B.Sc., COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)

Syllabus

Program Code: UAI

2023 - Onwards

MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

GUIDLINESS 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
1.7Ability 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 7Ability 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 x01= 04 Marks

Part –B

Two questions (‘either …. or ‘type) 2 x05= 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 x01	= 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

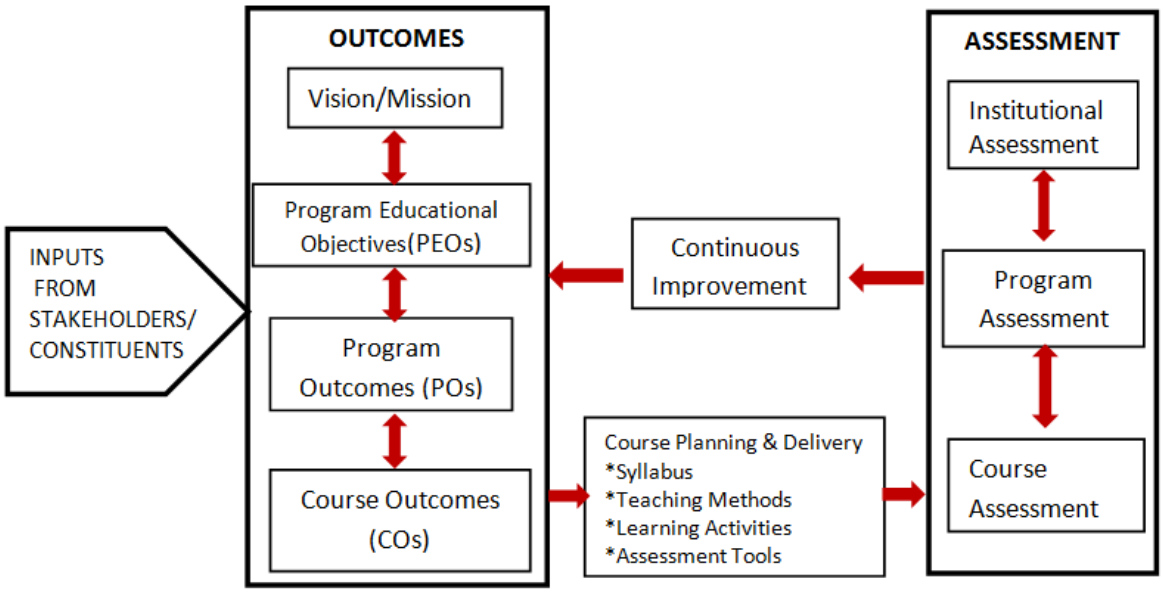
100

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.

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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

Course Name	PROGRAMMING IN C			
Course Code	23UAICC11	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- 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 20 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
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:

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	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	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 AI	CO1	K1 – K4	2	K1,K2	2(K3)	2(K3)
	CO2	K1 – K4	2	K1,K2	2(K4)	2(K4)
CI AII	CO3	K1 – K4	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	PROGRAMMING IN C LAB			
Course Code	23UAICP11	**L**	**P**	**C**
Category	CORE	-	5	5

COURSE OBJECTIVES:

- 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:

- E. Balaguruswamy, Programming in ANSI C, Sixth Edition, Tata McGraw Hill Publications Private Limited,New Delhi,2010

BOOK FOR REFERENCE:

- Byron Gottfried, Programming with C, McGraw Hill Education (India) Private Limited, New Delhi, Third Edition, 2014

WEB RESOURCES:

- **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**
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**

Course Name	DIGITAL LOGIC FUNDAMENTALS			
Course Code	23UELEA11	**L**	**P**	**C**
Category	CORE ELECTIVE	4	-	3

COURSE OBJECTIVES:

- 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:NumberSystem–BaseConversion – BinaryCodes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – UniversalGates.

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 AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	FUNDAMENTALS OF COMPUTERS			
Course Code	23UAINM11	**L**	**P**	**C**
Category	NON MAJOR ELECTIVE	2	-	2

COURSE OBJECTIVES:

- 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, Vasan Publications, 2010
- Pradeep K. Sinha & PritiSinha, 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.				

Course Name	PROBLEM SOLVING TECHNIQUES			
Course Code	23UAIFC11	**L**	**P**	**C**
Category	FOUNDATION COURSE	2	-	2

COURSE OBJECTIVES:

- 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 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.				


SECOND SEMESTER

Course Name	OBJECT ORIENTED PROGRAMMING WITH C++			
Course Code	23UAICC21	L	P	C
Category	CORE	5	-	5

COURSE OBJECTIVES:

- 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++‖, 2ndEdition, Oxford University Press
- ReemaThareja, (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 Constuctors, 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 AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

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

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, 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

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

Course Name	ELECTRONICS SCIENCE			
Course Code	23UELEA21	L	P	C
Category	CORE ELECTIVE	4	-	3

COURSE OBJECTIVES:

- 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- Multvibrators-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

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- Multvibrators-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 sesnsors- 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 AI	**CO1**	**K1 – K4**	**2**	**K1,K2**	**2(K3)**	**2(K3)**
	CO2	**K1 – K4**	**2**	**K1,K2**	**2(K4)**	**2(K4)**
CI AII	**CO3**	**K1 – K4**	**2**	**K1,K2**	**2(K3)**	**2(K3)**
	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**	

Course Name	FUNDAMENTALS OF INFORMATION TECHNOLOGY			
Course Code	23UAINM21	**L**	**P**	**C**
Category	NON - MAJOR ELECTIVE	**2**	**-**	**2**

COURSE OBJECTIVES:

- 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&PritiSinha, "Computer Fundamentals", 6th Edition, BPB Publications, 2004.
- S. K Bansal, "Fundamental of Information Technology"

BOOKS FOR REFERENCES:

- BhardwajSushilPuneet 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
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:

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:

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:

UNIT	COURSE NAME	HRS	PEDAGOGY

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.				

