B.Sc., COMPUTER SCIENCE

Syllabus

Program Code: UCS

2023-2024 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

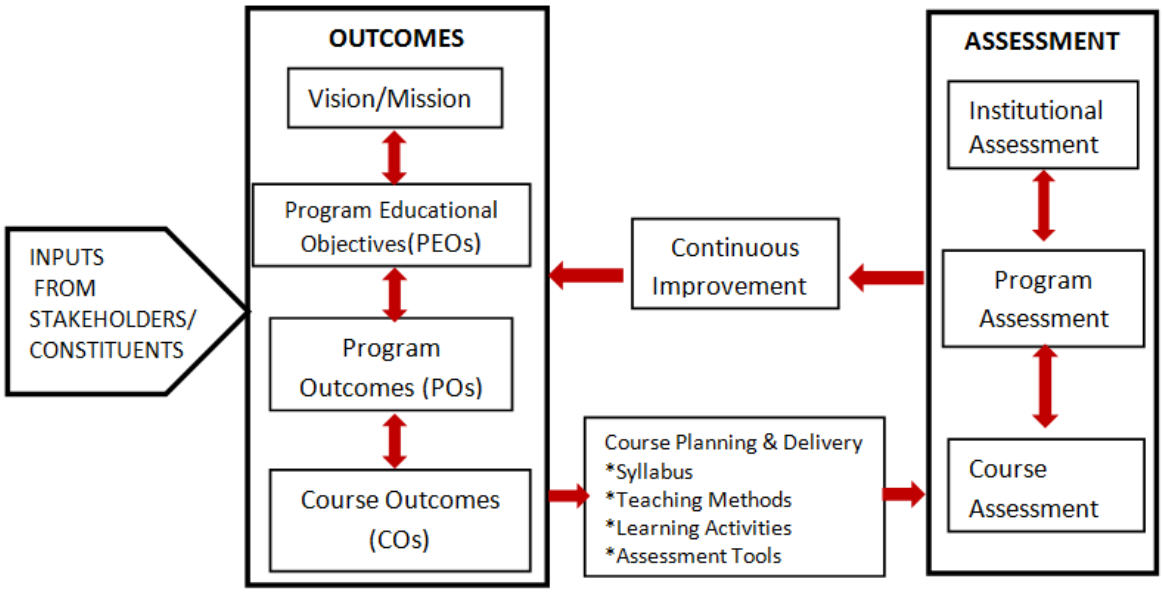
100

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.

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS),
MADURAI – 625 004
B.SC COMPUTER SCIENCE 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**					
23UCSCC11	PROGRAMMING IN C	5	5	25	75	100
23UCSCP11	PROGRAMMING IN C LAB	5	5	25	75	100
Part - III	**Elective Course**					
23UMTEA12	NUMERICAL METHODS	4	3	25	75	100
Part IV	**Non Major Elective**					
23UCSNM11	FUNDAMENTALS OF INFORMATION TECHNOLOGY	2	2	25	75	100
Part IV	**Foundation Course**					
23UCSFC11	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**					
23UCSCC21	DATA STRUCTURES AND ALGORITHMS	5	5	25	75	100
23UCSCP21	DATA STRUCTURES AND ALGORITHMS LAB	5	5	25	75	100
Part - III	**Elective Course**					
23UMTEA22	DISCRETE MATHEMATICS – I	4	3	25	75	100
Part IV	**Non Major Elective**					
23UCSNM21	OFFICE AUTOMATION	2	2	25	75	100
Part IV	**Skill Enhancement course**					
23UCSSP21	ADVANCED EXCEL LAB	2	2	25	75	100
	Total	30	23	175	525	700


FIRST SEMESTER

Course Name	PROGRAMMING IN C			
Course Code	23UCSCC11	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
- To understand the concept using if statements and loops
- This unit covers the concept of Arrays and Functions
- This unit covers the concept of Structures and unions and Preprocessors
- To understand the concept of implementing pointers.

UNIT - I : Overview of C **15**

Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables--- Assignment statement, declaring a variable as constant, as volatile.

Operators and Expression: Arithmetic, Relational, logical, assignment, increment, decrement, conditional, bitwise and special operators, arithmetic expressions, operator precedence, type conversions, mathematical functions. Managing Input and Output Operators: Reading and writing a character, formatted input, formatted output.

UNIT - II : Decision Making, Branching and Looping **15**

Decision making with If, simple IF, IF ELSE, nested IF ELSE, ELSE IF ladder, switch, GOTO statement. Decision Making and Looping: While, Do-While, For, Jumps in loops.

UNIT - III : Arrays & Functions **15**

Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. Functions: The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions.

UNIT - IV : Structures and Unions **15**

Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, arrays within structures, structures within structures, structures and functions, unions. Preprocessors: Macro substitution, file inclusion.

UNIT - V : Pointers **15**

Definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures.

Total Lecture Hours **75**

BOOKS FOR STUDY:

- E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

BOOKS FOR REFERENCES:

- Byron Gottfried, Schaum‟s Outline Programming with C, Fourth Edition, TataMcGraw-Hill, 2018.
- Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall,1998.
- YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021
- Byron Gottfried, Schaum‟s Outline Programming with C, Fourth Edition, TataMcGraw-Hill, 2018.

