INFORMATION TECHNOLOGY

Syllabus

Program Code: UIT

2021-2022 onwards

MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

Eligibility for Admission

Candidates should have passed the Higher Secondary Examination with 10+2 pattern conducted by the Board of Higher Secondary Education, Govt. of Tamil Nadu or any other examinations accepted by the Syndicate as equivalent there to and the candidate should have studied +2 level Mathematics in the 10+2 pattern.

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 / Company Secretarial Practice and Modern Office Management
Part II   : English

Part III   :
1. Core Subjects
2. Allied Subjects
3. Electives

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

Part V   :
Extension Activities

Pattern of the question paper 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
Three short answers questions (answer all)   3 x02= 06 Marks
Part –C
Two questions ('either …. or 'type)   2 x 05=10 Marks
Part –D
Two questions out of three   1 x 10 =10 Marks

                        Total   30 Marks

The scheme of Examination for Part-I, II & III

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   --5 marks

Assignment   --5 marks

        Total   25 Marks

Pattern of the question paper 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

Short answer questions (one question from each unit)   5 x02   = 10 Marks

Part –C

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

(One question from each Unit)

Part –D

Three Essay questions out of five   3 x 10   =30 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)
Pattern of the questions paper for the continuous Internal Assessment

45 MCQs will be asked for each internal assessment tests (45 x 1=45 Marks**) and converted for 15 marks**

The components for continuous internal assessment are:

Two tests and their average   --15 marks

Seminar /Group discussion   --5 marks

Assignment   --5 marks

        Total   25 Marks

Summative Examination Pattern

Pattern of the Question Paper for Skill Based Papers (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

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--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.

Question Paper Pattern

 (Internal Assessment)

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

45 MCQs will be asked for each internal assessment tests (45 x 1=45 Marks) **and converted for 15 marks**

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

Total		25 Marks

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

Pattern of the Question Paper for (Internal Examination & Summative Examination)

Internal Examinations   - - 40 Marks

Summative Examinations - - 60 Marks

                          _____

                   100

                          _____

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

The 12 Graduate Attributes*:

1. (KB) A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.

2. (PA) Problem analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions

3. (Inv.) Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.

4. (Des.) Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. (Tools) Use of engineering tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.

6. (Team) Individual and teamwork: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.

7. (Comm.) Communication skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.

8. (Prof.) Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.

9. (Impacts) Impact of engineering on society and the environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

10. (Ethics) Ethics and equity: An ability to apply professional ethics, accountability, and equity.

11. (Econ.) Economics and project management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.

12. (LL) Life-long learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

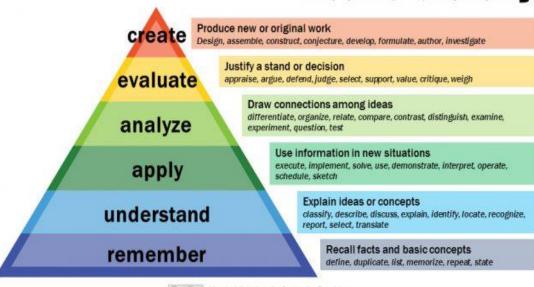| WA	Graduate Attributes	Caption As
WA1	Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.	Knowledge Base
WA2	An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions	Problem Analysis & Investigation
WA4	An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.	
WA10	An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.	Communication Skills & Design
WA3	An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.	
WA9	An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.	Individual and Team Work
WA6	An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.	Professionalism, Ethics and equity

WA8	An ability to apply professional ethics, accountability, and equity.	
WA12	An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge	**Life long learning**
WA5	An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.	--
WA7	An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.	Impact on Society
WA11	An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations	Economics and project management

PROGRAM EDUCATIONAL OBJECTIVE (PEOs)	
PEO1:	To empower students with high level attainment in professional career and higher Education by accruing knowledge of computation, mathematics and pursue higher studies
PEO2:	To equip students with profound knowledge about the vital information technology to deal With industry oriented problems and develop novel products.
PEO3:	To incorporate Graduates with excellent communication skills, excel in multi-disciplinary, Multi-cultural teams and non-technical disciplines.
PEO4:	To identify and analyze user needs and to take them into account in the evaluation and administration of computing based systems.
PEO5:	To inculcate professional-social ethics, team work in students and acquaint them with Requisite technical and managerial skills to attain a successful career
PEO6:	To take on positions as I.T. leaders and/or embark on a research career in the field, Collaborate effectively in teams, Work effectively in the IT field to make a positive contribution to society.

PO NO	PROGRAMME OUTCOMES (POs)	
At the end of the programme, the students will be able to		
PO – 1	Demonstrate the knowledge and understanding of Science concepts and its relevant fields.	**Disciplinary Knowledge**
PO – 2	Identify, formulate, analyse complex problems and reach valid conclusions using the methodologies of Science.	**Problem Solving**
PO – 3	Employ critical and analytical thinking in understanding the concepts and apply them in various problems appearing in different branches of Science.	**Analytical Reasoning & Critical Thinking**
PO - 4	Communicate the known concepts effectively within the profession and with any forum	**Communication Skills**
PO - 5	Function successfully as a member/leader in any team and to apply ethics, accountability and equity in their life.	**Team Work and Moral/Ethical Awareness**
PO - 6	Use ICT tools in various learning situations, related information sources, suitable software to analyze data and furthermore participating in learning activities throughout life to meet the demands of work place through knowledge /up-skilling / re-skilling	**Digital Literacy & Life-long Learning**

PROGRAM SPECIFIC OUTCOME (PSOs)	
PSO1:	Understand the technical concepts and practices in the core Information Technologies of human computer interaction, information management, programming, and networking
PSO2:	Ability to identify and define the computing requirements appropriate to its solution and implement the same.
PSO3:	Apply and recommend the appropriate IT infrastructure required for the implementation of a project.
PSO4:	Design, develop and test software systems for world-wide network of computer stop provide solutions to real world problem
PSO5:	Effectively integrate IT-based solutions in to the user environment.
PSO6:	Pursue and successfully complete an advanced degree, if desired.

Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

Vanderbilt University Center for Teaching

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS), MADURAI

Information Technology CURRICULUM

(For the student admitted during the academic year 2021-2022 onwards)

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
FIRST SEMESTER						
Part – I	**Tamil / Alternative Course**					
21UTAG11	இக்காலக் கவிதையும் நாடகமும்	6	3	25	75	100
Part – II	**English**					
21UENG11	Communicative English -I	6	3	25	75	100
Part - III	**Core Courses**					
21UITC11	Computing Fundamentals and C Programming	5	5	25	75	100
21UITCP1	Programming in C Lab	4	4	40	60	100
Part III	**Allied Course**					
21UMCA11	Mathematical Foundations	5	4	25	75	100
Part IV	**Skill Based Course**					
21UITSP1	Internet Basics Lab	2	2	40	60	100
Part IV	**Mandatory Course**					
21UEVG11	Environmental Studies	2	2	25	75	100
	Total	**30**	**23**	**205**	**495**	**700**
SECOND SEMESTER						
Part – I	**Tamil / Alternative Course**					
21UTAG21	இடைக்கால இலக்கியமும் சிறுகதையும்	6	3	25	75	100
Part – II	**English**					
21UENG21	Communicative English -II	6	3	25	75	100
Part - III	**Core Courses**					
21UITC21	Object Oriented Programming with C++	5	5	25	75	100
21UITCP2	Object Oriented Programming with C++ Lab	4	4	40	60	100
Part III	**Allied Course**					
21UELA21	Digital Principles and Computer Organization	5	4	25	75	100
Part IV	**Skill Based Course**					
21UITSP2	PC Software Lab	2	2	40	60	100
21UVLG21	**Value Education**	2	2	25	75	100
	Total	**30**	**23**	**205**	**495**	**700**

THIRD SEMESTER						
Part – I	**Tamil / Alternative Course**					
21UTAG31	காப்பிய இலக்கியமும் உரைநடையும்	6	3	25	75	100
Part – II	**English**					
21UENG31	Communicative English -III	6	3	25	75	100
Part - III	**Core Courses**					
21UITC31	Relational Database Management System	5	5	25	75	100
21UITCP3	Relational Database Management System Lab	4	4	40	60	100
Part III	**Allied Course**					
21UMCA31	Numerical Aptitude	5	4	25	75	100
Part IV	**Skill Based Course**					
21UITSP3	R Programming Lab	2	2	40	60	100
Part IV	**Non Major Elective Course**					
21UITN31	Computer Fundamentals	2	2	25	75	100
	Total	**30**	**23**	**205**	**495**	**700**
FOURTH SEMESTER						
Part – I	**Tamil / Alternative Course**					
21UTAG41	பண்டைய இலக்கியமும் புதினமும்	6	3	25	75	100
Part – II	**English**					
21UENG41	Communicative English -IV	6	3	25	75	100
Part - III	**Core Courses**					
21UITC41	Programming in Java	5	4	25	75	100
21UITCP4	Programming in Java Lab	4	4	40	60	100
Part III	**Allied Course**					
21UITA41	Systems Programming and Operating Systems	5	4	25	75	100
Part IV	**Skill Based Course**					
21UITSP4	Linux Lab	2	2	40	60	100
Part IV	**Non Major Elective Course**					
21UITN41	Introduction to Internet	2	2	25	75	100
Part V	**Extension Activities**					
21UEAG40 - 21UEAG49	NSS, NCC, YRC	-	1	40	60	100
	Total	**30**	**23**	**245**	**555**	**800**

	FIFTH SEMESTER					
Part - III	**Core Courses**					
21UITC51	Software Engineering	6	4	25	75	100
21UITC52	.NET and C# Programming	6	4	25	75	100
21UITCP5	.NET and C# Programming Lab	6	4	40	60	100
Part III	**Core Elective -I**					
21UITE51	Data Structures					
21UITE52	Multimedia and Applications	5	5	25	75	100
21UITE53	Computer Graphics and Design					
Part III	**Core Elective -II**					
21UITE54	Data Communications and Networks					
21UITE55	Cryptography & Network Security	5	5	25	75	100
21UITE56	Principles of Software Testing					
Part IV	**Skill Based Course**					
21UITSP5	Programming in PHP and MYSQL Lab	2	2	40	60	100
	Total	**30**	**24**	**180**	**420**	**600**
	SIXTH SEMESTER					
Part - III	**Core Courses**					
21UITC61	Python Programming	6	4	25	75	100
21UITCP6	Python Programming Lab	6	4	40	60	100
21UITPR1	Project and Viva Voce	6	4	40	60	100
Part III	**Core Elective Courses -I**					
21UITE61	Management Information System					
21UITE62	Artificial Intelligence and Knowledge Representation	5	5	25	75	100
21UITE63	Internet of Things					
Part III	**Core Elective Courses -II**					
21UITE64	Data Mining					
21UITE65	Cloud Computing Principles	5	5	25	75	100
21UITE66	Big Data Analytics					
Part IV	**Skill Based Course**					
21UITSP6	MangoDB Lab	2	2	40	60	100
	Total	**30**	**24**	**195**	**405**	**600**
	Grand Total	**180**	**140**	**1235**	**2865**	**4100**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	COMPUTING FUNDAMENTALS AND C PROGRAMMING			
Course Code	21UITC11	L	P	C
Category	Core	5	-	5
Nature of course:	EMPLOYABILITY✓ SKILL ORIENTED ✓ ENTREPRENEURSHIP			

Course Objectives:

- To introduce the concepts of computer basics & programming with particular attention to Engineering examples.
- To learn the fundamental programming concepts and methodologies which are essential to building good C programs.
- To practice the fundamental programming methodologies in the C programming language via laboratory experiences.
- To code, document, test, and implement a well-structured, robust computer program using the C programming language.
- To write reusable modules (collections of functions).

Unit: I	Introduction	15
Generation and Classification of Computers – Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for Logical Analysis and Thinking – Algorithm – Pseudo Code – Flowchart		
Unit: II	C Programming Basics	15
Problem Formulation – Problem Solving – Introduction to "C" Programming – Fundamentals – Structure of a "C" Program – Compilation and Linking Processes – Constants, Variables – Data types – Expressions Using Operators in "C" – Managing Input and Output Operations – Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems.		
Unit: III	Arrays and Strings	15
Arrays – Initialization – Declaration – One Dimensional and Two Dimensional Arrays – String – String Operations – String Arrays. Simple programs – Sorting – Searching – Matrix Operations.		
Unit: IV	Functions and Pointers	15
Function – Definition of function – Declaration of function – Pass by Value – Pass by Reference – Recursion – Pointers – Definition – Initialization – Pointers and Arrays – Example Problems.		
Unit: V	Structures and Unions	15
Introduction – Need for Structure Data Type – Structure Definition – Structure Declaration – Structure within a Structure - Union – Program Using Structures and Unions – Storage Classes – Pre-processor Directives		
	Total Lecture Hours	75

Books for Study:

1. Anita Goel & Ajay Mittal, COMPUTER FUNDAMENTALS AND PROGRAMMING IN C, Pearson ,Noida, 2017.

    Unit I   : Chapter 1 and 2
    Unit II : Chapter 2,3,4,and 5
    Unit III : Chapter 6 and 7
    Unit IV : Chapter 6 and 8

Unit V : Chapter9 and 10	

Books for References:

1. E.Balagurusamy, Programming in ANSI C, Tata McGraw Hill Education Private Limited, Sixth Edition, New Delhi, 2012
2. YashavantKanetkar, Let Us C, BPB Publications, New Delhi, Tenth Edition, 2010.
3. Byron Gottfried, Programming with C, McGraw Hill Education (India) Private Limited, New Delhi, Third Edition, 2014.
4. Brain W.Kernigham& Dennis Ritchie, C Programming, Prentice Hall, Second Edition, 1988.

Web Resources:

1. **https://www.slideshare.net/AjitNayak20/computer-fundamentals-intro-to-c-programming-module-i**
2. **https://www.slideshare.net/avikdhupar/amazing-c**

Course Outcomes	K Level
CO1: Use the concepts for solving scientific and mathematical problems.	**K3**
CO2: Demonstrate an understanding of computer programming language concepts.	**K3**
CO3: Design and develop computer programs, analyses and interprets the concept of pointers, declarations, initialization, operations on pointers and their implementations.	**K3**
CO4: Define data types, use them in simple data processing applications and able to describe the concept of array of structures.	**K3**
CO5: Relate the concepts of programming and develop confidence to learn the C language for life time.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	1	3	3	1	2	1
CO 2	2	1	3	2	3	1
CO 3	2	2	3	3	3	1
CO 4	2	2	3	3	2	2
CO5	1	2	1	3	2	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	Computing fundamentals and C Programming	Hrs	Pedagogy
I	Generation and Classification of Computers – Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for Logical Analysis and Thinking – Algorithm – Pseudo Code – Flowchart	15	Chalk & Talk, ICT Kit
II	Problem Formulation – Problem Solving – Introduction to "C" Programming – Fundamentals – Structure of a "C" Program – Compilation and Linking Processes – Constants, Variables – Data types – Expressions Using Operators in "C" – Managing Input and Output Operations – Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems.	15	Chalk & Talk, ICT Kit
III	Arrays – Initialization – Declaration – One Dimensional and Two Dimensional Arrays – String – String Operations – String Arrays. Simple programs – Sorting – Searching – Matrix Operations.	15	Chalk & Talk, ICT Kit
IV	Function – Definition of function – Declaration of function – Pass by Value – Pass by Reference – Recursion – Pointers – Definition – Initialization – Pointers and Arrays – Example Problems.	15	Chalk & Talk, ICT Kit
V	Introduction – Need for Structure Data Type – Structure Definition – Structure Declaration – Structure within a Structure - Union – Program Using Structures and Unions – Storage Classes – Pre-processor Directives	15	Chalk & Talk, ICT Kit

Course Designed by**: Dr. M. Karthika & Mrs. R. Vanitha**

Learning Outcome Based Education & Assessment (LOBE) **Formative Examination - Blue Print** **Articulation Mapping – K Levels with Course Outcomes (COs)**								
Internal	**Cos**	**K Level**	**Section A** **MCQs**		**Section B** **Short Answers**		**Section C** **Either or Choice**	**Section D** **Open Choice**
			No. of Questions	**K – Level**	**No. of Questions**	**K - Level**		
CIA I	CO1	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CIA II	CO3	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II	**No. of Questions to be asked**		4		3		4	2
	No. of Questions to be answered		4		3		2	1
	Marks for each question		1		2		5	10
	Total Marks for each section		4		6		10	10

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
	Distribution of Marks with K Level CIA I & CIA II							
CIA I	K1	2	-	-	-	2	4	20
	K2	2	6	-	-	8	16	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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.

S.No	COs	K - Level	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)								
1	CO1	**K3**	2	K1&K2	1	K1	2 (K3& K3)	1 (K2)
2	CO2	**K3**	2	K1&K2	1	K1	2 (K3 &K3)	1 (K3)
3	CO3	**K3**	2	K1&K2	1	K2	2 (K3 &K3)	1 (K3)
4	CO4	**K3**	2	K1&K2	1	K2	2 (K3 &K3)	1 (K3)
5	CO5	**K4**	2	K1&K2	1	K2	2 (K4 &K4)	1 (K4)
\multicolumn{3}{l}{No. of Questions to be Asked}	10		5		10	5
\multicolumn{3}{l}{No.of Questions to be answered}	10		5		5	3
\multicolumn{3}{l}{Marks for each question}	1		2		5	10
\multicolumn{3}{l}{Total Marks for each section}	10		10		25	30
(Figures in parenthesis denotes, questions should be asked with the given K level)								

Distribution of Marks with K Level

K Levels	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	6	10	-	19	**15.83**	**42**
K2	5	4	10	10	31	**25.83**	
K3	-	-	20	30	50	**41.67**	**42**
K4	-	-	10	10	20	**16.67**	**16**
Marks	**10**	**10**	**50**	**50**	**120**	**100**	**100**

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K4	
20) b	CO5	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K3	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	**PROGRAMMING IN C LAB**			
Course Code	**21UITCP1**	**L**	**P**	**C**
Category	**Core Lab**	**-**	**4**	**4**

Nature of course:	EMPLOYABILITY	✓SKILL ORIENTED	✓	ENTREPRENEURSHIP

Course Objectives:

- To understand the concepts of data types
- To Read, understand and trace the execution of programs written in C language.
- To write programs that performs operations using derived data types.
- To develop logics this will help them to create programs, applications in C.
- To learn the basic programming constructs they can easily switch over to any other language in future.

S. No.	List of Programs	Hours
1.	Simple interest calculation	
2.	Check the given number is odd or even –ordinary/ conditional operator methods.	
3.	Prime number checking	
4.	Print all prime numbers between any two given limit.	
5.	Check the given character is vowels or not.	
6.	Perform various arithmetic operations using switch case.	
7.	Find the sum of digits of a given number and find the reverse of a number.	
8.	Program to generate a Fibonacci series	
9.	Program to find GCD of two numbers	
10.	Binary to decimal-Decimal to binary conversion.	
11.	Arrange -n numbers in ascending and descending order	**60**
12.	Arrange -N strings in alphabetical order.	
13.	Matrix addition/ subtraction/multiplication	
14.	Calculate the factorial value by recursion.	
15.	Reverse a string by recursion.	
16.	Mark list processing- array of structures.	
17.	Program to declare and initialize an Union	
18.	Program to store information of 5 students in Structure and display it.	
19.	Program to create a File and store information about a person in terms of name, age and salary.	
20.	Program to find the biggest among the 3 numbers using Pointers.	

	Total Lecture Hours	**60**

Course Outcomes:		K Level
At the will be Course the student will be able to		
CO1:	Identify and understand the logic for a given problem.	**K2**
CO2:	Memorize the C programming keywords build new programs.	**K2**

CO3:	Execute and mind mapping the syntax and construction of C programming code	K3
CO4:	Understand and validating the use of header files.	K3
CO5:	Remember and applying the steps involved in compiling, linking and debugging C code.	K4

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	-	-	2	2	-
CO 2	-	-	2	3	3	-
CO 3	3	3	3	3	2	-
CO 4	3	3	2	-	2	3
CO5	1	3	3	3	-	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S. No.	List of Programs	Hrs	Mode
1.	Simple interest calculation		
2.	Check the given number is odd or even –ordinary/ conditional operator methods.		
3.	Prime number checking		
4.	Print all prime numbers between any two given limit.		
5.	Check the given character is vowels or not.		
6.	Perform various arithmetic operations using switch case.		
7.	Find the sum of digits of a given number and Find the reverse of a number.		
8.	Program to generate a Fibonacci series		
9.	Program to find GCD of two numbers		
10.	Binary to decimal-Decimal to binary conversion.		
11.	Arrange -n numbers in ascending and descending order	60	Laboratory experiments
12.	Arrange -N strings in alphabetical order.		
13.	Matrix addition/ subtraction/multiplication		
14.	Calculate the factorial value by recursion.		
15.	Reverse a string by recursion.		
16.	Mark list processing- array of structures.		
17.	Program to declare and initialize an Union		
18.	Program to store information of 5 students in Structure and display it.		
19.	Program to create a File and store information about a person in		
20.	terms of name, age and salary. Program to find the biggest among the 3 numbers using Pointers.		

Course Designed by: **Dr. M. Karthika & Mrs. R. Vanitha**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	Mathematical Foundations			
Course Code	**21UMCA11**	**L**	**P**	**C**
Category	**Allied**	5	-	4
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENEURSHIP**			✓

Course Objectives:

- To understand the rank of a matrix and apply it to solving system of linear equations.
- To analyze Eigen values and associated Eigen vectors of a matrix.
- To study the methods of reasoning, which includes algebra of propositions, such as compound propositions, truth tables, and tautologies
- To write and interpret mathematical notation and mathematical definitions
- To acquire a basic idea of graph, various terms associated and matrix representations of graphs, Trees and their properties

Unit: I	Matrix Algebra	15

Introduction - Matrix operations – Inverse of a Square Matrix – Elementary operations and Rank of a Matrix – Simultaneous Linear Equations.

Unit: II	Matrix Algebra	15

Inverse by Partitioning – Eigen values and Eigen vectors(Problems only)

Unit: III	Logic	15

Introduction – TF-statements – Connectives – Atomic and compound statements – Well Formed (Statement) Formulae – Truth table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae

Unit: IV	Lattices and Boolean Algebra	15

Lattices – Some properties of Lattices – New Lattices – Modular and Distributive Lattices – Boolean Algebras – Boolean Polynomials – Karnaugh Graphs (Problems only).

Unit: V	Graph Theory	15

Basic concepts – Matrix Representation of Graphs – Trees – Spanning Trees – Shortest Path Problem (Problems only).

		Total Lecture Hours	**75 Hrs**

Books for Study:

Dr. M.K. Venkataraman. N. Sridharan. and N. Chandrasekaran.., **"Discrete Mathematics"**, The National Publishing Company, Chennai, 2006.

Unit I   - Chapter 6:   Pages : 6.1- 6.31
Unit II   - Chapter 6: Pages   : 6.31- 6.44
Unit III   - Chapter 9:   Pages : 9.1 – 9.34
Unit IV   - Chapter10:   Pages :10.1 – 10.70
Unit V   - Chapter11:   Pages : 11.1 – 11.81

Books for References:

1. Trembley. J.P. and Manohar.R., 2001, **Discrete Mathematical Structures with Applications to Compute Science**, Tata McGraw –Hill Publishing Company Ltd, New Delhi.
2. Seymour Lipschutz and Marc Lars Lipson, 2002, **Discrete Mathematics**, Tata McGraw Hill

Publishing Company Ltd. New Delhi.	

Web Resources:
- **https://nptel.ac.in/courses/106/106/106106094/**
- **https://nptel.ac.in/courses/111/107/111107058/**
- **https://nptel.ac.in/courses/111/106/111106086/**
- **https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-cs53/**

Course Outcomes		K Level
On the successful completion of the course, the students will be able to		
CO1:	apply the matrix theory to study other branches of mathematics like algebra, vector analysis, cryptography, graph theory etc	**K1**
CO2:	apply the matrix theory to analyze the quantitative and qualitative properties of solutions of mathematical models in biological, ecological systems and in engineering problems	**K1**
CO3:	be conversant with the rules of logic to understand and reason with statements	**K3**
CO4:	Formulate and interpret Boolean logic principles.	**K3**
CO5:	have a strong background of graph theory	**K3**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	3	2	3	2
CO 2	2	3	3	3	2	3
CO 3	3	2	2	2	3	2
CO 4	3	2	2	3	3	2
CO5	3	2	3	3	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

<u>LESSON PLAN</u>

UNIT	Mathematical Foundations	Hrs	Pedagogy
I	Introduction - Matrix operations – Inverse of a Square Matrix – Elementary operations and Rank of a Matrix – Simultaneous Linear Equations.	12	**Chalk & Talk, LCD Projector**
II	Inverse by Partitioning – Eigen values and Eigen vectors (Problems only)	12	**Chalk & Talk**
III	Introduction – TF-statements – Connectives – Atomic and compound statements – Well Formed (Statement) Formulae – Truth table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae	12	**Chalk & Talk**
IV	Lattices – Some properties of Lattices – New Lattices – Modular and Distributive Lattices – Boolean Algebras – Boolean Polynomials – Karnaugh Graphs (Problems only).	12	**Chalk & Talk, LCD Projector**
V	Basic concepts – Matrix Representation of Graphs – Trees – Spanning Trees – Shortest Path Problem (Problems only).	12	**Chalk & Talk, Assignment**

Course Designed by: **Mr. P. Palanikumar & Dr. S. Suriyakala**

			Section A		Section B		Section C Either or Choice	Section D Open Choice
Internal	**Cos**	**K Level**	MCQs		Short Answers			
			No. of. Questions	**K - Level**	**No. of. Questions**	**K – Level**		
CI AI	**CO1**	Up to K3	2	K1,K2	1	K1	2 (K2)	1 K3
	CO2	Up to K4	2	K1,K2	2	K2	2(K3&K3)	1 (K4)
CI AII	**CO3**	Up to K4	2	K1,K2	1	K1	2 (K2)	1 (K3)
	CO4	Up to K4	2	K1,K2	2	K2	2 (K3)	1 (K4)
Question Pattern CIA I & II	No. of Questions to be asked		**4**		**3**		**4**	**2**
	No. of Questions to be answered		**4**		**3**		**2**	**1**
	Marks for each question		**1**		**2**		**5**	**10**
	Total Marks for each section		**4**		**6**		**10**	**10**

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

*Note: It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	2	2	-	-	4	8	40
	K2	2	4	10	-	16	32	
	K3	-	-	10	10	10	20	40
	K4	-	-	-	10	10	10	20
	K5	-	-	-	--	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	**K1**	2	2	-	-	4	8	40
	K2	2	4	10	-	16	32	
	K3	-	-	10	10	10	20	40
	K4	-	-	-	10	10	10	20
	K5	-	-	-	--	-	-	-
	Marks	4	6	20	20	50	100	100

Title of table: **Distribution of Marks with K Level CIA I & CIA II**

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.

			MOQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level		
1	CO 1	**K3**	**2**	**K1**	**1**	**K1**	**2 (K3& K3)**	**1 (K2)**
2	CO 2	**K3**	**2**	**K1**	**1**	**K1**	**2 (K3 &K3)**	**1 (K3)**
3	CO 3	**K3**	**2**	**K1&K2**	**1**	**K2**	**2 (K3 &K4)**	**1 (K3)**
4	CO 4	**K4**	**2**	**K1&K2**	**1**	**K2**	**2 (K3 &K4)**	**1 (K3)**
5	CO 5	**K4**	**2**	**K1&K2**	**1**	**K2**	**2 (K3 &K4)**	**1 (K4)**
No. of Questions to be Asked			**10**		**5**		**5**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	**5**	**6**	**10**	**-**	**19**	**15.83**	**42**
K2	**5**	**4**	**10**	**10**	**31**	**25.83**	
K3	**-**	**-**	**20**	**30**	**50**	**41.67**	**42**
K4	**-**	**-**	**10**	**10**	**20**	**16.67**	**16**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K3	
6	CO3	K3	
7	CO4	K3	
8	CO4	K3	
9	CO5	K3	
10	CO5	K3	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K3	
14	CO4	K3	
15	CO5	K3	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K1	
16) b	CO1	K1	
17) a	CO2	K1	
17) b	CO2	K1	
18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K3	
20) b	CO5	K3	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K1	
22	CO2	K1	
23	CO3	K3	
24	CO4	K3	
25	CO5	K3	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	INTERNET BASICS LAB			
Course Code	**21UITSP1**	**L**	**P**	**C**
Category	**Skill Lab**	-	2	2
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ ENTREPRENEURSHIP			

Course Objectives:
- To provide complete knowledge of Internet basics
- To learn the concept of static web page .
- To know the usage of Markup languages with scripting.
- To understand the working principle behind the website.
- To learn the concepts of chatting and network components in future.

S. No.	List of Programs	Hours
1.	Describe the stages of create e-mail id on yahoo web site, how will you send and receive e mail.	
2.	Describe the chatting components on the internet	
3.	Describe the use and function of the following (a) telnet (b) TCP/IP (c) HTTP.	
4.	Create your first web page using notepad in HTML.	
5.	Create your login webpage for your college website or company website.	

6.	Create the web page with the following constraints
	   a) an image on the webpage.
	   b) a hyperlink to college website
	   c) a table of marks of IT class students.
		30

7.	Show blinking effect on web page using java script.	
8.	Design a digital clock on your web page using java script.	
9.	Design a digital calculator using HTML and java Script.	
10.	Design the web site on your college	
	Total Lecture Hours	**30**

Course Outcomes :		K Level
At the end of the Course the student will be able to		
CO1:	Understand, create email id, sending and receiving emails.	**K3**
CO2:	Apply and design Web Page using HTML and Java script.	**K2**
CO3:	Familiarize with Web page design using HTML / DHTML.	**K3**
CO4:	Create a Web site using text, images, links, lists.	**K4**
CO5:	Demonstrate simple applications programs using HTML controls	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	-	-	2	2	-
CO 2	-	-	2	3	3	-
CO 3	3	3	3	3	2	-
CO 4	3	3	2	-	2	3
CO5	1	3	3	3	-	3

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

S. No.	List of Programs	Hours	Mode
1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	Describe the stages of create e-mail id on yahoo web site, how will you send and receive e mail. Describe the chatting components on the internet Describe the use and function of the following (a) telnet (b) TCP/IP (c) HTTP. Create your first web page using notepad in HTML. Create your login webpage for your college website or company website. Create the web page with the following constraints a) an image on the webpage. b) a hyperlink to college website c) a table of marks of IT class students. Show blinking effect on web page using java script. Design a digital clock on your web page using java script. Design a digital calculator using HTML and java Script. Design the web site on your college	30	**Laboratory Experiments**

Course Designed by**: Ms. T. Thivya Sindhu & Mrs. R.K. Vijayalakshmi**

SECOND SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	OBJECT ORIENTED PROGRAMMING WITH- C++			
Course Code	**21UITC21**	**L**	**P**	**C**
Category	**Core**	5	-	5
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED**		✓	ENTREPRENEURSHIP
Course Objectives:				

- To understand how C++ improves C with object-oriented features.
- To learn how to write inline functions for efficiency and performance.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To implement the object oriented Paradigm.

Unit: I	**Principles of OOP :**	15

Object Oriented Programming Paradigm- Basic concepts of OOP-Benefits of OOP. Beginning with C++: What is C++ - A simple C++ program-Structure of C++ Program -Tokens-Keywords-Identifiers and Constants-Basic data types-User defined data types – Derived data types-storage classes- type compatibility-Declaration of variables-Scope resolution operator- manipulator-Expression and their types-Control structures.

Unit: II	**Functions in C++:**	15

The Main function-function prototyping-Call by reference-return by reference-Inline functions-Recursion- Function Overloading- Default Arguments-Function Overloading. Class and Objects: Introduction-specifying a Class-Defining member function-Nesting of member function- Arrays within a class-Memory allocation for objects-Static data members and member functions-Array of objects-Friendly functions-returning objects-const member functions.

Unit: III	**Constructors and Destructors:**	15

Introduction-Constructors- Parameterized constructor-Constructor with default arguments-Dynamic initialization of objects-Copy constructor-Dynamic constructor-constructing two dimensional arrays-Destructor. Operator Overloading: Defining operator overloading-Overloading unary operators-Overloading binary operators- Rules for overloading operators. Inheritance: Introduction-Single-Multilevel-Multiple-Hierarchical-Hybrid inheritance-virtual base class

Unit: IV	**Templates:**	15

Introduction-Class templates-Class template with multiple parameters-function templates-function template with multiple parameters –overloading of template functions-member function template-non-type template arguments. Exception Handling: Introduction - basics of exception handling-exception handling mechanism-catching mechanism-rethrowing an exception. Manipulating strings: Introduction (string) objects-manipulating string objects-relational operations-comparing and swapping.

Unit: V	**I/O Operations:**	15

Managing console I/O operations: Introduction-C++ streams- C++ stream classes-unformatted I/O operations-formatted console I/O operations-output manipulators. Working with files: Introduction: classes for file stream operations-opening and closing a file-detecting EOF() - file modes-sequential i/o operations-random access-command line arguments.

	Total Lecture Hours	75
Books for study:		

1. E.Balagurusamy, Object Oriented Programming with C++, McGraw Hill Education (Private) Limited, 6th Edition New Delhi, 2014.
   Unit 1: Chapter 1,2 & 3
   Unit 2: Chapter 3 & 4
   Unit 3: Chapter 5,6 & 7
   Unit 4: Chapter 12,13 & 14
   Unit 5: Chapter 10 & 11

Books for References:

1. Stroustrup, The C++ Programming Language, 4th Edition. AddisionWesley . May 2013.
2. Herbert Schildt C++ - The Complete Reference ,4th Edition, McGraw Hill. July 2017

Web Resources:

1. **http://www.lmpt.univ-tours.fr/~volkov/C++.pdf**
2. **https://www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf**

Course Outcomes:		K Level
At the end of the Course the student will be able to		
CO1:	Define various data types, use them in simple data processing applications, object oriented concepts for solving scientific and mathematical problems.	**K3**
CO2:	Understand of object oriented programming concepts in real time problems.	**K3**
CO3:	Implement the concept of overloading, inheritance, exception handling.	**K3**
CO4:	Find the advantages of OOPs over Procedural Languages	**K4**
CO5:	Develop Application of C++ program skills in real time project and develop confidence to update the C++ language for life time.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	1	3	3	-	2	-
CO 2	2	-	3	2	3	-
CO 3	2	2	2	3	-	-
CO 4	2	2	3	3	3	2
CO 5	-	2	2	3	3	3

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

UNIT	Object Oriented Programming- C++	Hrs	Pedagogy
I	Principles of OOP : Object Oriented Programming Paradigm- Basic concepts of OOP-Benefits of OOP. Beginning with C++: What is C++ - A simple C++ program-Structure of C++ Program -Tokens-Keywords-Identifiers and Constants-Basic data types-User defined data types – Derived data types-storage classes- type compatibility-Declaration of variables-Scope resolution operator- manipulator-Expression and their types-Control structures.	15	**Chalk & Talk, ICT Kit**
II	Functions in C++: The Main function-function prototyping-Call by reference-return by reference-Inline functions-Recursion- Function Overloading- Default Arguments-Function Overloading. Class and Objects: Introduction-specifying a Class-Defining member function-Nesting of member function- Arrays within a class-Memory allocation for objects-Static data members and member functions-Array of objects-Friendly functions-returning objects-const member functions.	15	**Chalk & Talk, ICT Kit**
III	Constructors and Destructors: Introduction-Constructors- Parameterized constructor-Constructor with default arguments-Dynamic initialization of objects-Copy constructor-Dynamic constructor-constructing two dimensional arrays-Destructor. Operator Overloading: Defining operator overloading-Overloading unary operators-Overloading binary operators-Rules for overloading operators. Inheritance: Introduction-Single-Multilevel-Multiple-Hierarchical-Hybrid inheritance-virtual base class	15	**Chalk & Talk, ICT Kit**
IV	Templates: Introduction-Class templates-Class template with multiple parameters-function templates-function template with multiple parameters –overloading of template functions-member function template-non-type template arguments. Exception Handling: Introduction - basics of exception handling- exception handling mechanism-catching mechanism-rethrowing an exception. Manipulating strings: Introduction (string) objects-manipulating string objects-relational operations-comparing and swapping.	15	**Chalk & Talk, ICT Kit**
V	Managing console I/O operations: Introduction-C++ streams- C++ stream classes-unformatted I/O operations-formatted console I/O operations-output manipulators. Working with files: Introduction: classes for file stream operations-opening and closing a file-detecting EOF() - file modes-sequential i/o operations-random access-command line arguments.	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mrs.R.Vanitha & Mr.P.Ganeshbabu**

Learning Outcome Based Education & Assessment (LOBE) **Formative Examination - Blue Print** **Articulation Mapping – K Levels with Course Outcomes (COs)**								
			Section A		Section B		**Section C** **Either or** **Choice**	**Section D** **Open** **Choice**
			MCQs		Short Answers			
Internal	**Cos**	**K Level**	**No. of.** **Questions**	**K –** **Level**	**No. of.** **Questions**	**K -** **Level**		
CIA I	CO1	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CIA II	CO3	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
Question **Pattern** **CIA I & II**	No. of Questions to be asked		4		3		4	2
	No. of Questions to be answered		4		3		2	1
	Marks for each question		1		2		5	10
	Total Marks for each section		4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K **Level**	**Section A** **(Multiple** **Choice** **Questions)**	**Section B** **(Short** **Answer** **Questions)**	**Section C** **(Either /** **Or** **Choice)**	**Section D** **(Open** **Choice)**	**Total** **Marks**	**% of** **(Marks** **without** **choice)**	**Consolidate** **of %**
CIA I	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	10	50	100	100
CIA II	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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.

			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level		
1	CO1	**K3**	2	K1&K2	1	K1	2 (K3& K3)	1 (K3)
2	CO2	**K3**	2	K1&K2	1	K1	2 (K3 &K3)	1 (K3)
3	CO3	**K3**	2	K1&K2	1	K2	2 (K3 &K3)	1 (K3)
4	CO4	**K4**	2	K1&K2	1	K2	2 (K4 &K4)	1 (K4)
5	CO5	**K4**	2	K1&K2	1	K2	2 (K4 &K4)	1 (K4)
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(Figures in parenthesis denotes, questions should be asked with the given K level)

Distribution of Marks with K Level

K Levels	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	6	10	-	19	15.83	42
K2	5	4	10	10	31	25.83	
K3	-	-	20	30	50	41.67	42
K4	-	-	10	10	20	16.67	16
Marks	10	10	50	50	120	100	100

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K4	
19) b	CO4	K4	
20) a	CO5	K4	
20) b	CO5	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

Course Name	OBJECT ORIENTED PROGRAMMING WITH C++ LAB			
Course Code	21UITCP2	**L**	**P**	**C**
Category	Core Lab	-	4	4
Nature of course:	EMPLOYABILITY ✓	SKILL ORIENTED ✓	ENTREPRENEURSHIP	

Course Objectives:
- To understand how C++ improves C with object-oriented features.
- To learn how to write inline functions for efficiency and performance.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To implement the concept of OOPs.

S. No.	List of Programs	Hours
1.	Conversion of Fahrenheit and Celsius using class.	
2.	Calculate multiplication and division using inline function.	
3.	Perform area calculation the function overloading	
4.	Print the employee details using Arrays of object.	
5.	Swapping of two numbers using friend function.	
6.	Change the sign using overloading unary minus	
7.	Overload binary + operator this adds two complex numbers.	
8.	Calculate BMI using single inheritance	
9.	Generate salary bill using multiple inheritance.	
10.	Calculate square and cube of a number using hierarchical inheritance.	
11.	Process Student Mark list Multilevel inheritance.	**60**
12.	Print the Student Mark list using Virtual Base class.	
13.	Sort N numbers using Bubble Sort.	
14.	Search an element using Linear Search	
15.	Search an element using Binary Search.	
16.	Perform stack operations using Array.	
17.	Perform stack operations using Linked List.	
18.	Print Fibonacci series using Recursion.	
19.	Perform queue operations using Array.	
20.	Traversal of Tree	
	Total Lecture Hours	**60**

Course Outcomes	K Level
At the end of the Course the students will be able to	
CO1: Understand the concept of class, member function and member variable.	**K2**
CO2: Understand the difference between the top-down and bottom-up approach	**K3**
CO3: Categorize the inheritance types and polymorphism	**K3**
CO4: Apply and analyze Exception handling.	**K4**
CO5: Test the templates concept of OOP.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	-	-	2	2	-
CO 2	-	-	2	3	3	-
CO 3	3	3	3	3	2	-
CO 4	3	3	2	-	2	3
CO5	1	3	3	3		3

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

S. No.	List of Programs	Hrs	Pedagogy
1.	Conversion of Fahrenheit and Celsius using class.		
2.	Calculate multiplication and division using inline function.		
3.	Perform area calculation the function overloading		
4.	Print the employee details using Arrays of object.		
5.	Swapping of two numbers using friend function.		
6.	Change the sign using overloading unary minus		
7.	Overload binary + operator this adds two complex numbers.		
8.	Calculate BMI using single inheritance		
9.	Generate salary bill using multiple inheritance.		
10.	Calculate square and cube of a number using hierarchical inheritance.	**60**	**Laboratory Experiments**
11.	Process Student Mark list Multilevel inheritance.		
12.	Print the Student Mark list using Virtual Base class.		
13.	Sort N numbers using Bubble Sort.		
14.	Search an element using Linear Search		
15.	Search an element using Binary Search.		
16.	Perform stack operations using Array.		
17.	Perform stack operations using Linked List.		
18.	Print Fibonacci series using Recursion.		
19.	Perform queue operations using Array.		
20.	Traversal of Tree		

Course Designed by: **Mrs.R.Vanitha & Mr.P.Ganeshbabu**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION			
Course Code	21UELA21	L	P	C
Category	Allied	5	-	4
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENEURSHIP			

Course Objectives:

- To understand the basics of number system and gates.
- To learn how to work on combinatorial Logic.
- To learn the Arithmetic Circuits and Flip-Flops.
- To learn the types of Registers.
- To implement the instruction codes.

Unit: I	Number Systems and Codes:	15

Binary Number system – Binary to decimal – decimal to binary – hexa decimal – ASCII code – Excess-3 Code – Gray code.
Digital Logic: The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.

Unit: II	Combinatorial Logic Circuits:	15

Boolean Laws and Theorems. - Sum of Products method - Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.
Data Processing Circuits: Multiplexers – Demultiplexers-1-of-16 Decoder – BCD-to- decimal Decoders – Seven-segment Decoders – Encoders – Exclusive- OR Gates- Parity Generators and Checkers

Unit: III	Arithmetic Circuits:	15

Binary Addition- Binary Subtraction – 2'S Complement Representation - 2's Complement Arithmetic – Arithmetic Building Blocks- Adder- Subtractor
Flip-Flops-RS Flip-Flops-Gated Filp-Flops-Edge-triggered RS Flip-Flops-Edge-triggered D Flip-flops--Edge-triggered JK Flip-Flops-JK Master Slave Flip-flops.

Unit: IV	Types of Registers	15

Serial In-Serial Out – Serial In-Parallel Out – Parallel In- Parallel Out – Ring Counter – Ripple Counter – Synchronous Counter.

Unit: V	Instruction Codes	15

Computer Register – Computer Instructions – Timing And Control – Instruction Cycle. Control Memory – Address Sequencing – General Register Organization – Stack Organization – Instruction Formats – Data Transfer and Manipulations -Addressing Modes – Program Control.

		Total Lecture Hours	75

Books for Study:

2. Digital Principles and Applications – Donald P Leach, Albert Paul Malvino, Goutam Saha, 8th edition , McGraw-Hill Education, 3rd reprint 2015.
3. Computer System Architecture, M. Morris Mano, Pearson Education,3rd Edition- 2007
     UNIT I   : Text Book 1 :Chapters 5: (5.1 to 5.9) and 2: (2.1 to 2.3)

UNIT II   : Text Book 1 :Chapters 3: (3.1 to 3.8) and 4: (4.1 to 4.7)
UNIT III : Text Book 1 :Chapters 6: (6.1 to 6.8) and 8: (8.1 to 8.5,8.8)
UNIT IV : Text Book 1 :Chapters 9: (9.1 to 9.6) and 10: (10.1,10.3)
 UNIT V : Text Book 2 :Chapter 5:(5.1 to 5.5) ,7:(7.1,7.2) and Chapter 8 (8.1
to8.7)

Books for References:

1. Digital Design, R.Anantha Natarajan, PHI Learning, 2015.
2. Principles of Digital Electronics, K.Meena, PHI Learning, 2013.
3. Digital Computer Fundamentals, Thomas C. Bartee TMH 2007.

Web Resources:

 1. https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPL ICATION%20BY%20LEACH%20&%20MALVINO.pdf
 2. https://www.javatpoint.com/digital-computers

Course Outcomes	K Level
CO1: Understand the basics of number system and logic gates	**K3**
CO2: Understand combinatorial logic circuits and implementation of circuits	**K3**
CO3: Analyze the concept of Arithmetic circuits and Flip Flops.	**K4**
CO4: Relate the ideas of types of registers	**K3**
CO5: Analyze the use of Instruction codes, Addressing modes and program controls	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	**1**	**3**	**3**	**-**	**2**	**-**
CO 2	**2**	**-**	**3**	**2**	**3**	**-**
CO 3	**2**	**2**	**2**	**3**	**-**	**-**
CO 4	**2**	**2**	**3**	**3**	**3**	**2**
CO 5	**-**	**2**	**2**	**3**	**3**	**3**

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

UNIT	Digital Principles And Computer Organization	Hrs	Pedagogy
I	Binary Number system – Binary to decimal – decimal to binary – hexa decimal – ASCII code – Excess-3 Code – Gray code. **Digital Logic:** The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.	15	Chalk & Talk, ICT Kit
II	Boolean Laws and Theorems. - Sum of Products method - Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions- Product-of sums method -Product-of sums Simplifications. **Data Processing Circuits:** Multiplexers – Demultiplexers-1-of-16 Decoder – BCD-to- decimal Decoders – Seven-segment Decoders – Encoders – Exclusive- OR Gates- Parity Generators and Checkers	15	Chalk & Talk, ICT Kit
III	Binary Addition- Binary Subtraction – 2'S Complement Representation - 2's Complement Arithmetic – Arithmetic Building Blocks- Adder- Subtractor **Flip-Flops**-RS Flip-Flops-Gated Filp-Flops-Edge-triggered RS Flip-Flops-Edge- triggered D Flip-flops--Edge-triggered JK Flip-Flops-JK Master Slave Flip-flops.	15	Chalk & Talk, ICT Kit
IV	Serial In-Serial Out – Serial In-Parallel Out – Parallel In- Parallel Out – Ring Counter –Ripple Counter – Synchronous Counter.	15	Chalk & Talk, ICT Kit
V	Computer Register – Computer Instructions – Timing And Control – Instruction Cycle. Control Memory – Address Sequencing – General Register Organization – Stack Organization – Instruction Formats – Data Transfer and Manipulations -Addressing Modes – Program Control.	15	Chalk & Talk, ICT Kit

Course Designed by**: Mrs. R.K. Vijayalakshmi & Mrs. T. ThivyaSindhu**

| | | | Section A | | Section B | | Section C | Section D |
| | | | MCQs | | Short Answers | | Either or | Open |
Internal	Cos	K Level	No. of. Questions	K – Level	No. of. Questions	K - Level	Choice	Choice
CIA I	CO1	K3	2	K1&K2	1	K2	2(K3&K3)	1(K3)
	CO2	K3	2	K1&K2	2	K2	2 (K3&K3)	1(K3)
CIA II	CO3	K4	2	K1&K2	2	K2	2 (K4&K4)	1(K4)
	CO4	K3	2	K1&K2	1	K3	2 K3&K3)	1(K3)
Question Pattern CIA I & II	No. of Questions to be asked	4		3		4	2
	No. of Questions to be answered	4		3		2	1
	Marks for each question	1		2		5	10
	Total Marks for each section	4		6		10	10

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

*Note: It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2	2	-	-	4	8	40
	K2	2	4	10		16	32	
	K3	-	-	10	10	20	40	40
	K4	-	-	-	10	10	20	20
	Marks	4	6	20	20	50	100	100
CIA II	K1	2	2	-	-	4	8	40
	K2	2	4	10		16	32	
	K3	-	-	10	10	20	40	40
	K4	-	-	-	10	10	20	20
	Marks	4	6	20	20	50	100	100

Centered title above table: **Distribution of Marks with K Level CIA I & CIA II**

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.

S.No	COs	K - Level	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	CO1	**K3**	**2**	**K1&K2**	**1**	**K1**	**2 (K3& K3)**	**1 (K3)**
2	CO2	**K3**	**2**	**K1&K2**	**1**	**K1**	**2 (K3&K3)**	**1 (K3)**
3	CO3	**K4**	**2**	**K1&K2**	**1**	**K2**	**2 (K4&K4)**	**1 (K4)**
4	CO4	**K3**	**2**	**K1&K2**	**1**	**K2**	**2 (K3&K3)**	**1 (K3)**
5	CO5	**K4**	**2**	**K1&K2**	**1**	**K2**	**2 (K3&K3)**	**1 (K4)**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(Figures in parenthesis denotes, questions should be asked with the given K level)								

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

Distribution of Marks with K Level

K Levels	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	**5**	**6**		**-**	**11**	**9.17**	**33.34**
K2	**5**	**4**	**10**	**10**	**29**	**24.17**	
K3	**-**	**-**	**30**	**30**	**60**	**50**	**50**
K4	**-**	**-**	**10**	**10**	**20**	**16.67**	**16 .66**
Marks	**10**	**10**	**50**	**50**	**120**	**100**	**100**

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K4	
18) b	CO3	K4	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K4	
20) b	CO5	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K4	
24	CO4	K3	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PC SOFTWARE LAB			
Course Code	21UITSP2	**L**	**P**	**C**
Category	Skilled Lab	-	2	2
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENEURSHIP ✓			

Course Objectives:

- To Bring the creativity and enhance the learners in desktop applications
- To know the techniques and application of the said.
- To experiment themselves in the application.
- To apply the concepts of the tools used.
- To think, create, design, develop and implement office tools with a good aesthetic sense of designing.

S. No.	List of Programs	Hours
1.	Create and manage files and folder tree	
2.	Use accessories utilities of windows OS	
3.	Entering and editing text in document file.	
4.	Apply formatting features on text like bold, italics, underline, font type, color and size. Apply features like bullet, numbering	
5.	Create documents, insert images, format tables	
6.	Create and manipulate tables	
7.	Entering and editing data in worksheet	
8.	Apply formula and functions in the sheet	
9.	Use graphics and auto shapes in excel sheet	
10.	Create and manipulate excel charts	
11.	Create pay bills, pay slips, electricity bills using excel	30
12.	Print sheet using print area	
13.	Basic operations of power point, create ppt and inset and delete slides	
14.	Create project presentations, lecture presentations.	
15.	Use of mater slide in presentation	
16.	Apply basic formatting features in presentation like font, font size, font colour, text fill, spacing and line spacing formatting text boxes, word arts, styles bullet and numbering	
17.	Working with drawing tools, applying shape or picture styles, applying object borders, object fill, object effects.	
18.	Working with video, link to video and sound files.	
19.	Creating hyperlinks, using action buttons.	
20.	Procedure to type a word and apply the effects shadow emboss	
	Total Lecture Hours	**30**

Course Outcomes	K Level
At the end of he Course the students will be able to	
CO1: Understand the concept of files and folders in a system.	**K3**
CO2: Execute the usage of word document and its properties.	**K3**
CO3: Execute the usage of Excel worksheet and its properties.	**K3**

CO4:	Understand the basics of PowerPoint.	K3
CO5:	Execute the tools in PowerPoint.	K3

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	-	-	2	2	-
CO 2	-	-	2	3	3	-
CO 3	3	3	3	3	2	-
CO 4	3	3	2	-	2	3
CO5	1	3	3	3		3

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

S. No.	List of Programs	Hrs	Mode
1.	Create and manage files and folder tree		
2.	Use accessories utilities of windows OS		
3.	Entering and editing text in document file.		
4.	Apply formatting features on text like bold, italics, underline, font type,color and size. Apply features like bullet, numbering		
5.	Create documents, insert images, format tables		
6.	Create and manipulate tables		
7.	Entering and editing data in worksheet		
8.	Apply formula and functions in the sheet		
9.	Use graphics and auto shapes in excel sheet		
10.	Create and manipulate excel charts		
11.	Create pay bills, pay slips, electricity bills using excel		
12.	Print sheet using print area	**30**	**Laboratory Experiments**
13.	Basic operations of power point, create ppt and inset and delete		
14.	slides		
15.	Create project presentations, lecture presentations.		
16.	Use of mater slide in presentation		
17.	Apply basic formatting features in presentation like font, font size, font colour, text fill, spacing and line spacing formatting text boxes, word arts, styles bullet and numbering		
18.	Working with drawing tools, applying shape or picture styles, applying object borders, object fill, object effects.		
19.	Working with video, link to video and sound files.		
20.	Creating hyperlinks, using action buttons.		
	Procedure to type a word and apply the effects shadow emboss		

Course Designed by: **Mr. P. Ganesh Babu & Dr. M. Karthika**

THIRD SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	RELATIONAL DATABASE MANAGEMENT SYSTEM			
Course Code	21UITC31	L	P	C
Category	Core	5	-	5
Nature of course:	EMPLOYABILITY ✓	SKILL ORIENTED ✓	ENTREPRENEURSHIP	✓

Course Objectives:

- To understand the basic concepts of database systems and familiar with database storage structures.
- Develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
- To emphasize the importance of normalization in databases.
- To Master the basics of SQL and construct queries using SQL.
- To understand the concepts of cursors and trigger.