Course Name	ADVANCED EXCEL LAB			
Course Code	23UAISP21	**L**	**P**	**C**
Category	SKILLED	**-**	**2**	**2**

COURSE OBJECTIVES:

- 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**
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

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)							
Internal	**Cos**	**K Level**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
CI AI	**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**

B.Sc., COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)

Syllabus

Program Code: UAI

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 COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE) 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
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**					
23UAICC31	DATA STRUCTURES AND COMPUTER ALGORITHMS	5	5	25	75	100
23UAICP31	DATA STRUCTURES AND COMPUTER ALGORITHMS LAB	5	5	25	75	100
Part - III	**Elective course**					
23UMTEA32	MATHEMATICAL STATISTICS – I	4	3	25	75	100
Part - IV	**Skill Based courses**					
23UAISC31	E – COMMERCE	1	1	25	75	100
23UAISP31	WEB TECHNOLOGY 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**					
23UAICC41	JAVA PROGRAMMING	5	5	25	75	100
23UAICP41	JAVA PROGRAMMING LAB	5	5	25	75	100
Part - III	**Elective course**					
23UMTEA43	MATHEMATICAL STATISTICS - II	4	4	25	75	100
Part - IV	**Skill Based courses**					
23UAISC41	BIOMETRICS	1	1	25	75	100
23UAISP41	PHP PROGRAMMING LAB	2	2	25	75	100
Part - IV	**Mandatory course**					
23UEVSG41	ENVIRONMENTAL STUDIES	1	2	25	75	100
	Total	30	25	200	600	800


THIRD SEMESTER

Course Name	DATA STRUCTURES AND COMPUTER ALGORITHMS			
Course Code	23UAICC31	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- Understand the meaning asymptotic time complexity analysis and various data structures.
- To enhancing the problem-solving skills and thinking skills.
- To write efficient algorithms and Programs.
- To understand how to handle the files in Data Structure.

UNIT - I ARRAYS AND ORDERED LISTS **15**

Abstract data types - asymptotic notations – complexity analysis – Linked lists : Singly linked list – Doubly linked lists – Circular linked list, General lists – Stacks – Queues – Circular Queues – Evaluation of expressions.

UNIT - II TREES AND GRAPHS **15**

Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - Threaded Binary Trees – Application of tree (Sets). Representation of Graphs – Graph implantation – Graph Travels – Minimum Cost Spanning trees – Shortest Path Problems – Application of graphs

UNIT - III SEARCHING AND SORTING **15**

Sorting – Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Selection Sort. Searching – Linear Search, Binary Search

UNIT - IV GREEDY METHOD AND DYNAMIC PROGRAMMING **15**

Greedy Method: Knapsack problem – Job Sequencing With deadlines – Optimal storage on tapes. General method – Multistage Graph Forward Method – All pairs shortest path – Single sources shortest path – Search Techniques for Graphs – DFS – Connected Components – Bi – Connected Components.

UNIT - V BACKTRACKING **15**

General Method – 8-Queen's – Sum of Subsets – Graph Colouring – Hamiltonian Cycles – Branch and Bound: General Method – Travelling Sales Person Problem.

Total Lecture Hours **75**

BOOKS FOR STUDY:

- Seymour Lipshutz(2011),Schaum‟s Outlines - Data Structures with C, Tata McGraw Hill publications.
- Ellis Horowitz and SartajSahni (2010), Fundamentals of Computer Algorithms, Galgotia Publications Pvt., Ltd

BOOKS FOR REFERENCES:

- Gregory L.Heileman(1996), Data Structures, Algorithms and Object-Oriented Programming, McGraw Hill International Edition, Singapore.
- A.V.Aho, J.D. Ullman, J.E.Hopcraft(2000). Data Structures and Algorithms, Addison Wesley Publication

WEB RESOURCES:

- **https://www.udemy.com/course/data-structures-and-algorithms-in-c/?couponCode=NVDPRODIN35**
- **https://www.tutorialspoint.com/data_structures_algorithms/index.htm**
- **https://www.programiz.com/dsa**
- **https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/**

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 asymptotic notations and analysis of time and space complexity	K1 to K4
CO2	Perform traversal operations on Trees and Graphs.	K1 to K4
CO3	To apply searching and sorting techniques	K1 to K4
CO4	To understand the concepts of Greedy Method To apply searching techniques.	K1 to K4
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	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	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	Arrays and ordered Lists: Abstract data types – asymptotic notations – complexity analysis- Linked lists: Singly linked list – doubly linked lists - Circular linked list, General lists- stacks – Queues – Circular Queues – Evaluation of expressions.	15	LCD, BLACK BOARD
II	Trees And Graphs: Trees and Graphs Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - threaded Binary Trees - Application of trees (Sets). Representation of Graphs – Graph implementation – graph Traversals - Minimum Cost	15	LCD, BLACK BOARD

	Spanning Trees – Shortest Path Problems-Application of graphs		
III	Searching and Sorting: Sorting – Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Selection Sort. Searching – Linear search, Binary search.	**15**	**LCD, BLACK BOARD**
IV	Greedy Method and Dynamic programming: Greedy Method: Knapsack problem– Job Sequencing with deadlines – Optimal storage on tapes. General method – Multistage Graph Forward Method– All pairs shortest path – Single source shortest path – Search Techniques for Graphs – DFS – Connected Components – Bi-Connected co ‘Components.	**15**	**LCD, BLACK BOARD**
V	Backtracking: General Method – 8-Queen‟s – Sum Of Subsets – Graph Colouring – Hamiltonian Cycles – Branch And Bound: General Method – Travelling Sales Person Problem	**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 MCQs**		**Section B Either or Choice**	**Section C Either or Choice**
			No. of. Questions	**K - Level**		
CI AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	DATASTRUCTURES AND COMPUTER ALGORITHMS LAB			
Course Code	23UAICP31	**L**	**P**	**C**
Category	CORE LAB	-	5	5