WEB RESOURCES:

- **https://codeforwin.org/**
- **https://www.geeksforgeeks.org/c-programming-language/**
- **http://en.cppreference.com/w/c**
- **http://learn-c.org/**
- **https://www.cprogramming.com/**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED	-	ENTREPRENEURSHIP	-		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change	**100%**	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	Remember the program structure of C with its syntax and semantics	K1 to K4
CO2	Understand the programming principles in C (datatypes, operators, branching and looping, arrays, functions, structures, pointers and files)	K1 to K4
CO3	Apply the programming principles learnt in real-timeproblems	K1 to K4
CO4	Analyze the various methods of solving a problemand choose the best method	K1 to K4
CO5	Code, debug and test the programs with appropriate test cases	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	L	S	L	M	M	S	L	M
CO2	S	L	M	S	M	S	L	M	S	L
CO3	L	M	S	L	S	M	S	S	L	M
CO4	S	L	S	M	L	S	L	L	M	S
CO5	M	S	L	L	L	S	S	M	L	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	2	3
CO 3	2	3	2	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	14	15	14	14	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93%	100%	93%	93%	100%

LESSON PLAN:

UNIT	PROGRAMMING IN C	HRS	PEDAGOGY
I	Overview of C: Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables--- Assignment statement, declaring a variable as constant, as volatile.	15	LCD, BLACK BOARD

	Operators and Expression: Arithmetic, Relational, logical, assignment, increment, decrement, conditional, bitwise and special operators, arithmetic expressions, operator precedence, type conversions, mathematical functions.Managing Input and Output Operators: Reading and writing a character, formatted input, formatted output.		
II	Decision Making and Branching: Decision making with If, simple IF, IF ELSE, nested IF ELSE , ELSE IF ladder, switch,GOTO statement. Decision Making and Looping: While, Do-While, For, Jumpsin loops.	**15**	**LCD, BLACK BOARD**
III	Arrays: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. Functions: The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions	**15**	**LCD, BLACK BOARD**
IV	Structures and Unions: Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, arrays within structures, structures within structures, structures and functions, unions.Preprocessors: Macro substitution, file inclusion.	**15**	**LCD, BLACK BOARD**
V	Pointers: definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures.	**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,K3)	2(K4,K4)
	CO2	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
	CO4	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
Question Pattern CIA I & II		**No. of Questions to be asked**	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

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

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented- Solving Problems

K4- Examining, analyzing, 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,K3)	2 (K4,K4)
2	CO2	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
3	CO3	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
4	CO4	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
5	CO5	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,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**		
		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	23UCSCP11	**L**	**P**	**C**
Category	CORE	-	5	5

COURSE OBJECTIVES:

- To familiarize the students with the Programming basics and the fundamentals of C,
- Data types in C, Mathematical and logical operations.
- To understand the concept using if statements and loops
- This unit covers the concept of Arrays and Functions
- This unit covers the concept of Structures and unions and Preprocessors
- To understand the concept of implementing pointers and files

UNIT – I LIST OF PROGRAMS

1. Evaluation of expression ex: ((x+y) ^2 * (x+z))/w
2. Temperature conversion problem (Fahrenheit to Celsius)
3. Program to convert days to months and days (Ex: 364 days= 12 months and 4 days)
4. Solution of quadratic equation
5. Salesman salary (Given: Basic Salary, Bonus for every itemsold, commission on the total monthly sales)
6. Maximum of three numbers
7. Calculate Square root of five numbers (using goto Statement)
8. Pay-Bill Calculation for different levels of employee(Switch statement)
9. Fibonacci series
10. Floyds Triangle
11. Pascal‟s Triangle
12. Prime numbers in an array
13. Sorting data (Ascending and Descending)
14. Matrix Addition and Subtraction
15. Matrix Multiplication
16. Function with no arguments and no return values
17. Function that convert lower case letters to upper case
18. Factorial using recursion.
19. Perform String Operations using Switch Case.
20. Structures that describes a Hotel (name, address, grade, avg room rent, number of rooms) Perform some operations (list ofhotels of a given grade etc.)
21. Using Pointers in Structures.
22. Cricket team details using Union.
23. Write a macro that calculates the max and min of twonumbers
24. Nested macro to calculate Cube of a number.

25. Evaluation of Pointer expressions 26. Function to exchange two pointer values 27. Creation, insertion and deletion in a linked list 28. Program to read a file and print the data. 29. Program to receive a file name and a line of text ascommand line arguments and write the text to the file 30. Program to copy the content of one file to another file.

