B.Sc., COMPUTER SCIENCE

Syllabus

Program Code: UCS

2023 - Onwards

MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

GUIDLINESS FOR OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(FOR UG PROGRAM FROM 2023 -2024 ONWARDS)

ELIGIBILITY FOR ADMISSION

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

DURATION OF THE COURSE

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

Subjects of Study

Part I : Tamil / Hindi /

Part II : English

Part III :

1.Core Subjects
2.Allied Subjects
3.Electives

Part IV:

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

Part V :

Extension Activities

ARTS & SCIENCE

CBCS COURSE STRUCTURE FOR UG PROGRAMS

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

QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL ASSESSMENT

Note: Duration – 1 hour

(FOR PART I, PART II & PART III)

The components for continuous internal assessment are:

Part –A

Four multiple choice questions (answer all) 4 x01= 04 Marks

Part –B

Two questions (‘either …. or ‘type) 2 x05= 10 Marks

Part –C

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

Total 30 Marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

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

Two tests and their average --15 marks

Seminar /Group discussion / Quiz Test --5 marks

Assignment --5 marks

Total 25 Marks

QUESTION PAPER PATTERN FOR THE SUMMATIVE EXAMINATIONS:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions	10 x01	= 10 Marks

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

Part –B

Five Paragraph questions (‘either …. or ‘type)	5 x 05	= 25 Marks

(One question from each Unit)

Part –C

Five Paragraph questions (‘either …. or ‘type)	5 x 08	= 40 Marks

(One question from each Unit)

Total	75 Marks

PART-IV- SKILL BASED PAPERS / NME:

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

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

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

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

Two tests and their average	--15 marks
Seminar /Group discussion / Quiz Test	-- 5 marks
Assignment	-- 5 marks
Total	25 Marks

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

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

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)

(15MCQ's from each unit)

PART-IV- ENVIRONMENTAL STUDIES AND VALUE EDUCATION

QUESTION PAPER PATTERN (INTERNAL ASSESSMENT)

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

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

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

Total		25 Marks
		---

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

SUMMATIVE EXAMINATION PATTERN

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

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)

(15MCQ's from each unit)

PART V EXTENSION ACTIVITIES: (MAXIMUM MARKS: 100)

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

Internal Examinations - - 25 Marks

Summative Examinations - - 75 Marks

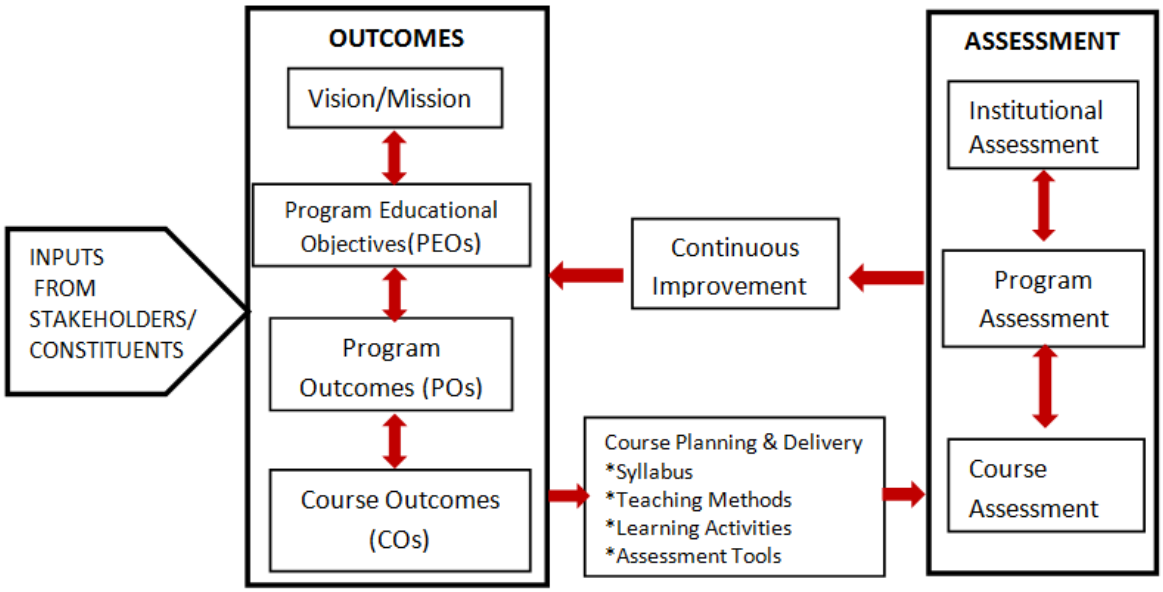
100

OUTCOME BASED EDUCATION:

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

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

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



INSTITUTIONAL VISION

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

INSTITUTIONAL MISSION

1. Enlightening the learners on the ethical and environmental issues.

2. Extending holistic training to shape the learners in to committed and competent citizens.

3. Equipping them with soft skills for facing the competitive world.

4. Enriching their employability through career oriented courses.

5. Ensuring accessibility and opportunity to make education affordable to the underprivileged.

Highlights of the Revamped Curriculum:

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

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

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 INITIAL 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**		**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	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**