COURSE OBJECTIVES:

- To predict the performance of different algorithms in order to guide design decisions,
- To provide theoretical estimation for the required resources of an algorithm to solve a specific computational problem

S. No	**LIST OF PROGRAMS**	**HOURS**
1.	Perform stack operations	
2.	Perform queue operations	
3.	Perform tree traversal operations	
4.	Search an element in an array using linear search.	
5.	Search an element in an array using binary search	
6.	Sort the given set of elements using Merge Sort.	
7.	Sort the given set of elements using Quick sort.	
8.	Search the Kth smallest element using Selection Sort	
9.	Find the Optimal solution for the given Knapsack Problem using Greedy Method.	
10.	Find all pairs shortest path for the given Graph using Dynamic Programming method	
11.	Find the Single source shortest path for the given Travelling Salesman problem using Dynamic Programming method	
12.	Find all possible solution for an N Queen problem using backtracking method	
13.	Find all possible Hamiltonian Cycle for the given graph using backtracking method	
	Total Lecture Hours	**75**

BOOKS FOR STUDY:

- Ellis Horowitz , SartajSahni, Susan Anderson Freed, Second Edition , "Fundamentals of Data in C", Universities Press
- E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition ,—Fundamentals of Computer Algorithms — Universities Press.

BOOKS FOR REFERENCES:

- Seymour Lipschutz ,Data Structures with C, First Edition, Schaum's outline series in computers, Tata McGraw Hill.
- R.Krishnamoorthy and G.IndiraniKumaravel, Data Structures using C, Tata McGrawHill – 2008.
- A.K.Sharma, Data Structures using C , Pearson Education India,2011.

WEB RESOURCES:

- **https://www.coursera.org/learn/data-structures-in-c**
- **https://onlinecourses.swayam2.ac.in/nou23_cs13/preview**
- **https://www.geeksforgeeks.org/courses/c-Programming-basic-to-advanced**

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	Implement data structures using C.	K1 to K4
CO2	Implement various types of linked lists and their applications.	K1 to K4
CO3	Implement Tree Traversals.	K1 to K4
CO4	Implement various algorithms in C.	K1 to K4
CO5	Implement different sorting and searching algorithms.	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.	Perform stack operations	75	LCD, BLACK
2.	Perform queue operations		BOARD
3.	Perform tree traversal operations		LCD, BLACK
4.	Search an element in an array using linear search.		BOARD

5.	Search an element in an array using binary search.		**LCD, BLACK**
6.	Sort the given set of elements using Merge Sort.		**BOARD**
7.	Sort the given set of elements using Quick sort.		**LCD, BLACK**
8.	Search the Kth smallest element using Selection Sort		**BOARD**
9.	Find the Optimal solution for the given Knapsack Problem using Greedy Method.		**LCD, BLACK**
10.	Find all pairs shortest path for the given Graph using Dynamic Programming method		**BOARD**
11.	Find the Single source shortest path for the given Travelling Salesman problem using Dynamic Programming method		**LCD, BLACK**
12.	Find all possible solution for an N Queen problem using backtracking method		**BOARD**
13.	Find all possible Hamiltonian Cycle for the given graph using backtracking method		**LCD, BLACK**

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**

Course Name	MATHEMATICAL STATISTICS - I			
Course Code	23UMTEA32	**L**	**P**	**C**
Category	ELECTIVE	4	-	3

COURSE OBJECTIVES:

- Organizing and summarizing the data. Analyzing the data and drawing conclusions from it. Assessing the strengths of the conclusions andevaluating their uncertainty
- Define the principal concepts about probability.
- Explain the concept of a random variable and the probability distributions.
- To understanding the concept of conditional probability
- To explain the Random Variable and Mathematical expectation

UNIT - I **12**

Nature and Scope of Statistical Methods and Their Limitations — Classifications, Tabulation and Diagrammatic Representation of various types of statistical data — Frequency Curves and Ogives — Graphical determination of percentiles quartiles and their properties.

UNIT - II **12**

Measures of Location — Arithmetic Mean, Median, Mode,Geometric Mean

UNIT - III **12**

Measures of Dispersion — Range, Mean Deviation, Quartile Deviation,Standard Deviation, Coefficient of Variation

UNIT - IV **12**

Probability of an event — Finitely additive probability space addition and multiplication theorems — Independence of events —Conditional Probability

UNIT - V **12**

Concepts of Random Variable — Mathematical expectation — Moments of random variable (raw and central moments) –moment generating function

Total Lecture Hours **60**

BOOKS FOR STUDY:

- Book 1:Statistical Methods, S.P.Gupta, Sultan Chand and sons Publications,4th Edition 2011.
  UNIT 1: Chapter 15 and Chapter 16
  UNIT 2:Chapter 7
  Unit 3:Chapter 8
- Book 2: Statistics, Dr. S.Arumugam and A.ThangapandiIssac, New Gamma Publication house, 2002.
  Unit IV: Chapter 11
- Unit V :Chapter 12 Sections 12.1,12.2,12.3,12.4,12.5

BOOKS FOR REFERENCES:

- KishorS. Trivedi - Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India (P) Ltd., New Delhi -1997
- Discrete Mathematics - Seymour Lipschutz, Marc Lars Lipson Schaum_s Outlines- by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint, 2012