Total Lecture Hours	**75**

BOOKS FOR STUDY:

- E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

BOOKS FOR REFERENCES:

- Byron Gottfried, Schaum‟s Outline Programming with C, Fourth Edition, TataMcGraw-Hill, 2018.
- Kernighan and Ritchie, the C Programming Language, Second Edition, Prentice Hall, 1998.
- YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021

WEB RESOURCES:

- **https://codeforwin.org/**
- **https://www.geeksforgeeks.org/c-programming language/**
- **http://en.cppreference.com/w/c**
- **http://learn-c.org/**
- **https://www.cprogramming.com/**

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP				
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL			GLOBAL		✓	
Changes Made in the Course	Percentage of Change		**80%**	No Changes Made			New Course				

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

COURSE OUTCOME:		K LEVEL
CO1	Remember the program structure of C with its syntax and semantics	K1 to K4
CO2	Understand the programming principles in C (datatypes, operators, branching and looping, arrays, functions, structures, pointers and files)	K1 to K4
CO3	Apply the programming principles learnt in real-time Problems	K1 to K4
CO4	Analyze the various methods of solving a problem and choose the best method	K1 to K4
CO5	Code, debug and test the programs with appropriate test cases	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG M – MEDIUM S - SMALL

CO & PO MAPPING:

COS	PO 1	PO 2	PO 3	PO 4	PO 5
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:			
S. No.	**PROGRAMMING IN C LAB**	**HRS**	**PEDAGOGY**
1.	Evaluation of expression ex: ((x+y) ^2 * (x+z))/w	**75**	**Hands on Training**
2.	Temperature conversion problem (Fahrenheit to Celsius)		
3.	Program to convert days to months and days (Ex: 364 days= 12 months and 4 days)		
4.	Solution of quadratic equation		
5.	Salesman salary (Given: Basic Salary, Bonus for every itemsold, commission on the total monthly sales)		
6.	Maximum of three numbers		
7.	Calculate Square root of five numbers (using goto Statement)		
8.	Pay-Bill Calculation for different levels of employee (Switch statement)		
9.	Fibonacci series		
10.	Floyds Triangle		
11.	Pascal‟s Triangle		
12.	Prime numbers in an array		
13.	Sorting data (Ascending and Descending)		
14.	Matrix Addition and Subtraction		
15.	Matrix Multiplication		
16.	Function with no arguments and no return values		
17.	Function that convert lower case letters to upper case		
18.	Factorial using recursion.		
19.	Perform String Operations using Switch Case.		
20.	Structures that describe a Hotel (name, address, grade, avg room rent, and number of rooms) Perform some operations (list of hotels of a given grade etc.)		
21.	Using Pointers in Structures.		
22.	Cricket team details using Union.		
23.	Write a macro that calculates the max and min of two numbers		
24.	Nested macro to calculate Cube of a number.		
25.	Evaluation of Pointer expressions		
26.	Function to exchange two pointer values		
27.	Creation, insertion and deletion in a linked list		
28.	Program to read a file and print the data.		

29.	Program to receive a file name and a line of text as command line arguments and write the text to the file		
30.	Program to copy the content of one file to another file.		

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

Distribution of Marks with K Level CIA I									
	K Level	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding**	**Debugging & Output**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
CIA I	**K1**	**5**					**5**	**20**	**20**
	K2		**5**				**5**	**20**	**20**
	K3			**5**			**5**	**20**	**20**
	K4				**5**	**5**	**10**	**40**	**40**
	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**
CI AI	**CO1**	**K1**	**15**				
	CO2	**K2**		**15**			
	CO3	**K3**			**15**		
	CO4	**K4**				**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**	**20**	**20**
K4				15	15	**30**	**40**	**40**
Marks	**15**	**15**	**15**	**15**	**15**	**75**	**100**	**100**

Course Name	NUMERICAL METHODS			
Course Code	23UMTEA12	**L**	**P**	**C**
Category	ELECTIVE ALLIED	4	-	3

COURSE OBJECTIVES:

- To introduce the various topics in Numerical methods.
- To make understand the fundamentals of algebraic equations.
- To apply interpolation and approximation on examples.
- To solve problems using numerical differentiation and integration
- To solve linear systems, numerical solution of ordinary differential equations

UNIT - I FUNDAMENTALS OF ALGEBRAIC EQUATION: 12

Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method

UNIT - II ITERATIVE, INTERPOLATION AND APPROXIMATION: 12

Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi‟s method for symmetric matrices. Interpolation with unequal intervals – Lagrange‟s interpolation – Newton‟s divided difference interpolation

UNIT -IIII INTERPOLATION WITH EQUAL INTERVAL: 12

Difference operators and relations. -Interpolation with equal intervals – Newton‟s forward and backward difference formulae

UNIT - IV NUMERICAL DIFFERENTIATION AND INTEGRATION: 12

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson‟s 1/3 rule

UNIT - V NITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS: 12

Single step methods – Taylor‟s series method – Euler‟s method – Modified Euler‟s method - RungeKutta method for solving(first, second , Third and 4th) order equations – Multi step methods

Total Lecture Hours 60

BOOKS FOR STUDY:

- Numerical Methods, Second Edition, S.Arumugam, A.ThangapandiIssac, A.Somasundaram, SCITECH publications, 2009.