B.Sc., COMPUTER SCIENCE

Syllabus

Program Code: UCS

2023 - Onwards

MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS), MADURAI – 625 004

B.SC COMPUTER SCIENCE CURRICULUM

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

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
THIRD SEMESTER						
Part – I	**Tamil / Alternative course**					
23UTAGT31	தமிழக வரலாறும் பண்பாடும்	6	3	25	75	100
Part – II	**English**					
23UENGE31	GENERAL ENGLISH - III	6	3	25	75	100
Part - III	**Core courses**					
23UCSCC31	PYTHON PROGRAMMING	5	5	25	75	100
23UCSCP31	PYTHON PROGRAMMING LAB	5	5	25	75	100
Part - III	**Elective course**					
23UMTEA31	STATISTICAL METHODS AND ITS APPLICATION	4	3	25	75	100
Part IV	**Skill Based courses**					
23UCSSC31	MULTIMEDIA SYSTEMS	1	1	25	75	100
23UCSSP31	WEB DESIGNING LAB	2	2	25	75	100
Part IV	**Mandatory course**					
23UEVSG41	ENVIRONMENTAL STUDIES	1	-	-	-	-
	Total	30	22	175	525	700
FOURTH SEMESTER						
Part – I	**Tamil / Alternative course**					
23UTAGT41	தமிழும் அறிவியலும்	6	3	25	75	100
Part – II	**English**					
23UENGE41	GENERAL ENGLISH - IV	6	3	25	75	100
Part - III	**Core courses**					
23UCSCC41	JAVA PROGRAMMING	5	5	25	75	100
23UCSCP41	JAVA PROGRAMMING LAB	5	5	25	75	100
Part - III	**Elective course**					
23UMTEA41	RESOURCE MANAGEMENT TECHNIQUES	4	4	25	75	100
Part IV	**Skill Based courses**					
23UCSSC41	SOFTWARE TESTING	1	1	25	75	100
23UCSSP41	PHP PROGRAMMING LAB	2	2	25	75	100
Part IV	**Mandatory course**					
23UEVSG41	ENVIRONMENTAL STUDIES	1	2	25	75	100
	Total	30	25	200	600	800


THIRD SEMESTER

Course Name	PYTHON PROGRAMMING			
Course Code	23UCSCC31	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- To make students understand the concepts of Python programming.
- To apply the OOPs concept in PYTHON programming.
- To impart knowledge on demand and supply concepts
- To make the students learn best practices in PYTHON programming
- To know the costs and profit maximization

UNIT - I Basics of Python Programming **15**

History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. **Python Arrays:** Defining and Processing Arrays – Array methods

UNIT - II Control & Jump Statements **15**

Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.

UNIT - III **15**

Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. **Function Arguments**: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. **Python Strings:** String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. **Modules**: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.

UNIT - IV Lists & Dictionaries **15**

Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.

UNIT - V Python File Handling **15**

Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods-append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.

Total Lecture Hours **75**

BOOKS FOR STUDY:

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

BOOKS FOR REFERENCES:

- VamsiKurama, "Python Programming: A Modern Approach", Pearson Education.
- Mark Lutz, "Learning Python", Orielly.
- Adam Stewarts, "Python Programming", Online.
- Fabio Nelli, "Python Data Analytics", A Press.
- Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

WEB RESOURCES:

- https://en.wikipedia.org/wiki/Python_(programming_language)
- https://www.programiz.com/python-programming
- https://www.guru99.com/python-tutorials.html
- https://www.w3schools.com/python/python_intro.asp
- https://www.geeksforgeeks.org/python-programming-language/

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

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Learn the basics of python, Do simple programs on python, Learn how to use an array	**K1 to K4**
CO2	Develop program using selection statement, Work with Looping and jump statements, Do programs on Loops and jump statements.	**K1 to K4**
CO3	Concept of function, function arguments, Implementing the concept strings in various application, Significance of Modules, Work with functions, Strings and modules	**K1 to K4**
CO4	Work with List, tuples and dictionary, Write program using list, tuples and dictionary.	**K1 to K4**
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	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	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
WEIGHTAGE	15	14	15	15	12	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	100%	100%	80%	100%

LESSON PLAN:

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

V	Python File Handling: Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.	**15**	**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**	**K3**	
		OR		
13. b)	**Unit - III**	**CO3**	**K3**	
14. a)	**Unit - IV**	**CO4**	**K3**	
		OR		
14. b)	**Unit - IV**	**CO4**	**K3**	
15. a)	**Unit - V**	**CO5**	**K3**	
		OR		
15. b)	**Unit - V**	**CO5**	**K3**	

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

Course Name	PYTHON PROGRAMMING LAB			
Course Code	23UCSCP31	L	P	C
Category	CORE	-	5	5

COURSE OBJECTIVES:

- Be able to design and program Python applications.
- Be able to create loops and decision statements in Python.
- Be able to work with functions and pass arguments in Python.
- Be able to build and package Python modules for reusability.
- Be able to read and write files in Python

LIST OF PROGRAMS **75**

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

Total Lecture Hours **75**

BOOKS FOR STUDY:

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

BOOKS FOR REFERENCES:

- VamsiKurama, "Python Programming: A Modern Approach", Pearson Education.
- Mark Lutz, "Learning Python", Orielly.
- Adam Stewarts, "Python Programming", Online.
- Fabio Nelli, "Python Data Analytics", A Press.
- Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

WEB RESOURCES:

- **https://en.wikipedia.org/wiki/Python_(programming_language)**
- **https://www.programiz.com/python-programming**
- **https://www.guru99.com/python-tutorials.html**
- **https://www.w3schools.com/python/python_intro.asp**
- **https://www.geeksforgeeks.org/python-programming-language/**

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED			ENTREPRENEURSHIP				
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL			GLOBAL	✓		
Changes Made in the Course	Percentage of Change		**30%**	No Changes Made			New Course				

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Demonstrate the understanding of syntax and semantics of PYTHON language	**K1 to K4**
CO2	Identify the problem and solve using PYTHON programming techniques.	**K1 to K4**
CO3	Identify suitable programming constructs for problem solving	**K1 to K4**
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.	**K1 to K4**
CO5	Develop a PYTHON program for a given problem and test for its correctness	**K1 to K4**