WEB RESOURCES:

- **Web resources from NDL Library, E-content from open-source libraries.**
- **https://www.w3schools.com/statistics/statistics_quartiles_and_percentiles.php**
- **https://www.geeksforgeeks.org/measures-of-dispersion/**

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 basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiarwith common named discrete and continuous random variables.	K1 to K4
CO2	Derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions.	K1 to K4
CO3	Derive the marginal and conditional distributions of randomvariables, translate real world problems into probability models.	K1 to K4
CO4	Analyse the different Statistical measures of data.	K1 to K4
CO5	Understanding the Random Variable and Mathematical expectation.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

S- STRONG M – MEDIUM L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	2	2	3	3	3
CO 2	2	2	3	2	3
CO 3	2	3	2	2	3
CO 4	2	2	2	3	2
CO 5	3	3	2	2	3
WEITAGE	11	12	12	12	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	0.022	0.024	0.024	0.024	0.028

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Nature and Scope of Statistical Methods and Their Limitations — Classifications, Tabulation and Diagrammatic Representation of various types of statistical data — Frequency Curves and Ogives — Graphical determination of percentiles quartiles and their properties	12	Chalk & Talk, Power Point Presentation
II	Measures of Location — Arithmetic Mean,	12	Chalk & Talk,

	Median, Mode,Geometric Mean		**Power Point Presentation**
III	Measures of Dispersion — Range, Mean Deviation, Quartile Deviation, Standard Deviation, Coefficient of Variation	**12**	**Chalk & Talk, Power Point Presentation**
IV	Probability of an event — Finitely additive probability sopace addition and multiplication theorems — Independence of events — Conditional Probability	**12**	**Chalk & Talk, Power Point Presentation**
V	Concepts of Random Variable — Mathematical expectation — Moments of random variable (raw and central moments) –moment generating function	**12**	**Chalk & Talk, Power Point Presentation**

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(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	E - COMMERCE			
Course Code	23UAISC31	L	P	C
Category	SKILLED	1	-	1

COURSE OBJECTIVES:

- Understanding of the foundations and importance of E-commerce
- Understanding of retailing in E-commerce by in terms of branding and pricing strategies and determining the effectiveness of market research
- Assess the Internet trading relationships including Business to Consumer, Business- to-Business, Intra-organizational
- Knowing key features of Internet, Intranets and Extranets and how they relate to each other.
- Understanding legal issues and privacy in E-Commerce

UNIT - I E-Commerce **6**

E-Commerce Framework – E-Commerce and Media Convergence – The anatomy of E-commerce applications - E-Commerce Consumer Applications - E- Commerce Organization Applications.

UNIT - II The Internet **6**

The Internet Terminology – NSFNET – Architecture and Components– National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/Online companies - National Independent ISPs – Regional level ISPs – Local level ISPs.

UNIT - III E-Commerce and the World Wide Web **6**

Architectural Framework for E-commerce – WWW as the architecture – Technology behind the web – Security and the web.

UNIT - IV Electronic Payment Systems **6**

Types of Electronic Payment Systems – Digital token Electronic Payment Systems – Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems. Electronic Data Interchange: Legal, Security and Privacy issues.

UNIT - V Advertising and Marketing on the Internet **6**

E-Commerce Catalogs – Information Filtering – Consumer Data Interface – Emerging tools. Software Agents: Characteristics and Properties of Software Agents – Technology behind Software Agents - Applets, Browsers, and Software Agents.

Total Lecture Hours **30**

BOOKS FOR STUDY:

- Ravi Kalakota& Andrew Whinston**, "***Frontiers of Electronic-Commerce*", Addison Wesley.

BOOKS FOR REFERENCES:

- EfraimTurvanJ.Lee, David Kug andChung, "Electronic Commerce", Pearson Education, Asia.
- Manlyn Greenstein and Miklos, "Electronic Commerce", TMH.

WEB RESOURCES:

- **https://www.udemy.com/topic/e-commerce/**
- **https://www.edx.org/learn/ecommerce**
- **https://www.tutorialspoint.com/e_commerce/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	Demonstrate E-Commerce Frameworks. Distinguish E-Commerce and media Convergence. Illustrate E-Commerce Applications.	**K1 & K2**
CO2	Describe the E-Commerce Networks and Research Networks, Analyse the Internet Commercialization	**K1 & K2**
CO3	Evaluate the E-Commerce how incorporate the Internet, Construct the Web Security	**K1 & K2**
CO4	Distinguish the different payment system. Illustrate the data interchange	**K1 & K2**
CO5	Understanding the Advertising and Marketing on the Internet, Describe Software Agents	**K1 & K2**

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	**E-Commerce:** E-Commerce Framework – E-Commerce and Media Convergence – The anatomy of E-commerce applications - E-Commerce Consumer Applications - E- Commerce Organization Applications.	**6**	**LCD, BLACK BOARD**
II	**The Internet:** The Internet Terminology – NSFNET – Architecture and Components– National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/Online companies - National Independent ISPs – Regional level ISPs – Local level ISPs.	**6**	**LCD, BLACK BOARD**
III	**E-Commerce and the World Wide Web:** Architectural Framework for E- commerce – WWW as the architecture – Technology behind the web – Security and the web.	**6**	**LCD, BLACK BOARD**
IV	**Electronic Payment Systems:** Types of Electronic Payment Systems – Digital token Electronic Payment Systems – Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems. Electronic Data Interchange: Legal, Security and Privacy issues.	**6**	**LCD, BLACK BOARD**
V	**Advertising and Marketing on the Internet:** E-Commerce Catalogs – Information Filtering – Consumer Data Interface – Emerging tools. Software Agents: Characteristics and Properties of Software Agents – Technology behind Software Agents - Applets, Browsers, and Software Agents.	**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.				