BOOKS FOR REFERENCES:

- Mathews J.H. Numerical Method for Maths, Science and Engineering; PHI, New Delhi, 2001
- Iqbal H. Khan & Q. Hassan Numerical Methods for Engineers and Scientist - Galgotia Publications (P) Ltd., New Delhi – 1997
- M.K. Jain, S.R.K. Iyengar&R.K.Jain - Numerical Methods for Scientific and Engineering Computation - New Age International(P) Ltd., New Delhi – 1996

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	**100%**	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	Know how to solve various problems on numerical methods	**K1 to K4**
CO2	Use approximation to solve problems	**K1 to K4**
CO3	Differentiation and integration concept are applied	**K1 to K4**
CO4	Apply , direct methods for solving linear systems PO1, PO2,	**K1 to K4**
CO5	Numerical solution of ordinary differential equations	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	L	S	M	S	S	S	S
CO2	M	M	L	L	L	M	L	M
CO3	S	L	S	S	S	S	S	L
CO4	L	S	S	S	L	M	S	M
CO5	M	M	L	M	M	S	L	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	2	3
CO 3	2	3	3	3	3
CO 4	3	3	3	3	23
CO 5	3	3	2	3	3
WEITAGE	14	15	14	15	14
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93.3	100	93.3	100	100

LESSON PLAN:			
UNIT	**NUMERICAL METHODS**	**HRS**	**PEDAGOGY**
I	Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method	**12**	**LCD**
II	Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi‟s method for symmetric matrices. Interpolation with unequal intervals – Lagrange‟s interpolation – Newton‟s divided difference interpolation	**12**	**LCD**
III	Difference operators and relations. -Interpolation with equal intervals – Newton‟s forward and backward difference formulae	**12**	**LCD**
IV	Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson‟s 1/3 rul	**12**	**LCD**
V	Single step methods – Taylor‟s series method – Euler‟s method – Modified Euler‟s method - RungeKutta method for solving (first, second , Third and 4th) order equations – Multi step methods	**12**	**LCD**

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,K3)	2 (K4,K4)
	CO2	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
	CO4	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
Question Pattern CIA I & II		**No. of Questions to be asked**	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

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

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented- Solving Problems

K4- Examining, analyzing, 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,K3)	2 (K4,K4)
2	CO2	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
3	CO3	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
4	CO4	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,K4)
5	CO5	K1-K4	2	K1,K2	2 (K3,K3)	2 (K4,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**		
		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 INFORMATION TECHNOLOGY			
Course Code	23UCSNM11	**L**	**P**	**C**
Category	NME	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, EEPROM.Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridgetape, 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 theiradvantages & 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, Compilersand Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows,Unix/Linux.

Total Lecture Hours **30**

BOOKS FOR STUDY:

- Anoop Mathew, S. Kavitha Murugeshan (2009), " Fundamental of Information Technology", Majestic Books.
- Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2nd Edition.
- S. K Bansal, "Fundamental of Information Technology".

BOOKS FOR REFERENCES:

- Bhardwaj SushilPuneet 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	100%		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	S	S	S	S	S	M	M	M	L
CO2	S	S	S	S	S	S	L	M	M	M
CO3	S	S	S	S	S	S	M	M	L	M

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

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

LESSON PLAN:

UNIT	Fundamentals of Information Technology	HRS	PEDAGOGY
I	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	LCD, BLACK BOARD
II	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	LCD, BLACK BOARD
III	Primary Vs Secondary Storage, Data storage & retrieva methods. Primary Storage: RAM ROM, PROM, EPROM EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks Cartridge tape, hard disks, Floppy disks Optical Disks, Compac Disks, Zip Drive, Flash Drives	6	LCD, BLACK BOARD
IV	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	6	LCD, BLACK BOARD

	Sheets Presentation, Graphics, DBMS s/w		
V	Functions, Measuring System Performance, Assemblers, Compilers and Interpreters. Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows,Unix/Linux.	**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	23UCSFC11	**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 **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 **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 **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 **6**

Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.

UNIT – V **6**

Data Flow Diagrams: Definition, DFD symbols and typesof DFDs. **Program Modules:** Subprograms-Value andReference 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:

- Problem Solving & Comprehension, 6th edition, Arthur Whimbey and Jack Lochhead,
- Routledge, 2013
- Strategies for Creative Problem Solving, 3rd Edition, H. Scott, Folger, Steven E.
- LeBlanc; with Benjamin R. Rizzo, Pearson, Upper Saddle River, New Jersey: Prentice Hall, 2014
- How to Solve Almost Any Problem, Alan Barker, Pearson 2013

WEB RESOURCES:

- **https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm**
- **http://www.nptel.iitm.ac.in/video.php?subjectId=106102067**
- **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	**100%**	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.	**K1 to K2**
CO3	Develop program using flow chart and pseudocode.	**K1 to K2**
CO4	Determine the various operators. Explain about the structures.	**K1 to K2**
CO5	Illustrate the concept of Loops	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	**L**	**M**	**S**	**M**	**L**	**S**	**L**	**M**		
CO2	**S**	**L**	**S**	**L**	**M**	**S**	**M**	**L**		
CO3	**L**	**M**	**L**	**M**	**S**	**L**	**S**	**S**		
CO4	**M**	**S**	**S**	**L**	**S**	**M**	**L**	**L**		
CO5	**L**	**M**	**M**	**S**	**L**	**L**	**L**	**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	**PROBLEM SOLVING TECHNIQUES**	**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, High-level language,4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.	6	**BLACK BOARD, LCD**
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, documenting and testing a program: Comment lines and types of errors. **Program design:** Modular Programming.	6	**BLACK BOARD, LCD**
III	**Selection Structures:** Relational and Logical Operators - Selecting from Several Alternatives – Applications of Selection Structures. **Repetition Structures:**	6	**BLACK BOARD, LCD**

	Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.		
IV	**Data:** Numeric Data and Character Based Data. **Arrays:** One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.	**6**	**BLACK BOARD, LCD**
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**	**BLACK BOARD, LCD**

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. (I^{st} Test-2 CO's & II^{nd} 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	DATA STRUCTURES AND ALGORITHMS			
Course Code	23UCSCC21	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- The objective of the course is to introduce the fundamentals of OOPs and Data Structures
- Abstract concepts and how these concepts are useful in problem solving
- Analyze step by step and develop algorithms to solve real world problems
- Implementing various data structures Stacks, Queues, Linked Lists, Trees and Graphs
- Understanding various searching & sorting techniques file structures

UNIT – I Principles of Object-Oriented Programming: 15

Introduction – Tokens – Expressions- Control Structures – Functions in C++ - Classes and Objects- Constructors & Destructors – Pointers- Polymorphism.

UNIT – II Introduction and Overview 15

Definition – Concept of Data Structures – Overview of Data structures -Arrays: -Array based implantation – Linked list implementation.

UNIT – III Linked List 15

Definition – Single linked list – Circular Linked list – Double Linked lists — Applications of Linked Lists.

UNIT – IV Applications of Stacks & Queues 15

Stack: Introduction- Stack Operations-Evaluation of Arithmetic Expressions-Code Generation for Stack Machines –Implementation of Recursion using Factorial Calculation. **Queues:** Introduction – Definition – Representation of Queues – Various Queue Structures – Application of Queues.

UNIT – V Trees and Graphs 15

Trees: Basic Terminologies – Definition and Concepts – Representation of Binary Tree – Operations on a Binary Tree – Types of Binary Trees - Trees and Forests - B Trees - B+ Tree Indexing.

Graph: Introduction – Graph Terminologies-Representation of Graphs- Operations on Graphs.

Total Lecture Hours 75

BOOKS FOR STUDY:

- E.Balagurusamy, " Object Oriented Programming with C++", McGraw Hill Company Ltd.,8th Edition, 2021.
- Debasis Samanta, Classic Data Structures, 2nd Edition, PHI, New Delhi, 2013

BOOKS FOR REFERENCES:

- Mark Allen Weiss, "DataStructues and Algorithms Analysis in C ++", Pearson Education 2014, 4th Edition.
- Varsha H.Patil " Data structures using C++", Oxford Universities Press

WEB RESOURCES:

- **https://www.programiz.com/dsa**
- **https://www.codecademy.com/learn/c-plus-plus-for-programmers/modules/cpp-built-in-data-structures/cheatsheet**
- **https://www.javatpoint.com/cpp-dsa**

Nature of Course	EMPLOYABILITY			SKILL ORIENTED	✓		ENTREPRENEURSHIP					
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL			GLOBAL	✓			
Changes Made in the Course	Percentage of Change	**100%**		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	Be able to understand the basic concepts of OOPs Concept	**K1 to K4**
CO2	Be able to understand the concept of ADT and basic data structures as arrays	**K1 to K4**
CO3	Be able to describe the basic Linked list types.	**K1 to K4**
CO4	Be able to understand the basic data structures of Stack and Queues and its operations	**K1 to K4**
CO5	Be able to understand and identify the performance characteristics of Tree structure and graph	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	L	M	L	S	L	M		
CO2	L	S	S	L	M	M	S	L		
CO3	S	L	L	M	S	S	L	M		
CO4	L	M	M	L	S	L	M	S		
CO5	S	L	L	S	L	M	L	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**	**2**	**3**	**3**
CO 3	**3**	**3**	**3**	**2**	**3**
CO 4	**3**	**2**	**3**	**3**	**3**
CO 5	**3**	**3**	**3**	**3**	**3**
WEITAGE	**15**	**14**	**13**	**13**	**15**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**100%**	**93%**	**93%**	**93%**	**100%**

LESSON PLAN:

UNIT	DATA STRUCTURES AND ALGORITHMS	HRS	PEDAGOGY
I	**Principles of Object-Oriented Programming:** Introduction – Tokens – Expressions- Control Structures – Functions in C++ - Classes and Objects- Constructors & Destructors – Pointers- Polymorphism.	**15**	**BLACK BOARD, LCD**
II	**Introduction and Overview** Definition – Concept of Data Structures – Overview of Data structures -Arrays: -Array based implantation – Linked list implementation.	**15**	**BLACK BOARD, LCD**
III	**Linked List:** Definition – Single linked list – Circular Linked list – Double Linked lists — Applications of Linked Lists.	**15**	**BLACK BOARD, LCD**
IV	**Applications of Stacks & Queues** **Stack:** Introduction- Stack Operations-Evaluation of Arithmetic Expressions-Code Generation for Stack Machines –Implementation of Recursion using Factorial Calculation .**Queues:** Introduction – Definition – Representation of Queues – Various Queue Structures – Application of Queues.	**15**	**BLACK BOARD, LCD**
V	**Trees & Graph:** **Trees:** Basic Terminologies – Definition and Concepts – Representation of Binary Tree – Operations on a Binary Tree – Types of Binary Trees - Trees and Forests - B Trees - B+ Tree Indexing. **Graph:** Introduction – Graph Terminologies-Representation of Graphs- Operations on Graphs.	**15**	**BLACK BOARD, LCD**

