamil Nadu or any other state or its equivalent qualification.

DURATION OF THE COURSE

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subjects of Study

Part I : Tamil / Hindi /

Part II : English

Part III:

- 1.Core Subjects
- 2.Allied Subjects
- 3.Electives

Part IV:

- 1.Non Major Electives (I Year)
- 2.Skill Based Subjects
- 3.Environmental Studies - Mandatory Subject
- 4.Value Education - Mandatory Subject

Part V :

Extension Activities

ARTS & SCIENCE

CBCS COURSE STRUCTURE FOR UG PROGRAMS

Sem I	Credit	Sem II	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1. Language - Tamil	3	2.1. Language - Tamil	3	3.1. Language - Tamil	3	4.1. Language - Tamil	3	5.1 Core Course - \CC IX	4	6.1 Core Course - CC XIII	4
1.2 English	3	2.2 English	3	3.2 English	3	4.2 English	3	5.2 Core Course - CC X	4	6.2 Core Course - CC XIV	4
1.3 Core Course - CC I	4	2.3 Core Course - CC III	4	3.3 Core Course - CC V	4	4.3 Core Course - CC VII Core Industry Module	4	5.3. Core Course - CC -XI	4	6.3 Core Course - CC XV	4
1.4 Core Course - CC II	4	2.4 Core Course - CC IV	4	3.4 Core Course - CC VI	4	4.4 Core Course - CC VIII	4	5.3. Core Course -/ Project with viva-voce CC - XII	4	6.4 Elective -VII Generic/ Discipline Specific	3
1.5 Elective I Generic/ Discipline Specific	3	2.5 Elective II Generic/ Discipline Specific	3	3.5 Elective III Generic/ Discipline Specific	3	4.5 Elective IV Generic/ Discipline Specific	3	5.4 Elective V Generic/ Discipline Specific	3	6.5 Elective VIII Generic/ Discipline Specific	3
1.6 Skill Enhancement Course SEC-1 (NME)	2	2.6 Skill Enhancement Course SEC-2 (NME)	2	3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill)	1	4.6 Skill Enhancement Course SEC-6	2	5.5 Elective VI Generic/ Discipline Specific	3	6.6 Extension Activity	1
1.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-1	2	2.7 Skill Enhancement Course - SEC-3(NME)	2	3.7 Skill Enhancement Course SEC-5	2	4.7 Skill Enhancement Course SEC-7	2	5.6 Value Education	2	6.7 Professional Competency Skill	2
1.8 Skill Enhancement - (Foundation Course)	2	2.8 Ability Enhancement Compulsory Course (AECC) Soft Skill-2	2	3.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-3	2	4.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-4	2	5.5 Summer Internship /Industrial Training	2		
				3.8 E.V.S	-	4.8 E.V.S	2				
	23		23		22		25		26		21
Total Credit Points											140

**QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL
ASSESSMENT**

Note: Duration – 1 hour

(FOR PART I, PART II & PART III)

The components for continuous internal assessment are:

Part –A

Four multiple choice questions (answer all) 4 x 01= 04 Marks

Part –B

Two questions (‘either or ‘type) 2 x 05= 10 Marks

Part –C

Two questions (‘either or ‘type) 2 x 08=16 Marks

Total 30 Marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

(60 Marks of two continuous internal assessments will be converted to 15 marks)

Two tests and their average --15 marks

Seminar /Group discussion / Quiz Test --5 marks

Assignment --5 marks

Total 25 Marks

QUESTION PAPER PATTERN FOR THE SUMMATIVE EXAMINATIONS:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions 10 x 01 = 10 Marks

No Unit shall be omitted: not more than two questions from each unit.)

Part –B

Five Paragraph questions ('either or 'type) 5 x 05 = 25 Marks

(One question from each Unit)

Part –C

Five Paragraph questions ('either or 'type) 5 x 08 = 40 Marks

(One question from each Unit)

Total

75 Marks

PART-IV- SKILL BASED PAPERS / NME:

The Scheme of Examination for Skill Based Papers: (Except Practical Lab Subjects)

QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL ASSESSMENT (SKILL BASED AND NME COURSES) DURATION – 1 HOUR

- ❖ 50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and converted for 15 marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

Two tests and their average	--15 marks
Seminar /Group discussion / Quiz Test	-- 5 marks
Assignment	-- 5 marks

Total	25 Marks

SUMMATIVE EXAMINATION PATTERN (SKILL BASED AND NME COURSES) DURATION – 3 HOURS

Pattern of the Question Paper for Skill Based and Non-Major Elective courses
(External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)
(15MCQ's from each unit)

PART-IV- ENVIRONMENTAL STUDIES AND VALUE EDUCATION
QUESTION PAPER PATTERN (INTERNAL ASSESSMENT)

Pattern of the Question Paper for Environmental Studies & Value Education
(Internal)

50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and
converted for 15 marks

Two tests and their average	--	15 marks
Project	--	10 marks

Total		25 Marks

* The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

SUMMATIVE EXAMINATION PATTERN

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)
(15MCQ's from each unit)

PART V EXTENSION ACTIVITIES: (MAXIMUM MARKS: 100)

1. NCC
2. NSS
3. Physical Education
4. YRC
5. RRC
6. Health & Fitness Club
7. Eco Club
8. Human Rights Club

Internal Examinations - - 25 Marks

Summative Examinations - - 75 Marks

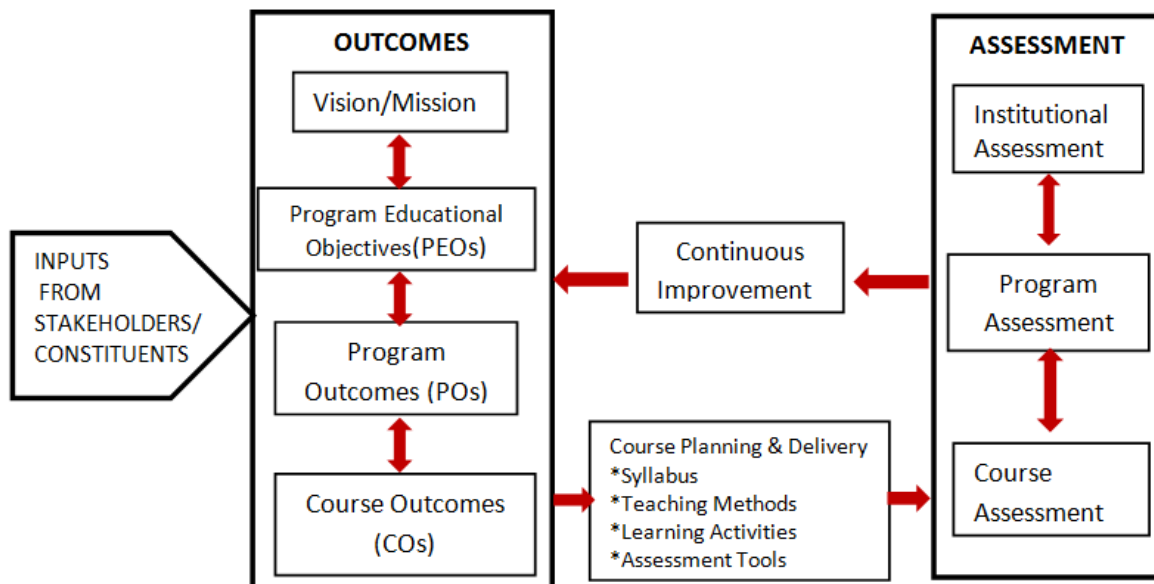
100

OUTCOME BASED EDUCATION:

OBE starts with the identification and articulation of clear and measurable learning outcomes for each course or program. These outcomes describe the skills, knowledge, and abilities that students are expected to acquire. The curriculum, instructional methods, and assessments are aligned with the defined learning outcomes. This ensures that everything taught and evaluated is directly related to what students are expected to learn.

The Learning Outcomes-Based Approach to curriculum planning and transaction in our institution ensures whether the teaching-learning processes are oriented towards enabling students to attain the defined learning outcomes relating to the courses within a programme. The outcome based approach, particularly in the context of undergraduate studies, requires a significant shift from teacher-centric to learner-centric pedagogies and from passive to active/participatory pedagogies.

Assessment Method: The students are assessed with 2 internal examination and the summative examination which includes problem based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports ,case-study reports; team project reports; oral presentations, including seminar presentation; viva voce interviews; computerized adaptive testing; etc. and any other pedagogic approaches as per the context.



INSTITUTIONAL VISION

To Mould the learners into accomplished individuals by providing them with a stimulus for social change through character, confidence and competence.

INSTITUTIONAL MISSION

1. Enlightening the learners on the ethical and environmental issues.
2. Extending holistic training to shape the learners in to committed and competent citizens.
3. Equipping them with soft skills for facing the competitive world.
4. Enriching their employability through career oriented courses.
5. Ensuring accessibility and opportunity to make education affordable to the underprivileged.

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS),
MADURAI – 625 004
B.SC COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)
CURRICULUM**

(For the student admitted during 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					
23UAICC11	PROGRAMMING IN C	5	5	25	75	100
23UAICP11	PROGRAMMING IN C LAB	5	5	25	75	100
Part - III	Elective Course					
23UELEA11	DIGITAL LOGIC FUNDAMENTALS	4	3	25	75	100
Part IV	Non Major Elective					
23UAINM11	FUNDAMENTALS OF COMPUTERS	2	2	25	75	100
Part IV	Foundation Course					
23UAIFC11	PROBLEM SOLVING TECHNIQUES	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					
23UAICC21	OBJECT ORIENTED PROGRAMMING WITH C++	5	5	25	75	100
23UAICP21	OBJECT ORIENTED PROGRAMMING WITH C++ LAB	5	5	25	75	100
Part - III	Elective Course					
23UELEA21	ELECTRONICS SCIENCE	4	3	25	75	100
Part IV	Non Major Elective					
23UAINM21	FUNDAMENTALS OF INFORMATION TECHNOLOGY	2	2	25	75	100
Part IV	Skill Enhancement course					
23UAISP21	ADVANCED EXCEL LAB	2	2	25	75	100
Total		30	23	175	525	700

FIRST SEMESTER

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	PROGRAMMING IN C			
Course Code	23UAICC11	L	P	C
Category	CORE	5	-	5
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To familiarize the students with the understanding of code organization➤ To improve the programming skills➤ Learning the basic programming constructs				
UNIT - I Studying Concepts of Programming Languages				15
Language Evaluation Criteria-Language design-Language Categories-Implementation Methods – Programming Environments - Overview of C: History of C-Importance of C- Basic Structure of C Programs-Executing a C Program-Constants,Variables and Datatypes- Operators and Expressions – Managing Input and Output Operations				
UNIT - II Decision Making and Branching				15
DecisionMakingandLooping-Arrays-CharacterArraysandStrings				
UNIT - III User Defined Functions				15
ElementsofUserDefinedFunctions-Definition of Functions- Return Values and their Types- Function Call-FunctionDeclaration-CategoriesofFunctions-NestingofFunctions- Recursion.				
UNIT - IV Structures and Unions				15
Introduction- Defining a Structure- DeclaringStructureVariablesAccessingStructureMembers- StructureInitialization-ArraysofStructures-ArrayswithinStructures-Unions- SizeofStructures.				
UNIT - V Pointers				15
UnderstandingPointers-AccessingtheAddressofaVariable- Declaring Pointer Variables- Initializing of Pointer Variables-Accessing a Variable through its Pointer- Chain of Pointers- PointerExpressions- PointerandScaleFactor-PointerandArrays-Pointersand CharacterStrings-ArrayofPointers- PointerasFunctionArguments-FunctionsReturningPointers-PointerstoFunctions-File ManagementinC				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Robert W. Sebesta, (2012), —Concepts of Programming Languages, Fourth Edition, Addison Wesley (Unit I : Chapter – 1)
- E. Balaguruswamy, (2010), —Programming in ANSI C Fifth Edition, Tata McGraw Hill Publications

BOOKS FOR REFERENCES:

- Ashok Kamthane, (2009), —Programming with ANSI & Turbo C, Pearson Education
- Byron Gottfried, (2010), —Programming with C, Schaums Outline Series, Tata McGraw Hill Publications

WEB RESOURCES:

- ❖ <http://www.tutorialspoint.com/cprogramming/>
- ❖ <http://www.programmingsimplified.com/c-program-examples>
- ❖ <http://www.cprogramming.com/>
- ❖ <http://www.programiz.com/c-programming>
- ❖ <http://www.cs.cf.ac.uk/Dave/C/CE.html>
- ❖ <http://fresh2refresh.com/c-programming/c-function/>

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

CO1	Outline the fundamental concepts of C programming languages, and its features.	K1 to K4
CO2	Demonstrate the programming methodology.	K1 to K4
CO3	Identify suitable programming constructs for problem solving.	K1 to K4
CO4	Select the appropriate data representation, control structures, functions and concepts based on the problem requirement.	K1 to K4
CO5	Evaluate the program performance by fixing the errors.	K1 to K4