Course Name	WEB TECHNOLOGY LAB			
Course Code	23UAISP31	**L**	**P**	**C**
Category	SKILLED LAB	-	2	2

COURSE OBJECTIVES:

- To learn the basic web concepts and to create rich internet applications that use most recent client-sid programming technologies.
- To learn the basics of HTML, DHTML, XML, CSS, Java Script
- To construct basic websites using HTML and Cascading Style Sheets
- To build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms
- To Analyze a web page and identify its elements and attributes.

LIST OF PROGRAMS	**HOURS**

HTML

1. Basic Html Tags

2. Hyper Links, Tables & Multimedia

3. Frames

CSS

4.Inline, Internal and External Style sheets

JAVA SCRIPT

5. Registration Form with Table

6. String, Math & Date Object's predefined methods

7 Calendar Creation

8. Event Handling

9 .Validating Simple Form

10.Multi-Validating Registration Form

11.Background Color Change

12.OnMouseover event

Total Lecture Hours	**30**

BOOKS FOR STUDY:

- Pankaj Sharma, "Web Technology", Sk Kataria&Sons Bangalore, 2011.(UNIT I, II, III &IV).
- Achyut S Godbole&AtulKahate, "Web Technologies", 2002, 2nd Edition. (UNIT V:AJAX)

BOOKS FOR REFERENCES:

- Laura Lemay, RafeColburn , Jennifer Kyrnin, "Mastering HTML, CSS &Javascript Web
- Publishing‖,2016.
- DT Editorial Services (Author), ―HTML 5 Black Book (Covers CSS3, JavaScript, XML,
- XHTML, AJAX, PHP, jQuery), Paperback 2016, 2ndEdition.

WEB RESOURCES:

- **https://www.coursera.org/learn/html-css-javascript-for-web-developers**
- **https://www.udemy.com/topic/html/**
- **https://www.w3schools.com/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	Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).	K1 to K4
CO2	Ability to optimize page styles and layout with Cascading Style Sheets (CSS).	K1 to K4
CO3	Ability to Understand, analyze and apply the role of languages to create a capstone	K1 to K4
CO4	Website using client-side web programming languages like HTML, DHTML, CSS, ML, JavaScript, and AJAX	K1 to K4
CO5	Able to understand the concept of jQuery and AngularJS	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 PLAN:		
LIST OF PROGRAMS	**HRS**	**PEDAGOGY**
HTML 1. Basic Html Tags 2. Hyper Links, Tables & Multimedia 3. Frames **CSS** 4.Inline, Internal and External Style sheets **JAVA SCRIPT** 5. Registration Form with Table 6. String, Math & Date Object's predefined methods 7 Calendar Creation 8. Event Handling 9 .Validating Simple Form 10.Multi-Validating Registration Form 11.Background Color Change 12.OnMouseover event	**30**	**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**	**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

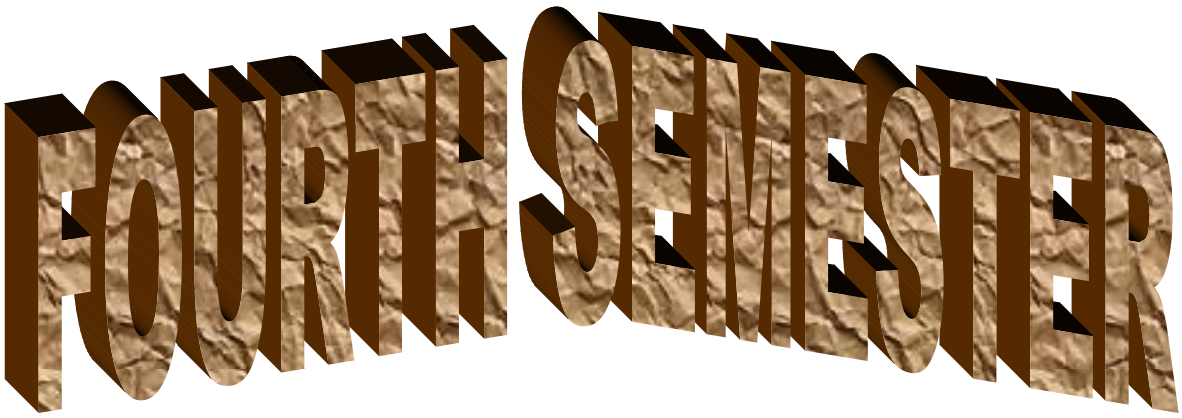
K2- Basic understanding of facts and stating main ideas with general answers

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)							
S. No.	**Cos**	**K Level**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K3**				**15**	
5	**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	**15**	**15**	**15**	**15**	**15**	**75**	**100**	**100**


FOURTH SEMESTER

Course Name	JAVA PROGRAMMING			
Course Code	23UAICC41	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- Object Oriented Programming with Java.
- Apply the OOPs concept in JAVA programming
- Become proficient programmers through the java programming language.
- Give insight into real world applications
- Get the attentions of users in user interface using graphics

UNIT - I Introduction **15**

Java's Lineage-The Java Buzzwords-Object Oriented Programming- Lexical Issues-Data Types – Variables – Arrays – Operators – Control Statements – Classes – Objects –Constructors – Overloading method –Inheritance: Inheritance Basics - Using super -Method Overriding

UNIT - II Packages & Threads **15**

Packages-Access Protection-Importing Packages-Interfaces-Exception Handling-Throw and Throws-Thread-Synchronization-Messaging- Runnable Interface-Inter thread communication-Deadlock-suspending, resuming and stopping threads-Multithreading

UNIT - III Input/Output& Collection API **15**

I/O Streams-File Streams-String Objects-String Buffer-Char Array – Java Utilities-Collections interface – Collection classes-Enumeration – Vector –Stack –Hash tables – String class

UNIT - IV Networking **15**

Networking –Networking basics – java and the Net – Inet Address- TCP/IP Client Sockets – URL- URL Connection – TCP/IP Server Sockets – Datagrams.