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,K3)	2 (K4,K4)
	CO2	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
	CO4	**K1 – K4**	2	K1,K2	2 (K3,K3)	2 (K4,K4)
Question Pattern CIA I & II		**No. of Questions to be asked**	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

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

K1- Remembering and recalling facts with specific answers
K2- Basic understanding of facts and stating main ideas with general answers
K3- Application oriented- Solving Problems
K4- Examining, analyzing, 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**		
		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	DATA STRUCTURES AND ALGORITHMS LAB			
Course Code	23UCSCP21	**L**	**P**	**C**
Category	CORE	-	5	5

COURSE OBJECTIVES:

- To know the real time usage of Data Structures
- To understand basic concepts of Linear and nonlinear data Structures.
- To understand importance of data structures in context of writing efficient programs
- To develop skills to apply appropriate data structures in problem solving
- To Understand the elements handling in various data structures

S. No.	**LIST OF PROGRAMS**
1.	Write C++ Program to insert an Element in an Array.
2.	Write C++ Program to delete an Element in an Array.
3.	Write a C++ Program to demonstrate the concept of Functions.
4.	Write a C++ Program to demonstrate the concept of classes and objects.
5.	Write a C++ Program to sort the elements using Insertion sort.
6.	Write a C++ Program to sort the elements using Bubble sort.
7.	Write a C++ Program to sort the elements using Selection sort.
8.	Write a C++ Program to sort the elements using heap sort.
9.	Write a C++ Program to search the elements using linear search.
10.	Write a C++ Program to search the elements using binary search.
11.	Write a C++ Program to implement QUEUE operations.
12.	Write a C++ Program to implement STACK operations.
13.	Write a C++ Program to insert, delete and store the elements using linked list.

Total Lecture Hours	**60**

BOOKS FOR STUDY:

- Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.
- ReemaThareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition

BOOKS FOR REFERENCES:

- The C++ Programming Language: Special Edition.
- Effective C++: 55 Specific Ways to Improve Your Programs and Designs (3rd Edition)
- Michael T. Goodrich, Roberto Tamassia, David M. Mount, Data Structures and Algorithms

In C++, ISBN 978-0-470-38327-8, February 2011. Paperback, 736 pagesAlgorithms", Pearson Education 2003

WEB RESOURCES:

- **https://www.tutorialspoint.com/data_structures_algorithms/index.htm**
- **https://www.digimat.in/nptel/courses/video/106105225/L01.html**
- **https://www.youtube.com/watch?v=DXuIf4JCvRk**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED		ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change	**100%**	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	Infer the basic concepts of Arrays.	**K1 to K4**
CO2	Summarizing the knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, sorting of each data structure.	**K1 to K4**
CO3	Use the concepts of searching the element in data structures.	**K1 to K4**
CO4	Sketch the concepts of QUEUE and STACK, Linked list data structure.	**K1 to K4**
CO5	Classify the concepts of Trees.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	L	L		
CO2	S	L	M	S	M	S	M	M		
CO3	S	M	S	M	M	S	L	M		
CO4	L	M	S	S	M	M	M	M		
CO5	S	M	L	M	S	S	M	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**	**1**	**3**	**2**
CO 3	**3**	**3**	**3**	**3**	**2**
CO 4	**3**	**3**	**3**	**3**	**2**
CO 5	**3**	**2**	**3**	**3**	**3**
WEITAGE	**15**	**15**	**13**	**15**	**13**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**100%**	**100%**	**86.6%**	**100%**	**86.6%**

LESSON PLAN:

S. No	DATA STRUCTURES AND ALGORITHMS LAB	HRS	PEDAGOGY
1.	Write C++ Program to insert an Element in an Array.	**60**	**Black Board, Lab Demonstration and LCD Projector.**
2.	Write C++ Program to delete an Element in an Array.		
3.	Write a C++ Program to demonstrate the concept of Functions.		
4.	Write a C++ Program to demonstrate the concept of classes and objects.		
5.	Write a C++ Program to sort the elements using Insertion sort.		
6.	Write a C++ Program to sort the elements using Bubble sort.		
7.	Write a C++ Program to sort the elements using Selection sort.		
8.	Write a C++ Program to sort the elements using heap sort.		
9.	Write a C++ Program to search the elements using linear search.		
10.	Write a C++ Program to search the elements using binary search.		
11.	Write a C++ Program to implement QUEUE operations.		
12.	Write a C++ Program to implement STACK operations.		
13.	Write a C++ Program to insert, delete and store the elements using linked list.		
14.	Write a C++ Program to implement Binary Search Trees.		
15.	Write a C++ Program to implement Tree traversal.		