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	L	S	S	M	M	L	S	M
CO2	L	S	M	M	M	S	L	M	M	S
CO3	L	M	S	L	S	M	S	S	S	M
CO4	M	L	S	M	M	S	S	L	M	S
CO5	S	S	L	S	L	M	L	S	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	1	3	2
CO 3	3	3	3	3	2
CO 4	3	3	3	3	2
CO 5	3	2	3	3	3
WEIGHTAGE	15	14	13	15	12
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	87%	100%	100%

LESSON PLAN:

S. No.	Python Programming Lab	HRS	PEDAGOGY
1.	Program using variables, constants, I/O statements in Python.	75	Hands on Training
2.	Program using Operators in Python.		
3.	Program using Conditional Statements.		
4.	Program using Loops.		
5.	Program using Jump Statements.		
6.	Program using Functions.		
7.	Program using Recursion.		
8.	Program using Arrays.		
9.	Program using Strings.		
10.	Program using Modules.		
11.	Program using Lists.		
12	Program using Tuples.		
13.	Program using Dictionaries.		
14.	Program for File Handling.		

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 & Outpu**
CIA	**CO1**	**K1**	**5**				
	CO2	**K2**		**5**			
	CO3	**K3**			**5**		
	CO4	**K4**				**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	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

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**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K4**				**15**	
5	**CO5**	**K4**					**15**
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**
(Figures in parenthesis denotes, questions should be asked with the given K level)							

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**	15					**15**	**20**	**20**
	K2		15				**15**	**20**	**20**
	K3			15			15	20	20
	K4				15	1 5	30	40	40
	Marks						**75**	**100**	**100**

Course Name	STATISTICAL METHODS AND ITS APPLICATION			
Course Code	23UMTEA31	**L**	**P**	**C**
Category	ELECTIVE ALLIED	4	-	3

COURSE OBJECTIVES:

- To make understand the fundamentals of Statistics.
- Define the principal concepts about probability.
- To explain the Coefficient of Variation
- To understand the concept of Conditional Probability
- Explain the concept of a random variable and the probability distributions

UNIT - I	**12**
Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data.	
UNIT - II	**12**
Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation – Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient of Skewness.	
UNIT - III	**12**
Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression.	
UNIT - IV	**12**
Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem.	
UNIT - V	**12**
Concept of sampling distributions – standard error – Tests of significance based on t, Chi-square.	
Total Lecture Hours	**60**

BOOKS FOR STUDY:

BOOKS FOR STUDY:

Statistical Methods, S.P. Gupta, Sultan Chand and sons Publications, 4th Edition 2011

- Unit I : Chapter - 3, 5 & 6, Vol. 1.
- Unit II : Chapter - 8 & 9, Vol. 1.
- Unit III : Chapter – 10, Vol. 1.
- Unit IV : Chapter – 1, Vol. 2.
- Unit V : Chapter - 3 & 4, Vol. 2.

BOOKS FOR REFERENCES:

- Statistics, Dr. S.Arumugam and A.ThangapandiIssac, New Gamma Publication house, 2002
- KishorS. Trivedi - Probability and statistics with reliability queuing

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	Summarize the concepts of statistical methods	**K1 to K4**
CO2	Analyse the different Statistical measures of data	**K1 to K4**
CO3	Derive the marginal and conditional distributions of random variables, translate realworld problems into probability models	**K1 to K4**
CO4	To understanding the concepts of Probability of an event	**K1 to K4**
CO5	Understand basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables	**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	L	M
CO2	M	M	L	L	L	M	L	M	S	L
CO3	S	L	S	S	S	S	S	L	L	M
CO4	L	S	S	S	L	M	S	M	M	S
CO5	M	M	L	M	M	S	L	S	L	M

S- STRONG	M – MEDIUM	L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
WEIGHTAGE	15	14	15	15	12	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	100%	100%	80%	87%

LESSON PLAN:

UNIT		HRS	PEDAGOGY
I	Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data.	12	LCD, BLACK BOARD
II	Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation – Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient of Skewness.	12	LCD, BLACK BOARD
III	Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression.	12	LCD, BLACK BOARD
IV	Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem.	12	LCD, BLACK BOARD
V	Concept of sampling distributions – standard error – Tests of significance basedont, Chi-square.	12	LCD, BLACK BOARD

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	**Cos**	**K Level**	**Section A**		**Section B Either or Choice**	**Section C Either or Choice**
			MCQs			
			No. of. Questions	**K - Level**		
CI AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3,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**	**K3**	
		OR		
13. b)	**Unit - III**	**CO3**	**K3**	
14. a)	**Unit - IV**	**CO4**	**K3**	
		OR		
14. b)	**Unit - IV**	**CO4**	**K3**	
15. a)	**Unit - V**	**CO5**	**K3**	
		OR		
15. b)	**Unit - V**	**CO5**	**K3**	

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

Course Name	MULTIMEDIA SYSTEMS			
Course Code	23UCSSC31	**L**	**P**	**C**
Category	SKILL ENHANCEMENT COURSE	1	-	1

COURSE OBJECTIVES:

- Understand the definition of Multimedia
- To study about the Image File Formats, Sounds Audio File Formats
- Understand the concepts of Animation and Digital Video Containers
- To study about the Stage of Multimedia Project
- Understand the concept of Ownership of Content Created for Project Acquiring Talent

UNIT - I	**Multimedia Introduction**	**3**

Multimedia Definition-Use of Multimedia-Delivering Multimedia- Text: About Fonts and Faces - Using Text in Multimedia .