UNIT - V Graphical User Interface in Java **15**

Working with windows using AWT Classes – Class Hierarchy of Window and Panel –AWT controls – Layout Managers – Menus- Menu bars - Dialog Boxes- File Dialog- Applets-Lifecycle of Applet-Types of Applets-Event handling-Applet tags - JDBC and connecting to Databases – CRUD operations

Total Lecture Hours **75**

BOOKS FOR STUDY:

- P.Naughton and H.Schildt(1999), Java 2 (The Complete Reference), Third Edition, Tata MCGraw Hill Edition

BOOKS FOR REFERENCES:

- Cay S. Horstmann, Gary Cornell(2012), Core Java 2 Volume I, Fundamentals- Ninth Edition Addision Wesley
- K.Arnold and J.Gosling, The Java Programming Language- Second Edition, ACM Press/Addison- Wesley Publishing Co. New York

WEB RESOURCES:

- **https://www.udemy.com/topic/java/**
- **https://www.w3schools.com/java/java_oop.asp#:~:text=OOP%20provides%20a%20clear%20structure,code%20and%20shorter%20development%20time**
- **https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/**
- **https://www.coursera.org/learn/object-oriented-java**

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	Use the syntax and semantics of java programming language and basic concepts of OOP	K1 to K4
CO2	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages	K1 to K4
CO3	Apply the concepts of Multithreading and Exception handling to Develop efficient and error free codes	K1 to K4
CO4	Design event driven GUI and web related applications which mimic the real word scenario	K1 to K4
CO5	Build the internet-based dynamic applications using the concept of applets	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	2	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	2
WEITAGE	15	15	14	15	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	100%	93%	100%	93%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Java's Lineage-The Java Buzzwords-Object Oriented Programming-Lexical Issues-Data Types – Variables – Arrays – Operators – Control Statements – Classes – Objects –Constructors – Overloading method – Inheritance: Inheritance Basics - Using super -Method Overriding	15	LCD, BLACK BOARD
II	Packages-Access Protection-Importing Packages-Interfaces-Exception Handling-Throw and Throws- Thread-Synchronization-Messaging-	15	LCD, BLACK BOARD

	Runnable Interface-Inter thread communication-Deadlock-suspending, resuming and stopping threads-Multithreading		
III	I/O Streams-File Streams-String Objects-String Buffer-Char Array – Java Utilities-Collections interface – Collection classes-Enumeration – Vector –Stack –Hash tables – String class.	**15**	**LCD, BLACK BOARD**
IV	Networking –Networking basics – java and the Net – Inet Address-TCP/IP Client Sockets – URL- URL Connection – TCP/IP Server Sockets – Datagrams.	**15**	**LCD, BLACK BOARD**
V	Working with windows using AWT Classes – Class Hierarchy of Window and Panel –AWT controls – Layout Managers – Menus- Menu bars - Dialog Boxes- File Dialog- Applets-Lifecycle of Applet-Types of Applets-Event handling-Applet tags - JDBC and connecting to Databases – CRUD operations.	**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 AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	JAVA PROGRAMMING LAB			
Course Code	23UAICP41	**L**	**P**	**C**
Category	CORE LAB	-	5	5

COURSE OBJECTIVES:

- Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
- Read and make elementary modifications to Java programs that solve real-world problems.
- Be able to create an application using string concept.
- Be able to create a program using files in application.
- Be able to create an Applet to create an application.

S. No	**LIST OF PROGRAMS**	**HOURS**
1.	Program using Class and Object.	
2.	Program using Constructors.	
3.	Program using Command-Line Arguments.	
4.	Program using Random Class.	
5.	Program using Vectors.	
6.	Program using String Tokenizer Class.	
7.	Program using Interface.	
8.	Program using all forms of Inheritance.	
9.	Program using String class.	
10.	Program using String Buffer class.	
11.	Program using Exception Handling.	
12.	Implementing Thread based applications	
13.	Program using Packages.	
14.	Program using Files.	
	APPLETS	
15.	Working with Colors and Fonts	
16.	Parameter passing technique	
17.	Drawing various shapes using Graphical statements.	
18.	Usage of AWT components and Listener in suitable applications.	
	Total Lecture Hours	**75**

BOOKS FOR STUDY:

- Barry A. BurdBarry A. Burd, Beginning Programming with Java for Dummies,Fifth Edition,Wiley Publications,2017

BOOKS FOR REFERENCES:

- E.Balagurusamy, Programming with Java, McGraw Hill Education (India) Private Limited, New Delhi, Third Edition, 2019.

WEB RESOURCES:

- **https://www.coursera.org/courses?query=java**
- **https://www.udemy.com/topic/java/**
- **https://www.edx.org/learn/java**

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	Implement Java programs using object oriented concepts for problem solving.	K1 to K4
CO2	Detect syntax and logical errors in java programs.	K1 to K4
CO3	Apply exception handling for making robust JAVA code.	K1 to K4
CO4	Analyze various concepts of Java language to solve the problem in an efficient way.	K1 to K4
CO5	Design java applications using File I/O and GUI.	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.	Program using Class and Object.	75	LCD, BLACK
2.	Program using Constructors.		
3.	Program using Command-Line Arguments.		
4.	Program using Random Class.		
5.	Program using Vectors.		
6.	Program using String Tokenizer Class.		
7.	Program using Interface.		