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

S- STRONG

M – MEDIUM

L - LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	2	2	3	2
CO 2	3	3	2	3	2
CO 3	3	3	3	3	2
CO 4	3	3	2	3	2
CO 5	3	3	2	3	2
WEITAGE	15	14	11	15	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	73%	100%	66%

LESSON PLAN:			
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UNIT	COURSE NAME	HRS	PEDAGOGY
I	Studying Concepts of Programming Languages-Language Evaluation Criteria-Language design-Language Categories-Implementation Methods – Programming Environments - Overview of C: History of C-Importance of C- Basic Structure of C Programs-Executing a C Program-Constants,Variables and Datatypes-Operators andExpressions –Managing Input and Output Operations	15	LCD, BLACK BOARD

II	Decision Making and Branching: DecisionMakingandLooping-Arrays-CharacterArraysandStrings	15	LCD, BLACK BOARD
III	User Defined Functions: ElementsofUserDefinedFunctions-Definition of Functions- Return Values and their Types- Function Call-FunctionDeclaration-CategoriesofFunctions-NestingofFunctions-Recursion.	15	LCD, BLACK BOARD
IV	Structures and Unions: Introduction- Defining a Structure-DeclaringStructureVariablesAccessingStructureMembers-StructureInitialization-ArraysofStructures-ArrayswithinStructures-Unions- SizeofStructures.	15	LCD, BLACK BOARD
V	Pointers :Understanding Pointers-Accessing theAddress of aVariable-Declaring Pointer Variables- Initializing of Pointer Variables-Accessing a Variable through its Pointer- Chain of Pointers- PointerExpressions-PointerandScaleFactor-PointerandArrays-Pointersand CharacterStrings-ArrayofPointers-PointerasFunctionArguments-FunctionsReturningPointers-PointerstoFunctions-File ManagementinC	15	LCD, BLACK BOARD

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(K3)
AI	CO2	K1 – K4	2	K1,K2	2(K4)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K3)
AII	CO4	K1 – K4	2	K1,K2	2(K4)	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	3.57	7.54
	K2	2			2	3.57	
	K3		10	16	26	46.42	46.43
	K4		10	16	26	46.42	46.43
	Marks	4	20	30	56	100	100
CIA II	K1	2			2	5.56	7.54
	K2	2			2	5.56	
	K3		10	16	26	44.44	46.43
	K4		10	16	26	44.44	46.43
	Marks	4	20	30	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, presentation and make inferences with evidences

CO5 - will be allotted for individual Assignment which carries five marks as part of 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	3.57	3.57
K2	5			5	3.57	3.57
K3		50		50	35.72	35.72
K4			80	80	57.14	57.14
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	CO1	K1	a)	b)
				c)	d)
4.	Unit - II	CO1	K2	a)	b)
				c)	d)
5.	Unit - III	CO1	K1	a)	b)
				c)	d)
6.	Unit - III	CO1	K2	a)	b)
				c)	d)
7.	Unit - IV	CO1	K1	a)	b)
				c)	d)
8.	Unit - IV	CO1	K2	a)	b)
				c)	d)
9.	Unit - V	CO1	K1	a)	b)
				c)	d)
10.	Unit - V	CO1	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 ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	PROGRAMMING IN C LAB			
Course Code	23UAICP11	L	P	C
Category	CORE	-	5	5
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ The Course aims to provide exposure to problem-solving through C programming➤ It aims to train the student to the basic concepts of the C -Programming language➤ Apply different concepts of C language to solve the problem				
S. No	List of Programs	Hours		
1	Programs using Input/ Output functions	75		
2	Programs on conditional structures			
3	Command Line Arguments			
4	Programs using Arrays			
5	String Manipulations			
6	Programs using Functions			
7	Recursive Functions			
8	Programs using Pointers			
9	Files			
10	Programs using Structures & Unions			
Total Lecture Hours				75
BOOK FOR STUDY:				
<ul style="list-style-type: none">➤ E. Balaguruswamy, Programming in ANSI C, Sixth Edition, Tata McGraw Hill Publications Private Limited, New Delhi, 2010				
BOOK FOR REFERENCE:				
<ul style="list-style-type: none">➤ Byron Gottfried, Programming with C, McGraw Hill Education (India) Private Limited, New Delhi, Third Edition, 2014				
WEB RESOURCES:				
<ul style="list-style-type: none">❖ https://www.slideshare.net/AjitNayak20/computer-fundamentals-intro-to-c-programming-module-i❖ https://www.slideshare.net/avikdhupar/amazing-c❖ https://www.guru99.com/c-programming-tutorial.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
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After studying this course, the students will be able to:

CO1	Demonstrate the understanding of syntax and semantics of C programs.	K1 to K4
CO2	Identify the problem and solve using C programming techniques.	K1 to K4
CO3	Identify suitable programming constructs for problem solving	K1 to K4
CO4	Analyze various concepts of C language to solve the problem in an efficient way.	K1 to K4
CO5	Develop a C program for a given problem and test for its correctness.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG

M - MEDIUM

L - LOW

CO / PO MAPPING:

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

LESSON PLAN:

S.NO	List of Programs	HRS	PEDAGOGY
1.	Programs using Input/ Output functions	75	LCD, BLACK BOARD
2.	Programs on conditional structures		
3.	Command Line Arguments		
4.	Programs using Arrays		
5.	String Manipulations		
6.	Programs using Functions		
7.	Recursive Functions		
8.	Programs using Pointers		
9.	Files		
10.	Programs using Structures & Unions		

**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	Debugging & Output
CI AI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA	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									
	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidated %
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						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, presentation and make inferences with evidences

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
Internal	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Debugging & Output
CIAI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					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		7.5	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)	Consolidated %
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

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Course Name	DIGITAL LOGIC FUNDAMENTALS			
Course Code	23UELEA11	L	P	C
Category	CORE ELECTIVE	4	-	3
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ It aims to train the student to the basic concepts of Digital Logic Fundamental➤ To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits.➤ To explain the concept of Combinational Logic and counters➤ To introduce the concepts of Flip-Flops, Registers➤ To explain the Asynchronous and Synchronous Counters				
UNIT - I Number systems, Codes		12		
Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.				
UNIT - II Combinational Logic Circuits		12		
Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime - Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.				
UNIT - III Arithmetic Circuits and Data -Processing Circuits:		12		
Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.				
UNIT - IV Flip- flops		12		
Sequential Logic: RS, JK, D and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers				
UNIT - V Counters		12		
Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters – Ring Counters. Memory: Basic Terms and Ideas – Types of ROMs – Types of RAMs.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- V.Rajaraman and T.Radhakrishnan,Digital Computer Design, Prentice Hall of India,2001
- D.P.LeachandA.P.Malvino,Digital Principles and Applications–TMH– Fifth Edition–2002.
- M.MorisMano,Digital Logic and Computer Design,PHI,2001
- T.C.Bartee,DigitalComputerFundamentals,6thEdition,TataMcGrawHi ll,1991

BOOKS FOR REFERENCES:

- Albert Paul Malvino and Donald P. Leach, **Digital principles and Applications**, Tata McGraw Hill Publishing Company Ltd, 7th edition, 2005, New Delhi.
- Stephen Brown ZvonkoVranesic, **Fundamentals of Digital logic design with VHDL**, special Indian Edition, TMH, 2006, New Delhi.