Unit: I	Data, Information and Information Processing:	15 hours

Introduction – Definition of information, Quality of information. **Files, File organization and file structures:** Introduction – Operations on files – File storage organization – Storage media. **Introduction to Database Management System (DBMS):** Introduction – Why a database – Characteristics of data in a Database – Why DBMS –Schema - Types of Data Base Management System

Unit: II	Introduction to Relational Database Management System:	15 hours

Introduction – RDBMS terminology –The Relational data structure – Relational data manipulation – Codd's rules. **Entity - Relationship (E-R) Modeling:** E-R model – Components of an E-R model – E-R modeling symbols. **Data Normalization:** Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization.

Unit: III	Relational algebra and Relational calculus:	15 hours

Relational algebra **-** Relational calculus. **Introduction to Structured Query Language:** Introduction – Characteristics of SQL - Advantages of SQL – SQL data types and Literals – Types of SQL commands – SQL operators – Arithmetic, Comparison operators - Logical operators - Set operators – Operator precedence.

Unit: IV	Tables, Views and Indexes:	15 hours

Tables-Views. **Queries and Sub queries** : Queries – Sub queries. **Aggregate functions** – **Joins and Unions:** Joins.

Unit: V	Cursor:	15 hours

Cursor operations – Cursor positions – Cursor coding guidelines. **Triggers:** Types of triggers – Trigger syntax – Combining Trigger types Setting inserted values – Enabling / Disabling, Replacing and Dropping Triggers – Advantages and disadvantages of triggers.

		Total Lecture Hours	75 Hrs

Books for Study:

1.Alexis Leon and Mathews Leon, Database Management Systems, Leon Vikas Publishing, New Delhi, 1999.

Books for References:

5. Abraham Silberschtz, Henry F. Korth, S.Sudershan, Data Base System Concepts, 4th Edition, McGraw Hill International Editions, New Delhi, 2002.
6. Date C.J., An Introduction to Database Systems Vol.1, Narosha Publishing House, New Delhi, 1995.
7. Rob, Coronel, "Database Systems",Seventh Edition, Cengage Learning.
8. Elmasri, R. and S. B. Navathe: Fundamentals of Database Systems (5th Ed.), Addison Wesley, 2007.
9. Jeffrey A. Hoffer, Mary B. Prescott, and Fred R. McFadden. Modern Database Management (8th Ed.). Prentice-Hall, 2007

Web Resources:

1. **https://onlinecourses.nptel.ac.in/noc18_cs15/preview**
2. **http://nptel.ac.in/courses/106106095/**
3. **https://www.javatpoint.com/dbms-tutorial Database Management System (DBMS) – Geeks for Geeks**

Course Outcomes		K Level
CO1:	Enumerate the underlying concepts of the management of database systems.	**K3**
CO2:	Describe the structure and model of the relational database System	**K3**
CO3:	Analyze a database based on a data model considering the normalization to a specified level	**K3**
CO4:	Construct simple and moderately advanced database queries using Structured Query Language (SQL)	**K4**
CO5:	Design multiple tables using group functions, sub queries and Implement cursor and trigger concept for a given scenario	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	RELATIONAL DATABASE MANAGEMENT SYSTEM	Hrs	Pedagogy
I	**Data, Information and Information Processing:** Introduction – Definition of information, Quality of information. **Files, File organization and file structures:** Introduction – Operations on files – File storage organization – Storage media. **Introduction to Database Management System (DBMS):** Introduction – Why a database – Characteristics of data in a Database – Why DBMS- Schema – Types of Data Base Management System.	15	**Chalk & Talk, ICT Kit**
II	**Introduction to Relational Database Management System:** Introduction – RDBMS terminology –The Relational data structure – Relational data manipulation – Codd's rules. **Entity - Relationship (E-R) Modelling:** E-R model – Components of an E-R model – E-R modelling symbols. **Data Normalization:** Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization.	15	**Chalk & Talk, ICT Kit**
III	**Relational algebra and Relational calculus:** Relational algebra - Relational calculus. **Introduction to Structured Query Language:** Introduction – Characteristics of SQL - Advantages of SQL – SQL data types and Literals – Types of SQL commands – SQL operators – Arithmetic, Comparison operators - Logical operators - Set operators – Operator precedence.	15	**Chalk & Talk, ICT Kit**
IV	**Tables, Views and Indexes:** Tables-Views. **Queries and Sub queries :** Queries – Sub queries. **Aggregate functions** – **Joins and Unions:** Joins	15	**Chalk & Talk, ICT Kit**
V	**Cursor:** Cursor operations – Cursor positions – Cursor coding guidelines. **Triggers:** Types of triggers – Trigger syntax – Combining Trigger types – Setting inserted values – Enabling / Disabling, Replacing and Dropping Triggers – Advantages and disadvantages of triggers.	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mrs. R.K.Vijayalakshmi**

			Section A		Section B		Section C Either or Choice	Section D Open Choice
Internal	**Cos**	**K Level**	**MCQs**		**Short Answers**			
			No. of. Questions	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	CO1	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II	No. of Questions to be asked		4		3		4	2
	No. of Questions to be answered		4		3		2	1
	Marks for each question		1		2		5	10
	Total Marks for each section		4		6		10	10

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

	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	10	50	100	100
CIA II	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	50	100	100

Distribution of Marks with K Level CIA I & CIA II

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.

SI.No	COs	K - Level	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	CO1	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
2	CO2	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
3	CO3	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
4	CO4	**K4**	**2**	**K1,K2**	**1**	**K2**	**2(K4,K4)**	**1(K4)**
5	CO5	**K4**	**2**	**K1,K2**	**1**	**K2**	**2(K4,K4)**	**1(K4)**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(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 (Short Answer Questions)**	**Section C (Either/ or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	5		-	-	5	4.16	**17**
K2	5	10	-	-	15	12.5	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K4	
19) b	CO4	K4	
20) a	CO5	K4	
20) b	CO5	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	RELATIONAL DATABASE MANAGEMENT SYSTEM LAB			
Course Code	**21UITCP3**	**L**	**P**	**C**
Category	**Core**	-	4	4

Nature of course:	EMPLOYABILITY	✓	SKILL ORIENTED	✓ENTREPRENEURSHIP	✓

Course Objectives:

- To provide a sound introduction to the creation of problem statements from real life situations.
- To give a good formal foundation on the relational model of data and usage of Relational Algebra.
- To introduce the concepts of basic SQL as a universal Database language.
- To enhance knowledge of advanced SQL topics like embedded SQL, procedures connectivity through JDBC.
- To enable the design of an efficient database using normalization concepts. .

List of Programs	60 Hours

1. Write a program to table creating, renaming a table, copying another table, dropping a table
2. Write a Program for table description, describing table definitions, modifying tables, joining tables, number and date functions.
3. Write a program for SQL queries , sub queries and aggregate functions
4. Write a Program for experiments using database DDL SQL statement
5. Write a program for experiments using database DML SQL statement
6. Write a program for experiments using database DCL SQL statement
7. Write a program for PL/SQL procedure for application using exception handling
8. Write a program for functions: PL/SQL procedure for application using functions
9. Write a program for cursor: PL/SQL procedure for application using cursors
10. Write a program for trigger: PL/SQL procedure for application using triggers
11. Write a program for package:: PL/SQL procedure for application using package

	Total Lecture Hours	60 Hrs

Web Resources:

https://www.tutorialspoint.com/sql/sql-rdbms-concepts.html
https://www.w3schools.com/sql/
https://www.javatpoint.com/dbms-sql-introduction

Course Outcomes		K Level
CO1:	Use data manipulation language to query, update and manage a database	**K2**
CO2:	Describe the fundamental elements of relational database management systems	**K3**
CO3:	Analyze the database using queries to retrieve records	**K3**
CO4:	Create views to satisfy the user's changing requirements	**K4**
CO5:	Apply PL/SQL for processing data base.	**K3**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	2	2	3	2
CO 3	3	2	2	2	2	2
CO 4	2	2	2	2	2	3
CO 5	3	3	3	3	2	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

SI .No	Programming in Java Lab	Hrs	Pedagogy
1.	Write a program to table creating, renaming a table, copying another table, dropping a table		
2.	Write a Program for table description, describing table definitions, modifying tables, joining tables, number and date functions.		
3.	Write a program for SQL queries , sub queries and aggregate functions		
4.	Write a Program for experiments using database DDL SQL statement		
5.	Write a program for experiments using database DML SQL statement		**Black Board, Lab Demonstration and LCD Projector**
6.	Write a program for experiments using database DCL SQL statement	60	
7.	Write a program for PL/SQL procedure for application using exception handling		
8.	Write a program for functions: PL/SQL procedure for application using functions		
9.	Write a program for cursor: PL/SQL procedure for application using cursors		
10.	Write a program for trigger: PL/SQL procedure for application using triggers		
11.	Write a program for package:: PL/SQL procedure for application using package		

Course Designed by: **Mrs. R.K.Vijayalakshmi**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	NUMERICAL APTITUDE			
Course Code	**21UMCA31**	**L**	**P**	**C**
Category	**Allied**	5	-	4
Nature of course:	**EMPLOYABILITY**	**SKILL ORIENTED**	**ENTREPRENURSHIP**	

Course Objectives:

- To improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.
- To enrich their knowledge and to develop their logical reasoning thinking ability.
- To compute either speed, distance, or time with 90% accuracy.
- To know and how to use the formula for calculating simple interest.
- To understand how to algebraically manipulate the interest formulas to solve for different variables.

Unit: I	H.C.F and L.C.M of Numbers - Average	15 hrs
Unit: II	Problems on Ages - Percentage	15 hrs
Unit: III	Ratio and proportions - Time and Distance	15 hrs
Unit: IV	Simple interest- Compound interest	15 hrs
Unit: V	Calendar – Permutations and Combinations	15 hrs
	Total Lecture Hours	75 hrs

Book for Study:

Text Book: Dr. R. S. Aggarwal, **'Quantitative Aptitude'** S.Chand and company limited, New Delhi, Reprint 2017

    Unit I   : Chapter: 2 & 6
    Unit II   : Chapter: 8 & 11
    Unit III   : Chapter: 13 & 18
    Unit IV   : Chapter: 22 & 23
    Unit V   : Chapter: 27 & 30

Books for Reference:

1. Abhijit Guha, **"Quantitative Aptitude" for All Competitive Examinations**, McGraw Hill Education (India) Private Limited, 6th Edition, 2017.
2. Dinesh Khattar, **"Quantitative Aptitude" for Competitive Examinations,** Pearson India Education Services Pvt. Ltd., 4th Edition, 2020.

Web Resources:

1. **https://www.thinkiit.in/pre-foundation/english/class-10/mental-ability/**
2. **https://www.indiabix.com/non-verbal-reasoning/questions-and-answers/**
3. **https://www.slideshare.net/MyPrivateTutor/study-material-for-competitive-exams-verbal-non-verbal-reasoning-mathematics-operation**
4. **https://bankexamportal.com/study-material/reasoning-verbal/non-verbal-analogy-mcq**

Course Outcomes:		K Level
After the completion of the course, Students will be able to		
CO1:	Acquire the knowledge of numbers.	**K3**
CO2:	Understand the concepts of ratio and proportions.	**K3**

CO3:	Appear for Competitive Examinations.	K4
CO4:	Find HCF and LCM	K3
CO5:	Understand the difference between ordinary interest and exact interest, and be able to calculate both.	K3

CO & PO Mappings:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	3	3	2
CO2	2	3	3	2	3	3
CO3	2	3	2	2	2	2
CO4	3	2	2	2	2	3
CO5	3	3	2	2	3	3

*3 –Advanced Application; **2 –** Intermediate Development; **1 –** Introductory Level

LESSON PLAN

UNIT	COURSE NAME	Hrs	Pedagogy
I	H.C.F and L.C.M of Numbers - Average	15	**Chalk & Talk, PPT**
II	Problems on Ages - Percentage	15	**Chalk & Talk, Group Discussion**
III	Ratio and Proportion - Time and Distance	15	**Chalk & Talk, LCD**
IV	Simple interest - Compound interest	15	**Chalk & Talk, Seminar**
V	Calendar – Permutations and Combinations	15	**Chalk & Talk, Seminar**

Course designed by: Dr. P. Visvanathan and **Mrs . H. Sowmiya Gowri**

Internal	Cos	K Level	Section A MCQs		Section B Short Answers		Section C Either or Choice	Section D Open Choice
			No. of. Questions	K - Level	No. of. Questions	K – Level		
CI AI	CO1	Up to K3	2	K1,K2	1	K2	2(K3&K3)	1 (K3)
	CO2	Up to K3	2	K2,K2	2	K2	2(K3&K3)	1 (K3)
CI AII	CO3	Up to K4	2	K1,K2	1	K2	2(K3&K3)	1 (K4)
	CO4	Up to K3	2	K2,K2	2	K2	2(K3&K3)	1 (K3)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	1		2		5	10
		Total Marks for each section	4		6		10	10

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

*Note: It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	1	-	-	-	1	2	20
	K2	3	6	-	-	9	18	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	K5	-	-	-	--	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	1	-	-	-	1	2	20
	K2	3	6	-	-	9	18	
	K3	-	-	20	10	30	60	60
	K4	-	-	-	10	10	20	20
	K5	-	-	-	--	-	-	-
	Marks	4	6	20	20	50	100	100

Title of table: **Distribution of Marks with K Level CIA I & CIA II**

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.

S.No	COs	K - Level	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	CO1	**K3**	2	K1&K2	1	K1	2 (K3& K3)	1 (K3)
2	CO2	**K3**	2	K1&K2	1	K1	2 (K3 &K3)	1 (K3)
3	CO3	**K4**	2	K1&K2	1	K2	2 (K4 &K4)	1 (K4)
4	CO4	**K3**	2	K1&K2	1	K2	2 (K3 &K3)	1 (K3)
5	CO5	**K3**	2	K1&K2	1	K2	2 (K3 &K3)	1 (K3)
No. of Questions to be Asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each section			10		10		25	30

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

(Figures in parenthesis denotes, questions should be asked with the given K level)

K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	4	-	-	9	7.5	16
K2	5	6	-	-	11	9.17	
K3	-	-	40	40	80	66.67	67
K4	-	-	10	10	20	16.67	17
Marks	10	10	50	50	120	100	100

Distribution of Marks with K Level

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K4	
18) b	CO3	K4	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K3	
20) b	CO5	K3	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K4	
24	CO4	K3	
25	CO5	K3	

Course Name	R PROGRAMMING LAB			
Course Code	**21UITSP3**	**L**	**P**	**C**
Category	**Skill**	**-**	**2**	**2**
Nature of course:	EMPLOYABILITY	**SKILL ORIENTED** ✓	ENTREPRENEURSHIP	

Course Objectives:

- To import a variety of data formats into R using R Studio.
- To introduce the concepts of programming with examples.
- To learn the fundamental programming concepts and methodologies which are essential to building good R programs.
- To understand the fundamental syntax of R through readings, practice exercises, demonstrations, and writing R code.
- To apply critical programming language concepts such as data types, iteration, control structures, functions, and Boolean operators by writing R programs and through examples.

	List of Programs	**30 Hours**
	Download and install R-Programming environment and install basic packages using install, packages() command in R.	
	Learn all the basics of R-Programming (Data types, Variables, Operators etc.)	
	Making operations on if-else statements in R.	
	Creating programs on For loop in R.	
	Creating programs on While loop in R.	
	Learn the basics of functions in R and implement with examples.	
	Creating matrix and manipulation matrix in R.	
	Creating and operations on factors in R.	
	Implement different String Manipulation functions in R.	
	Programs to find operations on Data Frames in R.	
	Perform the various operations on lists in R.	
	Implement different data structures in R (Vectors, Lists, Data Frames)	
	Write a program to read a csv file and analyze the data in the file in R	
	Create pie charts and bar charts using R.	
	Create a data set and do statistical analysis on the data using R.	
	Presentation using Text, animation, images, media,	
	Creating a graph in a PowerPoint slides	
	Prepare a presentation with five slides including animation, insertion of scanned images	
	Total Lecture Hours	**30**

Web Resources:

https://www.tutorialspoint.com/r/r_tutorial.pdf
FULL R PROGRAMMING METERIAL_2.pdf (stmarysguntur.com)
https://www.jnec.org/labmanuals/it/te/sem1/R-lab.pdf
https://www.r-project.org
https://www.slideshare.net/GRajendra/r-programming-lab-manual

Course Outcomes		K Level
CO1:	Construct the programming logic using R Packages.	**Upto K2**
CO2:	Differentiate the Data types for developing programs.	**Upto K2**
CO3:	Show the installation of R Programming Environment.	**Upto K2**
CO4:	Analyze the datasets using R programming capabilities.	**Upto K3**
CO5:	Classify the use of different R Data Structures	**Upto K3**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	1	1	2	2	3
CO 2	1	1	2	3	2	3
CO 3	3	3	3	3	3	3
CO 4	3	3	2	1	2	2
CO 5	1	3	3	3	1	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S.No	R Programming	Hrs	Pedagogy
1.	Download and install R-Programming environment and install basic packages using install. packages() command in R.		
2.	Learn all the basics of R-Programming (Data types, Variables, Operators etc.)		
3.	Making operations on if-else statements in R.		
4.	Creating programs on For loop in R.		
5.	Creating programs on While loop in R.		
6.	Learn the basics of functions in R and implement with examples		**Black Board, Lab Demonstration and LCD Projector**
7.	Creating matrix and manipulation matrix in R.	30	
8.	Creating and operations on factors in R.		
9.	Implement different String Manipulation functions in R.		
10.	Programs to find operations on Data Frames in R.		
11.	Perform the various operations on lists in R.		
12.	Implement different data structures in R (Vectors, Lists, Data Frames)		
13.	Write a program to read a csv file and analyze the data in the file in R		
14.	Create pie charts and bar charts using R.		
15.	Create a data set and do statistical analysis on the data using R.		

Course Designed by: **Mrs.R.Vanitha**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	COMPUTER FUNDAMENTALS			
Course Code	21UITN31	L	P	C
Category	Non Major Elective	2	-	2

Nature of course:	EMPLOYABILITY	✓SKILL ORIENTED	✓ ENTREPRENEURSHIP	✓

Course Objectives:

- To understand the basic concepts of computer fundamentals and Historical Evolution of Computer.
- Describe the usage of computers with essential components of computer.
- Provide Knowledge about the uses of Microsoft Office applications Word, Excel, Access and PowerPoint.
- Provide foundational of computer that prepares students for life-long learning of computer concepts and skills.

Unit: I	Historical Evolution of Computing Systems:	6 hours

History of Computing Systems: Overview of Data Processing, History of Computing, Computer Generations; Characteristics of Computer, Anatomy of Computer, Classification of Computers. Number **Systems and Codes:** Introduction, Number Systems and its types, and inter-conversion of Number Systems; ASCII and EBCDIC codes. **Input and Output Devices:** Concept of Input/Output, Types of Input Devices; Output Devices – Printers, Plotters and Monitors

Unit: II	Memory and Storage Devices:	6 hours

Memory and Storage Devices: Characteristics of memory systems, memory hierarchy, Types of Memory – RAM, ROM, etc.; Magnetic Disks, Magnetic Tapes, Optical Disks; Concept of Cache Memory and Virtual Memory.

Unit: III	Using Word Processing:	6 hours

Using Word Processing: Opening and Closing of documents, Text creation and Manipulation, Moving Around in a Document, Formatting of text, Table handling, Spell check, language setting and thesaurus, Handling Multiple Documents, Printing of word document.

Unit: IV	Using Spreadsheet tool:	6 hours

Basics of Spreadsheet: Manipulation of cells, Formulas and Functions, Editing of Spread Sheet, Page setups, header and footer, printing of Spread Sheet.

Unit: V	Using Slide Presentation Tool:	6 hours

Using Slide Presentation Tool: Basics of PowerPoint, Preparation and Presentation of Slides, Slide Show, Formatting and Clip Arts, Taking printouts of presentation / handouts.

		Total Lecture Hours	**30 Hrs**

Books for Study:

1. P.K Sinha: Computer Fundamentals, BPB Publications-30 NOV 2004.
2. V. Rajaraman: Fundamentals of Computers, PHI 5. Microsoft Office – Complete Reference – BPB Publication-2015

Books for References:

1. Norton Peter: Introduction to Computer, McGraw-Hill.
2. C.S. French: Data Processing and Information Technology, BPB Publications.
3. Nasib Singh Gill: Handbook of Computer Fundamentals, Khanna Books Publishing Co.(P) Ltd., New Delhi, 2016.
4. Leon, Alexis & Leon, Mathews: Introduction to Computers, Leon Tech World.

Web Resources:

1. **https://onlinecourses.nptel.ac.in/noc18_cs15/preview**
2. **http://nptel.ac.in/courses/106106095/**
3. **https://www.javatpoint.com/dbms-tutorial Computer Fundamentals - GeeksforGeeks**

Course Outcomes		K Level
CO1:	Students can describes the computer and its general features	**K2**
CO2:	Students can be to able express basic computer hardware	**K2**
CO3:	Outline the salient features of word processing with special reference to Microsoft Word	**K2**
CO4:	Discuss the main features of Spread Sheet emphasizing Microsoft Excel	**K2**
CO5:	Describe the features of Microsoft PowerPoint	**K2**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	3	2	3	3
CO 2	2	2	3	2	2	3
CO 3	3	2	3	3	2	2
CO 4	2	3	2	3	2	3
CO 5	2	3	3	3	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	COMPUTER FUNDAMENTALS	Hrs	Pedagogy
I	**History of Computing Systems:** Overview of Data Processing, History of Computing, Computer Generations; Characteristics of Computer, Anatomy of Computer, Classification of Computers. Number **Systems and Codes:** Introduction, Number Systems and its types, and inter-conversion of Number Systems; ASCII and EBCDIC codes. **Input and Output Devices:** Concept of Input/Output, Types of Input Devices; Output Devices – Printers, Plotters and Monitors	6	**Chalk & Talk, ICT Kit**
II	**Memory and Storage Devices:** Characteristics of memory systems, memory hierarchy, Types of Memory – RAM, ROM, etc.; Magnetic Disks, Magnetic Tapes, Optical Disks; Concept of Cache Memory and Virtual Memory.	6	**Chalk & Talk, ICT Kit**
III	**Using Word Processing:** Opening and Closing of documents, Text creation and Manipulation, Moving Around in a Document, Formatting of text, Table handling, Spell check, language setting and thesaurus, Handling Multiple Documents, Printing of word document.	6	**Chalk & Talk, ICT Kit**
IV	**Basics of Spreadsheet:** Manipulation of cells, Formulas and Functions, Editing of Spread Sheet, Page setups, header and footer, printing of Spread Sheet.	6	**Chalk & Talk, ICT Kit**
V	**Using Slide Presentation Tool:** Basics of PowerPoint, Preparation and Presentation of Slides, Slide Show, Formatting and Clip Arts, Taking printouts of presentation / handouts.	6	**Chalk & Talk, ICT Kit**

Course Designed by: **Dr. M. Karthika & Mrs. R. Vanitha**

FOURTH SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PROGRAMMING IN JAVA			
Course Code	21UITC41	L	P	C
Category	Core	5	-	4
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			

Course objectives:

- To Gain knowledge about basic java language syntax and semantics to write java programs and use concepts such as variables, conditional and iterative execution methods etc.
- Understand the fundamentals of object oriented programming concepts, including objects, invoking methods etc and exception handling mechanisms.
- Understand the principles of inheritance, Packages and interfaces.
- To introduce the design controls of using applets

Unit: I	Introduction : Java Evolution	15 Hours

Java Evolution: Java History – Java Features – How differs from C and C++ - Java and Internet – Java and WWW – Web browsers – Java Support Systems – Java Environment
Overview of Java Language: Introduction – Simple Java program – more of java and an application with two classes – java program structure – java tokens – java statements – Installing and Configuring Java – Implementing a Java program – Java Virtual Machine – Command Line Arguments – Programming Style

Unit: II	Data types, Decision Making and Branching & Looping	15 Hours

Constant, Variables, & Data Types: Constants – Variables – Data types – Declaration of variables – giving values to variables – scope of variables – symbolic constants – Type Casting. **Operators and Expressions:** Arithmetic operators – Relational Operators – Logical Operators – Assignment operators. Increment and Decrement operators – Conditional Operators – Bitwise operators – Special operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic operators – Type conversion in expressions.
Decision Making and branching & Looping: Decision making with if statements – simple IF statement, IF ELSE, Nesting of..IF, The Else if Ladder – The Switch statement – The? : operator ; Introduction – While, Do, for statement – Jumps in loops – Labeled loops

Unit: III	Class, objects, Arrays	15 Hours

Class, objects and methods: Defining a class – fields and methods declaration – creating objects – accessing class members – constructors – methods overloading – static members – nesting of methods – Inheritance: Extending a class – overriding methods – Final variables and methods. **Arrays, strings and Vectors:** Introduction – One dimensional array – Strings, Vectors, Wrapper classes – enumerated types – annotations. **Interfaces:** Defining Interfaces – extending Interface – implementing Interfaces – Accessing Interface variables

Unit: IV	Package & Multithreading	15 Hours

Packages: Introduction – Java API packages- using system packages – naming conversions – creating, accessing, using packages – adding a class to a package – hiding class – static import. **Multithread Programming:** Creating Threads- extending thread class – stopping and blocking a thread – lifecycle of a thread – using thread methods – thread exceptions – thread priority – synchronization

Unit: V	Managing Errors & Applet Programming	15 Hours

Managing Errors and Exceptions: Types of errors – exceptions – syntax of exception handling code – multiple catch statements – using finally statements – throwing our own Exceptions – using exceptions for Debugging. **Applet Programming:** Introduction – how Applets differ from applications – preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a web page – Applet tag – adding Applet in HTML file – Running the Applet – More about Applet tags – passing parameters to Applets- Aligning the display – more about HTML tags – displaying numeric values – getting input from the user- event handing

	Total Lecture Hours	75 Hours

Books for Study:

1. **Text Book:** Programming with JAVA – E- Balagurusamy , Sixth Edition, Mc Graw Hill Education,2009.