UNIT - II	**Computers and Text**	**3**

Font Editing and Design Tools-Hypermedia and Hypertext. Images: Plan Approach - Organize Tools - Configure Computer Workspace -Making Still Images - Color - Image File Formats

UNIT - III	**Sound**	**3**

The Power of Sound -DigitalAudio-MidiAudio-Midivs.DigitalAudio-MultimediaSystemSoundsAudio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project

UNIT - IV	**Animation:**	**3**

Animation: The Power of Motion-Principles of Animation-Animation by Computer - Making Animations that Work. .

UNIT - V	**Video**	**3**

Video: Using Video - Working with Video and Displays-Digital Video Containers-Obtaining Video Clips - Shooting and Editing Video

Total Lecture Hours	**15**

BOOKS FOR STUDY:

- TayVaughan,"Multimedia: Making It Work",8thEdition,Osborne/McGraw-Hill,2001

BOOKS FOR REFERENCES:

- Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication &Applications", Pearson Education, 2012.

WEB RESOURCES:

- **https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/**

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Understand the concepts, importance, application and the process of developing multimedia	**K1 & K2**
CO2	To have basic knowledge and understanding about image related processings	**K1 & K2**
CO3	To understand the framework of frames and bit images to animations	**K1 & K2**
CO4	Speaks about the multimedia projects and stages of requirement in phases of project.	**K1 & K2**
CO5	Understanding the concept of cost involved in multimedia planning, designing, and producing	**K1 & 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	PSO6
CO 1	2	2	3	3	3	2
CO 2	2	3	2	3	2	1
CO 3	1	2	3	3	3	2
CO 4	3	2	2	2	1	2
CO 5	2	3	1	3	3	3
WEIGHTAGE	10	12	11	14	12	10
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	67%	80%	73%	93%	80%	67%

LESSON PLAN:			
UNIT		**HRS**	**PEDAGOGY**
I	Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data.	**3**	**LCD, BLACK BOARD**
II	Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation – Moments – skewness and kurtosis – Pearson's coefficient of skewness – Bowley's coefficient of Skewness.	**3**	**LCD, BLACK BOARD**
III	Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression.	**3**	**LCD, BLACK BOARD**
IV	Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem.	**3**	**LCD, BLACK BOARD**
V	Concept of sampling distributions – standard error – Tests of significance basedont, Chi-square.	**3**	**LCD, BLACK BOARD**

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

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

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

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

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

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

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

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

Course Name	WEB DESIGNING LAB			
Course Code	23UCSSP31	L	P	C
Category	SKILL	-	2	2

COURSE OBJECTIVES:

- Understand the basics of HTML and its components
- To study about the Graphics in HTML
- Understand and apply the concepts of XML and DHTML
- Understand the concept of JavaScript
- To identify and understand the goals and objectives of the Ajax

LIST OF PROGRAMS **30**

HTML

- Basic Html Tags
- Hyper Links, Tables & Multimedia
- Frames

CSS

- Inline, Internal and External Style sheets

JAVA SCRIPT

- Registration Form with Table
- String, Math & Date Object's predefined methods
- Calendar Creation
- Event Handling
- Validating Simple Form
- Multi-Validating Registration Form
- Background Color Change
- On Mouseover event.

Total Lecture Hours	**30**

BOOKS FOR STUDY:

- Pankaj Sharma, "Web Technology", SkKataria& Sons Bangalore 2011.
- Mike Mcgrath, "Java Script", Dream Tech Press 2006, 1st Edition.
- Achyut S Godbole&AtulKahate, "Web Technologies", 2002, 2nd Edition

BOOKS FOR REFERENCES:

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

WEB RESOURCES:

- **NPTEL & MOOC courses titled Web Design and Development.**
- **https://www.geeksforgeeks.org**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	✓
Changes Made in the Course	Percentage of Change	**20%**	No Changes Made		New Course			

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Develop working knowledge of HTML	**K1 to K4**
CO2	Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).	**K1 to K4**
CO3	Ability to optimize page styles and layout with Cascading Style Sheets (CSS).	**K1 to K4**
CO4	Ability to develop a java script .	**K1 to K4**
CO5	An ability to develop web application using Ajax	**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	S
CO3	M	M	M	S	M	S	M	M	M	M
CO4	M	L	M	S	S	S	M	M	M	S
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**	**PSO6**
CO 1	**3**	**3**	**3**	**3**	**3**	**3**
CO 2	**3**	**3**	**1**	**3**	**2**	**3**
CO 3	**3**	**3**	**3**	**3**	**2**	**3**
CO 4	**3**	**3**	**3**	**3**	**2**	**2**
CO 5	**3**	**2**	**3**	**3**	**3**	**3**
WEIGHTAGE	**15**	**14**	**13**	**15**	**12**	**14**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**100%**	**93%**	**87%**	**100%**	**100%**	**93%**

LESSON PLAN:

S. No.	WEB DESIGNING LAB	HRS	PEDAGOGY
	HTML		
1.	• Basic Html Tags		
2.	• Hyper Links, Tables & Multimedia		
3.	• Frames		
	CSS		
4.	• Inline, Internal and External Style sheets		
	JAVA SCRIPT		
5.	• Registration Form with Table	**30**	**Hands on Training**
6.	• String, Math & Date Object's predefined methods		
7.	• Calendar Creation		
8.	• Event Handling		
	• Validating Simple Form		
9.	• Multi-Validating Registration Form		
10.	• Background Color Change		
11.	• OnMouseover event		
12.			