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**
CI AI	**CO1**	**K1**	**15**				
	CO2	**K2**		**15**			
	CO3	**K3**			**15**		
	CO4	**K4**				**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**	**20**	**20**
K4				**15**		**15**	**20**	**20**
K5					**15**	**15**	**20**	**20**
Marks						**75**	**100**	**100**

Course Name	DISCRETE MATHEMATICS – I			
Course Code	23UMTEA22	L	P	C
Category	ELECTIVE ALLIED	4	-	3

COURSE OBJECTIVES:

- To understand the mathematical concepts like set theory, logics, number theory, combinatory and relations
- To Explain the Relations concepts and their properties
- To know the Applications of recurrence relations
- To understand the Graphs and Graphs models
- To explain the Matrices concepts

UNIT - I SET THEORY **12 Hours**

Introduction- set and Its Element – Set Description (Roster, Set 12 Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Minsets-Countable and un Countable set. Algebra of sets and Duality

UNIT - II MATHEMATICAL LOGIC: **12 Hours**

Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs (Direct and Indirect)- Function- Definition-Notation- Types of Function- Composition of Functions

UNIT -III NUMBER THEORY **12 Hours**

The Integers and Division, Integers and Algorithms,(Multiplication, Addition and Division-Sequences and Summations, Recursive algorithms, Program correctness

UNIT - IV COMBINATORICS: **12 Hours**

The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations

UNIT - V RELATIONS **12 Hours**

Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings-Recurrence Relations Binary Relations

Total Lecture Hours **60**

BOOKS FOR STUDY:

- Discrete Mathematics and its applications, Seventh Edition, Kenneth.H.Rosen, McGrawHill Publishing Company, 2012
- Discrete Mathematics, M.Venkataraman, N.Sridharan and N.Chandrasekaran, The National Publishing Company, 2009.
  Unit I : Textbook 1 Chapter 1: Sections: 1.1, 1.2, 1.3, 1.4, 1.6
  Unit II : Textbook 1 Chapter 9: Sections: 9.1, 9.3, 9.4, 9.5, 9.6
  Unit III : Textbook 1 Chapter 6: Sections: 6.1, 6.2, 6.3 Chapter 8: Sections: 8.1, 8.2, 8.3 (Pages: 527 -529 only) (Exclude algorithms and relations, on page 507 and its related problems)
  Unit IV : Textbook 1 Chapter 10: Sections: 10.1, 10.2, 10.3, 10.4, 10.6)
  Unit V : Textbook 2 Chapter 6 :Sections :6.1 to 6.5, and 6.7) M.K. Jain, S.R.K. Iyengar&R.K.Jain - Numerical Methods for Scientific and Engineering Computation - New Age International(P) Ltd., New Delhi – 1996
- J.K Sharma "DISCRETE MATHEMATICS" 3 rd Edition Macmillan Reprint2011

BOOKS FOR REFERENCES:

- Modern Algebra - S.Arumugam and A. Thangapandi Isaac, Scitechpublications 2005
- Invitation to Graph Theory-S.Arumugam and S.Ramachandran, Scitech Publications,2005, Chennai.
- Discrete Mathematical Structures with applications to Computer Science - Tremblay and Manohar, McGraw Hill, 1997.

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	**100%**	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 mathematical concepts like set theory, logics, number theory, Combinatory and relations.	K1 to K4
CO2	To understand different mathematical logics and functions	K1 to K4
CO3	To Understanding the different form of number theory	K1 to K4
CO4	To gain knowledge on set theory	K1 to K4
CO5	Able to understand Relations and its applications	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	M	S	S	S	S		
CO2	M	M	L	L	L	M	L	M		
CO3	S	L	S	M	S	S	L	L		
CO4	L	L	S	M	L	M	S	M		
CO5	M	M	L	M	M	S	L	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	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	Discrete Mathematics -I	HRS	PEDAGOGY
I	Introduction- set and Its Element – Set Description (Roster, Set Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Minsets- Countable and un Countable set. Algebra of sets and Duality	12	LCD
II	Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs (Direct and	12	LCD

	Indirect)- Function- Definition-Notation- Types of Function- Composition of Functions		
III	The Integers and Division, Integers and Algorithms,(Multiplication, Addition and Division- Sequences and Summations, Recursive algorithms, Program correctness	**12**	**LCD**
IV	The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations.	**12**	**LCD**
V	Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings- Recurrence Relations Binary Relations	**12**	**LCD**

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,K3)	2(K4,K4)
	CO2	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
CI AII	**CO3**	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
	CO4	**K1 – K4**	2	K1,K2	2(K3,K3)	2(K4,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

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

K1- Remembering and recalling facts with specific answers
K2- Basic understanding of facts and stating main ideas with general answers
K3- Application oriented- Solving Problems
K4- Examining, analyzing, 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**		
		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	OFFICE AUTOMATION			
Course Code	23UCSNM21	**L**	**P**	**C**
Category	NME	2	-	2

COURSE OBJECTIVES:

- Understand the basics of computer systems and its components.
- Understand and apply the basic concepts of a word processing package.
- Understand and apply the basic concepts of electronic spreadsheet software.
- Understand and apply the basic concepts of database management system.
- Understand and create a presentation using PowerPoint tool.