Unit I   Chapter 2 :2.1 to 2.9
               Chapter 3 : 3.1 to 3.12
Unit II   Chapter 4 :4.1 to 4.09
               Chapter 5 :5.1 to 5.12
               Chapter 6 : 6.1 to 6.8
               Chapter 7 : 7.1 to 7.7
Unit III   Chapter 8 : 8.1 to 8.13
               Chapter 9 : 9.1 to 9.9
               Chapter 10 : 10.1 to 10.5
Unit IV Chapter 11 : 11.1 to 11.10
               Chapter 12 : 12.1 to 12.9
Unit V   Chapter 13 : 13.1 to 13.9
               Chapter 14 : 14.1 to 14.7

Book for Reference

1. Java: The Complete Reference, by Herbert schildt, Tata McGraw hill Education india, Seventh Edition, 2006.
2. Programming with java by C Muthu, Vijay Nicole india, Second Edition, 2008.

Web Resources

1. **https://www.tutorialspoint.com/java/index.htm**

2. **https://www.javatpoint.com/java-tutorial**

3. **https://www.w3schools.com/java/**

COURSE OUTCOMES:		K Level
At the end of the course the students will be able to		
CO1	Identify classes, Objects, Members of a class and relationships among them needed for a specific problem.	**K3**
CO2	Essential concepts of Java programs in Constants , variables and operators and then Decision making 's branching and looping	**K3**

CO3	Determining the concepts of classes, objects, inheritance, Packages and Interface in java.	K3
CO4	Associating exception handling, multithreaded applications with synchronization	K4
CO5	Validating Java programs to learning Managing errors & exceptions and implement applets for web applications.	K4

CO & PO Mappings:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	1	2	2	2	3	2
CO 2	2	2	2	3	2	2
CO 3	2	2	3	2	2	2
CO 4	3	2	2	2	3	2
CO 5	3	3	2	2	2	2

*3 –Advanced Application; **2** – Intermediate Development; **1** –Introductory Level

LESSON PLAN

UNIT	PROGRAMMING IN JAVA	Hrs	Mode
I	**Java Evolution:** Java History – Java Features – How differs from C and C++ - Java and Internet – Java and WWW – Web browsers – Java Support Systems – Java Environment **Overview of Java Language**: Introduction – Simple Java program – more of java and an application with two classes – java program structure – java tokens – java statements – Installing and Configuring Java – Implementing a Java program – Java Virtual Machine – Command Line Arguments – Programming Style	15 Hrs	Chalk& PPT
II	**Constant, Variables, & Data Types:** Constants – Variables – Data types – Declaration of variables – giving values to variables – scope of variables – symbolic constants – Type Casting. **Operators and Expressions:** Arithmetic operators – Relational Operators – Logical Operators – Assignment operators. Increment and Decrement operators – Conditional Operators – Bitwise operators – Special operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic operators – Type conversion in expressions. **Decision Making and branching & Looping:** Decision making with if statements – simple IF statement, IF ELSE, Nesting of..IF, The Else if Ladder – The Switch statement – The? : operator ; Introduction – While, Do, for statement – Jumps in loops – Labeled loops	15 Hrs	Chalk& PPT
III	**Class, objects and methods**: Defining a class – fields and methods declaration – creating objects – accessing class members – constructors – methods overloading – static members – nesting of methods – Inheritance: Extending a class – overriding methods – Final variables and methods. **Arrays, strings and Vectors:** Introduction – One dimensional array – Strings, Vectors, Wrapper classes – enumerated types – annotations. **Interfaces:** Defining Interfaces – extending Interface – implementing Interfaces – Accessing Interface variables	15 Hrs	Chalk &PPT
IV	**Packages:** Introduction – Java API packages- using system packages – naming conversions – creating, accessing, using packages – adding a class to a package – hiding class – static import. **Multithread Programming:** Creating Threads- extending thread class – stopping and blocking a thread – lifecycle of a thread – using thread methods – thread exceptions – thread priority – synchronization	15 Hrs	Chalk& PPT
V	**Managing Errors and Exceptions:** Types of errors – exceptions – syntax of exception handling code – multiple catch statements – using finally statements – throwing our own Exceptions – using exceptions for Debugging. **Applet Programming:** Introduction – how Applets differ from applications – preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a web page – Applet tag – adding Applet in HTML file – Running the Applet – More about Applet tags – passing parameters to Applets- Aligning the display – more about HTML tags – displaying numeric values – getting input from the user- event handing	15 Hrs	Chalk& PPT

Course Designed by: **Mr. J. RAJKUMAR**

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

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Internal	Cos	K Level	Section A MCQs		Section B Short Answers		Section C Either or Choice	Section D Open Choice
			No. of Questions	K - Level	No. of Questions	K - Level		
CI AI	CO1	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	1		2		5	10
		Total Marks for each section	4		6		10	10

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Distribution of Marks with K Level CIA I & CIA II

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	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	10	50	100	100
CIA II	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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.

			MOQs		Short Answers		Section C	Section D
S.No	COs	K - Level	No. of Questions	K – Level	No. of Questions	K – Level	(Either / or Choice)	(Open Choice)

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

S.No	COs	K - Level	No. of Questions	K – Level	No. of Questions	K – Level	Section C (Either / or Choice)	Section D (Open Choice)
1	CO1	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
2	CO2	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
3	CO3	**K3**	**2**	**K1,K2**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
4	CO4	**K4**	**2**	**K1,K2**	**1**	**K2**	**2(K4,K4)**	**1(K4)**
5	CO5	**K4**	**2**	**K1,K2**	**1**	**K2**	**2(K4,K4)**	**1(K4)**
No. of Questions to be Asked			**10**	**K1,K2**	**5**	**K2**	**10**	**5**
No.of Questions to be answered			**10**	**K1,K2**	**5**	**K2**	**5**	**3**
Marks for each question			**1**	**K1,K2**	**2**	**K2**	**5**	**10**
Total Marks for each section			**10**	**K1,K2**	**10**	**K2**	**25**	**30**

(Figures in parenthesis denotes, questions should be asked with the given K level)

K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
Distribution of Marks with K Level							
K1	5		-	-	5	4	**16**
K2	5	10	-	-	15	12	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	34	**34**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions   (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3,K3	
16) b	CO1	K3,K3	
17) a	CO2	K3,K3	
17) b	CO2	K3,K3	
18) a	CO3	K3,K3	
18) b	CO3	K3,K3	
19) a	CO4	K4,K4	
19) b	CO4	K4,K4	
20) a	CO5	K4,K4	
20) b	CO5	K4,K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PROGRAMMING IN JAVA LAB			
Course Code	21UITCP4	L	P	C
Category	Core	-	4	4

Nature of course:	EMPLOYABILITY	✓ SKILL ORIENTED	✓ ENTREPRENEURSHIP	✓

Course Objectives:

- To build software development skills using java programming for real world applications.
- To implement Packages, interfaces and inheritance concepts.
- To implement classical problems using java programming.
- To emphasis on Exception Handling.
- Design and develop the concept of Multithreading and AWT controls.

	List of Programs	60 Hours
1	Write a Program to print the text "Welcome to World of Java". Save it with name Welcome.java in your folder.	
2	Write a Program check two strings are equal or not	
3	Write a program to give the examples of operators i) Arithmetic ii) Conditional	
4	Write a program to create a class student with data 'name,city and age' along with method print Data to display the data	
5	Write a Java Program to the find the Prime number or not	
6	Write a program in Java to demonstrate the method and constructor overloading	
7	Write a Java program to arrange the numbers in Ascending Order	
8	Write a Java program to finds addition of two matrices using arrays	
9	Write a Java program to implement Method Overriding	
10	Write a Java program to give example for Multiple Inheritance in Java	
11	Write a Java program to create a package named mtncollege and import it in circle class	
12	Write a Java program for example of try and catch block and whether the given array size is negative or not	
13	Write a java program to create a file and write the text in it and save the file	
14	Write a Java program for creation of user defined exception	
15	Draw the circle using an Applet	
	Total Lecture Hours	**60 Hrs**

Web Resources:

https://www.javatpoint.com/java-programs
https://javatutoring.com/java-programs/
https://www.programiz.com/java-programming/examples

Course Outcomes		K Level
CO1:	Identifying the basic data types and control flow constructs.	K2
CO2:	Summarizing object oriented class structures with parameters, constructors,	K2

	and utility and calculations methods, including inheritance, test classes and exception handling.	
CO3:	Gathering Java programs using arrays, functions, manipulating strings and recursion.	**K2**
CO4:	Examining threads, exception handling and polymorphism	**K3**
CO5:	Validating Java programs to implement applets for web applications.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	2	2	2	3	2	2
CO 2	2	2	2	3	2	2
CO 3	2	2	3	2	2	3
CO 4	2	2	2	2	3	2
CO 5	2	3	2	2	3	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S.NO	List of Programs	Hrs	Mode
1	Write a Program to print the text "Welcome to World of Java". Save it with name Welcome.java in your folder.		
2	Write a Program check two strings are equal or not		
3	Write a program to give the examples of operators		
	i) Arithmetic ii) Conditional		
4	Write a program to create a class student with data 'name,city and age' along with method print Data to display the data		
5	Write a Java Program to the find the Prime number or not		
6	Write a program in Java to demonstrate the method and constructor overloading		
7	Write a Java program to arrange the numbers in Ascending Order		Black Board, Lab Demonstration and LCD Projector
8	Write a Java program to finds addition of two matrices using arrays	60	
9	Write a Java program to implement Method Overriding		
10	Write a Java program to give example for Multiple Inheritance in Java		
11	Write a Java program to create a package named mtncollege and import it in circle class		
12	Write a Java program for example of try and catch block and whether the given array size is negative or not		
13	Write a java program to create a file and write the text in it and save the file		
14	Write a Java program for creation of user defined exception		
15	Draw the circle using an Applet		

Course Designed by: Mr.J.Rajkumar

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	SYSTEMS PROGRAMMING AND OPERATING SYSTEMS			
Course Code	**21UITA41**	**L**	**P**	**C**
Category	**Core**	5	-	5
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENEURSHIP ✓			

Course Objectives:

- Comparing and analyze the different implementation approach of system programming and operating system abstractions
- To formulate the problem and develop the solution for same
- To study the various design issues in developing an operating systems.
- To Explain the function and structure of the I/O system
- To Describe path names and directory structure visible to end users

Unit: I	**Introduction to System Programming**	15 hours

Language Processors: Introduction – Languages Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – Language Processor Development Tools Date Structures for Language Processing – Scanning and Parsing – Assemblers: Elements of Assembly programming – A simple Assembly scheme – Pass Structure of Assembler – Design of a Two Pass Assembler Macros and Macro Processors: Macro definition and Call – Macro Expansion

Unit: II	**Compilers , Interpreters and Linkers**	15 hours

Aspects of compilation – memory allocation – compilation of expressions – compilation of control structures – code optimization – Interpreters Linkers: Relocation and Linking Concepts – Design of a Linker – Self Relocating programs – A linker for MS DOS – linking for overlays – loaders Software Tools: Software tools for Program Development – Editors – Debug Monitors-Programming Environments

Unit: III	**Introduction to Operating System and Process Management**	15 hours

OS Functions – Evolution of OS functions – Batch processing Systems – Multiprogramming systems- Time Sharing Systems – Real Time Operating Systems – Os structure – Process: Process definition – Process Control – Interacting Processes – Implementation of Interacting Processes - Threads

Unit: IV	**Scheduling, Deadlocks and Process Synchronization**	15 hours

Scheduling Policies – Job Scheduling – Process Scheduling – Process Management in Unix – Scheduling in Multiprocessor OS. Deadlocks: Definitions – Resource status Modeling – Handling Deadlocks – Deadlock detection and resolution – Deadlock Avoidance. Process Synchronization: classical process synchronization problems – Semaphores – conditional critical regions – Monitors-concurrent programming in Ada

Unit: V	**Interprocess communication and Memory Management**	15 hours

Interprocess Messages – Implementation Issues – Mailboxes – Interprocess Messages in Unix – Interprocess Messages in Mach. Memory Management: Memory Allocation Preliminaries – Contiguous Memory Allocation – Noncontiguous memory allocation – Virtual memory using Paging – virtual memory using Segmentation

		Total Lecture Hours	**75 Hrs**

Books for Study:
1. D M Dhamdhere, Systems Programming and Operating Systems, Tata McGraw Hill, 2nd Revised Edition,2008

Books for References:
1. Leland L Beck, D.Manjula, - System Software: Introduction to System Programming, 3rd Edition, Pearceson 2. John J Donovan, System Programming, Tata McGraw Hill Edition,2009 3. Silberchatsz, Galvin, Gagne - Operating Systems Concepts,8th Edition,2009 4. Dilipkumar Sultania – System Programming and Operating Systems,Tech Knowledge Publications,2021

Web Resources:
1. **https://www.wikinote.org/course/view.php?id=8&section=3** 2. **https://www.w3schools.in/operating-system/intro#:~:text=An%20operating%20system%20falls%20under,networking%20hardware%2C%20printers%2C%20etc.** 3. **https://www.tutorialspoint.com/operating_system/index.htm**

Course Outcomes		K Level
CO1:	Understand the system programming and operating system abstractions can be implemented	K3
CO2:	Linkers, loaders and software tools in system programming implementing knowledge	K3
CO3:	Get more knowledge in operating systems	K3
CO4:	Analyze memory allocation methods, input output devices and file system	K4
CO5:	Acquire knowledge in Memory Management systems and page replacement algorithms	K4

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	RELATIONAL DATABASE MANAGEMENT SYSTEM	Hrs	Pedagogy
I	**Introduction to System Programming** Language Processors: Introduction – Languages Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – Language Processor Development Tools Date Structures for Language Processing – Scanning and Parsing – Assemblers: Elements of Assembly programming – A simple Assembly scheme – Pass Structure of Assembler – Design of a Two Pass Assembler Macros and Macro Processors: Macro definition and Call – Macro Expansion	15	**Chalk & Talk, ICT Kit**
II	**Compilers , Interpreters and Linkers** Aspects of compilation – memory allocation – compilation of expressions – compilation of control structures – code optimization – Interpreters Linkers: Relocation and Linking Concepts – Design of a Linker – Self Relocating programs – A linker for MS DOS – linking for overlays – loaders Software Tools: Software tools for Program Development – Editors – Debug Monitors- Programming Environments	15	**Chalk & Talk, ICT Kit**
III	**Introduction to Operating System and Process Management** OS Functions – Evolution of OS functions – Batch processing Systems – Multiprogramming systems- Time Sharing Systems – Real Time Operating Systems – Os structure – Process: Process definition – Process Control – Interacting Processes – Implementation of Interacting Processes – Threads	15	**Chalk & Talk, ICT Kit**
IV	**Scheduling, Deadlocks and Process Synchronization** Scheduling Policies – Job Scheduling – Process Scheduling – Process Management in Unix – Scheduling in Multiprocessor OS. Deadlocks: Definitions – Resource status Modeling – Handling Deadlocks – Deadlock detection and resolution – Deadlock Avoidance. Process Synchronization: classical process synchronization problems – Semaphores – conditional critical regions – Monitors- concurrent programming in Ada	15	**Chalk & Talk, ICT Kit**
V	**Interprocess communication and Memory Management** Interprocess Messages – Implementation Issues – Mailboxes – Interprocess Messages in Unix – Interprocess Messages in Mach. Memory Management: Memory Allocation Preliminaries – Contiguous Memory Allocation – Noncontiguous memory allocation – Virtual memory using Paging – virtual memory using Segmentation	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mr. J.RAJKUMAR**

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	Section A MCQs K - Level	Section B Short Answers No. of. Questions	Section B Short Answers K - Level	Section C Either or Choice	Section D Open Choice
CI AI	CO1	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
CI AI	CO2	K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1,K2	1	K2	2(K3,K3)	1(K3)
CI AII	CO4	K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II	No. of Questions to be asked		4		3		4	2
	No. of Questions to be answered		4		3		2	1
	Marks for each question		1		2		5	10
	Total Marks for each section		4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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.

			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
SI.No	**COs**	**K - Level**	**No. of Questions**	**K – Level**	**No. of Question**	**K – Level**		
1	CO1	**K3**	**2**	**K1,K2**	**1**	**K2**	2(K3,K3)	1(K3)
2	CO2	**K3**	**2**	**K1,K2**	**1**	**K2**	2(K3,K3)	1(K3)
3	CO3	**K3**	**2**	**K1,K2**	**1**	**K2**	2(K3,K3)	1(K3)
4	CO4	**K4**	**2**	**K1,K2**	**1**	**K2**	2(K4,K4)	1(K4)
5	CO5	**K4**	**2**	**K1,K2**	**1**	**K2**	2(K4,K4)	1(K4)
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(Figures in parenthesis denotes, questions should be asked with the given K level)

K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either/ or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	5		-	-	5	4.16	**17**
K2	5	10	-	-	15	12.5	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**100**	**100**

Distribution of Marks with K Level

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	
8	CO4	K2	
9	CO5	K1	
10	CO5	K2	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K4	
19) b	CO4	K4	
20) a	CO5	K4	
20) b	CO5	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

	MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) **DEPARTMENT OF INFORMATION TECHNOLOGY** **(For those who joined in 2021-2022 and after)**				

Course Name	LINUX LAB				
Course Code	**21UITSP4**		**L**	**P**	**C**
Category	**Core**		-	2	2
Nature of course:	EMPLOYABILITY	**SKILL ORIENTED**	✓	ENTREPRENEURSHIP	

Course Objectives:

- To think, create, design, develop and implement the basic knowledge of Linux commands and file handling utilities by using Linux shell environment
- To know the techniques and application of file operation commands.
- To create the directory, how to change and remove the directory.
- To apply the concepts of list of files.
- To define date format using shell programming.

List of Programs	30 Hours
Write a Linux program to Use of basic Unix Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit. Write a Linux program to find Number Checking. Write a Linux program to display Multiplication Table in Linux. Write a Linux program to Checking File or Directory in Linux. Write a Linux program to display File Operations in Linux- Create. Copy, Delete and Rename. Write a Linux program to display Directory Operations in Linux- Create, Remove and Toggle. Write a Linux script to find the sum of digits and reversing of a given number. Write a Linux script to convert lowercase to uppercase using tr utility. Write a Linux script to perform arithmetic operations using case. Write a Linux script to add two real numbers. Write a Linux program Counting number of lines, words and characters in a file. Write a Linux program to calculate Fibonacci series in shell scripting. Write a Linux program to calculate Odd or even in shell scripting Write a Linux program to change date format. Show the time taken in execution of this script. Write a Linux script to sort the numbers in ascending order. Write a Linux program to find whether a given number is prime.	

	Total Lecture Hours	**30 Hrs**

Web Resources:

Linux Operating System (w3schools.in)
LINUX PROGRAMMING LAB.pdf (mlrinstitutions.ac.in)
UNIX LINUX LAB (MCA - 208).pdf (subhartidde.com)
Linux Programming and Data Mining Lab Notes | vikramlearning.com
Linux Lab - Computing & Software Systems (CSS) - UW Bothell

Course Outcomes		K Level
CO1:	Develop solutions to simple computational problems using linux programs.	**UptoK2**
CO2:	Solve problems using conditionals and loops in linux.	**UptoK2**
CO3:	Understand the concepts of Arrays.	**UptoK2**
CO4:	Develop shell programs by date functions.	**UptoK2**

CO5:	Develop shell programs using files.	UptoK2

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	1	1	2	2	3
CO 2	1	1	2	3	2	2
CO 3	3	3	3	3	2	3
CO 4	3	3	2	2	1	3
CO 5	1	3	3	3	2	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S.No	Linux Lab	Hrs	Pedagogy
1	Write a Linux program to Use of basic Unix Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.	60	**Black Board, Lab Demonstration and LCD Projector**
2	Write a Linux program to find Number Checking.		
3	Write a Linux program to display Multiplication Table in Linux.		
4	Write a Linux program to Checking File or Directory in Linux.		
5	Write a Linux program to display File Operations in Linux- Create. Copy, Delete and Rename.		
6	Write a Linux program to display Directory Operations in Linux- Create, Remove and Toggle.		
7	Write a Linux script to find the sum of digits and reversing of a given number.		
8	Write a Linux script to convert lowercase to uppercase using tr utility. .		
9	Write a Linux script to perform arithmetic operations using case.		
10	Write a Linux script to add two real numbers.		
11	Write a Linux program Counting number of lines, words and characters in a file.		
12	Write a Linux program to calculate Fibonacci series in shell scripting.		
13	Write a Linux program to calculate Odd or even in shell scripting		
14	Write a Linux program to change date format. Show the time taken in execution of this script.		
15	Write a Linux script to sort the numbers in ascending order.		
16	Write a Linux program to find whether a given number is prime.		

Course Designed by: Mrs.R.Vanitha

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	**INTRODUCTION TO INTERNET**			
Course Code	**21UITN41**	**L**	**P**	**C**
Category	**Non Major Elective**	2	-	2
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP** ✓			

Course Objectives:

- To make aware of various uses of Internet & its applications
- To introduce the concept of web page.
- To develop web page using the basic controls and tags.
- To make them understand the basics of security.
- To know the usability of audio and video in web pages

Unit: I	**Introduction to computer and the internet:**	6 hours

Definition - Characteristics of a Computer - Application / uses of Computers - Application of Computers in different fields – Basic Functional Units of a computer / Basic - Programming Language Types – Difference between machine, assembly and High-Level Language – Personal Computer – Internet – History of Internet – History of World Wide Web – Micro Software .Net / Mirosfot.Net – Java – Web Resources. **Web Browser :** Web Browser – Connecting to the Internet – Internet Service Provider (ISP) – Types of Internet Connections – Internet Explorer – Features of Internet Explorer – Searching the internet – Online Help and Tutorials – File Transmission Protocol (FTP) – Browser Settings. **E Mail:** E-Mail – Creating an E-mail id – Sending and Receiving mails – Attaching a File – Function of E-mail – Advantages of e-mail – Disadvantages of e-mail – Instant Messaging.

Unit: II	**Hyper Text Markup Language (HTML):**	6 hours

Introduction – Structure of HTML document – Basic Tags in HTML – Headers – Linking – Images – Special Characters and line breaks – Line Break – Unordered Lists – Simple HTML Programs. **E-Business** E-Marketing – Consumer Tracking – Electronic Advertising (E-Advertising) – Search Engine – Customer Relationships Management (CRM) – Online Payments – Smart Card. **Connecting to the Internet-** Internet Connection Concepts – Domain Name System and DNS Servers – Types of Internet Connections.

Unit: III		6 hours

Exchanging E-mail- E-mail Concepts – E-mail Address – Message Headers – Downloading E mail – E-mail Netiquette – Using Abbreviations, Emotions, and Smileys – Formatted E-mail – Web Based E-mail – Avoiding Viruses. **Sending and Receiving Files by Email-** Attachments – Outlook 2002 and Outlook Express – Eudora – Netscape Messenger and Netscape Mail – America Online (AOL) – Yahoo Mail – Hotmail – Gmail – Rediffmail.

Unit: IV		6 hours

Fighting Spam, Sorting Mail, and Avoiding E-mail Viruses: Controlling E-mail Volume and Reducing Spam – Advantages of Filtering E-mail – Filtering Mail, Deleting Spam, and Defending Against Viruses in Outlook 20002 – Filtering Mail, Deleting Spam, and Defending Against Viruses in Outlook Express – Filtering Mail, Deleting Spam, and Defending Against Viruses in Eudora – Filtering Mail, Deleting Spam, and Defending Against Viruses in Netscape Messenger and Netscape Mail – Blocking Junk mail in AOL – Filtering Mail and Deleting Spam in Yahoo Mail – Filtering mail and Deleting Spam in Host mail.

Voice and Video Conferencing : Internet Phone – Voice Conferencing –Video Conferencing – Getting Voice and Video Hardware – Making Phone Calls over the Internet – Voice and Video Conferencing Using Instant Messenger Programs – Making Internet Phone Call with ICQ – Making Internet Phone Call with AOL Instant Messenger (AIM) – Voice and Video Conferencing with Yahoo Messenger – Conferencing With Windows Messenger and MSN Messenger – Making PC to Phone Calls with Windows Messenger –

Making Pc to PC Calls with Windows Messenger – Video Conferencing Windows Messenger – Conferencing With Stand - Along Programs-Net meeting.

Web Security, Privacy and Blocking-Web Security and Privacy Concepts – Cookies – Platform for internet Content Selection (PICS) – Security in Internet Explorer – Security in Netscape Navigator.

Unit: V		6 hours

Audio and Video on the Web: Playing Streaming Audio and Video – Playing Mp3 Music – Playing Video on the Internet – Windows Media Player – Real One Players **Web Page Editors** Introduction – Editing Pages with Netscape Composer – Editing Pages With FrontPage – Editing Pages With Dream weaver. **File Transfer, Downloading, FTP, Peer-to-Peer:** File Transfer Protocol (FTP) – Transferring Files by E-mail – Transferring Files using windows XP web folders – Transferring Files using peer-to-peer file sharing utilities - Transferring Files using FTP – FTP Client _ Common FTP Commands – Tel netting With Hyper Terminal.

		Total Lecture Hours	**30 Hrs**

Books for Study:

P.RIZWAN AHMED, Internet and Its Applications , Margham publications, Reprint 2018.