WEB RESOURCES:

- ❖ **Web resources from NDL Library, E-content from open-source libraries**
- ❖ <https://nptel.ac.in/courses/117/106/117106086/>
- ❖ <https://nptel.ac.in/courses/117/106/117106086/>
- ❖ <https://nptel.ac.in/courses/108/105/108105132/>

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	Identify the logic gates and their functionality.									K1 to K4
CO2	Perform number conversions from one system to another system									K1 to K4
CO3	Understand the functions of combinational circuits									K1 to K4
CO4	Perform number conversions									K1 to K4
CO5	Perform Counter design and learn its operations									K1 to K4
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	M	M	M	M	L	M	L
CO2	S	L	S	M	M	S	S	M	M	M
CO3	S	M	S	S	S	M	S	S	M	S
CO4	S	M	S	S	S	S	S	M	L	M
CO5	S	M	S	S	S	S	M	S	S	S
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	2	3	3	3	3
CO 3	3	3	2	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	14	15	14	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93%	100%	93%	100%	100%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Number Systems and Codes: Number System–Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	12	LCD, BLACK BOARD
II	Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions– Using Theorems,K-Map,Prime–Implicant Method–Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers– Arithmetic Building Blocks–Adder–Subtractor.	12	LCD, BLACK BOARD
III	Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders –Code Converters– Parity Generators and Checkers.	12	LCD, BLACK BOARD
IV	Sequential Logic:RS,JK,D and T Flip-Flops–Master-Slave Flip-Flops.Registers:Shift Registers–Types of Shift Registers	12	LCD, BLACK BOARD
V	Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas – Types of ROMs –Types of RAMs.	12	LCD, BLACK BOARD

**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(K3)
AI	CO2	K1 – K4	2	K1,K2	2(K4)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K3)
AII	CO4	K1 – K4	2	K1,K2	2(K4)	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	3.57	7.54
	K2	2			2	3.57	
	K3		10	16	26	46.42	46.43
	K4		10	16	26	46.42	46.43
	Marks	4	20	30	56	100	100
CIA II	K1	2			2	5.56	7.54
	K2	2			2	5.56	
	K3		10	16	26	44.44	46.43
	K4		10	16	26	44.44	46.43
	Marks	4	20	30	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, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of 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	3.57	3.57
K2	5			5	3.57	3.57
K3		50		50	35.72	35.72
K4			80	80	57.14	57.14
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		

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Course Name	FUNDAMENTALS OF COMPUTERS			
Course Code	23UAINM11	L	P	C
Category	NON MAJOR ELECTIVE	2	-	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ Discuss the Introduction about Computer and its Components➤ To Perform the Microsoft Word, Excel, PowerPoint and its operations➤ To get Knowledge about the Internet and Intranet➤ Insert heading levels within a web page➤ Insert ordered and unordered lists within a web page. Create a web page				
UNIT - I	INTRODUCTION TO COMPUTERS	6		
Generations of Computer – Data and Information – Components of Computer – Software – Hardware – Input Devices - Output Devices — Types of Operating System				
UNIT - II	MS WORD	6		
Introduction – Elements of Window – Files, Folders and Directories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – Text Formatting: Font – Style, Size, Face and Colors (Both foreground and background) – Alignment - Bullets and Numbering - Header and footer- watermark – inserting objects (images, other application document) – Table creation – Mail merge				
UNIT - III	MS EXCEL	6		
Introduction – Inserting rows and columns – Sizing rows and columns – Implementing formulas – Generating series - Functions in excel – Creation of Chart – Inserting objects – Filter – Sorting – Inserting worksheet				
UNIT - IV	MS POWER POINT	6		
Introduction – Slides Manipulation (Inserting new, Copy, paste, delete and duplicate slides) – Slide show– Types of Views – Types of Animations – Inserting Objects – Implementing multimedia (Video and Audio) – Templates (Built-in and User-Defined)				
UNIT - V	INTERNET	6		
Introduction to Internet and Intranet – Services of Internet - Domain Name – URL – Browser – Types of Browsers – Search Engine - E-Mail – Basic Components of E-Mail –How to send group mail. E-Commerce: Digital Signature – Digital Currency – Online shopping and transaction.				
Total Lecture Hours				30

BOOKS FOR STUDY:

- G. Manjunath, Computer Basics, Vasana Publications, 2010
- Pradeep K. Sinha & Priti Sinha, Computer Fundamentals, 6th Edition, BPB Publications, 2004.

BOOKS FOR REFERENCES:

- Bhardwaj Sushil Puneet Kumar, Fundamental of Information Technology
- GG WILKINSON, Fundamentals of Information Technology, Wiley-Blackwell
- A Ravichandran, Fundamentals of Information Technology, Khanna Book Publishing

WEB RESOURCES:

- ❖ https://www.tutorialspoint.com/computer_fundamentals/index.htm
- ❖ https://www.tutorialspoint.com/basics_of_computers/index.htm
- ❖ <https://www.tutorialspoint.com/word/index.htm>
- ❖ <https://www.tutorialspoint.com/excel/index.htm>
- ❖ <https://www.tutorialspoint.com/powerpoint/index.htm>

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 Computer and its Generations. Be able to understand the components of computer	K1 to K2
CO2	To Understand the introduction about MS Word. Be able to perform the Elements of window, Text Formatting, Text Manipulating options in MS Word.	K1 to K2
CO3	To Understand the introduction about MS Excel. Be able to inserting and sizing the cells Implementing formulas and inserting worksheet.	K1 to K2
CO4	To Understand the introduction about MS PowerPoint Be able to perform the slides manipulation. Implementing Multimedia and templates.	K1 to K2
CO5	To Understand the introduction about Internet and Intranet. Be able to access the browsers. To get knowledge about basic components of E-Mail and E-Commerce.	K1 to K2

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	M	S	M	L
CO2	S	S	S	M	M	S	S	M	L	M