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 & Outpu**
CIA	**CO1**	**K1**	**5**				
	CO2	**K2**		**5**			
	CO3	**K3**			**5**		
	CO4	**K4**				**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	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

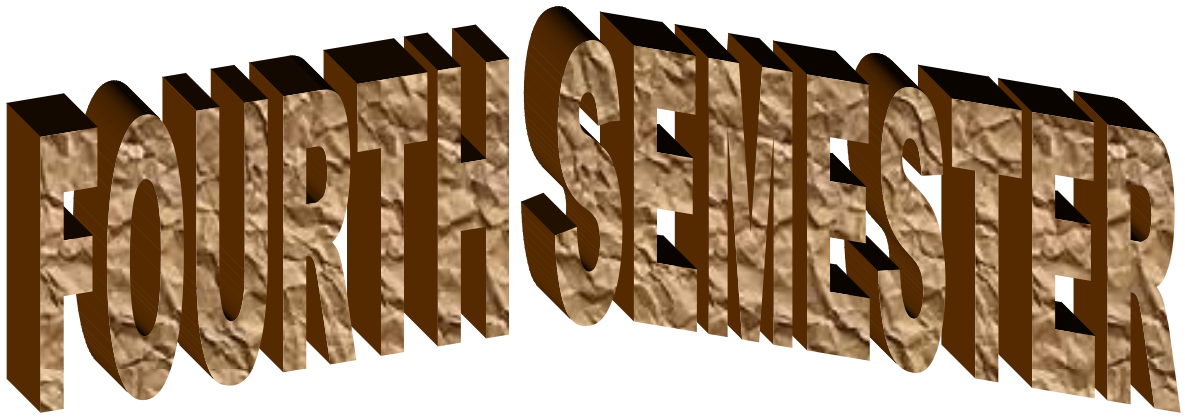
K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

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**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K4**				**15**	
5	**CO5**	**K4**					**15**
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**
(Figures in parenthesis denotes, questions should be asked with the given K level)							

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**	15					**15**	**20**	**20**
	K2		15				**15**	**20**	**20**
	K3			15			15	20	20
	K4				15	1 5	30	40	40
	Marks						**75**	**100**	**100**


FOURTH SEMESTER

Course Name	JAVA PROGRAMMING			
Course Code	23UCSCC41	**L**	**P**	**C**
Category	CORE	5	-	5

COURSE OBJECTIVES:

- To provide fundamental knowledge of object-oriented programming
- To equip the student with programming knowledge in Core Java from the basics up.
- To enable the students to use AWT controls, Event Handling and Swing for GUI.
- To provide fundamental knowledge of object-oriented programming.
- To equip the student with programming knowledge in Core Java from the basics up.

UNIT - I introduction **15**

Review of Object Oriented concepts – History of Java – Java buzzwords – JVM architecture - Datatypes - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes .

UNIT - II Inheritance Packages, Interfaces and Exception Handling **15**

Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. **Packages**: Definition-Access Protection -Importing Packages. **Interfaces**: Definition–Implementation–Extending Interfaces. **Exception Handling**: *try – catch- throw - throws – finally* – Built-in exceptions - Creating own Exception classes.

UNIT - III Multithreaded Programming and I/O Streams **15**

Multithreaded Programming: Thread Class - Runnable interface –Synchronization–Using synchronized methods– Using synchronized statement- Interthread Communication –Deadlock. **I/O Streams:** Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling

UNIT - IV AWT Controls and Event Handling **3**

The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers.

Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes

UNIT - V Swing: **15**

Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox - JScrollPane.

Total Lecture Hours	**75**

BOOKS FOR STUDY:

- Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010
- Gary Cornell, *Core Java 2 Volume I – Fundamentals,* Addison Wesley, 1999

BOOKS FOR REFERENCES:.

- Head First Java, O"Rielly Publications,
- Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010

WEB RESOURCES:

- **https://javabeginnerstutorial.com/core-java-tutorial**
- **http://docs.oracle.com/javase/tutorial/**
- **https://www.coursera.org/**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED		ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL	-	NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change	**10%**	No Changes Made		New Course			

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.	**K1 to K4**
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	**K1 to K4**
CO3	Implement multi-threading and I/O Streams of Core Java ds	**K1 to K4**
CO4	Implement AWT and Event handling.	**K1 to K4**
CO5	Use Swing to create GUI	**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	L	M
CO2	L	S	S	L	M	M	S	L	S	L
CO3	S	L	L	M	S	S	L	M	L	M
CO4	L	M	M	L	S	L	M	S	M	S
CO5	S	L	L	S	L	M	L	M	L	M

S- STRONG **M – MEDIUM** **L - LOW**

CO / PO MAPPING:

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

CO 2	**3**	**3**	**3**	**2**	**2**	**3**
CO 3	**2**	**2**	**1**	**3**	**3**	**3**
CO 4	**3**	**3**	**3**	**3**	**3**	**2**
CO 5	**3**	**3**	**3**	**3**	**3**	**1**
WEIGHTAGE	**14**	**14**	**13**	**14**	**14**	**11**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**93%**	**93%**	**87%**	**93%**	**93%**	**73%**

LESSON PLAN:

UNIT	Java Programming	HRS	PEDAGOGY
I	Introduction: Review of Object Oriented concepts – History of Java - Javabuzzwords – JVM architecture - Datatypes - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and StringBufferClasses.	**15**	**BLACK BOARD, LCD**
II	Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. Packages: Definition-Access Protection - Importing Packages. Interfaces: Definition–Implementation–Extending Interfaces. Exception Handling: try – catch- throw - throws – finally – Built-inexceptions - Creating own Exception classes.	**15**	**BLACK BOARD, LCD**
III	Multithreaded Programming: Thread Class - Runnable interface – Synchronization–Using synchronized methods– Using synchronized statement- Interthread Communication –Deadlock. I/O Streams: Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.	**15**	**BLACK BOARD, LCD**
IV	AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers. Event Handling: Events - Event sources - Event	**15**	**BLACK BOARD, LCD**
V	**Swing:** Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox - JScrollPane. .	**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,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**	**K3**	
		OR		
13. b)	**Unit - III**	**CO3**	**K3**	
14. a)	**Unit - IV**	**CO4**	**K3**	
		OR		
14. b)	**Unit - IV**	**CO4**	**K3**	
15. a)	**Unit - V**	**CO5**	**K3**	
		OR		
15. b)	**Unit - V**	**CO5**	**K3**	

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

Course Name	JAVA PROGRAMMING LAB			
Course Code	23UCSCP41	L	P	C
Category	CORE	-	5	5

COURSE OBJECTIVES:

- To provide fundamental knowledge of object-oriented programming.
- To equip the student with programming knowledge in Core Java from the basics up.
- To enable the students to know about Event Handling .
- To enable the students to use String Concepts.
- To equip the student with programming knowledge in to creat GUI using AWT

LIST OF PROGRAMS **75**

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text
4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using CharacterArray and perform the following string operations:
   a. String length
   b. Finding a character at a particular position
   c. Concatenating two strings
6. Write a program to perform the following string operations using String class:
   a. String Concatenation
   b. Search a substring
   c. To extract substring from given string
7. Write a program to perform string operations using String Buffer class:
   a. Length of a string
   b. Reverse a string
   c. Delete a substring from the given string
8. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number
9. Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.

10.Write a program to demonstrate the use of following exceptions.
a. Arithmetic Exception
b. Number Format Exception
c. ArrayIndexOutofBoundException
d. NegativeArraySizeException

11. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes

12. Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.

13. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).

14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown

Total Lecture Hours	**75**

BOOKS FOR STUDY:

- Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010
- Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999

BOOKS FOR REFERENCES:

- Head First Java, O"Rielly Publications,
- Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010

WEB RESOURCES:

- **https://javabeginnerstutorial.com/core-java-tutorial**
- **http://docs.oracle.com/javase/tutorial/**
- **https://www.coursera.org/**

Nature of Course	EMPLOYABILITY	✓	SKILL ORIENTED		ENTREPRENEURSHIP			
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change	**60%**	No Changes Made		New Course			

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

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.	K1 to K4
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	K1 to K4
CO3	Implement multi-threading and I/O Streams of Core Java	K1 to K4
CO4	Implement AWT and Event handling.	K1 to K4
CO5	Use Swing to create GUI.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

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

S- STRONG M – MEDIUM L - LOW

CO / PO MAPPING:

COS	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	2	2	3
CO 3	2	2	1	3	3	3
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	2
WEIGHTAGE	14	14	13	14	14	12
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	93%	93%	87%	93%	93%	80%

LESSON PLAN:

S.No.	JAVA PROGRAMMING LAB	HRS	PEDAGOGY
1. 2. 3. 4.	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer Write a Java program to multiply two given matrices. Write a Java program that displays the number of characters, lines and words in a text Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.	75	Hands on Training

5.	Write a program to do String Manipulation using Character Array and perform the following string operations: a. String length b. Finding a character at a particular position c. Concatenating two strings		
6.	Write a program to perform the following string operations using String class: a. String Concatenation b. Search a substring c. To extract substring from given string		
7.			
8.	Write a program to perform string operations using String Buffer class: a. Length of a string b. Reverse a string c. Delete a substring from the given string		
9.			
10.	Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number		
11.	Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.		
12	Write a program to demonstrate the use of following exceptions. a. Arithmetic Exception b. Number Format Exception c. ArrayIndexOutofBoundException d. NegativeArraySizeException		
13.	Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes		
14.	Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).		
15.	Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.		

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 & Outpu**
CIA	**CO1**	**K1**	**5**				
	CO2	**K2**		**5**			
	CO3	**K3**			**5**		
	CO4	**K4**				**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	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

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**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K4**				**15**	
5	**CO5**	**K4**					**15**
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**
(Figures in parenthesis denotes, questions should be asked with the given K level)							

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**	15					**15**	**20**	**20**
	K2		15				**15**	**20**	**20**
	K3			15			15	20	20
	K4				15	1 5	30	40	40
	Marks						**75**	**100**	**100**

Course Name	RESOURCE MANAGEMENT TECHNIQUES			
Course Code	23UMTEA41	L	P	C
Category	ELECTIVE ALLIED	4	-	4

COURSE OBJECTIVES:

- To introduce the concepts of OR
- To explain the Linear Programming Problem
- To illustrate the Simplex Method
- To know the Duality Theorems
- To understanding the Methods for finding IBFS for the Transportation Problems

UNIT - I	12
Development of OR: Definition of OR – Modeling - Characteristics and Phases - Tools,Techniques & Methods - scope of OR.	
UNIT - II	**12**
Linear Programming Problem: Formulation - Slack & surplus variables - Graphical solution of LPP.	
UNIT - III	**12**
.Simplex Method - Concept of duality in LPP - Definition of primal dual problems - General rules for converting any primal into its dual.	
UNIT - IV	**12**
Duality Theorems: (without proof) Primal dual correspondence - Duality and Simplex method -Mathematical formulation of assignment problem - Method for solving assignment problem.	
UNIT - V	**12**
Mathematical formulation of Transportation Problem: Methods for finding IBFS for the Transportation Problems.	
Total Lecture Hours	**60**

BOOKS FOR STUDY:

Operations Research, S.D.Sharma, KedarNath Ram Nath& Co

- Unit I : Chapter-1(1.1, 1.2, 1.4,1.,1.8,1.9,1.10,1.11)
- Unit II : Chapter-3 (3.1, 3.2, 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.4,3.5)
- Unit III : Chapter-5 (5.1, 5.2, 5.2.1, 5.4) Chapter- 7 (7.1,7.2,7.3,7.4)
- Unit IV : Chapter-7 (7.5) (Statements only); 7.6, 7.7 Chapter 11(11.2,11.3,11.4)
- Unit V : Chapter-12 (12.2 to 12.8)

BOOKS FOR REFERENCES:

- Operation Research, Nita H.Shah, Ravi M.Gor and Hardiksoni,PrenticeHall of India Pvt. Ltd., New Delhi 2008.
- Operation Research, R.Sivarethinamohan, Tata McGraw Hill, 2005.
- Operations Research – An Introduction by HamdyA.Taha. Ninth Edition, Dorling Kindersley Pvt. Ltd., Noida, India, 2012

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 understanding the concepts of Development of OR	**K1 to K4**
CO2	Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems	**K1 to K4**
CO3	Solve the problems of Simplex Method	**K1 to K4**
CO4	To study the Duality Theorems	**K1 to K4**
CO5	Finding initial basic feasible and optimal solution of the Transportation problems	**K1 to K4**

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

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	2
CO 3	3	3	3	3	3	2
CO 4	3	2	3	3	23	3
CO 5	3	3	2	3	3	3
WEIGHTAGE	14	15	14	15	14	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100	93.3	93.3	100	100	87

LESSON PLAN:			
UNIT		HRS	PEDAGOGY
I	Development of OR: Definition of OR – Modeling - Characteristics and Phases - Tools, Techniques & Methods - scope of OR.	12	LCD, BLACK BOARD
II	Linear Programming Problem: Formulation - Slack & surplus variables - Graphical solution of LPP.	12	LCD, BLACK BOARD
III	Simplex Method - Concept of duality in LPP - Definition of primal dual problems - General rules for converting any primal into its dual	12	LCD, BLACK BOARD
IV	Duality Theorems: (without proof) Primal dual correspondence - Duality and Simplex method - Mathematical formulation of assignment problem - Method for solving assignment problem.	12	LCD, BLACK BOARD
V	Mathematical formulation of Transportation Problem: Methods for finding IBFS for the Transportation Problems.	12	LCD, BLACK BOARD

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	**Cos**	**K Level**	**Section A**		**Section B Either or Choice**	**Section C Either or Choice**
			MCQs			
			No. of. Questions	**K - Level**		
CI AI	**CO1**	**K1 – K4**	2	K1,K2	2(K3,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**	**K3**	
		OR		
13. b)	**Unit - III**	**CO3**	**K3**	
14. a)	**Unit - IV**	**CO4**	**K3**	
		OR		
14. b)	**Unit - IV**	**CO4**	**K3**	
15. a)	**Unit - V**	**CO5**	**K3**	
		OR		
15. b)	**Unit - V**	**CO5**	**K3**	

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

Course Name	SOFTWARE TESTING			
Course Code	23UCSSC41	**L**	**P**	**C**
Category	SKILL ENHANCEMENT COURSE	1	-	1

COURSE OBJECTIVES:

- To study fundamental concepts in software testing
- To discuss various software testing issues and solutions in software unit test, integration and system testing.
- To study the basic concept of Data flow testing and Domain testing.
- To Acquire knowledge on path products and path expressions.
- To learn about Logic based testing and decision table

UNIT - I Introduction	**3**
Purpose–Productivity and Quality in Software–TestingVs Debugging–Model for Testing–Bugs–Types of Bugs – Testing and Design Style .	
UNIT - II Flow / Graphs and Path Testing	**3**
Flow / Graphs and Path Testing – Achievable paths – Path instrumentation Application Transaction Flow Testing Techniques.	
UNIT - III Testing Strategies	**3**
Data Flow Testing Strategies - Domain Testing:Domains and Paths – Domains and Interface Testing.	
UNIT - IV Metrics	**3**
Linguistic –Metrics – Structural Metric – Path Products and Path Expressions.SyntaxTesting–Formats–Test Cases . .	
UNIT - V Logic Based Testing	**3**
Logic Based Testing–Decision Tables–Transition Testing–States, State Graph, StateTesting.	
Total Lecture Hours	**15**

BOOKS FOR STUDY:

- B.Beizer,"SoftwareTestingTechniques",IIEdn.,DreamTechIndia,NewDelhi,2003.
- K.V.K.Prasad,"SoftwareTestingTools",DreamTech.India,NewDelhi,2005

BOOKS FOR REFERENCES:

- Burnstein,2003,"PracticalSoftwareTesting",SpringerInternationalEdn.
- E. Kit, 1995, "Software Testing in the Real World: Improving the Process", PearsonEducation,Delhi.
  R. Rajani,andP.P.Oak,2004,"SoftwareTesting",TataMcgrawHill,New Delhi.