Books for References:

1.RAJ KUMAR SHRIVASTAVA, Internet and Web Page Design,Dominant, Edition 2017.
2.RAMESH BENGIA, Internet Technology and Web Design, Firewall Media,Third Edition 2011.

Web Resources:

    1.**https://html.com**
    2.**https://www.w3schools.com/html/**
    3. **http://web.mit.edu/6.813/www/sp16/labs/lab1-html-css/**

Course Outcomes		**K Level**
CO1:	List editors which can be used to create HTML documents.	**K2**
CO2:	Describe the Structure of Mail.	**K2**
CO3:	Identity different Tags are given in HTML.	**K2**
CO4:	Compare the various Securities.	**K2**
CO5:	List the audio and video on the Web.	**K2**

CO & PO Mapping:

COs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**
CO 1	3	2	3	2	3	3
CO 2	2	2	3	2	2	3
CO 3	3	2	3	3	2	2
CO 4	2	3	2	3	2	3
CO 5	2	3	3	3	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit		Hrs	Pedagogy
I	Definition - Characteristics of a Computer - Application / uses of Computers - Application of Computers in different fields – Basic Functional Units of a computer / Basic - Programming Language Types – Difference between machine, assembly and High-Level Language – Personal Computer – Internet – History of Internet – History of World Wide Web – Micro Software .Net / Mirosfot.Net – Java – Web Resources. **Web Browser :** Web Browser – Connecting to the Internet – Internet Service Provider (ISP) – Types of Internet Connections – Internet Explorer – Features of Internet Explorer – Searching the internet – Online Help and Tutorials – File Transmission Protocol (FTP) – Browser Settings. **E Mail:**E-Mail – Creating an E-mail id – Sending and Receiving mails – Attaching a File – Function of E-mail – Advantages of e-mail – Disadvantages of e-mail – Instant Messaging.	15	**Chalk & Talk, ICT Kit**
II	Introduction – Structure of HTML document – Basic Tags in HTML – Headers – Linking – Images – Special Characters and line breaks – Line Break – Unordered Lists – Simple HTML Programs. **E-Business** E-Marketing – Consumer Tracking – Electronic Advertising (E-Advertising) – Search Engine – Customer Relationships Management (CRM) – Online Payments – Smart Card. **Connecting to the Internet**Internet Connection Concepts – Domain Name System and DNS Servers – Types of Internet Connections.	15	**Chalk & Talk, ICT Kit**
III	**Exchanging E-mail-**E-mail Concepts – E-mail Address – Message Headers – Downloading E mail – E-mail Netiquette – Using Abbreviations, Emotions, and Smileys – Formatted E-mail – Web Based E-mail – Avoiding Viruses. **Sending and Receiving Files by Email-** Attachments – Outlook 2002 and Outlook Express – Eudora – Netscape Messenger and Netscape Mail – America Online (AOL) – Yahoo Mail – Hotmail – Gmail – Rediffmail.	15	**Chalk & Talk, ICT Kit**
IV	**Fighting Spam, Sorting Mail, and Avoiding E-mail Viruses:** Controlling E-mail Volume and Reducing Spam – Advantages of Filtering E-mail – Filtering Mail, Deleting Spam, and Defending Against Viruses in Outlook 20002 – Filtering Mail, Deleting Spam, and Defending Against Viruses in Outlook Express – Filtering Mail, Deleting Spam, and Defending Against Viruses in Eudora – Filtering Mail, Deleting Spam, and Defending Against Viruses in Netscape Messenger and Netscape Mail – Blocking Junk mail in AOL – Filtering Mail and Deleting Spam in Yahoo Mail – Filtering mail and Deleting Spam in Host mail. **Voice and Video Conferencing :** Internet Phone – Voice Conferencing –Video Conferencing – Getting Voice and Video Hardware – Making Phone Calls over the Internet – Voice and Video Conferencing Using Instant Messenger Programs – Making Internet Phone Call with ICQ – Making Internet Phone Call with AOL Instant Messenger (AIM) – Voice and Video Conferencing with Yahoo Messenger – Conferencing With Windows Messenger and MSN Messenger – Making PC to Phone Calls with Windows Messenger – Making Pc to PC Calls with Windows Messenger – Video Conferencing Windows Messenger – Conferencing With Stand - Along Programs-Net meeting. **Web Security, Privacy and Blocking-**Web Security and Privacy Concepts – Cookies – Platform for internet Content Selection (PICS) – Security in Internet Explorer – Security in Netscape Navigator.	15	**Chalk & Talk, ICT Kit**
V	**Audio and Video on the Web:** Playing Streaming Audio and Video – Playing Mp3 Music – Playing Video on the Internet – Windows Media Player – Real One Players **Web Page Editors** Introduction – Editing Pages with Netscape Composer – Editing Pages With FrontPage – Editing Pages With Dream	15	**Chalk & Talk, ICT Kit**

| | weaver. **File Transfer, Downloading, FTP, Peer-to-Peer:** File Transfer Protocol (FTP) – Transferring Files by E-mail – Transferring Files using windows XP web folders – Transferring Files using peer-to-peer file sharing utilities - Transferring Files using FTP – FTP Client _ Common FTP Commands – Tel netting With Hyper Terminal. | | |

Course Designed by: **Mrs. R.Vanitha & Mrs.J.Raj kumar**

FIFTH SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	SOFTWARE ENGINEERING			
Course Code	**21UITC51**	**L**	**P**	**C**
Category	**Core**	6	-	4
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP**			

Course Objectives:
- To understand the nature of software development and software life cycle process models, agile software development, SCRUM and other agile practices.
- To explain methods of capturing, specifying, visualizing and analyzing software requirements.
- To understand concepts and principles of software design and user-centric approach and principles of effective user interfaces.
- To know the basics of testing and understanding the concept of software quality assurance and software configuration management process.
- To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance Processes are conducted in a software project.

Unit: I	**Introduction to Software Engineering**:	18 Hrs

The Evolving role of Software – Software – The changing Nature of Software – Legacy software. **A Generic View of Process**: Software Engineering-A Process framework-The Capability Maturity Model Integration (CMMI)-**Process Models:** Prescriptive Models -The Waterfall Model – Incremental Process Models– Evolutionary Process Models.-An Agile Process View.

Unit: II	**Requirements Engineering:**	18 Hrs

Requirements engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements - Negotiating Requirements – Validating Requirements. **Building the Analysis Models** –Requirement analysis-Scenario-Based Modeling- Flow-Oriented Modeling-Creating a Behavioral Model.

Unit: III	**Design Engineering**:	18 Hrs

Design Process and Design Quality-Design Concepts-The Design Model. **Creating an Architectural Design:** Software Architecture-Data Design-Architectural Design-Mapping Data Flow into a Software Architecture.

Unit: IV	**Testing Strategies:**	18 Hrs

A strategic approach to Software Testing-Test strategies for Conventional Software- Validation testing –System testing –**Testing Tactics:** Software Testing fundamentals- Black-box and White Box Testing-Basic Path testing-Control Structure Testing – The art of Debugging.

Unit: V	**Product Metrics:**	18 Hrs

Software Quality-Metrics for the Analysis Model-Metrics for the Design Model-Metrics for the Source code-Metrics for testing-Metrics for Maintenance. **Project Management:** The Management Spectrum-The People-The Product-The Project .

		Total Lecture Hrs	**90 Hrs**

Books for Study:

1. R.S. Pressman, **Software Engineering**: A Practitioner's Approach, McGraw Hill Education (India) Private Limited, Sixth Edition, New Delhi, 2010.
Unit I: Chapter 1-Section 1.1-1.4,

Chapter 2 - Section 2.1-2.3,

Chapter 3- Section 3.1-3.4

Chapter 4 – Section 4.1-4.3

Unit II: Chapter 7- Section 7.2-7.4,7.7,7.8,

Chapter 8- Section 8.1,8.5, 8.6, 8.8

Unit III: Chapter 9- Section 9.2-9.4,

Chapter 10- Section 10.1,10.2,10.4,10.6

Unit IV: Chapter 13- Section 13.1, 13.3, 13.5, 13.6,13.7

Chapter 14- Section 14.1-14.6

Unit V: Chapter 15- Section 15.1,15.3-15.7

Chapter 21- Section 21.1-21.5

Books for References:
1. Richard Fairley,Software Engineering,Tata McGraw Hill,2016
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.

Web Resources:
1. **https://www.geeksforgeeks.org/software-engineering/**
2. **https://www.guru99.com/software-engineering-tutorial.html**
3. **https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm**

Course Outcomes		K Level
CO1:	Explain about software engineering life cycle and process model in software development.	**K3**
CO2:	Prepare the SRS, Design document, Project plan of a given software system.	**K3**
CO3:	Apply Project Management and Requirement analysis, Principles to S/W project development.	**K3**
CO4:	Analyze the cost estimate and problem complexity using various estimation techniques	**K4**
CO5:	Assess SQA in software projects through various testing strategies with product metrics.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	SOFTWARE ENGINEERING	Hrs	Pedagogy
I	**Introduction to Software Engineering**: The Evolving role of Software Software, The changing Nature of Software Legacy software **A Generic View of Process**: Software Engineering A Process framework The Capability Maturity Model Integration (CMMI) **Process Models:** Prescriptive Models, The Waterfall Model , Incremental Process Models, Evolutionary Process Models-An Agile Process View.	18	**Chalk & Talk, ICTKit**
II	**Requirements Engineering:** Requirements engineering tasks, Initiating the requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements **Building the Analysis Models** –Requirement analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Creating a Behavioral Model.	18	**Chalk & Talk, ICTKit**
III	**Design Engineering**: Design Process and Design Quality, Design Concepts-The Design Model, **Creating an Architectural Design:** Software Architecture,Data Design-Architectural Design, Mapping Data Flow into a Software Architecture.	18	**Chalk & Talk, ICTKit**
IV	**Testing Strategies:** A strategic approach to Software Testing, Test strategies for Conventional Software,Validation testing , System testing **Testing Tactics:** Software Testing fundamentals, Black-box and White Box Texting, White Box Testing, Basic Path testing, Control Structure Testing,Black Box Testing – The art of Debugging.	18	**Chalk & Talk, ICT Kit**
V	**Product Metrics:** Software Quality-Metrics for the Analysis Model, Metrics for the Design Model, Metrics for the Source code, Metrics for testing, Metrics for Maintenance., **Project Management:** The Management Spectrum, The People,The Product,The Project.	18	**Chalk & Talk, ICT Kit**

Course Designed by: **Dr.M.Karthika and Dr.T.Sujithra**

Internal	Cos	K Level	Section A No. of. Questions	Section A K - Level	Section B Short Answers No. of. Questions	Section B Short Answers K - Level	Section C Either or Choice	Section D Open Choice
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II	No. of Questions to be asked		4		3		4	2
	No. of Questions to be answered		4		3		2	1
	Marks for each question		4		3		5	10
	Total Marks for each section		4		6		10	10

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

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	50	100	100

Distribution of Marks with K Level CIA I & CIA II

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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	.NET AND C# PROGRAMMING			
Course Code	**21UITC52**	**L**	**P**	**C**
Category	**CORE**	6	-	4
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP ✓			

Course Objectives:

- To Highlighting Knowledge of Object- oriented paradigm in the C# Program Language and to Gathering knowledge of .NET environments.
- To design and develop console and window-based .NET Application.
- Demonstrate the usage of recent platforms like C#, XML, and ASP.Net which is used in the development of web application
- Represent the security in the .NET framework.
- To practice the fundamental programming mythologies in the C# programming via laboratory experiences.

Unit: I	Introduction to C#	20 Hrs

Evolution of C# - Characteristics – Applications – C# Differ from C++, Java - – **Understanding .NET:** The C# Environment – .NET Strategy, Origin, .NET Framework – Common Language Runtime – Framework Base Classes – User and Programme Interfaces – Visual Studio .NET, .NET Languages, Benefits. **Overview of C# -** Introduction, Simple C# Program, Namespaces, Adding Comments, Main Returning a value, Command Line Arguments, Main with a Class – Providing Interface Input – Using Mathematical functions – Compile Time Errors – Program Structure – Program Coding Style. **Literals, Variables and Data types –** Introduction – Literals – Variables, Data Types, Value Types, Reference Types, Declaration and initialization of variables, Default Values, Constant Variables, Scope of variables, Boxing and Unboxing.

Unit: II	Operations and Expressions-	18 Hrs

Introduction –Arithmetic Operations – Relational Operators – Logical Operators – Assignment Operators, Increment and Decrement operators, Conditional Operators, Bitwise operators, Special Operators, Arithmetic Expressions, Evaluation and Expressions, Type Conversions Mathematical Functions. **Decision Making and Branching – Introduction –** Decision Making with if Statement – Simple if Statement - if…else statement, Nesting of if…else statement, else…if ladder, Switch statement,?: operators- **Decision Making and Looping – Introduction –** while statement – do statement- for statement – for each statement – jump in loops.

Unit: III	Methods in C# -	17 Hrs

Introduction- Declaring methods – Main Methods – Invoking and Nesting of methods – Method parameters – pass by value and reference – output parameters – variable argument lists – method overloading, **Handling Arrays – Introduction –** One Dimensional Arrays – Creating an Array – Two Dimensional Arrays – Variable Size Arrays – System Array Class – Array List Class, **Manipulating Strings** - Creating Strings, String Methods, Inserting Strings, Comparing Strings, Finding Substrings, Mutable Strings, Array of Strings, Regular Expressions

Unit: IV	Classes and Objects	18 Hrs

Introduction- Basic Principles of OOPs – Defining a Class, adding variables, Methods, Member Access Modifiers, Creating Objects, Accessing Class Members, Constructors, overloaded constructors, Static Members and Constructors, Private Constructors, Copy Constructors, Destructors, member initialization, This reference- Nesting of Classes, Constant members, Read-

only members, properties, Indexes. **Inheritance and Polymorphism** - classical, containment, Defining a subclass, visibility control, defining subclass constructors, Multilevel Inheritance, Hierarchical Inheritance,Overriding methods, Hiding methods, Abstract Classes& Methods, Sealed Classes and Preventing inheritance, sealed methods, polymorphism, Extensive Methods
.

Unit: V	Interface and Delegates	17 Hrs

Defining an Interface **–** Extending an Interface – Implementing Interfaces, interfaces and inheritance, Explicit interface implementations, Abstract Class and interfaces, **Operator Overloading -** Operators, Need for operator overloading, Defining Operator overloading, overloading unary operators, overloading binary operators, overloading Comparing operators, **Delegates and Events –** Delegates – Declaration and methods – Delegate Instantiation- Delegate invocation – using Delegates – multicast Delegates – Events, **Managing Console IO operations –** Console Class, Console input, Console output, formatted output, Numeric formatting, Standard Numeric Format, Custom Numeric Format .

	Total Lecture Hrs	**90 Hrs**

Books for Study:

1. **Balagurusamy .E ,Programming in C # , Tata McGraw Hill, New Delhi, Fourth Edition, 2004.**
    UNIT I: Chapters 1.1 – 1.7, 2.1 – 2.9, 3.1 – 3.15,4.1 – 4.12
    UNIT II: Chapters 5.1 – 5.15,6.1 - 6.8, 7.1 – 7.6
    UNIT III: Chapters 8.1 – 8.11,9.1 – 9.7, 10.1 – 10.9
    UNIT IV: Chapters 12.1 – 12.22, 13.1 – 13.16
    UNIT V: Chapters 14.1 – 14.7, 15.1 – 15.7, 16.1 – 16.9-17.1 – 17.8

Books for References:

1.   Rober Powell, Richard Weeks, C# and .NET Framework, Tech Media Publication, New Delhi,2008.
2. Jon Skeet , C# in depth, Manning Version, Fourth Edition, 2019
3. YashavantKanetkar, Let Us C, BPB Publications, New Delhi, Tenth Edition, 2010.
4. Byron Gottfried, Programming with C, McGraw Hill Education (India) Private Limited, New Delhi,Third Edition,2014.

Web Resources:

1. **https://www.tutorialspoint.com/csharp/index.htm**
2. **https://www.javatpoint.com/c-sharp-tutorial**
3. **https://www.udemy.com/course/c-net-for-beginners/**

Course Outcomes	K Level
CO1:	Understanding the programming constructs in C#	**K3**
CO2:	Develop and formulate the concepts of programming language	**K3**
CO3:	Implement the concepts of OOPS in all relevant areas & development	**K3**
CO4:	Application of C# as a software tool.	**K4**
CO5:	Develop a new project in team and as a individual member.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	2	3	3	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	.NET AND C# PROGRAMMING	Hrs	Pedagogy
I	-Evolution of C# - Characteristics – Applications – C# Differ from C++, Java - – **Understanding .NET:** The C# Environment – .NET Strategy, Origin, .NET Framework – Common Language Runtime – Framework Base Classes – User and Programme Interfaces – Visual Studio .NET, .NET Languages, Benefits. **Overview of C# -** Introduction, Simple C# Program, Namespaces, Adding Comments, Main Returning a value, Command Line Arguments, Main with a Class – Providing Interface Input – Using Mathematical functions – Compile Time Errors – Program Structure – Program Coding Style. **Literals, Variables and Data types –** Introduction – Literals – Variables, Data Types, Value Types, Reference Types, Declaration and initialization of variables, Default Values, Constant Variables, Scope of variables, Boxing and Unboxing	20	**Chalk & Talk**
II	Arithmetic Operations – Relational Operators – Logical Operators – Assignment Operators, Increment and Decrement operators, Conditional Operators, Bitwise operators, Special Operators, Arithmetic Expressions, Evaluation and Expressions, Type Conversions Mathematical Functions. **Decision Making and Branching – Introduction –** Decision Making with if Statement – Simple if Statement - if…else statement, Nesting of if…else statement, else…if ladder, Switch statement,?: operators- **Decision Making and Looping – Introduction –** while statement – do statement- for statement – for each statement – jump in loops.	18	**ICT**
III	Introduction- Declaring methods – Main Methods – Invoking and Nesting of methods – Method parameters – pass by value and reference – output parameters – variable argument lists – method overloading, **Handling Arrays – Introduction –** One Dimensional Arrays – Creating an Array – Two Dimensional Arrays – Variable Size Arrays – System Array Class – Array List Class, **Manipulating Strings** - Creating Strings, String Methods, Inserting Strings, Comparing Strings, Finding Substrings,	17	**ICT**

	Mutable Strings, Array of Strings, Regular Expressions		
IV	Basic Principles of OOPs – Defining a Class, adding variables, Methods, Member Access Modifiers, Creating Objects, Accessing Class Members, Constructors, overloaded constructors, Static Members and Constructors, Private Constructors, Copy Constructors, Destructors, member initialization, This reference- Nesting of Classes, Constant members, Read-only members, properties, Indexes. **Inheritance and Polymorphism** - classical, containment, Defining a subclass, visibility control, defining subclass constructors, Multilevel Inheritance, Hierarchical Inheritance, Overriding methods, Hiding methods, Abstract Classes& Methods, Sealed Classes and Preventing inheritance, sealed methods, polymorphism, Extensive Methods.	18	**Chalk & Talk**
V	Defining an Interface – Extending an Interface – Implementing Interfaces, interfaces and inheritance, Explicit interface implementations, Abstract Class and interfaces, **Operator Overloading -** Operators, Need for operator overloading, Defining Operator overloading, overloading unary operators, overloading binary operators, overloading Comparing operators, **Delegates and Events –** Delegates – Declaration and methods – Delegate Instantiation- Delegate invocation – using Delegates – multicast Delegates – Events, **Managing Console IO operations –** Console Class, Console input, Console output, formatted output, Numeric formatting, Standard Numeric Format, Custom Numeric Format .	17	**Chalk & Talk**

Course Designed by: **Mrs.R.Vanitha and Dr.T.Sujithra**

| Inte rnal | Cos | K Level | Section A | | Section B | | Section C Either or Choice | Section D Open Choice |
| | | | | | **Short Answers** | | | |
			No. of. Questions	K - Level	No. of. Questions	K - Level		

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

Inte rnal	Cos	K Level	No. of. Questions	K - Level	No. of. Questions	K - Level	Section C Either or Choice	Section D Open Choice
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
			Distribution of Marks with K Level CIA I & CIA II					
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
1	K3	2	K1	1	K2	2(K3,K3)	1(K3)	K3
2	K3	2	K1	1	K2	2(K3,K3)	1(K3)	K3
3	K3	2	K1	1	K2	2(K3,K3)	1(K3)	K3
4	K4	2	K1	1	K2	2(K4,K4)	1(K4)	K4
5	K4	2	K1	1	K2	2(K4,K4)	1(K4)	K4
No. of Questions to be Asked			10		5		10	5
No.of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each section			10		10		25	30

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	17
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	50
K4	-	-	20	20	40	33.33	33
Marks	10	10	50	50	120	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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) **DEPARTMENT OF INFORMATION TECHNOLOGY** **(For those who joined in 2021-2022 and after)**	

Course Name	.NET AND C# PROGRAMMING LAB			
Course Code	**21UITCP5**	**L**	**P**	**C**
Category	**CORE LAB**	-	6	4
Nature of course: EMPLOYABILITY ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP**				✓

Course Objectives:
- Making student understand the concept of framework.
- To develop logics this will help them to create programs, applications in Net Framework.
- To create a simple application through framework and its native Language.
- To understand the Programming concepts in .Net Framework and create website using .Net Controls.
- Design and develop dynamic, database using .Net.

S.No	List of Programs	Hrs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	C# Program to Display Numbers in the form of Triangle C# Program to Get a Number and Display the Sum of the Digits C# Program to Search an Element in an Array C# Program to Demonstrate Boxing and Unboxing Operations C# Program to Combine Two Delegates C# Program to Demonstrate Multilevel Inheritance C# Program to Illustrate Hierarchical Inheritance C# Program to Demonstrate Multiple Exceptions C# program to convert a temperature from Celsius to Fahrenheit C# program to design a simple calculator. C# Program to Generate the Mark sheet of the Student Create a windows form with the following controls Textbox, Radio button, Check box, Command Button Create a program to perform validation using validation controls. Write a program to store the employee details using class and methods in C# .NET Create a program to connect with database and manipulate the records in the database using ADO .NET	90
	Total Lecture Hrs	**90 Hrs**

Web Resources

1. **https://www.tutorialspoint.com/csharp/index.htm**
2. **https://www.javatpoint.com/c-sharp-tutorial**
3. **https://www.udemy.com/course/c-net-for-beginners/**

Course Outcomes		K Level
CO1:	Understand code solutions and compile C# projects within the .NET framework.	**K2**
CO2:	Design and develop professional console and window based .NET application.	**K3**
CO3:	Implement string manipulation, events and exception handling within .NET application environment.	**K3**
CO4:	Design and Implement database connectivity using ADO.NET in window based	**K4**

	application.	
CO5:	Develop professional console and window based .NET application.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	.NET AND C# PROGRAMMING LAB	Hrs	Pedagogy
1 **2** **3** **4** **5** **6** **7** **8** **9** **10** **11** **12** **13** **14** **15**	C# Program to Display Numbers in the form of Triangle C# Program to Get a Number and Display the Sum of the Digits C# Program to Search an Element in an Array C# Program to Demonstrate Boxing and Un boxing Operations C# Program to Combine Two Delegates C# Program to Demonstrate Multilevel Inheritance C# Program to Illustrate Hierarchical Inheritance C# Program to Demonstrate Multiple Exceptions C# program to convert a temperature from Celsius to Fahrenheit C# program to design a simple calculator. C# Program to Generate the Mark sheet of the Student Create a windows form with the following controls Textbox, Radio button, Check box, Command Button Create a program to perform validation using validation controls. Write a program to store the employee details using class and methods in C# .NET Create a program to connect with database and manipulate the records in the database using ADO .NET	**90**	**Laboratory experiments**

Course Designed by: Mrs.R.Vanitha and Dr.T.Sujithra

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	DATA STRUCTURES			
Course Code	**21UITE51**	**L**	**P**	**C**
Category	**Core Elective-I**	5	-	5
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP** ✓			

Course Objectives:

- The Objective of the course is to introduce the fundamentals of Data Structure.
- Abstract Concepts and how these concepts are used in Problem Solving.
- Allow to assess how the choice of data structures and algorithm design methods impacts the performance of programs
- To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.
- Understanding Various Searching and Sorting Techniques File Structure.