UNIT - I INTRODUCTORY CONCEPTS **06**

Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse andScanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS–UNIX – Windows. Introduction to Programming Languages.

UNIT - II WORD PROCESSING **06**

Word Processing: Open, Save and close word document; Editingtext – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.

UNIT - III SPREADSHEETS **06**

Spreadsheets: Excel– opening, entering text and data, formatting, navigating; Formulas– entering, handling and copying; Charts–creating, formatting andprinting, analysis tables, preparation of financial statements ,introduction to data analytics.

UNIT - IV DATABASE CONCEPTS **06**

Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking ofdatafiles; Understanding Programming environment in DBMS;Developing menu drive applications in query language(MS–Access).

UNIT - V POWER POINT **06**

Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.

Total Lecture Hours **30**

BOOKS FOR STUDY:

- PeterNorton, "Introductionto Computers"–TataMcGraw-Hill.

BOOKS FOR REFERENCES:

- Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.
- Professional Office Procedure by Susan H Cooperman, Prentice Hall 2005

WEB RESOURCES:

- **https://www.udemy.com/course/office-automation-certificate-course/**
- **https://www.javatpoint.com/automation-tools**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED		ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	
Changes Made in the Course	Percentage of Change	**100**	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	Possess the knowledge on the basics of computers and its components	**K1 to K2**
CO2	Gain knowledge on Creating Documents, spreadsheet and presentation.	**K1 to K2**
CO3	Learn the concepts of Database and implement the Query in Database.	**K1 to K2**
CO4	Demonstrate the understanding of different automation tools.	**K1 to K2**
CO5	Utilize the automation tools for documentation, calculation and presentation purpose.	**K1 to K2**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	M	L
CO2	S	S	S	M	M	S	L	M	M	M
CO3	M	M	S	M	S	M	S	M	L	M
CO4	M	M	S	S	S	M	S	L	M	M
CO5	M	M	M	S	M	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	3

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

LESSON PLAN:

UNIT	OFFICE AUTOMATION	HRS	PEDAGOGY
I	**Introductory concepts:** Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output Devices: Monitor, Printer. Introduction to Operating systems & its features: DOS–UNIX – Windows. Introduction to Programming Languages.	**6**	**LCD, BLACK BOARD**
II	**Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.	**6**	**LCD, BLACK BOARD**
III	**Spreadsheets:** Excel – opening, entering text and data, formatting, navigating; Formulas– entering, handling and copying; Charts–creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	**6**	**LCD, BLACK BOARD**
IV	**Database Concepts:** The concept of data base management system; Dat field, records, and files, Sorting and indexing data; Searching records Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS;Developing menu drive application in query language (MS–Access).	**6**	**LCD, BLACK BOARD**
V	**Power point:** Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion ,timers.	**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	ADVANCED EXCEL LAB			
Course Code	23UCSSP21	**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**
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. Create simple bar charts, line charts, and pie charts to visualize data trends.
3.	Filter and Sort data to quickly find information in large datasets.
4.	Write basic IF statements to perform conditional calculations in your spreadsheet.
5.	Create data tables to perform sensitivity analysis or to display multiple scenarios of a calculation.
6.	Practice text functions like CONCATENATE, LEFT, RIGHT, and TRIM to clean and manipulate text data.
7.	Use functions like VLOOKUP and HLOOKUP to search for and retrieve specific data from a table.
8.	Build a PivotTable to summarize and analyze data from a large dataset.
9.	Apply conditional formatting rules to highlight specific data based on certain criteria.
10.	Use Subtotal function to group and summarize data in a list.
11.	Use date and time functions to calculate dates, durations and time differences

Total Lecture Hours	**30 Hours**

BOOKS FOR STUDY:

- Excel 2019 All
- Microsoft Excel 2019 Pivot Table Data Crunching

BOOKS FOR REFERENCES:

- Excel 2019 All-in-One for Dummies, Greg Harvey, 1st edition

WEB RESOURCES:

- **https://www.simplilearn.com**
- **https://www.javatpoint.com**
- **https://www.w3schools.com**

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Work with big data tools and its analysis techniques.	**K1 to K4**
CO2	Analyze data by utilizing clustering and classification algorithms.	**K1 to K4**
CO3	Learn and apply different mining algorithms and recommendation systems for large volumes of data	**K1 to K4**
CO4	Perform analytics on data streams.	**K1 to K4**
CO5	Learn No-SQL databases and management.	**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	M	M	M	M
CO2	S	S	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	M	M	L
CO4	M	L	M	S	S	S	M	M	M	M
CO5	M	M	S	M	M	M	M	S	L	M

S- STRONG **M – MEDIUM** **L - LOW**

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	2	2	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	14	14	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93.3	93.3	100	100

LESSON PLAN:			
S. No.	**Advanced Excel**	**HRS**	**PEDAGOGY**
1.	Use Excel functions like SUM, AVERAGE, MAX, and MIN to calculate totals, averages, and other basic statistics.	**30**	**Hands on Training**
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. Build a PivotTable to summarize and analyze data from a large dataset.		
9.	Apply conditional formatting rules to highlight specific data based on certain criteria.		
10.	Use Subtotal function to group and summarize data in a list.		
11.	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

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**