CO3	S	M	S	S	S	M	S	M	M	M
CO4	S	M	S	S	S	S	S	M	M	L
CO5	S	M	S	S	S	S	M	S	M	M
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	2	2	3	2
CO 2	3	3	2	3	2
CO 3	3	3	3	3	2
CO 4	3	3	2	3	2
CO 5	3	3	2	3	2
WEITAGE	15	14	11	15	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	73%	100%	66%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Introduction to Computers - Generations of Computer – Data and Information – Components of Computer – Software – Hardware – Input Devices - Output Devices — Types of Operating System.	6	LCD, BLACK BOARD
II	MS Word: Introduction – Elements of Window – Files, Folders and Directories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – Text Formatting: Font – Style, Size, Face and Colors (Both foreground and background) – Alignment - Bullets and Numbering - Header and footer-watermark – inserting objects (images, other application document) – Table creation – Mail merge.	6	LCD, BLACK BOARD
III	MS Excel: Introduction – Inserting rows and columns – Sizing rows and columns – Implementing formulas – Generating series - Functions in excel – Creation of Chart – Inserting objects – Filter – Sorting – Inserting worksheet.	6	LCD, BLACK BOARD
IV	MS PowerPoint: Introduction – Slides Manipulation (Inserting new, Copy, paste, delete and duplicate slides) – Slide show– Types of Views – Types of Animations – Inserting Objects – Implementing multimedia (Video and Audio) – Templates (Built-in and User-Defined).	6	LCD, BLACK BOARD
V	Internet: Introduction to Internet and Intranet – Services of Internet - Domain Name – URL – Browser – Types of Browsers – Search Engine - E-Mail – Basic Components of E-Mail –How to send group mail. E-Commerce: Digital Signature – Digital Currency – Online shopping and transaction.	6	LCD, BLACK BOARD

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

Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	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, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

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Course Name	PROBLEM SOLVING TECHNIQUES			
Course Code	23UAIFC11	L	P	C
Category	FOUNDATION COURSE	2	-	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving➤ Implement different programming constructs and decomposition of problems into functions➤ Use data flow diagram, Pseudo code to implement solutions.➤ Define and use of arrays with simple applications.➤ Understand about operating system and their uses.				
UNIT - I Introduction				6
Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language, 4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers				
UNIT - II Data				6
Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming				
UNIT - III Selection Structures				6
Selection Structures: Relational and Logical Operators -Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.				
UNIT - IV Data				6
Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters				
UNIT - V Data Flow Diagrams				6
Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters- Scope of a variable - Functions – Recursion. Files: File Basics-Creating and reading a sequential file- Modifying Sequential Files.				
Total Lecture Hours				30

BOOKS FOR STUDY:

- Stewart Venit, Introduction to Programming: Concepts and Design, Fourth Edition, 2010, Dream Tech Publishers

BOOKS FOR REFERENCES:

- Dromey.R.G, “How to Solve it by Computer”, Prentice-Hall of India, 8th Indian Reprint, 2008
- Problem Solving & Comprehension, 6th edition, Arthur Whimbey and Jack Lochhead, Routledge, 2013 (Available in the Safari database at www.lib.vt.edu)

WEB RESOURCES:

- ❖ <https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm>
- ❖ http://www.nptel.iitm.ac.in/video.php?subjectId=106102067_26
- ❖ http://utubersity.com/?page_id=876

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	Study the basic knowledge of Computers. Analyze the programming languages.	K1 to K2
CO2	Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudocode.	K1 to K2
CO3	Determine the various operators. Explain about the structures. Illustrate the concept of Loops	K1 to K2
CO4	Study about Numeric data and character-based data. Analyze about Arrays.	K1 to K2
CO5	Explain about DFD Illustrate program modules Creating and reading Files	K1 to K2

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	S	S	M	M	M	L
CO2	S	M	S	M	S	S	M	M	L	M
CO3	S	S	S	S	S	M	S	S	M	S

CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	M	M	S	S	S	S	S

S- STRONG

M – MEDIUM

L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	2	3	3	3
CO 4	3	3	2	3	3
CO 5	3	3	3	3	3
WEITAGE	15	14	14	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	93%	100%	100%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, Highlevel language, 4GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers	6	LCD, BLACK BOARD
II	Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC).Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, 6 25 documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.	6	LCD, BLACK BOARD
III	Selection Structures: Relational and Logical Operators - Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.	6	LCD, BLACK BOARD
IV	Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of	6	LCD, BLACK BOARD

	Characters.		
V	Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters-Scope of a variable - Functions – Recursion. Files: File Basics-Creating and reading a sequential file- Modifying Sequential Files.	6	LCD, BLACK BOARD

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI	CO1	K1 – K2	25	K1,K2
AI	CO2	K1 – K2	25	K1,K2
CI	CO3	K1 – K2	25	K1,K2
AII	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	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, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

SECOND SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	OBJECT ORIENTED PROGRAMMING WITH C++			
Course Code	23UAICC21	L	P	C
Category	CORE	5	-	5
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To understand Principles of Object-Oriented Programming➤ To understand Token Expressions & Control Structures➤ To apply Functions in C++, Classes & Objects➤ To analyze Constructors & Destructors, Operator Overloading, Inheritance➤ To know the applications of Pointers, Virtual Functions & Polymorphism, Working with Files, Exception handling				
UNIT – I Principles of Objective Oriented Programming				15
Object Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of Object-Oriented Programming, Object Oriented Languages, Applications of Object-Oriented Programming, Beginning with C++. Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models.				
UNIT - II Control Statements				15
Token Expressions & Control Structures Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Implicit Conversions, Operator Overloading, Operator Precedence, Control Structures.				
UNIT - III Functions, Strings				15
Functions in C++, Classes & Objects. The Main Function, Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Function Overloading, Friend and Virtual Functions. Specifying a class, Member Functions, Arrays within a class, Static Member Functions, Arrays of Objects, Friendly Functions				
UNIT - IV Constructors				15
Constructors & Destructors, Operator Overloading, Inheritance Constructors, Parameterized Constructors, Copy Constructors, Dynamic Constructors, Destructors, Defining Operator Overloading, Overloading Operators, Rules for Overloading Operators, Type Conversions				
UNIT - V Pointers				15
Pointers, Virtual Functions & Polymorphism, Working with Files, Exception handling Pointers, Pointers to Objects, this pointer, Pointer to Derived Classes, Virtual Functions, Classes for File Stream Operations, Opening and Closing a File, File Modes, File Pointers, Input Output Operations, Updating a File.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- Object Oriented Design by Rumbaugh (Pearson publication)
- Object-oriented programming in Turbo C++ By Robert Lafore, Galgotia Publication
- Object-oriented programming with C++ by E.Balagurusamy, 2nd Edition, TMH.