Unit: I	Introduction	15 Hrs
Data Structures- Data Structure Operations- String Processsing- Introduction- Storing Strings-Character Data Type -String Operations.		
Unit: II	**Arrays, Records and Pointers**	**15 Hrs**
Arrays - Introduction – Linear Arrays – Representation of Linear arrays in memory – Traversing Linear arrays – Sorting – Linear Search – Binary Search – Multidimensional array – Pointers – Records – Representation of records in memory - Matrices – Sparse matrices.		
Unit: III	**Linked Lists**	**15 Hrs**
Linked List – Introduction – Representation of linked list in memory – Traversing a linked list – Searching a linked list – Memory allocation – Insertion into a linked list –Deletion from a Linked List.		
Unit: IV	**Stacks ,Queues and Trees**	**15 Hrs**
Stacks-Introduction-Array Representation of Stacks-Linked Representation of Stacks. Queues-Linked Representation of Queues. Trees: Introduction-Binary Trees-Representing Binary Trees in Memory-Traversing Binary Trees-Binary Search Trees-Searching and Inserting in Binary Search Trees-Deleting in a Binary Search Trees.		
Unit: V	**Graphs and Sorting**	**15 Hrs**
Graphs-Introduction- Linked Representation of a Graph- Operations on Graphs-Sorting-Insertion Sort-Selection Sort-Quick Sort-Merge Sort.		
	Total Lecture Hrs	**75 Hrs**

Books for Study:

Seymour Lipschutz, Data Structures, Tata McGraw Hill, New Delhi, 2nd Edition, 2006.
Unit-I : Chapter 1 – 1.3,1.4
       Chapter 3– 3.3,3.4,3.5
Unit-II : Chapter 4 – 4.
Unit-III: Chapter 1 – 1.3,1.4
Unit-IV: Chapter 1 – 1.3,1.4
Unit-V : Chapter 1 – 1.3,1.4

Books for References:

1. A.Chitra, P.T. Rajan, Classical Edition,2006. Data Structures,Vijay Nicole Imprints, 1st

2. D. Samanta, Classical Data Structures, PHI Learning Private Limited, New Delhi, 2nd Edition, 2008.

3. Data Structures: A Pseudo code Approach with C-By Gilberg and Forouzan-Thomson Learning

Web Resources:

1.Data Structure and Algorithms Tutorial (tutorialspoint.com)

2. https://www.cs.bham.ac.uk/~jxb/DSA/dsa.pdf

3. https://www.programiz.com/dsa

Course Outcomes		K Level
CO1:	Apply the different linear data structures like stack and queue to various computing problems.	**K3**
CO2:	Implement abstract data types using arrays and linked list.	**K3**
CO3:	Solve problem involving graphs, trees	**K3**
CO4:	Analyze the various sorting and searching algorithms.	**K4**
CO5:	Implement different types of trees and apply them to problem solutions.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	2	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

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LESSON PLAN

Unit	DATA STRUCTURES	Hrs	Pedagogy
I	**Introduction**:Data Structures- Data Structure Operations- String Processsing- Introduction- Storing Strings- Character Data Type -String Operations.	15	Chalk & Talk, ICT Kit
II	**Arrays, Records and Pointers** :Arrays - Introduction – Linear Arrays – Representation of Linear arrays in memory – Traversing Linear arrays – Sorting – Linear Search – Binary Search – Multidimensional array – Pointers – Records – Representation of records in memory - Matrices – Sparse matrices.	15	Chalk & Talk, ICT Kit
III	**Linked Lists**:Linked List – Introduction – Representation of linked list in memory – Traversing a linked list – Searching a linked list – Memory allocation – Insertion into a linked list –Deletion from a Linked List.	15	Chalk & Talk, ICT Kit
IV	**Stacks ,Queues and Trees**:Stacks-Introduction-Array Representation of Stacks-Linked Representation of Stacks.Queues-Linked Representation of Queues. Trees: Introduction-Binary Trees-Representing Binary Trees in Memory-Traversing Binary Trees-Binary Search Trees-Searching and Inserting in Binary Search Trees-Deleting in a Binary Search Trees.	15	Chalk & Talk, ICT Kit
V	**Graphs and Sorting**:Graphs-Introduction- Linked Representation of a Graph- Operations on Graphs-Sorting-Insertion Sort-Selection Sort-Quick Sort-Merge Sort.	15	Chalk & Talk, ICT Kit

Course Designed by: **Mrs.R.K.Vijayalakshmi and Dr.M.Karthika**

Internal	Cos	K Level	Section A		Section B		Section C Either or Choice	Section D Open Choice
					Short Answers			
			No. of. Questions	K - Level	No. of. Questions	K - Level		

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

Internal	Cos	K Level	No. of. Questions	K - Level	No. of. Questions	K - Level	Section C Either or Choice	Section D Open Choice
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
Distribution of Marks with K Level CIA I & CIA II								
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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.

			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S.No	**COs**	**K - Level**	**No. of Questions**	**K – Level**	**No. of Question**	**K – Level**		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**1 K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**1 K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**1 K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**1 K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**1 K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	**MULTIMEDIA AND APPLICATIONS**			
Course Code	**21UITE52**	**L**	**P**	**C**
Category	**CORE ELECTIVE -I**	5	-	5
Nature of course: EMPLOYABILITY	✓ SKILL ORIENTED	✓ ENTREPRENURSHIP		✓

Course Objectives:

- To learn the basic concepts of Multimedia.
- To identify a range of concepts, techniques and tools for creating and editing the interactive Multimedia applications.
- To identify the current and future issues related to Multimedia Technology.
- To identify both theoretical and practical aspects in designing Multimedia systems surrounding the emergence of Multimedia technologies using contemporary hardware and software technologies.
- To Identify the Multimedia computing technologies.

Unit: I	**INTRODUCTION TO MULTIMEDIA**	**15 Hrs**

Introduction-Multimedia-Multimedia Market-Content and Copyright- Resources for Multimedia Developers. Products and Evaluation: Types of Products-Evaluation.

Unit: II	**HARDWARE,OPERATING SYSTEMS AND SOFTWARE**	**15 Hrs**

Computer Architecture-Computer Architecture Standards-Operating Systems and Software-Multimedia Computer Architecture. Text: Elements of Text-Text data files-Using Text in Multimedia Applications.

Unit: III	**GRAPHICS, DIGITAL AUDIO**	**15 Hrs**

Elements of Graphics-Images and Color-Graphics File and Application Formats-Using graphics in Multimedia Applications. Digital audio: Characteristics of Sound and Digital Audio-Digital Audio Systems-MIDI-Audio File Formats-Using Audio in Multimedia Applications.)

Unit: IV	**DIGITAL VIDEO AND ANIMATION**	**15 Hrs**

Background on Video- Characteristics of Digital Video- Video Capture and Playback Systems-Computer Animations-Using Digital Video in Multimedia Applications.

Unit: V	**MULTIMEDIA AND THE INTERNET**	**15 Hrs**

The Internet-HTML and web Authoring-Multimedia Considerations for the Internet-Design Considerations for the Web pages.

		Total Lecture Hrs	**75 Hrs**

Books for Study:

1.Multimedia Technology and Applications by David Hillman, Galgotia Publication Pvt Ltd.

      Unit I: Chapter 1,2
      Unit II: Chapter 3,4
      Unit III: Chapter 5,6
      Unit IV: Chapter 7
      Unit V: Chapter 10

Books for References:

1.Multimedia-James E.Shuman-Vikas Publishing House.

2.Principles of Multimedia - Ranjan Parekh - TMGH, New Delhi - Twelfth Reprint.
3.Fundamental of Multimedia - Ze-Nian Li & M. S. Drew.

Web Resources:

1. https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm
2. https://ayomenulisfisip.files.wordpress.com/2018/01/introduction-to-multimedia.pdf
3. https://www.sciencedirect.com/topics/social-sciences/multimedia-learning

Course Outcomes		K Level
CO1:	Identify the basic hardware and software requirements for multimedia development	**K3**
CO2:	Discuss about audio digitization, audio file format and audio software.	**K3**
CO3:	Describe how to use text-related element in multimedia design correctly	**K3**
CO4:	Explain about digital video standards, formats and technology.	**K4**
CO5:	Understand about multimedia authoring and tools	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	2	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	MULTIMEDIA AND APPLICATIONS	Hrs	Pedagogy
I	**INTRODUCTION TO MULTIMEDIA** :Introduction-Multimedia-Multimedia Market-Content and Copyright- Resources for Multimedia Developers. Products and Evaluation: Types of Products-Evaluation.	15	**Chalk & Talk, ICT Kit**
II	**HARDWARE,OPERATING SYSTEMS AND SOFTWARE** Computer Architecture-Computer Architecture Standards-Operating Systems and Software-Multimedia Computer Architecture. Text: Elements of Text-Text data files-Using Text in Multimedia Applications.	15	**Chalk & Talk, ICT Kit**
III	**GRAPHICS, DIGITAL AUDIO** :Elements of Graphics-Images and Color-Graphics File and Application Formats-Using graphics in Multimedia Applications. Digital audio: Characteristics of Sound and Digital Audio-Digital Audio Systems-MIDI-Audio File Formats-Using Audio in Multimedia Applications.	15	**Chalk & Talk, ICT Kit**
IV	**DIGITAL VIDEO AND ANIMATION** :Background on Video-Characteristics of Digital Video- Video Capture and Playback Systems-Computer Animations-Using Digital Video in Multimedia Applications.	15	**Chalk & Talk, ICT Kit**
V	**MULTIMEDIA AND THE INTERNET** :The Internet-HTML and web Authoring-Multimedia Considerations for the Internet-Design Considerations for the Web pages.	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mrs.R.K.Vijayalakshmi and Mr.K.Tamilselvam**

			\multicolumn{2}{c}{Section A}	\multicolumn{2}{c}{Section B}	Section C	Section D
Inte rnal	**Cos**	**K Level**			\multicolumn{2}{c}{**Short Answers**}	**Either or Choice**	**Open Choice**
			No. of. Question s	K - Level	No. of. Questions	K - Level		
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II	\multicolumn{2}{l}{No. of Questions to be asked}	4		3		4	2
	\multicolumn{2}{l}{No. of Questions to be answered}	4		3		2	1
	\multicolumn{2}{l}{Marks for each question}	4		3		5	10
	\multicolumn{2}{l}{Total Marks for each section}	4		6		10	10

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

Distribution of Marks with K Level CIA I & CIA II

	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	COMPUTER GRAPHICS AND DESIGN			
Course Code	21UITE53	L	P	C
Category	CORE ELECTIVE - I	5	-	5
Nature of course: EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP ✓				

Course Objectives:

- To introduce to the students the concepts of computer graphics
- To Understand the need of developing graphics application
- To Learn algorithmic development of graphics primitives like: line, circle, polygon etc.
- To Learn the representation and transformation of graphical images and pictures.
- To demonstrate drawing algorithm, two-dimensional transformation and clipping.

Unit: I	GRAPHIC SYSTEMS	15 Hrs

Overview of Graphics Systems: Video display devices- Raster scan Systems -Random Scan Systems - Interactive input devices - Hard copy devices - Graphics software.

Unit: II	OUTPUT PRIMITIVES	15 Hrs

Output Primitives: Line-Drawing Algorithms- Line Function – Circle-Generating Algorithms– Filled-Area Functions-Character Generation.

Unit: III	ATTRIBUTES OF OUTPUT PRIMITIVES	15 Hrs

Attributes of Output Primitives:Line Attributes - Color and Grayscale Levels-Area-Fill Attributes-Character Attributes -Bundled Attributes. Two-Dimensional Transformations: Basic Transformations- Matrix Representation-Composite Transformations.

Unit: IV	TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS	15 Hrs

Two Dimensional Viewing: The Viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping- Text Clipping.

Unit: V	THREE DIMENSIONAL CONCEPTS	15 Hrs

Three Dimensional Concepts:Display Methods-Graphics Packages.Three Dimensional Geometric and Modeling Transformations:Translation – Rotation –Scaling-Other Transformations-Three-Dimensional Transformation Functions.Three Dimensional Viewing:Viewing Pipeline-Viewing Coordinates-Projections.

		Total Lecture Hrs	75 Hrs

Books for Study:

1.Donald D. Hearn and Pauline Baker M.,Computer Graphics, C Version",Pearson Education, Second Edition, New Delhi,2011.
Unit-I : Chapter 2 - 2.1-2.3,2.5-2.7
Unit-II : Chapter 3 – 3.2-3.5,3.11,3.14
Unit-III: Chapter 4 – 4.1, 4.3-4.6
           Chapter 5– 5.1, 5.2, 5.4
Unit – IV: Chapter 6 – 6.1 – 6.10
Unit – V: Chapter 9 – 9.1,9.2
           Chapter 11 – 11.1 - 11.4,11.6
           Chapter 12 – 12.1-12.3

Books for References:
1.Roy A Plostock, Zhigang Xiang., Schaum's outline of Computer Graphics, Tata McGraw Hill, New Delhi,2001.
2. Steve Marschner, Peter Shirley Fundamentals of Computer Graphics, CSR Press, Fourth Edition, 2016.
3. William.M.Newman,Robert F.Sproull,Principles of Interactive Computer Graphics,McGraw Hill Company.

Web Resources:

1. **https://www.geeksforgeeks.org/introduction-to-computer-graphics/**
2. **https://www.tutorialspoint.com/computer_graphics/computer_graphics_quick_guide.htm**
3. **https://www.britannica.com/topic/computer-graphics**

Course Outcomes		K Level
CO1:	Analyze and Apply Line and Circle drawing algorithms.	**K3**
CO2:	Understand the concepts of different type of geometric transformation of objects in 2D	**K3**
CO3:	Understand the implementation of three dimensional transformation.	**K3**
CO4:	Apply clipping and filling techniques for modifying an Object.	**K4**
CO5:	Describe the importance of viewing and projections.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	2	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	COMPUTER GRAPHICS AND DESIGN	Hrs	Pedagogy
I	**GRAPHIC SYSTEMS** :Overview of Graphics Systems: Video display devices- Raster scan Systems -Random Scan Systems - Interactive input devices - Hard copy devices - Graphics software.	15	**Chalk & Talk, ICT Kit**
II	**OUTPUT PRIMITIVES** :Output Primitives: Line-Drawing Algorithms- Line Function – Circle-Generating Algorithms– Filled-Area Functions-Character Generation.	15	**Chalk & Talk, ICT Kit**
III	**ATTRIBUTES OF OUTPUT PRIMITIVES** Attributes of Output Primitives:Line Attributes - Color and Grayscale Levels-Area-Fill Attributes- Character Attributes -Bundled Attributes. Two-Dimensional Transformations: Basic Transformations- Matrix Representation-Composite Transformations	15	**Chalk & Talk, ICT Kit**
IV	**TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS** Two-Dimensional Viewing: The Viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping- Text Clipping.	15	**Chalk & Talk, ICT Kit**
V	**THREE DIMENSIONAL CONCEPTS** :Three Dimensional Concepts:Display Methods-Graphics Packages.Three Dimensional Geometric and Modeling Transformations:Translation – Rotation –Scaling-Other Transformations-Three- Dimensional Transformation Functions.Three Dimensional Viewing:Viewing Pipeline-Viewing Coordinates-Projections	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mrs.R.K.Vijayalakshmi and Mrs.R.Vanitha**

			Section A		Section B		Section C Either or Choice	Section D Open Choice
					Short Answers			
Inte rnal	**Cos**	**K Level**	**No. of. Questions**	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	DATA COMMUNICATIONS AND NETWORKS			
Course Code	**21UITE54**	**L**	**P**	**C**
Category	**Core Elective-II**	5	-	5
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			✓

COURSE OBJECTIVES:
- To introduce the fundamental types of computer networks.
- To include learning about computer network organization
- To understand the data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.
- To demonstrate the TCP/IP & OSI model merits & demerits.
- To know the role of various protocols in Networking.

Unit: I	**Introduction:**	15 **Hrs**

Data Communication-Networks-Protocols and Standards-**Network Models:** Layered Tasks-The OSI Model-Layers in the OSI Model-TCP/IP Protocol suite.
Physical Layer: Transmission Media: Guided media- Unguided media: Wireless- **Wireless WANs**: Cellular Telephone and Satellite Networks –Cellular Telephony-Satellite Networks.

Unit: II	**Data Link Layer: Error Detection and Correction:**	15 **Hrs**

Introduction – Block Coding- Linear Block Codes- Cyclic Codes

Unit- III	**Network Layer:**	15 **Hrs**

Delivery, Forwarding and Routing: Delivery– Forwarding – Multicast Routing Protocols

Unit: IV	Transport Layer	15 **Hrs**

Process to Process Delivery –UDP-TCP-SCTP. Congestion Control and Quality Service.

Unit: V	**Network Security:**	15 **Hrs**

Security services – Message confidentiality – Message Integrity – Message Authentication – Digital Signature – Entity Authentication.

		Total Lecture Hrs	75 **Hrs**

Books for Study:

1. Behrouz A. Forouzan, Data Communications and Networking, TataMcGraw Hill Education Private Limited, New Delhi, Fourth Edition, 2007.
     Unit I : Chapter1 – Section: 1.1, 1.2, 1.4.
               Chapter2 – Section: 2.1- 2.4
                Chapter 7 – Section: 7.1,7.2
                Chapter 16 – Section:16.1,16.2
     Unit II: Chapter 10 – Section: 10.1 - 10.5
               Chapter 11 – Section:11.1-11.5
     Unit III: Chapter22 – Section: 22.1, 22.2, 22.4

     Unit IV: Chapter 23- Section 23.1-23.4
               Chapter 24 – Section 24.1- 24.5
     Unit V : Chapter 31 – Section: 31.1-31.6

Books for References:

1. Andrew S.Tanenbaum, Computer Network, Prentice Hall of India, New Delhi, Fifth Edition, 2014.
2. Prakash C.Gupta, Data Communications & Computer Networks, Prentice Hall of India, New Delhi, Third Edition, 2006.
3. William Stallings, Data and Computer Communications, Prentice Hall of India, New Delhi, Seventh Edition, 2004.

Web Resources

1. **https://www.journals.elsevier.com/computer-networks**
2. **https://www.tutorialspoint.com/computer_fundamentals/computer_networking.html**
3. **https://www.guru99.com/types-of-computer-network.html**

Course Outcomes		K Level
CO1:	Explain about building blocks of Computer Network, Components and Transmission media.	**K3**
CO2:	Demonstrate the Functionalities and Protocols in the layers of ISO/OSI Network Model.	**K3**
CO3:	Make use of the Data link layer protocols in Error detection and correction.	**K3**
CO4:	Apply Suitable Routing Strategies for a given network and choose appropriate access control, congestion control and congestion avoidance technique for given Traffic scenario	**K4**
CO5:	Assess the functions of Application layer Paradigms and Protocols and design for the real time applications.	**K4**

CO & PO Mappings:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	DATA COMMUNICATIONS AND NETWORKS	Hrs	Mode
I	**Introduction:** Data Communication-Networks-Protocols and Standards-**Network Models:** Layered Tasks-The OSI Model-Layers in the OSI Model-TCP/IP Protocol suite. **Physical Layer**: Transmission Media: Guided media- Unguided media: Wireless- **Wireless WANs**: Cellular Telephone and Satellite Networks –Cellular Telephony-Satellite Networks.	15	**Lecture, Chalk, PPT, ICT**
II	**Data Link Layer: Error Detection and Correction:** Introduction – Block Coding- Linear Block Codes- Cylic Codes.	15	**Lecture, Chalk, PPT, ICT**
III	**Network Layer:** Delivery, Forwarding and Routing: Delivery– Forwarding – Multicast Routing Protocols.	15	**Lecture, Chalk, PPT, ICT**
IV	**Transport Layer**: Process to Process Delivery –UDP-TCP-SCTP. Congestion Control and Quality Service.	15	**Lecture, Chalk, PPT, ICT**
V	**Network Security:** Security services – Message confidentiality – Message Integrity – Message Authentication – Digital Signature – Entity Authentication.	15	**Lecture, Chalk, PPT, ICT**

Course Designed by: **Dr.T.Sujithra and Mr.K.Tamilselvam**

			Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)					
			Section A		Section B		Section C Either or Choice	Section D Open Choice
					Short Answers			
Inte rnal	Cos	K Level	No. of. Question s	K - Level	No. of. Questions	K - Level		
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	CRYPTOGRAPHY & NETWORK SECURITY			
Course Code	21UITE55	**L**	**P**	**C**
Category	Core Elective-II	5	-	5
Nature of course:	EMPLOYABILITY ✓	SKILL ORIENTED ✓	ENTREPRENURSHIP	✓

COURSE OBJECTIVES:
- To define terms related to cryptography, hashing, message authentication code, digital signature.
- To understand vulnerability analysis of network security and acquire background on hash functions; authentication; firewalls; intrusion detection techniques.
- To demonstrate the generation of keys and execution of symmetric and public key algorithms from given data.
- To understand vulnerability analysis of network security and acquire background on hash functions; authentication; firewalls; intrusion detection techniques.
- To discuss Web security and Firewalls.

Unit: I	**Introduction to the Concepts of Security:**	15

Introduction – The need for security-Security Approaches – Principles of Security – Types of Attacks – Cryptography Techniques –**Introduction** – Plain Text and Cipher Text – Substitution Techniques – Transposition Techniques – Encryption and Decryption – Symmetric and Asymmetric Key cryptography – Steganography –Key range and Key size – Possible type ofAttacks.

Unit: II	**Computer Based Symmetric Key Cryptographic Algorithms:**	12

Introduction –Algorithm types and Modes – An Overview of Symmetric Key Cryptography – Data Encryption Standard (DES) – International Data Encryption Algorithm (IDEA) – RC$ - RC5 – Blowfish –Advanced Encryption standard (AES).

Unit: III	**Computer Based Asymmetric Key Cryptographic Algorithms**:	18

Introduction – An Overview of Asymmetric Key Cryptography – RSA Algorithm – Elgamal Cryptography – Symmetric and Asymmetric Key Cryptography – Digital Signature – Knapsack Algorithm – Elgamal Digital Signature – Attacks on Digital Signature – Problems with Public Key Exchange. **Public Key Infrastructure (PKI) : Introduction –** Digital Signature - Private Key Management – The PKIX model – Public Key Cryptographic standards (PKCS) – XML - PKI and Security

Unit: IV	**Internet Security Protocols : Introduction –**	18

Basic Concepts – Secure Socket Layer (SSL) **-** Transport Layer Security (TLS) – Secure Hyper Text Transfer Protocol (SHTTP) – Secure Electronic Transaction (SET) – SSL Versus SET – 3-D Secure Protocol – Email Security– Wireless Application Protocol (WAP) Security – Security in GSM – Security in #G – IEEE 802.11 Security – Link Security versus Network Security.

Unit: V	**User Authentication Mechanism :**	12

Introduction - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos – Key Distribution Centre – Security Handshake Pitfalls – single sign on Approaches – attacks on Authentication Schemes. **Network Security, firewalls and Virtual Private Networks (VPN) :** Introduction – Brief Introduction to TCP/IP – Firewalls – IP Security – Virtual Private Network – Intrusion.

		Total Lecture Hrs	75

Books for Study:

1. Atul Kahate, Cryptography and Network Security – McGraw Hill Education (India) Private Limited First Edition 2013.

        Unit I   : Chapter 1 ,2: 1.1-1.5 , 2.1 – 2.9.
        Unit II   : Chapter 3: 3.1 – 3.9.
        Unit III   : Chapter4 ,5 : 4.1 – 4.11, 5.1 – 5.6
        Unit IV   : Chapter 6: 6.1-6.14.
        Unit V   : Chapter 7 , 9 : 7.1 – 7.11, 9.1 – 9.6.

Books for References:

1. William Stallings, Cryptography and Network Security – Prentice Hall Publications 4 th Edition 2005.
2. BehrouzA.Forouzan , Cryptography and Network Security – McGraw Hill Publications.

Web Resource

1.https://www.geeksforgeeks.org/cryptography-introduction/
2.http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Cryptography_and_Network_Security.pdf
3.https://www.classcentral.com/course/swayam-cryptography-and-network-security-9896

Course Outcome		K Level
CO1:	Explain about Concepts of Security, types of attacks, cryptographic algorithms, various internet security protocols and basics of authentication.	**K3**
CO2:	Determine about various cryptographic techniques, algorithms types and digital signature.	**K3**
CO3:	Classify various attacks, symmetric key and asymmetric cryptographic algorithm internet security protocols and various user authentication mechanisms.	**K3**
CO4:	Assess the cryptographic techniques, DES and cryptographic algorithms, and different security protocols.	**K4**
CO5:	Interpret the, cryptography techniques, symmetric and asymmetric cryptographic algorithms, security protocols, security mechanism.	**K4**

CO & PO Mappings:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	NETWORK SECURITY AND CRYPTOGRAPHY	Hrs	Mode
I	**Introduction to the Concepts of Security:** Introduction – The need for security-Security Approaches – Principles of Security – Types of Attacks – Cryptography Techniques –**Introduction** – Plain Text and Cipher Text – Substitution Techniques – Transposition Techniques – Encryption and Decryption – Symmetric and Asymmetric Key cryptography – Steganography –Key range and Key size – Possible type ofAttacks.	15	**Lecture, Chalk,PPT, ICT**
II	**Computer Based Symmetric Key Cryptographic Algorithms:** Introduction –Algorithm types and Modes – An Overview of Symmetric Key Cryptography – Data Encryption Standard (DES) – International Data Encryption Algorithm (IDEA) – RC$ - RC5 – Blowfish –Advanced Encryption standard (AES).	12	**Lecture, Chalk,PPT ICT,**
III	**Computer Based Asymmetric Key Cryptographic Algorithms**: Introduction – An Overview of Asymmetric Key Cryptography – RSA Algorithm – Elgamal Cryptography – Symmetric and Asymmetric Key Cryptography – Digital Signature – Knapsack Algorithm – Elgamal Digital Signature – Attacks on Digital Signature – Problems with Public Key Exchange.**Public Key Infrastructure (PKI) : Introduction –** Digital Signature - Private Key Management – The PKIX model – Public Key Cryptographic standards (PKCS) – XML - PKI and Security.	18	**Lecture, Chalk,PPT ICT,**
IV	**Internet Security Protocols : Introduction –** Basic Concepts – Secure Socket Layer (SSL) **-** Transport Layer Security (TLS) – Secure Hyper Text Transfer Protocol (SHTTP) – Secure Electronic Transaction (SET) – SSL Versus SET – 3-D Secure Protocol – Email Security– Wireless Application Protocol (WAP) Security – Security in GSM – Security in #G – IEEE 802.11 Security – Link Security versus Network Security.	18	**Lecture, Chalk,PPT, ICT**
V	**User Authentication Mechanism :**Introduction - Authentication Basics – Passwords – Authentication Tokens – Certificate Based Authentication – Biometric Authentication – Kerberos – Key Distribution Centre – Security Handshake Pitfalls – single sign on Approaches – attacks on Authentication Schemes. **Network Security, firewalls and Virtual Private Networks (VPN) :** Introduction – Brief Introduction to TCP/IP – Firewalls – IP Security – Virtual Private Network – Intrusion.	12	**Lecture, Chalk,PPT, ICT**

Course Designed by: **Dr.T.Sujithra and Mr.K.Tamilselvam**

| | | | Section A | | Section B | | Section C | Section D |
| | | | | | Short Answers | | | |
Inte rnal	Cos	K Level	No. of. Question s	K - Level	No. of. Questions	K - Level	Either or Choice	Open Choice
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

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

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PRINCIPLES OF SOFTWARE TESTING			
Course Code	**21UITE56**	**L**	**P**	**C**
Category	**Core Elective II**	5	-	5
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP** ✓			

COURSE OBJECTIVES:

- To understand Software development model.
- To learn major concepts of the testing methodologies.
- To create and manage test cases and defect profiles.
- To build strategies to track testing processes in the bug tracking systems.
- To do document of the test report in the testing enclosure document.

Unit: I	**PRINCIPLES OF TESTING**	15 Hrs

Principles of Testing: Context of Testing in Producing Software –The Incomplete Car – Dijkstra's Doctrine – A test In Time! – The Cast and Saint – Test the Tests First.
Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality Control - Testing, Verification, and Validation – Process Model to Represent Different Phases – Life Cycle models.