8.	Program using all forms of Inheritance.		
9.	Program using String class.		
10.	Program using String Buffer class.		
11.	Program using Exception Handling.		
12.	Implementing Thread based applications		
13.	Program using Packages.		
14.	Program using Files.		
APPLETS			
15.	Working with Colors and Fonts		
16.	Parameter passing technique		
17.	Drawing various shapes using Graphical statements.		
18.	Usage of AWT components and Listener in suitable applications.		

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)							
ntern al	**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**
QuestionPattern		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**

Course Name	MATHEMATICAL STATISTICS - II			
Course Code	23UMTEA43	**L**	**P**	**C**
Category	ELECTIVE	4	-	4

COURSE OBJECTIVES:

- To introduce the concepts of statistics
- To know the concepts of Bowley's coefficient of Skewness – Coefficient of skewness based upon moments
- To explain the concepts of simple correlation
- To understanding the concept of Mathematical Expectation
- To know the standard error

UNIT - I **12**

Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Piediagrams – Graphical Representation of data – Histograms, Frequency polygon.

UNIT - II **12**

Measures of dispersion —Coefficient of variation-Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient Of Skewness.

UNIT - III **12**

Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression lines of regression

UNIT - IV **12**

Events and sets – sample space – concept of probability– Baye's Theorem – concept of random variable – Mathematical Expectation.

UNIT - V **12**

Concept of sampling distributions – standard error- Tests of significance based on t, Chi- square

Total Lecture Hours **60**

BOOKS FOR STUDY:

- Statistical Methods, S.P.Gupta, Sultan Chand and sons Publications,4th Edition 2011
  Unit 1: Chapter 3 and Chapter 6
  Unit 2: Chapter 9
  Unit 3: Chapter 10 and Chapter 11
  Unit 4: vol II-Chapter 1
  Unit 5: Chapter 4

BOOKS FOR REFERENCES:

- Statistics, Dr. S.Arumugam and A.Thangapandi Issac, New Gamma Publication house, 2002.
- Kishor S. Trivedi - Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India (P) Ltd., New Delhi -1997
- Discrete Mathematics - Seymour Lipschutz, Marc Lars Lipson Schaum s Outlines- by, 3rd Edition., Tata McGraw Hill Education Pvt. Ltd., New Delhi. 5th Reprint, 2012

WEB RESOURCES:

- **Web resources from NDL Library, E-content from open-source libraries**
- **https://builtin.com/data-science/t-test-vs-chi-square**
- **https://www.stat.auckland.ac.nz/~fewster/325/notes/ch2annotated.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	summarize the concepts of statistics	**K1 to K4**
CO2	Analyzing the concepts – Bowley's coefficient of Skewness –Coefficient of skewness based upon moments	**K1 to K4**
CO3	To understanding the concepts of simple correlation	**K1 to K4**
CO4	To understanding the concept of Mathematical Expectation	**K1 to K4**
CO5	To know the test of significance	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	2	2	2	3	2
CO2	1	1	1	1	1	2	2	2	1	1
CO3	1	2	1	1	3	2	1	1	2	2
CO4	1	2	2	1	1	3	2	1	2	3
CO5	2	1	2	2	1	2	2	1	2	2

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	2	3
CO 3	3	3	3	3	3
CO 4	3	2	3	3	23
CO 5	3	3	2	3	3
WEITAGE	14	15	14	15	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93.3	93.3	100	100

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Piediagrams_ – Graphical Representation of data – Histograms, Frequency polygon.	12	Chalk & Talk, Power Point Presentation
II	Measures of dispersion —Coefficient of variation-Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient Of Skewness.	12	Chalk & Talk, Power Point Presentation

III	Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression lines of regression .	**12**	**Chalk & Talk, Power Point Presentation**
IV	Events and sets – sample space – concept of probability– Baye's Theorem – concept of random variable – Mathematical Expectation.	**12**	**Chalk & Talk, Power Point Presentation**
V	Concept of sampling distributions – standard error- Tests of significance based on t, Chi- square .	**12**	**Chalk & Talk, Power Point Presentation**

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(K3)
	CO2	**K1 – K4**	2	K1,K2	2(K4)	2(K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3)	2(K3)
	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**	

Course Name	BIOMETRICS			
Course Code	23UAISC41	L	P	C
Category	SKILL	1	-	1

COURSE OBJECTIVES:

- To learn and understand biometric technologies and their functionalities.
- To learn the role of biometrics, computational methods, context of Biometric Applications.
- To learn to develop applications with biometric security.

UNIT - I Introduction **6**

What is Biometrics, History,Types of biometric Traits, General architecture of biometric systems, Basic working of biometric matching. **Face Biometrics:** Introduction, Background of Face Recognition, Design of Face Recognition System.

UNIT - II Retina and Iris Biometrics **6**

Introduction, Performance of Biometrics, Design of Retina Biometrics, Design of Iris Recognition System, Iris Segmentation Method , Determination of Iris Region, Determination of Iris Region.

UNIT - III Privacy Enhancement Using Biometrics **6**

Introduction, Privacy Concerns Associated with Biometric Deployments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics.

UNIT - IV Watermarking Techniques **6**

Introduction, Data Hiding Methods, Basic Framework of Watermarking, Classification of Watermarking, Applications of Watermarking, Attacks on Watermarks, Performance Evaluation, Characteristics of Watermarks, General Watermarking Process.

UNIT - V SCOPE AND FUTURE **6**

Scope and Future Market of Biometrics, Biometric Technologies, Applications of Biometrics, Biometrics and Information Technology Infrastructure, Role of Biometrics in Enterprise Security, Role of Biometrics in Border Security, Smart Card Technology and Biometrics.