BOOKS FOR REFERENCES:

- Sourav Sahay, (2017), Object Oriented Programming with C++||, 2nd Edition, Oxford University Press
- Reema Thareja, (2015), Object Oriented Programming with C++||, 1st Edition, Oxford University Press.

WEB RESOURCES:

- ❖ https://www.w3schools.com/cpp/cpp_oop.asp
- ❖ <https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/>
- ❖ <https://www.javatpoint.com/cpp-oops-concepts>

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 Token Expressions & Control Structures									K1 to K4
CO2	Applying Functions in C++, Classes & Objects									K1 to K4
CO3	Analyzing Constructors & Destructors, Operator Overloading, Inheritance									K1 to K4
CO4	Knowing the applications of Pointers, Virtual Functions & Polymorphism, Working with Files, Exception handling									K1 to K4
CO5	Understanding the Token Expressions & Control Structures									K1 to K4
MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	L	M	M	M	L	M	M	M	L
CO2	S	M	S	M	M	M	M	M	M	L
CO3	S	S	S	S	M	M	S	S	L	M
CO4	S	S	S	M	M	S	M	S	M	M
CO5	S	S	M	S	S	S	M	S	M	M
S- STRONG			M - MEDIUM				L - LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	1
CO 4	3	3	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	15	15	15	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	100%	100%	100%	86%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Principles of Objective Oriented Programming Object Oriented Programming Paradigm, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Applications of Object Oriented Programming, Beginning with C++. Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models.	15	Black Board/PPT
II	Token Expressions & Control Structures Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Implicit Conversions, Operator Overloading, Operator Precedence, Control Structures.	15	Black Board/PPT
III	Functions in C++, Classes & Objects. The Main Function, Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Function Overloading, Friend and Virtual Functions. Specifying a class, Member Functions, Arrays within a class, Static Member Functions, Arrays of Objects, Friendly Functions	15	Black Board/PPT
IV	Constructors & Destructors, Operator Overloading, Inheritance Constructors, Parameterized Constructors, Copy Constructors, Dynamic Constructors, Destructors, Defining Operator Overloading, Overloading Operators, Rules for Overloading Operators, Type Conversions	15	Black Board/PPT
V	Pointers, Virtual Functions & Polymorphism, Working with Files, Exception handling Pointers, Pointers to Objects, this pointer, Pointer to Derived Classes, Virtual Functions, Classes for File Stream Operations, Opening and Closing a File, File Modes, File Pointers, Input Output Operations, Updating a File	15	Black Board/PPT

**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(K3)
AI	CO2	K1 – K4	2	K1,K2	2(K4)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K3)
AII	CO4	K1 – K4	2	K1,K2	2(K4)	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	3.57	7.54
	K2	2			2	3.57	
	K3		10	16	26	46.42	46.43
	K4		10	16	26	46.42	46.43
	Marks	4	20	30	56	100	100
CIA II	K1	2			2	5.56	7.54
	K2	2			2	5.56	
	K3		10	16	26	44.44	46.43
	K4		10	16	26	44.44	46.43
	Marks	4	20	30	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, presentation and make inferences with evidences

CO 5 - will be allotted for individual Assignment which carries five marks as part of 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	3.57	3.57
K2	5			5	3.57	3.57
K3		50		50	35.72	35.72
K4			80	80	57.14	57.14
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	CO1	K3		
OR					
12. b)	Unit - II	CO1	K3		
13. a)	Unit - III	CO1	K3		
OR					
13. b)	Unit - III	CO1	K3		
14. a)	Unit - IV	CO1	K3		
OR					
14. b)	Unit - IV	CO1	K3		
15. a)	Unit - V	CO1	K3		
OR					
15. b)	Unit - V	CO1	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	CO1	K4		
OR					
17. b)	Unit - II	CO1	K4		
18. a)	Unit - III	CO1	K4		
OR					
18. b)	Unit - III	CO1	K4		
19. a)	Unit - IV	CO1	K4		
OR					
19. b)	Unit - IV	CO1	K4		
20. a)	Unit - V	CO1	K4		
OR					
20. b)	Unit - V	CO1	K4		

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	OBJECT ORIENTED PROGRAMMING WITH C++LAB			
Course Code	23UAICP21	L	P	C
Category	CORE	-	5	5
COURSE OBJECTIVES:				
➤ To predict the performance of different algorithms in order to guide design decisions provide theoretical estimation for the required resources of an algorithm to solve a specific computational problem				
CONTENTS				
<ol style="list-style-type: none">1. Write a Program to find Simple Interest and Compound Interest.2. Write a Program to demonstrate the working of following Loops: While, Do While, For, If-Else, switch3. Write a Program to find greatest of three numbers.4. Write a Program to add and subtract two matrices.5 Write a Program to display elements of an array.6 Write a Program to calculate Sum and Average of an array.7. Write a Program to sort elements of an array using Bubble sort.8. Write a Program to calculate Factorial of a number.9. Write a Program to generate Fibonacci series.10. Write a Program to show function Overloading.11. Write a Program to create a class and access member function of a class12. Write a program to show Constructor and Destructor in a class13. Write a program to convert the temperature in Fahrenheit to Celsius and vice-a-verse				
Total LAB Hours				75
BOOK FOR STUDY:				
➤ Object-oriented programming in Turbo C++ By Robert Lafore, Galgotia Publication				
➤ Object-oriented programming with C++ by E.Balagurusamy, 2nd Edition, TMH.				
BOOK FOR REFERENCE:				
➤ SouravSahay, (2017), Object Oriented Programming with C++I, 2ndEdition, Oxford University Press				
➤ ReemaThareja, (2015), Object Oriented Programming with C++I, 1st Edition, Oxford University Press				
WEB RESOURCES:				
❖ https://www.w3schools.com/cpp/cpp_oop.asp				
❖ https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/				
❖ https://www.javatpoint.com/cpp-oops-concepts				

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
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After studying this course, the students will be able to:		
CO1	To understand basics of Object-Oriented Programming	K1 to K4
CO2	To Identify the problem and solve using C++ programming techniques	K1 to K4
CO3	Identify suitable programming constructs for problem solving	K1 to K4
CO4	To analyze various concepts of C ++language to solve the problem in an efficient way.	K1 to K4
CO5	To develop a C++ program for a given problem and test for its correctness.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG

M – MEDIUM

L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	2	2	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	1	2
WEITAGE	15	15	14	14	13	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	100%	93%	93%	86%	93%

LESSON PLAN:

UNIT	LIST OF PROGRAMS	HRS	PEDAGOGY
1	Write a Program to find Simple Interest and Compound Interest.	75	LCD, BLACK BOARD
2	Write a Program to demonstrate the working of following Loops: While, Do While, For, If-Else, switch		
3	Write a Program to find greatest of three numbers.		
4	Write a Program to add and subtract two matrices.		
5	Write a Program to display elements of an array.		
6	Write a Program to calculate Sum and Average of an array.		
7	Write a Program to sort elements of an array using Bubble sort.		
8	Write a Program to calculate Factorial of a number		
9	Write a Program to generate Fibonacci series.		
10	Write a Program to show function Overloading.		
11	Write a Program to create a class and access member function of a class		
12	Write a program to show Constructor and Destructor in a class		
13	Write a program to convert the temperature in Fahrenheit to Celsius and vice-a-verse		

**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	Debugging & Output
CI AI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA	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									
	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidated %
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						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, presentation and make inferences with evidences

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
Internal	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Debugging & Output
CIAI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					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		7.5	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)	Consolidated %
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	ELECTRONICS SCIENCE			
Course Code	23UELEA21	L	P	C
Category	CORE ELECTIVE	4	-	3
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To introduce to basic semiconductor devices.➤ To understand the working of an Electronic circuit➤ To learn the working principles of Opto electronic devices➤ To understand the concepts of Electronic Communications.➤ To learn the working principles of Sensors				
UNIT – I	Semiconductor			12
Insulator- Conductor- Semiconductor- P type – N type – PN Junction diode- forward bias-reverse bias-transistors-pnp-npn, FET-MOSFET.				
UNIT - II	Electronic Circuits			12
Rectifier- full wave and bridge rectifiers -Amplifier- Power Amplifier types- Concepts of Feedback- Positive and Negative feedback-Oscillator- Multivibrators-types.				
UNIT - III	Optoelectronic Devices			12
Principles, Operation of an Optoelectronic devices-LDR-Photo diode-Photo Transistor – Photo Voltaic Cell –Solar cell -IR Emitter – Photo Emissive Sensors – Photo Multiplier- LED-IR Emitter-LCD- Optocouplers				
UNIT - IV	Communication			12
EM waves- propagation: Ground wave, Space wave and Sky wave - Block diagram of an Electronic Communication–Modulation- Need for modulation- AM-FM- Analog Communication-Digital Communication				
UNIT - V	Sensors			12
Need for sesnsors- theory of temperature sensor –pressure sensor- vibration sensor- displacement sensor- flow sensor- force sensor				
Total Lecture Hours				60

BOOKS FOR STUDY:

- C.S.Rangan,G R Sharma VSV Mani ,Instrumentation Devices & Systems, Tata McGraw Hill publishing company private ltd, Delhi II edition
- R.S. Sedha, Applied Electronics, S.Chand& Company Ltd, New Delhi, first Edition, 1990

BOOKS FOR REFERENCES:

- D.Patranabi, Sensors and Transducers, PHI Learning Pvt.Ltd, New Jersey,Second Edition,2003.
- V. K. Mehta, Principles of Electronics, S.Chand publications, Delhi, eleventh edition2000

WEB RESOURCES:

- ❖ <https://nptel.ac.in/courses/108/108/108108112/>
- ❖ <https://nptel.ac.in/courses/115/102/115102103/>
- ❖ <https://nptel.ac.in/courses/108/108/108108122/>

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 semiconductor device concepts use in Electronics devices.	K1 to K4
CO2	Enable the circuit working	K1 to K4
CO3	Understand the working and application of Opto electronics Devices.	K1 to K4
CO4	Understand the concept of Electronic Communications	K1 to K4
CO5	Understand the types and application of sensors.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG**M – MEDIUM****L - LOW****CO / PO MAPPING:**

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
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CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	2	2	3	3
CO 4	3	3	3	3	2	3
CO 5	3	3	2	3	3	2
WEITAGE	15	15	14	15	14	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	100%	93%	100%	93%	93%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Insulator- Conductor- Semiconductor- P type – N type – PN Junction diode- forward bias-reverse bias- transistors-pnp-npn, FET-MOSFET	12	Black Board/PPT
II	Rectifier- full wave and bridge rectifiers -Amplifier- Power Amplifier types- Concepts of Feedback- Positive and Negative feedback- Oscillator- Multivibrators-types	12	Black Board/PPT
III	Principles, Operation of an Optoelectronic devices-LDR-Photo diode-Photo Transistor – Photo Voltaic Cell –Solar cell -IR Emitter – – Photo Emissive Sensors – Photo Multiplier- LED-IR Emitter-LCD- Optocouplers	12	Black Board/PPT
IV	EM waves- propagation: Ground wave, Space wave and Sky wave - Block diagram of an Electronic Communication–Modulation- Need for modulation- AM-FM- Analog Communication-Digital Communication	12	Black Board/PPT
V	Need for sensors- theory of temperature sensor–pressure sensor- vibration sensor- displacement sensor-flow sensor- force sensor	12	Black Board/PPT

**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(K3)
AI	CO2	K1 – K4	2	K1,K2	2(K4)	2(K4)
CI	CO3	K1 – K4	2	K1,K2	2(K3)	2(K3)
AII	CO4	K1 – K4	2	K1,K2	2(K4)	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	3.57	7.54
	K2	2			2	3.57	
	K3		10	16	26	46.42	46.43
	K4		10	16	26	46.42	46.43
	Marks	4	20	30	56	100	100
CIA II	K1	2			2	5.56	7.54
	K2	2			2	5.56	
	K3		10	16	26	44.44	46.43
	K4		10	16	26	44.44	46.43
	Marks	4	20	30	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, presentation and make inferences with evidences

CO 5 will be allotted for individual Assignment which carries five marks as part of 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	3.57	3.57
K2	5			5	3.57	3.57
K3		50		50	35.72	35.72
K4			80	80	57.14	57.14
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	CO3	K3		
OR					
14. b)	Unit - IV	CO3	K3		
15. a)	Unit - V	CO3	K3		
OR					
15. b)	Unit - V	CO3	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 ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FUNDAMENTALS OF INFORMATION TECHNOLOGY			
Course Code	23UAINM21	L	P	C
Category	NON - MAJOR ELECTIVE	2	-	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ Understand basic concepts and terminology of information technology.➤ Have a basic understanding of personal computers and their operation➤ Be able to identify data storage and its usage➤ Get great knowledge of software and its functionalities➤ Understand about operating system and their uses				
UNIT – I Introduction to Computers				6
Introduction, Definition, Characteristics of computer, Evolution of Computer, Block Diagram of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer				
UNIT - II Basic Computer Organization				6
Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers				
UNIT - III Storage Fundamentals				6
Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, 6 31 EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives				
UNIT -IV Software				6
Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w				
UNIT - V Operating System				6
Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.				
Total Lecture Hours				30