Unit: II	**WHITE BOX TESTING**	15 Hrs

White Box Testing: What is White Box Testing – Static Testing – Structural Testing – Challenges in White Box Testing. Black Box Testing: What is Black Box Testing- Why Black Box Testing – When to do Black Box Testing – How to do Black Box Testing – Conclusion.

Unit: III	**INTEGRATION TESTING**	15 Hrs

Integration Testing: What is Integration Testing - Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash - Conclusion. System and Acceptance Testing: System Testing Overview – Why is System Testing Done – Functional Versus Non- Functional Testing – Functional System Testing – Non Functional Testing .

Unit: IV	**PERFORMANCE TESTING**	15 Hrs

Performance Testing: Introduction – Factors Governing Performance testing – Methodology for Performance Testing- Tools for Performance Testing – Process for Performance Testing. Regression Testing: What is Regression Testing – Types of Regression Testing – When to Regression Testing – How to Regression Testing – Best Practices in Regression Testing.

Unit: V	**TESTING OF OBJECT-ORIENTED SYSTEMS**	15 Hrs

Testing of Object-Oriented Systems: Introduction – Primer on Object-Oriented Software – Differences in OO Testing. Usability and Accessibility Testing: What is Usability Testing – When to do Usability Testing – Aesthetics Testing – Accessibility Testing – Tools for Usability – Usability Lab Setup – Test Roles for Usability.

		Total Lecture Hrs	75 Hrs

Books for Study:

1. Software Testing Principles and Practices, Srinivasan Desikan, Gopalaswamy, Ramesh, 1st Edition, 6th Reprint, Pearson Education, 2014.
    Unit I : Chapter1 & 2
    Unit II : Chapter 3 & 4
    Unit III: Chapter 5 & 6

Unit IV: Chapter 7 & 8	
Unit V : Chapter 11 & 12	

Books for References:

1. Software Quality and Testing: A Concise Study, S. A. Kelkar, 3rd Edition, PHI Learning, 2012.
2. Software Testing, Principles and Practices, Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education Inc., 2015
3. Software Testing- Principles, Techniques and Tools, M.G. Limaye, Tata McGraw-Hill Pvt. Ltd. 2017.

Web Resources:

1. **https://www.javatpoint.com/software-testing-tutorial**
2. **https://www.techtarget.com/whatis/definition/software-testing**
3. **https://www.guru99.com/software-testing.html**

Course Outcomes		K Level
CO1:	Explain about building Software Development Life Cycle Models and different types of testing	**K3**
CO2:	Demonstrate the need of testing and it types.	**K3**
CO3:	Identify suitable tests to be carried out in Software Development.	**K3**
CO4:	Document test plans and test cases designed.	**K4**
CO5:	Illustrate the use of automatic testing tools.	**K4**

CO & PO Mappings:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	PRINCIPLES OF SOFTWARE TESTING	Hrs	Mode
I	Principles of Testing: Context of Testing in Producing Software –The Incomplete Car – Dijkstra's Doctrine – A test In Time! – The Cast and Saint – Test the Tests First. Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality Control - Testing, Verification, and Validation – Process Model to Represent Different Phases – Life Cycle models.	15	**Lecture, Chalk, PPT, ICT**
II	White Box Testing: What is White Box Testing – Static Testing – Structural Testing – Challenges in White Box Testing. Black Box Testing: What is Black Box Testing- Why Black Box Testing – When to do Black Box Testing – How to do Black Box Testing – Conclusion.	15	**Lecture, Chalk, PPT, ICT**
III	Integration Testing: What is Integration Testing - Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash - Conclusion. System and Acceptance Testing: System Testing Overview – Why is System Testing Done – Functional Versus Non- Functional Testing – Functional System Testing – Non Functional Testing .	15	**Lecture, Chalk, PPT, ICT**
IV	Performance Testing: Introduction – Factors Governing Performance testing – Methodology for Performance Testing- Tools for Performance Testing – Process for Performance Testing. Regression Testing: What is Regression Testing – Types of Regression Testing – When to Regression Testing – How to Regression Testing – Best Practices in Regression Testing	15	**Lecture, Chalk, PPT, ICT**
V	Testing of Object-Oriented Systems: Introduction – Primer on Object-Oriented Software – Differences in OO Testing. Usability and Accessibility Testing: What is Usability Testing – When to do Usability Testing – Aesthetics Testing – Accessibility Testing – Tools for Usability – Usability Lab Setup – Test Roles for Usability.	15	**Lecture, Chalk, PPT, ICT**

Course Designed by: **Dr.T.Sujithra and Mrs.R.Vanitha**

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** Short Answers		**Section C Either or Choice**	**Section D Open Choice**
			No. of. Questions	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	**CO1**	**K3**	2	**K1**	1	**K2**	**2(K3,K3)**	**1(K3)**
	CO2	**K3**	2	**K1**	2	**K2**	**2(K3,K3)**	**1(K3)**
CI AII	**CO3**	**K3**	2	**K1**	1	**K2**	**2(K3,K3)**	**1(K3)**
	CO4	**K4**	2	**K1**	2	**K2**	**2(K4,K4)**	**1(K4)**
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PROGRAMMING IN PHP AND MYSQL LAB			
Course Code	21UITSP5	L	P	C
Category	SKILLED LAB	-	2	2
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			✓

Course Objectives:

- Design and develop dynamic, database-driven web applications using PHP.
- Get hands on experience on various techniques of web development and will be able to design and develop a complete website.
- Apply and analyze PHP programs to design real life problems.
- Examine the use of PHP programming that uses SQL tables.
- Design PHP programs using parsing functions.

S.No	List of Programs	Hrs
1	Write a PHP program to reverse given number.	
2	Write a PHP program to print table of a number.	
3	Write a PHP program to print Fibonacci series without using recursion and using recursion.	
4	Write a PHP program to swap two numbers with and without using third variable.	
5	Write a PHP program to print alphabet triangle.	
6	Develop a PHP program using controls and functions	
7	Develop a PHP program and check message passing mechanism between pages.	
8	Develop a PHP program using String function and Arrays.	
9	Develop a PHP program to display student information using MYSQL table.	
10	Develop a PHP program to design a college application form using MYSQL table.	60
11	Develop a PHP program using parsing functions (use Tokenizing)	
12	Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.	
13	Develop a PHP program and check File System functions, Network functions, and Date and time functions.	
14	Develop a PHP program using session	
15	Develop a PHP program using cookie and session.	
	Total Lecture Hrs	**60 Hrs**

Web Resources:

1. **https://www.javatpoint.com/php-tutorial**
2. **https://www.phptpoint.com/php-tutorial/**
3. **https://www.w3resource.com/php/php-home.php**

Course Outcomes	K Level
CO1: Understand the basic concepts of PHP programming.	**K2**
CO2: Apply and analyze PHP programs to design real life problems.	**K3**

CO3:	Examine the use of PHP programming that uses SQL tables.	**K4**
CO4:	Design PHP programs using parsing functions.	**K4**
CO5:	Assess regular expressions and hashing functions in PHP language.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	3	2	3	3	3
CO 2	3	3	2	3	2	3
CO 3	2	3	2	2	3	2
CO 4	3	2	3	3	3	3
CO 5	3	2	3	2	2	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	PROGRAMMING IN PHP AND MYSQL-LAB	Hrs	Pedagogy
1	Write a PHP program to reverse given number.		
2	Write a PHP program to print table of a number.		
3	Write a PHP program to print Fibonacci series without using recursion and using recursion.		
4	Write a PHP program to swap two numbers with and without using third variable.		
5	Write a PHP program to print alphabet triangle.		
6	Develop a PHP program using controls and functions		
7	Develop a PHP program and check message passing mechanism between pages.		
8	Develop a PHP program using String function and Arrays.		
9	Develop a PHP program to display student information using MYSQL table.	**60**	**Laboratory experiments**
10	Develop a PHP program to design a college application form using MYSQL table.		
11	Develop a PHP program using parsing functions (use Tokenizing)		
12	Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.		
13	Develop a PHP program and check File System functions, Network functions, and Date and time functions.		
14	Develop a PHP program using session		
15	Develop a PHP program using cookie and session.		

Course Designed by: **Dr.M.Karthika and Mrs.R.Vanitha**

SIXTH SEMESTER

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PYTHON PROGRAMMING			
Course Code	21UITC61	L	P	C
Category	CORE	6	-	4

Nature of course:	EMPLOYABILITY ✓	SKILL ORIENTED ✓	ENTREPRENURSHIP	✓

Course Objectives:

- Introduces the concepts of computer basics & programming in python.
- Explain the basics of OOP and translate the variables and code by utilize the control statement and Modules in Python.
- Manipulate the variables and statements using Loops, Function, Strings.
- Understand the method to reduce source code metrics with exception.
- Gain the knowledge thorough program using OOP and additional features of Python.

Unit: I	**Introduction to Python**	**18** Hrs

Introduction – Python Overview – Getting started with Python- Comments- Python Identifiers – Reserved Keywords- Variables – Standard Data Types – Operators- Statement and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration – While Statement – Input From Keyboard.

Unit: II	**Functions**	**18** Hrs

Functions: Introduction – Built- in Functions – Composition of Functions – User Defined Functions – Parameters and arguments – Function Calls – The return statement- Python Recursive Function – The Anonymous Functions – Writing Python Scripts.

Unit: III	**Strings and Lists**	**18** Hrs

Strings-Lists. **Tuples and Dictionaries:** Tuples-Dictionaries
Files and Exceptions
. Text Files-Directories-Exceptions-Exception with Arguments-User-Defined Exceptions

Unit: IV	**Classes and Objects**	**18** Hrs

Overview of OOP – Class Definition- Creating Objects- Objects as Arguments- Objects as Return Values – Built – in class Attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.

Unit: V	Frameworks	**18** Hrs

Introduction to frameworks – types of frame works- django –features of django - flask – features of flask.

	Total Lecture Hrs	**90 Hrs**

Books for Study:

1. E.Balagurusamy, "Problem Solving and Python Programming", McGraw Hill Education
   Private Limited, India, First Edition, 2018.

Unit I	:	Chapter 3: 3.1 – 3.15
Unit II	:	Chapter 4: 4.1 - 4.10
Unit III	:	Chapter 5: 5.1, 5.2
		Chapter 6:6.1,6.2
		Chapter 7:7.1-7.5
Unit IV	:	Chapter 8: 8.1 – 8.10

2. Carlos de la Guardia, "Python Web Frameworks", O'Reilly Media, Inc., March 2016 Unit V : Chapter 2: 2.1 – 2.2	

Books for References:

1. Wes Mckinney, "Python for Data Analysis", O'Reilly Media Inc, Second Edition, 2017.
2. Allen B.Downey, "Think Python", O'Reilly Media Inc, 5th reprint, Aug 2018.
3. Zed Shaw, "Learn PYTHON the HARD WAY", Pearson Education, Third Edition, 2013.

Web Resources:

1. **https://www.javatpoint.com/python-programs**
2. **https://www.programiz.com/python-programming/examples**
3. **https://www.geeksforgeeks.org/python-programming-examples/**

Course Outcomes		K Level
CO1:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	**K3**
CO2:	Demonstrate proficiency in handling Strings and File Systems.	**K3**
CO3:	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.	**K3**
CO4:	Interpret the concepts of Object-Oriented Programming as used in Python.	**K4**
CO5:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	2	3	3	2	2	2
CO 2	2	2	2	3	3	2
CO 3	2	2	3	3	2	2
CO 4	2	3	3	2	2	2
CO 5	3	2	2	2	3	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	PYTHON PROGRAMMING	Hrs	Pedagogy
I	Introduction – Python Overview – Getting started with Python- Comments- Python Identifiers – Reserved Keywords- Variables – Standard Data Types – Operators- Statement and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration – While Statement – Input From Keyboard.	18	**Chalk & Talk**
II	Functions: Introduction – Built- in Functions – Composition of Functions – User Defined Functions – Parameters and arguments – Function Calls – The return statement- Python Recursive Function – The Anonymous Functions – Writing Python Scripts.	18	**ICT**
III	Strings-Lists. Tuples and Dictionaries: Tuples-Dictionaries. Text Files-Directories-Exceptions-Exception with Arguments-User-Defined Exceptions	18	**ICT**
IV	Overview of OOP – Class Definition- Creating Objects- Objects as Arguments- Objects as Return Values – Built – in class Attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.	18	**Chalk & Talk**
V	Introduction to frameworks – types of frame works- django –features of django - flask – features of flask	18	**Chalk & Talk**

Course Designed by: **Mrs.R.Vanitha and Mrs.R.K.Vijayalakshmi**

Learning Outcome Based Education & Assessment (LOBE) **Formative Examination - Blue Print** **Articulation Mapping – K Levels with Course Outcomes (COs)**
Inte rnal	**Cos**	**K Level**	colspan="2"	**Section A**	colspan="2"	**Section B**	**Section C Either or Choice**	**Section D Open Choice**
							Short Answers		
			No. of. Questions	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	**CO1**	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
	CO2	**K3**	**2**	**K1**	**2**	**K2**	**2(K3,K3)**	**1(K3)**
CI AII	**CO3**	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**
	CO4	**K4**	**2**	**K1**	**2**	**K2**	**2(K4,K4)**	**1(K4)**
rowspan="4"	**Question Pattern CIA I & II**	No. of Questions to be asked	**4**		**3**		**4**	**2**
	No. of Questions to be answered	**4**		**3**		**2**	**1**
	Marks for each question	**4**		**3**		**5**	**10**
	Total Marks for each section	**4**		**6**		**10**	**10**

Distribution of Marks with K Level CIA I & CIA II
	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	**4**		**-**	**-**	**4**	**8**	**20**
	K2		**3**	**-**	**-**	**6**	**12**
	K3	**-**	**-**	**20**	**20**	**40**	**80**	**80**
	K4	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Marks	**4**	**6**	**20**	**20**	**50**	**100**	**100**
CIA II	**K1**	**4**		**-**	**-**	**4**	**8**	**20**
	K2		**3**	**-**	**-**	**6**	**12**
	K3	**-**	**-**	**10**	**10**	**20**	**40**	**40**
	K4	**-**	**-**	**10**	**10**	**20**	**40**	**40**
	Marks	**4**	**6**	**20**	**20**	**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	MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PYTHON PROGRAMMING LAB			
Course Code	21UITCP6	**L**	**P**	**C**
Category	CORE LAB	-	6	4
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP ✓			

Course Objectives:

- Understand the Variable, Tokens, keyword in python.
- Learn the syntax and semantics of python programming.
- Identify the analysis the decision making statements.
- Analysis the exception handling techniques in python.
- Justify the concept of various technique efficiency and performance.

S.No	List of Programs	Hrs
1	Write a Python program to find GCD of two numbers.	
2	Write a Python program to calculate the number of days between two dates.	
	Write a Python program to calculate the sum of three given numbers.	
3	Write a Python Program to find the square root of a number by Newton's Method	
4	Write a Python program to find the exponentiation of a number.	
	Write a Python Program to find the maximum from a list of numbers.	
5	Write a Python Program to perform Linear Search	
6	Write a Python Program to perform Binary Search	90
7	Write a Python Program to perform selection sort.	
8	Write a Python Program to perform Merge sort.	
9	Write a Python program to find first n prime numbers.	
10	Write a Python program to multiply matrices.	
11	Write a Python program to count the occurrences of each word in a given	
12	sentence.	
13	Program to demonstrate exception handling.	
	Total Lecture Hrs	**90 Hrs**

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. **https://www.javatpoint.com/python-programs**
2. **https://www.geeksforgeeks.org/python-programming-examples/**
3. **https://www.programiz.com/python-programming/examples**

Course Outcomes		K Level
CO1:	Memorizing the python programming keywords build new programs.	**K3**
CO2:	Identifying and understanding the logic of python programming.	**K3**
CO3:	Executing the syntax and construction of python programming code.	**K3**
CO4:	Understanding and validating the use of decision making statements.	**K4**
CO5:	Remembering and applying the steps involved in compiling, linking and debugging python code.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	3	2	2	3
CO 2	2	2	3	3	3	2
CO 3	2	2	3	3	2	3
CO 4	3	3	2	2	3	2
CO 5	3	2	2	3	2	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S.No	PYTHON PROGRAMMING LAB	Hrs	Pedagogy
1	Write a Python program to find GCD of two numbers.		
2	Write a Python program to calculate the number of days between two dates.		
3	Write a Python program to calculate the sum of three given numbers.		
4	Write a Python Program to find the square root of a number by Newton's Method		
5	Write a Python program to find the exponentiation of a number.		
6	Write a Python Program to find the maximum from a list of numbers.		
7	Write a Python Program to perform Linear Search	90	**Laboratory experiments**
8	Write a Python Program to perform Binary Search		
9	Write a Python Program to perform selection sort.		
10	Write a Python Program to perform Merge sort.		
11	Write a Python program to find first n prime numbers.		
12	Write a Python program to multiply matrices.		
	Write a Python program to count the occurrences of each word in a given sentence.		
13	Program to demonstrate exception handling.		

Course Designed by: Mrs. R. Vanitha and Mrs. R. K.Vijayalakshmi

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	PROJECT AND VIVA -VOCE			
Course Code	21UITPR1	L	P	C
Category	Core	-	6	4
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			✓

Course Objectives:

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

PHASES	Hrs
➢ Title ➢ Synopsis ➢ Introduction ➢ Module description ➢ Existing and proposed system ➢ Data Flow Diagram ➢ System Flow Diagram ➢ Entity Relationship Diagram ➢ Form Design ➢ Database Design ➢ Testing ➢ Implementation ➢ Form Design	60
Total Lecture Hrs	**60 Hrs**

Books For References:

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

Web Resources:

1. **https://www.elprocus.com/information-technology-projects/**
2. **https://engineering.purdue.edu/ECE/Academics/PMP**
3. **https://www.knowledgehut.com/blog**

Course Outcomes		K Level
CO1:	Design and implement a software with a good aesthetic sense of designing and latest technical know-how's.	K3
CO2:	Project one that involves practical work for understanding and solving problems in the field of computing.	K3
CO3:	To familiar with any software and develop tools	K3
CO4:	To develop a software or application.	K4
CO5:	To create applications using Languages.	K4

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	3	2	3	3	3
CO 2	3	3	2	3	2	3
CO 3	2	3	2	2	3	2
CO 4	3	2	3	3	3	3
CO 5	3	2	3	2	2	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Module	PHASES	Hrs	Pedagogy
I	• Title • Synopsis • Introduction	10	**Lecture**
II	• Module description • Existing and proposed system	20	**Practical**
III	• Data Flow Diagram • System Flow Diagram • Entity Relationship Diagram	20	**Practical**
IV	• Form Design • Database Design	20	**Practical**
V	• Testing • Implementation	20	**Practical & Presentation**

Course Designed by: **Mrs.R.K.Vijayalakshmi and Dr.M.Karthika**

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	MANAGEMENT INFORMATION SYSTEM			
Course Code	**21UITE61**	**L**	**P**	**C**
Category	**Core Elective -I**	5	-	5
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP** ✓			

Course Objectives:
- To understand the basic concepts Management Information Systems.
- To develop the Management Information quality.
- To emphasize the importance business intelligence.
- To develop the knowledge of management system
- To understand the concepts of Technology of Information System, Data Warehouse.

Unit: I	**Introduction to MIS:**	**15 Hrs**

Meaning - Definition- Integrated system- MIS vs. data processing - MIS and other academic discipline such as managerial Accounting, operational research, Management, organization theory and computer science.

Unit: II	**Classification, Development Process of MIS:**	**15 Hrs**

MIS support for decision making-Structured, Programmable decisions-unstructured, non-programmable Decisions- hierarchy of management activity-Information systems for operational & management control Planned performance - Variance from planned performance, reasons for variances, Analysis of possible decisions or courses of action - MIS structure based on organizational function - Formal Vs Informal systems.

Unit: III	**Decision making Process of MIS:**	**15 Hrs**

Decision- making process-Phases of decision- making process, problem finding, Formulation and solution or alternatives-criteria for decision making - Decision trees.

Unit: IV	**Concepts of information- MIS:**	**15 Hrs**

Concepts of information - Definition of information. Model of communication system - mathematical definition of Information-information presentation-quality of Information - Gentle model of the human as an Information processor.

Unit: V	**Concepts of planning and control and Organization Structure:**	**15 Hrs**

Concepts of planning and control and Organization Structure - Meaning-object of organizational planning Setting of goals and objectives-hierarchy of planning -the planning process-the sources of Planning data development of planning models - The basic model of organization structure-organization by product or service- Matrix organization.

		Total Lecture Hrs	**75 Hrs**

Books for Study:
1. Management Information System Conceptual Foundations, Structure & Development, Margrethe.H.Olson&Gordon.B.Davis–II Ed., -MGH.

Books for References:
1. Management Information System ,David kroneke,Richard Allan Hatch.
2. Management Information System ,C. Laudan,JanePriceLaudon – PHI.

Web Resources:
1. https://www.tutorialspoint.com/management_information_system/mis_tutorial.pdf
2. https://www.studocu.com/row/document/pwani-university/computer-science/mis-

	notes-for-knec/12239390	
Course Outcomes		**K Level**
CO1:	Enumerate the underlying concepts of the basic concepts Management Information Systems.	**K3**
CO2:	Describe and Develop the Management Information quality.	**K3**
CO3:	Analyze the importance of business intelligence	**K3**
CO4:	Construct simple anddevelop the knowledge of management system	**K4**
CO5:	Design the concepts of Technology of Information System, Data Warehouse	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	2	3	3	2	2	2
CO 2	2	2	2	3	3	2
CO 3	2	2	3	3	2	2
CO 4	2	3	3	2	2	2
CO 5	3	2	2	2	3	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	MANAGEMENT INFORMATION SYSTEM	Hrs	Pedagogy
I	Meaning - Definition- Integrated system- MIS vs. data processing - MIS and other academic discipline such as managerial Accounting, operational research, Management, organization theory and computer science.	15	**Chalk & Talk, ICTKit**
II	MIS support for decision making-Structured, Programmable decisions-unstructured, non-programmable Decisions- hierarchy of management activity-Information systems for operational & management control Planned performance - Variance from planned performance, reasons for variances, Analysis of possible decisions or courses of action - MIS structure based on organizational function - Formal Vs Informal systems.	15	**Chalk & Talk, ICTKit**
III	Decision- making process-Phases of decision- making process, problem finding, Formulation and solution or alternatives-criteria for decision making - Decision trees.	15	**Chalk & Talk, ICTKit**
IV	Concepts of information - Definition of information. Model of communication system - mathematical definition of Information-information presentation-quality of Information - Gentle model of the human as an Information processor.	15	**Chalk & Talk, ICTKit**
V	Concepts of planning and control and Organization Structure - Meaning-object of organizational planning Setting of goals and objectives-hierarchy of planning -the planning process-the sources of Planning data development of planning models - The basic model of organization structure- organization by product or service- Matrix organization.	15	**Chalk & Talk, ICTKit**

Course Designed by: **Mr. K. Tamilselvam and Mrs.R.K.Vijayalakshmi**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)								
Inte rnal	**Cos**	**K Level**	**Section A**		**Section B**		**Section C Either or Choice**	**Section D Open Choice**
			No. of. Question s	**K - Level**	**Short Answers**			
					No. of. Questions	**K - Level**		
CI AI	**CO1**	**K3**	2	**K1**	1	**K2**	2(K3,K3)	1(K3)
	CO2	**K3**	2	**K1**	2	**K2**	2(K3,K3)	1(K3)
CI AII	**CO3**	**K3**	2	**K1**	1	**K2**	2(K3,K3)	1(K3)
	CO4	**K4**	2	**K1**	2	**K2**	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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)								
			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q.No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	ARTIFICIAL INTELLIGENCE AND KNOWLEDGE REPRESENTATION			
Course Code	21UITE62	**L**	**P**	**C**
Category	Core Elective-I	5	-	5
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			

Course Objectives:

- Describe the concept of Artificial Intelligence.

- Analyze the search techniques and knowledge representation.

- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.

- Acquire knowledge to solve problems in areas ranging from optimizationProblems to text analytics.

- Learn the purpose of heuristic search techniques.

Unit: I	Introduction to Artificial Intelligence	15 Hrs

The AI problems- The Underlying Assumption- What is an AI technique?-The Level of the Model- Criteria for Success, Problems**. Problem Spaces and Search:** Defining the Problem as a State Space Search-Production Systems, Problem Characteristics, Production System Characteristics, Issue in the Design of Search Programs.

Unit: II	Heuristic Search Techniques:	15 Hrs

Heuristic Search Techniques: Generate and Test, Hill Climbing, Best – First Search, Problem Reduction, Constraint Satisfaction, Means – Ends Analysis.

Unit: III	Knowledge Representation Issues:	15 Hrs

Knowledge Representation Issues: Representation and Mappings – Approaches to Knowledge Representation, Issues in Knowledge Representation -The Frame Problem-**Using predicate Logic:** Representing Simple Facts in Logic-Representation Instance and ISA Relationships, Computable Functions and Predicates- Resolution-Natural Deduction.

Unit: IV	Representing knowledge using Rules:	15 Hrs

Representing knowledge using Rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning- Matching -Control Knowledge.

Unit: V	Symbolic Reasoning Under Uncertainty:	15 Hrs

Symbolic Reasoning Under Uncertainty: Introduction to Nonmonotonic Reasoning – Logic for Nonmonotonic Reasoning- Implementation Issues – Augmenting Problem Solver Implementation of DFS-Breadth–First search.

		Total Lecture Hrs	75 Hrs

Books for Study:
1. Elaine Rich, Kevin Knight, **Shivashankar B Nair, Artificial Intelligence,** Tata McGraw Hill Ltd, New Delhi, Third edition, 2009.

Unit I	:	Chapters 1 – Section 1.1 – 1.5.
		Chapter 2– Section 2.1, 2.5
Unit II	:	Chapter 3 – Section 3.1 –3.6
Unit III	:	Chapter 4 – Section 4.1 – 4.4.
		Chapter 5 – Section 5.1–5.5
Unit IV :		Chapter 6 – Section 6.1 – 6.5
Unit V	:	Chapter 7 – Section 7.1 – 7.6

Books for References:
1.Stuart J.Russell and Peter Norvig, **Artificial Intelligence: A Modern Approach**, PearsonEducation, New Delhi, Second Edition, 2009.
2.Simon Haykin, **Neural Networks and learning Machines**, Prentice Hall, New Delhi, ThirdEdition, 2008.