Total Lecture Hours **30**

BOOKS FOR STUDY:

- Biometrics: Concepts and Applications by G.R Sinha and SandeepB.Patil , Wiley, 2013.

BOOKS FOR REFERENCES:

- Guide to Biometrics by Ruud M. Bolle , SharathPankanti, Nalinik.Ratha, Andrew W.Senior, Jonathan H. Connell , Springer 2009
- Introduction to Biometrics by Anil k. Jain, Arun A. Ross, KarthikNandakumar
- Hand book of Biometrics by Anil K. Jain, Patrick Flynn, ArunA.Ross.

WEB RESOURCES:

- **Web resources from NDL Library, E-content from open-source libraries**

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 various biometric technologies.	**K1 & K2**
CO2	Design of biometric recognition.	**K1 & K2**
CO3	Develop simple applications for privacy	**K1 & K2**
CO4	Understand the need of biometric in the society	**K1 & K2**
CO5	Understand the scope of biometric techniques	**K1 & 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	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**	**2**	**3**
CO 5	**3**	**3**	**2**	**3**	**3**	**2**
WEIGHTAGE	**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	**Introduction**: What is Biometrics, History,Types of biometric Traits, General architecture of biometric systems, Basic working of biometric matching. **Face Biometrics:** Introduction, Background of Face Recognition, Design of Face Recognition System.	**6**	**Black Board/PPT**
II	**Retina and Iris Biometrics:** Introduction, Performance of Biometrics, Design of Retina Biometrics, Design of Iris Recognition System, Iris Segmentation Method, Determination of Iris Region, Determination of Iris Region.	**6**	**Black Board/PPT**
III	**Privacy Enhancement Using Biometrics:** Introduction, Privacy Concerns Associated with Biometric Deployments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics.	**6**	**Black Board/PPT**
IV	**Watermarking Techniques:** Introduction, Data Hiding Methods, Basic Framework of Watermarking, Classification of Watermarking, Applications of Watermarking, Attacks on Watermarks, Performance Evaluation, Characteristics of Watermarks, General Watermarking Process.	**6**	**Black Board/PPT**
V	**Scope and Future:** Scope and Future Market of Biometrics, Biometric Technologies, Applications of Biometrics, Biometrics and Information Technology Infrastructure, Role of Biometrics in Enterprise Security, Role of Biometrics in Border Security, Smart Card Technology and Biometrics.	**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.				

Course Name	PHP PROGRAMMING LAB			
Course Code	23UAISP41	**L**	**P**	**C**
Category	SKILLED LAB	-	2	2

COURSE OBJECTIVES:

- To provide the necessary knowledge on basics of PHP.
- To design and develop dynamic, database-driven web applications using PHP version.
- To get an experience on various web application development techniques.
- To learn the necessary concepts for working with the files using PHP.
- To get a knowledge on OOPS with PHP.

LIST OF PROGRAMS	**HOURS**
1. Get name of the user from a form and show greeting text.	
2. Write a PHP program to check whether given number is palindrome or not.	
3. Write a PHP program to check whether given number is Armstrong or not.	
4. Write a PHP program to find largest values of two numbers using nesting of function	
5. Write a PHP program for Mathematical calculator.	
6. Write a PHP program to design Curriculum Vitae.	
7. Write a PHP program to display a digital clock which displays the current time of the server	
8. Write a PHP program using function.	
9. Write a PHP program to Array manipulation.	
10. Create a PHP page for login page with sql connection.	
11. Write a PHP program to Write a file	
12. Create a web page to advertise a product of the company using images and audio.	
13. Create a web page for Travel agency.	
14. Create a web page for software company websites.	
Total Lecture Hours	**30**

BOOKS FOR STUDY:

- Head First PHP & MySQL: A Brain-Friendly Guide - 2009 - Lynn Mighley and Michael Morrison.
- The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL - Alan Forbes

BOOKS FOR REFERENCES:

- PHP: The Complete Reference - Steven Holzner.
- DT Editorial Services (Author), "HTML5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2nd Edition..

WEB RESOURCES:

- **Refer MOOC Courses like NPTEL and SWAYAM**
- **https://www.w3schools.com/php/default.asp**

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 process of executing a PHP-based script on a webserver	K1 to K4
CO2	Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops	K1 to K4
CO3	Develop PHP program to keep track of the number of visitors visiting the web page, Digital Clock, simple calculator, matrix addition, multiplication, transpose	K1 to K4
CO4	Implement the concepts of user defined functions	K1 to K4
CO5	Demonstrate the connectivity with MySQL database	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 PLAN:		
LIST OF PROGRAMS	**HRS**	**PEDAGOGY**
1. Get name of the user from a form and show greeting text. 2. Write a PHP program to check whether given number is palindrome or not. 3. Write a PHP program to check whether given number is Armstrong or not. 4. Write a PHP program to find largest values of two numbers using nesting of function 5. Write a PHP program for Mathematical calculator. 6. Write a PHP program to design Curriculum Vitae. 7. Write a PHP program to display a digital clock which displays the current time of the server 8. Write a PHP program using function. 9. Write a PHP program to Array manipulation. 10. Create a PHP page for login page with sql connection. 11. Write a PHP program to Write a file 12. Create a web page to advertise a product of the company using images and audio. 13. Create a web page for Travel agency. 14. Create a web page for software company websites.	**30**	**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**	**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)							
S.No.	**Cos**	**K Level**	**Syntax & Semantics**	**Programmingprinciples**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K3**				**15**	
5	**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	**15**	**15**	**15**	**15**	**15**	**75**	**100**	**100**