BOOKS FOR STUDY:

- G. Manjunath, “Computer Basics”, Vasan Publications, 2010
- Pradeep K. Sinha & Priti Sinha, “Computer Fundamentals”, 6th Edition, BPB Publications, 2004.
- S. K Bansal, “Fundamental of Information Technology”

BOOKS FOR REFERENCES:

- Bhardwaj Sushil Puneet Kumar, —Fundamental of Information Technology
- GG WILKINSON, —Fundamentals of Information Technology, Wiley-Blackwell
- A Ravichandran, —Fundamentals of Information Technology, Khanna Book Publishing

WEB RESOURCES:

- ❖ <https://testbook.com/learn/computer-fundamentals>
- ❖ <https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html>
- ❖ <https://www.javatpoint.com/computer-fundamentals-tutorial>
- ❖ https://www.tutorialspoint.com/computer_fundamentals/index.htm
- ❖ <https://www.nios.ac.in/media/documents/sec229new/Lesson1.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
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After studying this course, the students will be able to:

CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it	K1 to K2
CO2	Develop organizational structure using for the devices present currently under input or output unit	K1 to K2
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis	K1 to K2
CO4	Work with different software, Write program in the software and applications of software	K1 to K2
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware	K1 to K2

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

S- STRONG

M – MEDIUM

L - LOW

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

LESSON PLAN:			
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UNIT	COURSE NAME	HRS	PEDAGOGY
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I	Introduction to Computers: Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer,Capabilities and limitations of computer	6	Black Board/PPT
II	Basic Computer Organization: Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers	6	Black Board/PPT
III	Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, 6 31 EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives	6	Black Board/PPT
IV	Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w	6	Black Board/PPT
V	Operating System: Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multitasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.	6	Black Board/PPT

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	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, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)



DEPARTMENT OF ARTIFICIAL INTELLIGENCE FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	ADVANCED EXCEL LAB			
Course Code	23UAISP21	L	P	C
Category	SKILLED	-	2	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ Handle large amounts of data➤ Aggregate numeric data and summarize into categories and subcategories➤ Filtering, sorting, and grouping data or subsets of data➤ Create pivot tables to consolidate data from multiple files➤ Presenting data in the form of charts and graphs				
S. No	List of Programs	Hours		
1	Use Excel functions like SUM, AVERAGE, MAX, and MIN to calculate totals, averages, and other basic statistics.			
2	Set up data validation rules to control data input and prevent errors in your spreadsheet.			
3	Create simple bar charts, line charts, and pie charts to visualize data trends.			
4	Filter and Sort data to quickly find information in large datasets.			
5	Write basic IF statements to perform conditional calculations in your spreadsheet.			
6	Create data tables to perform sensitivity analysis or to display multiple scenarios of a calculation.			
7	Practice text functions like CONCATENATE, LEFT, RIGHT, and TRIM to clean and manipulate text data.			
8	Use functions like VLOOKUP and HLOOKUP to search for and retrieve specific data from a table.			
9	Build a PivotTable to summarize and analyze data from a large dataset.			
10	Apply conditional formatting rules to highlight specific data based on certain criteria.			
11	Use Subtotal function to group and summarize data in a list.			
12	Use date and time functions to calculate dates, durations and time differences			
Total Hours				30

BOOKS FOR STUDY:

- M Alexander ,Microsoft Excel 365 BIBLE,2022,Wiley

BOOKS FOR REFERENCES:

- Wanyne. L. Winston, Market Analytics Data Driven Technique with Microsoft Excel,2014
- PunitPrabhu, Data Analytics with Excel,2019
- Manisha Nigam, Advanced Analytics with Excel, 2019, BPB Publications

WEB RESOURCES:

- ❖ <https://www.coursera.org/learn/excel-data-analysis>
- ❖ <https://www.udemy.com/course/data-analytics-in-excel/>

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	Demonstrating the basic mechanics and navigation of an Excel spreadsheet.	K1 to K4
CO2	Formatting techniques and presentation styles.	K1 to K4
CO3	Learning the use and utility of functions and formulas on excel spreadsheet.	K1 to K4
CO4	Working knowledge of organizing and displaying large amounts and complex data	K1 to K4
CO5	Learning formulas, creating charts and graphs that can easily explain or simplify complex information or data.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG**M - MEDIUM****L - LOW****CO / PO MAPPING:**

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	2	3	2	2	2

CO 2	3	3	3	2	3	2
CO 3	3	2	2	3	3	3
CO 4	3	2	3	3	3	3
CO 5	3	3	2	3	3	3
WEITAGE	15	12	14	13	14	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	80%	93%	100%	93%	86%

LESSON

S. No	List of Programs	HRS	PEDAGOGY
1	Use Excel functions like SUM, AVERAGE, MAX, and MIN to calculate totals, averages, and other basic statistics.	60	LCD & Blackboard
2	Set up data validation rules to control data input and prevent errors in your spreadsheet.		
3	Create simple bar charts, line charts, and pie charts to visualize data trends.		
4	Filter and Sort data to quickly find information in large datasets.		
5	Write basic IF statements to perform conditional calculations in your spreadsheet.		
6	Create data tables to perform sensitivity analysis or to display multiple scenarios of a calculation.		
7	Practice text functions like CONCATENATE, LEFT, RIGHT, and TRIM to clean and manipulate text data.		
8	Use functions like VLOOKUP and HLOOKUP to search for and retrieve specific data from a table.		
9	Build a PivotTable to summarize and analyze data from a large dataset.		
10	Apply conditional formatting rules to highlight specific data based on certain criteria.		
11	Use Subtotal function to group and summarize data in a list.		
12	Use date and time functions to calculate dates, durations and time differences		

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	Debugging & Output
CIAI	CO1	K1	5				
	CO2	K2		5			
	CO3	K3			5		
	CO4	K3				5	
	CO5	K4					5
Question Pattern CIA	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									
	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding	Debugging & Output	Total Marks	% of (Marks without choice)	Consolidated %
CIA	K1	5					5	20	20
	K2		5				5	20	20
	K3			5	5		10	40	40
	K4					5	5	20	20
	Marks						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, presentation and make inferences with evidences

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

Internal	Cos	K Level	Syntax & Semantics	Programming principles	Concept Applications	Coding & Implementation	Debugging & Output
CIAI	CO1	K1	15				
	CO2	K2		15			
	CO3	K3			15		
	CO4	K3				15	
	CO5	K4					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		7.5	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)	Consolidated %
K1	15					15	20	20
K2		15				15	20	20
K3			15	15		30	40	40
K4					15	15	20	20
Marks						75	100	100