WEB RESOURCES:

- **https://www.javatpoint.com/software-testing-tutorial.**
- **https://www.guru99.com/software-testing.html**

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

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

COURSE OUTCOMES:		**K LEVEL**
After studying this course, the students will be able to:		
CO1	Students learn to apply software testing knowledge and engineering methods	**K1 to K4**
CO2	Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.	**K1 to K4**
CO3	Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.	**K1 to K4**
CO4	Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems	**K1 to K4**
CO5	Have an ability to use software testing methods and modern software testing tools for their testing projects	**K1 to K4**

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**	**PSO6**
CO 1	**3**	**2**	**1**	**2**	**1**	**2**
CO 2	**3**	**3**	**2**	**2**	**3**	**3**
CO 3	**3**	**3**	**2**	**3**	**3**	**2**
CO 4	**3**	**2**	**3**	**2**	**2**	**3**
CO 5	**3**	**2**	**2**	**2**	**3**	**3**
WEIGHTAGE	**15**	**12**	**10**	**11**	**12**	**13**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**100%**	**80%**	**67%**	**73%**	**80%**	**87%**

LESSON PLAN:

UNIT	SOFTWARE TESTING	HRS	PEDAGOGY
I	Introduction: Purpose–Productivity and Quality in Software–Testing Vs Debugging–Model for Testing–Bugs–Types of Bugs – Testing and Design Style	**3**	**LCD, BLACK BOARD**
II	Flow / Graphs and Path Testing – Achievable paths – Path instrumentation Application Transaction FlowTesting Techniques.	**3**	**LCD, BLACK BOARD**
III	Data Flow Testing Strategies - Domain Testing:Domains and Paths – Domains and Interface Testing.	**3**	**LCD, BLACK BOARD**
IV	Linguistic –Metrics – Structural Metric – Path Products and Path Expressions.SyntaxTesting–Formats–Test Cases	**3**	**LCD, BLACK BOARD**
V	Logic Based Testing–Decision Tables–Transition Testing–States, State Graph, State Testing	**3**	**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	PHP PROGRAMMING LAB			
Course Code	23UCSSP41	L	P	C
Category	SKILL	-	2	2

COURSE OBJECTIVES:

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

S.No.	**LIST OF PROGRAMS**	**30**

1. Get name of the user from a form and show greeting text.
2. Write a php program to check whether given number is palindrome or not.
3. Write a php program to check whether given number is Armstrong or not.
4. Write a php program to find largest values of two numbers using nesting of function.
5. Write a Mathematical calculator program.
6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
7. Write a PHP program to display a digital clock which displays the current time of the server
8. Write a php program using function.
9. Write a php program to Array manipulation.
10. Write a php program to design personal information
11. Create a PHP page for login page with sql connection.
12. Write a php program to Read from existing file.
13. Write a php program to Write a file
14. Write a php program to design Curriculum Vitae.
15. Write a php program hit counter using cookies.
16. Create a web page to advertise a product of the company using images and audio.
17. Create a web page for Travel agency.
18. Create a web page for software company websites

Total Lecture Hours	**30**

BOOKS FOR STUDY:

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

BOOKS FOR REFERENCES:

- PHP: The Complete Reference-Steven Holzner.
- DT Editorial Services (Author), "*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*", Paperback 2016, 2nd Edition.

WEB RESOURCES:

- **https://www.w3schools.com/php/default.asp**

Nature of Course	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENEURSHIP	✓		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	✓
Changes Made in the Course	Percentage of Change	**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	Write PHP scripts to handle HTML forms	**K1 to K4**
CO2	Write regular expressions including modifiers, operators, and metacharacters.	**K1 to K4**
CO3	Create PHP Program using the concept of array.	**K1 to K4**
CO4	Create PHP programs that use various PHP library functions	**K1 to K4**
CO5	Manipulate files and directories.	**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**	**PSO6**
CO 1	**3**	**2**	**1**	**2**	**1**	**2**
CO 2	**3**	**3**	**2**	**2**	**3**	**3**
CO 3	**3**	**3**	**2**	**3**	**3**	**2**
CO 4	**3**	**2**	**3**	**2**	**2**	**3**
CO 5	**3**	**2**	**2**	**2**	**3**	**3**
WEIGHTAGE	**15**	**12**	**10**	**11**	**12**	**13**
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	**100%**	**80%**	**67%**	**73%**	**80%**	**87%**

LESSON PLAN:

S. No.	PHP PROGRAMMING LAB	HRS	PEDAGOGY
1.	Get name of the user from a form and show greeting text.	30	Hands on Training
2.	Write a php program to check whether given number is palindrome or not.		
3.	Write a php program to check whether given number is Armstrong or not.		
4.	Write a php program to find largest values of two numbers using nesting of function.		
	Write a Mathematical calculator program.		
5.	Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.		
6.	Write a PHP program to display a digital clock which displays the		
7.	current time of the server		
8.	Write a php program using function.		
9.	Write a php program to Array manipulation.		
10.	Write a php program to design personal information		
11.	Create a PHP page for login page with sql connection.		
12.	Write a php program to Read from existing file.		
13.	Write a php program to Write a file		
14.	Write a php program to design Curriculum Vitae.		
15.	Write a php program hit counter using cookies.		
16.	Create a web page to advertise a product of the company using images		
17.	and audio.		
	Create a web page for Travel agency.		
18.	Create a web page for software company websites.		

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 & Outpu**
CIA	**CO1**	**K1**	**5**				
	CO2	**K2**		**5**			
	CO3	**K3**			**5**		
	CO4	**K4**				**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	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

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**	**Syntax & Semantics**	**Programming principles**	**Concept Applications**	**Coding& Implementation**	**Debugging & Output**
1	**CO1**	**K1**	**15**				
2	**CO2**	**K2**		**15**			
3	**CO3**	**K3**			**15**		
4	**CO4**	**K4**				**15**	
5	**CO5**	**K4**					**15**
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**
(Figures in parenthesis denotes, questions should be asked with the given K level)							

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**	15					**15**	**20**	**20**
	K2		15				**15**	**20**	**20**
	K3			15			15	20	20
	K4				15	1 5	30	40	40
	Marks						**75**	**100**	**100**