Web Resources:
1. **https://www.naukri.com/learning/welcome-to-artificial-intelligence-course-udeml574**
2. **https://www.naukri.com/learning/knowledge-based-ai-cognitive-systems-course-udacl82**
3. **https://www.naukri.com/learning/fundamentals-of-artificial-intelligence-by-nptel-course-nptel37**

Course Outcomes		K Level
CO1:	Enumerate the underlying concepts of the Artificial Intelligence.	**K3**
CO2:	Describe the search techniques and knowledge representation.	**K3**
CO3:	Analyze a knowledge of the building blocks of AI as presented in terms of intelligent agents.	**K3**
CO4:	Construct knowledge to solve problems in areas ranging from optimization Problems to text analytics.	**K4**
CO5:	Design the purpose of heuristic search techniques.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	2	3	3	2	2	2
CO 2	2	2	2	3	3	2
CO 3	2	2	3	3	2	2
CO 4	2	3	3	2	2	2
CO 5	3	2	2	2	3	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	ARTIFICIAL INTELLIGENCE AND KNOWLEDGE REPRESENTATION	Hrs	Pedagogy
I	The AI problems- The Underlying Assumption- An AI technique-The Level of the Model-Criteria for Success, **Problems, Problem Spaces and Search:** Defining the Problem as a State Space Search-Production Systems, Problem Characteristics, Production System Characteristics, Issue in the Design of Search Programs.	15	**Chalk & Talk, ICT Kit**
II	**Heuristic Search Techniques**: Generate and Test, Hill Climbing, Best – First Search, Problem Reduction, Constraint Satisfaction, Means – Ends Analysis.	15	**Chalk & Talk, ICT Kit**
III	**Knowledge Representation Issues**: Representation and Mappings – Approaches to Knowledge Representation, Issues in Knowledge Representation -The Frame Problem-**Using predicate Logic:** Representing Simple Facts in Logic-Representation Instance and ISA Relationships, Computable Functions and Predicates- Resolution-Natural Deduction.	15	**Chalk & Talk, ICT Kit**
IV	**Representing knowledge using Rules**: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning-Matching -Control Knowledge.	15	**Chalk & Talk, ICT Kit**
V	**Symbolic Reasoning Under Uncertainty:** Introduction to Non monotonic Reasoning – Logic for Non monotonic Reasoning- Implementation Issues – Augmenting Problem Solver Implementation of DFS- Breadth–First search.	15	**Chalk & Talk, ICT Kit**

Course Designed by: **Mr. K. Tamilselvam and Dr.M.Karthika**

Internal	Cos	K Level	Section A		Section B		Section C Either or Choice	Section D Open Choice
					Short Answers			
			No. of. Questions	K - Level	No. of. Questions	K - Level		
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

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

	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	50	100	100

Distribution of Marks with K Level CIA I & CIA II

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 | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q. No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q. No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q. No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q. No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	INTERNET OF THINGS			
Course Code	**21UITE63**	**L**	**P**	**C**
Category	**Core Elective-I**	5	-	5
Nature of course:	**EMPLOYABILITY** ✓	**SKILL ORIENTED** ✓	**ENTREPRENURSHIP** ✓	

Course Objectives:

- Describe and explain about IoT, Physical and Logical design of IoT, IoT levels, domain Specific IoTs

- Determine physical and logical design of IoT.

- Compare Physical and Logical IoT, different levels and domain specific IoTs.

- Conclude the importance of IoT, Physical and Logical IoT, IoT levels, domain specificIoTs.

- Design and develop Physical and Logical IoT, IoT deployment templates.

Unit: I	Introduction to internet of things:	15 Hrs

Introduction to internet of things: Introduction to internet of things - definition &Characteristics of IoT - Physical Design of IoT – Things in IoT - IoT protocols. Logical Design of IoT : IoT Functional blocks- IoT communication Models- IoT communication APIs. IoT Enabling Technologies– Wireless Sensor Networks- Cloud Computing- Big data Analysis – Communication Protocols – Embedded systems.

Unit: II	IoT Levels & Deployment Templates:	15 Hrs

IoT Levels & Deployment Templates: IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT Level-5 IoT Level -6. IoT physical devices and endpoints- What is an IoT device – Basic building blocks of an IoT Device.

Unit: III	IoT Platforms Design Methodology:	15 Hrs

IoT Platforms Design Methodology: Introduction - IoT Design Methodology **–** Introduction – IoT Design Methodology **–** Purpose and Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development.

Unit: IV	IoT and M2M:	15 Hrs

IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – **IoT System Management with NETCONF – YANG** – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF – YANG.

Unit: V	Domain Specific IoTs:	15 Hrs

Domain Specific IoTs: Introduction – Home Automation- Smart Lighting- Smart Appliances- Intrusion Detection-Smoke/ Gas Detectors. **Cities**– Smart Parking- Smart Lighting- Smart roads–Structural Health

Monitoring – Surveillance – Emergency Response. **Environment –** Weather Monitoring- Air Pollution Monitoring - Noise Pollution Monitoring - Forest Fire Detection – River Floods Detection Energy- Re- Logistics-Agriculture.

	Total Lecture Hrs	**75 Hrs**

Books for Study:

1. Arshdeep Bahga , Vijay Madisetti, **Internet of Things -** A Hands on Approach UniversityPress (India)Private Limited, New Delhi,2014

   Unit I : Chapter 1: 1.1-1.2, 1.3-1.4.

   Unit II : Chapter 1 & 7: 1.5,7.1

   Unit III: Chapter 5 : 5.1 – 5.3

   Unit IV: Chapter 3 &4 : 3.1-3.4, 4.1-4.6.

   Unit V : Chapter 2 : 2.1 – 2.10

Books for References:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, A Press Publications, 2013.

Web Resources:
1. **https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT**
2. **https://www.oracle.com/in/internet-of-things/what-is-iot/#iot-applications-deployed**
3. **https://onlinecourses.nptel.ac.in/noc22_cs96/preview**

Course Outcomes		K Level
CO1:	Enumerate the IoT, Physical and Logical design of IoT, IoT levels, Domain Specific IoTs r	**K3**
CO2:	Describe the physical and logical design of IoT	**K3**
CO3:	Analyze a Physical and Logical IoT, different levels and domain specific IoTs	**K3**
CO4:	Construct the importance of IoT, Physical and Logical IoT, IoT levels, domain specific IoTs	**K4**
CO5:	Design and develop Physical and Logical IoT, IoT deployment templates	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	2	3	3	2	2	2
CO 2	2	2	2	3	3	2
CO 3	2	2	3	3	2	2
CO 4	2	3	3	2	2	2
CO 5	3	2	2	2	3	2

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	INTERNET OF THINGS	Hrs	Pedagogy
I	**Introduction to internet of things:** Introduction to internet of things - definition &Characteristics of IoT - Physical Design of IoT – Things in IoT - IoT protocols. Logical Design of IoT : IoT Functional blocks- IoT communication Models- IoT communication APIs. IoT Enabling Technologies– Wireless Sensor Networks- Cloud Computing- Big data Analysis – Communication Protocols – Embedded systems.	15	Chalk & Talk, ICT Kit
II	**IoT Levels & Deployment Templates**: IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT Level-5 IoT Level -6. IoT physical devices and endpoints- What is an IoT device – Basic building blocks of an IoT Device.	15	Chalk & Talk, ICT Kit
III	**IoT Platforms Design Methodology :** Introduction - IoT Design Methodology **–** Introduction – IoT Design Methodology **–** Purpose and Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development	15	Chalk & Talk, ICT Kit
IV	**IoT and M2M :** Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – **IoT System Management with NETCONF – YANG** – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF – YANG.	15	Chalk & Talk, ICT Kit
V	**Domain Specific IoTs:** Introduction – Home Automation- Smart Lighting- Smart Appliances- Intrusion Detection-Smoke/ Gas Detectors. **Cities**– Smart Parking- Smart Lighting- Smart roads–Structural Health Monitoring – Surveillance – Emergency Response. **Environment –** Weather Monitoring- Air Pollution Monitoring - Noise Pollution	15	Chalk & Talk, ICT Kit

Monitoring - Forest Fire Detection – RiverFloods Detection Energy- Re- Logistics-Agriculture.		

Course Designed by: **Mr. K. Tamilselvam and Dr.T.Sujithra**

<table>
<tr><td colspan="11" align="center">Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)</td></tr>
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<td>Section B (Short Answer Questions)</td>
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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.

			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S. No	**COs**	**K - Level**	**No. of Questions**	**K – Level**	**No. of Question**	**K – Level**		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No. of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(Figures in parenthesis denotes, questions should be asked with the given K level)

K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either/ or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**100**	**100**

Distribution of Marks with K Level

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Section A (Multiple Choice Questions)
Answer All Questions   **(10x1=10 marks)**

Q. No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   **(5x2=10 marks)**

Q. No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   **(5 x 5 = 25 marks)**

Q. No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   **(3x10=30 marks)**

Q. No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	DATA MINING			
Course Code	21UITE64	**L**	**P**	**C**
Category	Core Elective- II	5	-	5
Nature of course:	**EMPLOYABILITY** ✓ **SKILL ORIENTED** ✓ **ENTREPRENURSHIP**			

Course Objectives:

- Discover the knowledge imbibed in the high dimensional system.
- Illustrate algorithms for finding the hidden interesting patterns in data.
- Determine the overview of developing areas – Web mining, Text mining and Big Data Mining Tools.
- Analyze the concepts of Data warehousing Architecture and implementation.
- Develop research interest towards advances in data mining.

Unit: I	**Data Warehousing:**	**15 Hrs**

Data Warehousing: Introduction – Data Warehouse Architecture – Dimensional Modeling – Categorization of Hierarchies – Aggregate Function.

Unit: II	**Data Mining:**	**15 Hrs**

Data Mining: What is Data Mining? Data Mining: Definitions – KDD vs. Data Mining – DBMS vs. DM – Other Related Areas – DM Techniques – Other Mining Problems – Issues and

Challenges in DM – DM Application Areas – DM Applications – Case Studies – Association

Rules: Apriori Algorithm – Partition Algorithm – Pincer Search Algorithm – Border Algorithm.

Unit: III	**Clustering Techniques:**	**15 Hrs**

Clustering Techniques: Clustering Paradigms – Partitioning Algorithms – K-Medoid Algorithms - CLARA – CLARANS – Hierarchical Clustering- DBSCAN –Categorical Clustering Algorithm – STIRR.

Unit: IV	**Decision Trees:**	**15 Hrs**

Decision Trees: Tree Construction Principle – Best Split – Splitting Indices –Splitting Criteria – Decision Tree Construction Algorithms – CART – ID3. Genetic Algorithm: Basic Steps of GA - Other Techniques – What is a Neural Network –Support Vector Machines.

Unit: V	**Web Mining:**	**15 Hrs**

Web Mining: Introduction - Web Mining– Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering.

		Total Lecture Hrs	**75 Hrs**

Books for Study:

1. Arun K. Pujari, Data Mining Techniques, Universities Press, Hyderabad, Third Edition,2013.

Unit I   Chapter 2 - Section: 2.1 To 2.5

Unit II	Chapter 3 – Section 3.2 To 3.11	
	Chapter 4 - Section: 4.4 To 4.6, 4.13	
Unit III	Chapter 5 - Section: 5.2 To 5.8, 5.11, 5. 12.	
Unit IV	Chapter 6 - Section: 6.3 To 6.9.	
	Chapter 8 - Section: 8.2.	
	Chapter 9 - Section: 9.2, 9.6.	
Unit V	Chapter 10 - Section: 10.1 To 10.6, 10.9, 10.10	

Books for References:

1. M. H. Dunham, Data Mining: Introductory and Advanced Topics, Pearson Education, New Delhi, 2001.
2. D. Hand, H. Mannila and P. Smyth, Principles of Data Mining, Prentice Hall, New Delhi, 2001.

Web Resources:

1. **https://www.tutorialspoint.com/dwh/index.htm**
2. **https://www.guru99.com/data-warehousing-tutorial.html**
3. **https://www.javatpoint.com/data-mining-techniques**

Course Outcomes		K Level
CO1:	Enumerate the underlying concepts of the imbibed in the high dimensional system.	**K3**
CO2:	Describe the algorithms for finding the hidden interesting patterns in data.	**K3**
CO3:	Analyze and overview of developing areas – Web mining, Text mining and Big Data Mining Tools.	**K3**
CO4:	Construct the concepts of Data warehousing Architecture and implementation	**K4**
CO5:	Design the advances in data mining.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

Unit	DATA MINING	Hrs	Pedagogy
I	Data Warehousing: Introduction – Data Warehouse Architecture – Dimensional Modeling –Categorization of Hierarchies – Aggregate Function	15	Chalk & Talk, ICT Kit
II	Data Mining: Data Mining: Definitions – KDD vs. Data Mining – DBMS vs. DM – Other Related Areas – DM Techniques – Other Mining Problems – Issues and Challenges in DM – DM Application Areas – DM Applications – Case Studies Association Rules: Apriori Algorithm – Partition Algorithm – Pincer Search Algorithm – Border Algorithm.	15	Chalk & Talk, ICT Kit
III	Clustering Techniques: Clustering Paradigms – Partitioning Algorithms – K-Medoid Algorithms - CLARA – CLARANS – Hierarchical Clustering- DBSCAN –Categorical Clustering Algorithm – STIRR.	15	Chalk & Talk, ICT Kit
IV	Decision Trees: Tree Construction Principle – Best Split – Splitting Indices –Splitting Criteria – Decision Tree Construction Algorithms – CART – ID3. Genetic Algorithm: Basic Steps of GA - Other Techniques – What is a Neural Network –Support Vector Machines.	15	Chalk & Talk, ICT Kit
V	Web Mining: Introduction - Web Mining– Web Content Mining – Web Structure Mining –Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering.	15	Chalk & Talk, ICT Kit

Course Designed by: **Mr. K. Tamilselvam and Mrs.R.Vanitha**

			Section A		Section B		Section C Either or Choice	Section D Open Choice
Inte rnal	**Cos**	**K Level**			**Short Answers**			
			No. of. Question s	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	**CO1**	**K3**	2	**K1**	1	**K2**	**2(K3,K3)**	**1(K3)**
	CO2	**K3**	2	**K1**	2	**K2**	**2(K3,K3)**	**1(K3)**
CI AII	**CO3**	**K3**	2	**K1**	1	**K2**	**2(K3,K3)**	**1(K3)**
	CO4	**K4**	2	**K1**	2	**K2**	**2(K4,K4)**	**1(K4)**
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

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

	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	50	100	100

Distribution of Marks with K Level CIA I & CIA II

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	No. of Questions	K – Level	Short Answers No. of Question	K – Level	Section C (Either / or Choice)	Section D (Open Choice)
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q. No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q. No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q. No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q. No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	CLOUD COMPUTING PRINCIPLES			
Course Code	**21UITE65**	**L**	**P**	**C**
Category	**CORE ELECTIVE –II**	5	-	5
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP ✓			

COURSE OBJECTIVES:
- To analyze the components of Cloud concepts & technologies.
- To understand the cloud storage technologies, databases and object storage.
- To evaluate the various cloud development tools.
- To collaborate with real time cloud services.
- To Analyze the role technology plays in the design of a storage solution in a cloud architecture

Unit: I	Cloud Computing concepts & technologies	15 **Hrs**

Introduction to cloud computing: Introduction-characteristics of cloud computing- Cloud models-Cloud services example- Cloud based services& applications.

Cloud concepts & technologies: Virtualization- Load balancing- Scalability & elasticity-Deployment- Replication- Monitoring- Software defined networking- Network function virtualization- Map Reduce-Identity and access management- Service level agreements- Service level agreements- billing.

Unit: II	Cloud services & platforms:	12 **Hrs**

Computer services- Storage services- Database services- Application services- Content delivery services- Analytics services- Deployment & management services- Identify & access management services- Open source private cloud software.

Unit: III	Hadoop & Cloud application design	18 **Hrs**

Hadoop &Map Reduce: Apache Hadoop- Hadoop map reduce job execution- Hadoop schedulers-Hadoop cluster setup.

Cloud application design: Introduction- Design considerations for cloud application- Reference architectures for cloud application- Cloud application design methodologies- Data storage approaches.

Unit: IV	Big data analytics	18 **Hrs**

Big data analytics: Introduction- Clustering big data- classification of big data- Recommendation systems.

Multimedia cloud: Introduction- Case study: live video streaming app- Streaming protocols- Case study: video transcoding app.

Cloud application benchmarking & tuning: Introduction- workload characteristics- Application performance metrics- Design considerations for a benchmarking methodology- Benchmarking tools-Deployment prototyping- load testing & detection case study- Hadoop benchmarking case study.

Unit: V	Cloud security	12 **Hrs**

Cloud security: Introduction- CSA cloud security architecture- Authentication- Identity & access management- Data security- Key management- Auditing.

Cloud for industry, healthcare & education: Cloud computing for healthcare- cloud computing for energy systems- cloud computing for transportation systems- Cloud computing for manufacturing industry- Cloud computing for education

		Total Lecture Hrs	75 **Hrs**

Books for Study:

1. Barrie Sosinsky, "**Cloud Computing Bible**", Wiley, India 2014.
    Unit 1: Chapter 1
    Unit 2: Chapter 3,4
    Unit 3: Chapter 5
    Unit 4: Chapter 7, 8
    Unit 5: Chapter 12, 14 on , 2013

Books for References:
1. Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski,"Cloud Computing: Principles and Paradigms", Wile, 2011. 2. Antony T Velte, "Cloud Computing: A Practical Approach", McGraw Hill, 2009. 3. Ray Rafaels, Cloud Computing: From Beginning to End, Create Space Independent Publishing Platform, New Delhi, 2015.

Web Resources:
1. **https://www.tutorialspoint.com/cloud_computing/index.htm** 2. **https://www.simplilearn.com/tutorials/cloud-computing-tutorial** 3. **https://www.w3schools.in/cloud-computing/tutorials/**

Course Outcomes		K Level
CO1:	Define Cloud Computing and its types	**K3**
CO2:	Explain the architecture of cloud computing	**K3**
CO3:	Make use of Virtualization Techniques	**K3**
CO4:	Analyze the different Google applications	**K4**
CO5:	Propose of the various applications in the Cloud	**K4**

CO & PO Mappings:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

 *3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	CLOUD COMPUTING PRINCIPLES	Hrs	Mode
I	Introduction to cloud computing: Introduction-characteristics of cloud computing- Cloud models- Cloud services example- Cloud based services& applications. Cloud concepts & technologies: Virtualization- Load balancing- Scalability & elasticity- Deployment- Replication- Monitoring- Software defined networking- Network function virtualization- Map Reduce-Identity and access management- Service level agreements- Service level agreements- billing.	15	**Chalk,PPT**
II	**Cloud services & platforms:** Computer services- Storage services- Database services- Application services- Content delivery services- Analytics services- Deployment & management services- Identify & access management services- Open source private cloud software.	12	**Chalk,PPT**
III	Hadoop &Map Reduce: Apache Hadoop- Hadoop map reduce job execution- Hadoop schedulers- Hadoop cluster setup. Cloud application design: Introduction- Design considerations for cloud application- Reference architectures for cloud application- Cloud application design methodologies- Data storage approaches.	18	**Chalk,PPT**
IV	Big data analytics: Introduction- Clustering big data- classification of big data- Recommendation systems. Multimedia cloud: Introduction- Case study: live video streaming app- Streaming protocols- Case study: video transcoding app. Cloud application benchmarking & tuning: Introduction- workload characteristics- Application performance metrics- Design considerations for a benchmarking methodology- Benchmarking tools- Deployment prototyping- load testing & detection case study- Hadoop benchmarking case study.	18	**Chalk,PPT**
V	Cloud security: Introduction- CSA cloud security architecture- Authentication- Identity & access management- Data security- Key management- Auditing. Cloud for industry, healthcare & education: Cloud computing for healthcare- cloud computing for energy systems- cloud computing for transportation systems- Cloud computing for manufacturing industry- Cloud computing for education	12	**Chalk,PPT**

Course Designed by: **Dr.T.Sujithra and Dr.M.Karthika**

			Section A		Section B		Section C	Section D
					Short Answers		**Section C Either or Choice**	**Section D Open Choice**
Inte rnal	**Cos**	**K Level**	**No. of. Question s**	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	CO1	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO2	K3	2	K1	2	K2	2(K3,K3)	1(K3)
CI AII	CO3	K3	2	K1	1	K2	2(K3,K3)	1(K3)
	CO4	K4	2	K1	2	K2	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

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

	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	K1	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	50	100	100

Distribution of Marks with K Level CIA I & CIA II

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.

			MCQs		Short Answers		Section C (Either / or Choice)	Section D (Open Choice)
S. No	**COs**	**K - Level**	**No. of Questions**	**K – Level**	**No. of Question**	**K – Level**		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**

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

(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions   (10x1=10 marks)

Q. No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions   (5x2=10 marks)

Q. No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions   (5 x 5 = 25 marks)

Q. No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions   (3x10=30 marks)

Q. No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	BIG DATA ANALYTICS			
Course Code	**21UITE66**	**L**	**P**	**C**
Category	**Core Elective-II**	5	-	5
Nature of course:	EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENURSHIP			✓

Course Objectives:

- To provide an overview of an exciting growing field of big data analytics
- To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map Reduce.
- To learn the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To provide them the knowledge of Data and its analysis.
- To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Unit: I	**Types of digital data:**	**15 Hrs**

Classification of digital data. Introduction to Big Data: Characteristics of data- Evolution of big data- Definition of Big Data- Challenges in big data- Big Data definition- Other characteristics of data- Need of big data- Traditional business Intelligence vs big data- A typical data warehouse environment- A typical Hadoop environment- New things- Changes- Realms of big data.

Unit: II	**Big data analytics:**	**15 Hrs**

Big data analytics- Classification of analytics- Greatest challenges that prevent business from capitalizing on big data- Top challenges facing big data- Importance of big data analytics- Data science- Data scientist- Terminologies used in big data environment- BASE- Analytics tool.

Unit: III	**The Big Data Technology Landscape:**	**15 Hrs**

No SQL- Types of No SQL database- Need of No SQL- Advantages of No SQL- Use of No SQL in industry- SQL va No SQL- Comparision of SQL, No SQL and NEW SQL.

Unit: IV	**Introduction to Hadoop:**	**15 Hrs**

Introduction Hadoop- Need of RDBMS- RDBMS vs Hadoop- Distributed Computing Challenges- History of Hadoop- Hadoop overview- Use case of Hadoop- Hadoop distribution- HDFS- Processing data with Hadoop- Managing resources and application with hadoop YARN- Interacting with Hadoop ecosystem. Hadoop: Features of Hadoop- Advantages of Hadoop- Overview of Hadoop- Hadoop distribution – Hadoop vs SQL- Integrated Hadoop system- Cloud-Based Hadoop Solutions.

Unit: V	**Introduction to Mango DB**	**15 Hrs**

What is MangoDB- Why MangoDB- Terms used in RDBMS and MangoDB- Data types in MangoDB- MangoDB query language.

	Total Lecture Hrs	**75 Hrs**

Books for Study:

1. Seema Acharya, Subhashini Chellappan, **Big Data and Analytics,** Wiley, 2015, New Delhi.
    Unit I   - Chapter 1(Full), Chapter 2.1 To 2.7, 2.9 To 2.13

Unit II - Chapter 3.2, 3.5 To 3.8, 3.10 To 3.14. Unit III - Chapter 4(Full) Unit IV - Chapter 5(Full) Unit V - Chapter 6(Full).	

Books for References:

1. DT Editorial Services, Big Data, Black book, Ninth Edition, Dreamtech, 2016, New Delhi.
2. Michael Minelli, Michele Chambers, AmbigaDhiraj, Big Data, Big Analytics, Wiley, 2016, New Delhi.
3. Field Cady, The Data Science Handbook, Wiley, 1st Edition, 2017

Web Resources:

1. **https://www.slideshare.net/mohitsainirke/big-data-lecture-notes** .
2. **www.tutorialspoint.com/big_data_analytics/big_data_analytics_pdf_version.htm**
3. **https://www.ntnu.no/iie/fag/big/lessons/lesson1.pdf**

Course Outcomes		K Level
CO1:	Knowing the big data technologies used for storage, analysis and manipulation of data.	**K3**
CO2:	Recognize the key concepts of Hadoop framework, Map Reduce, Pig, Hive, and No- SQL.	**K3**
CO3:	Ability to understand and apply scaling up machine learning techniques and associated Computing techniques and technologies.	**K3**
CO4:	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.	**K4**
CO5:	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.	**K4**

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

UNIT	BIG DATA ANALYTICS	Hrs	Mode
I	Classification of digital data. Introduction to Big Data: Characteristics of data- Evolution of big data- Definition of Big Data- Challenges in big data- Big Data definition- Other characteristics of data- Need of big data- Traditional business Intelligence vs big data- A typical data warehouse environment- A typical Hadoop environment- New things- Changes- Realms of big data.	15 Hrs	Chalk& PPT
II	Big data analytics- Classification of analytics- Greatest challenges that prevent business from capitalizing on big data- Top challenges facing big data- Importance of big data analytics- Data science- Data scientist- Terminologies used in big data environment- BASE- Analytics tool.	15 Hrs	Chalk& PPT
III	No SQL- Types of No SQL database- Need of No SQL- Advantages of No SQL- Use of No SQL in industry- SQL va No SQL- Comparision of SQL, No SQL and NEW SQL. Hadoop: Features of Hadoop- Advantages of Hadoop- Overview of Hadoop- Hadoop distribution – Hadoop vs SQL- Integrated Hadoop system- Cloud- Based Hadoop Solutions.	15 Hrs	Chalk &PPT
IV	Introduction Hadoop- Need of RDBMS- RDBMS vs Hadoop- Distributed Computing Challenges- History of Hadoop- Hadoop overview- Use case of Hadoop- Hadoop distribution- HDFS- Processing data with Hadoop- Managing resources and application with hadoop YARN- Interacting with Hadoop ecosystem.	15 Hrs	Chalk& PPT
V	What is MangoDB- Why MangoDB- Terms used in RDBMS and MangoDB- Data types in MangoDB- MangoDB query language.	15 Hrs	Chalk& PPT

Course Designed by: **Dr.M.Karthika and Mrs.R.K.Vijayalakshmi**

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)								
Inte rnal	**Cos**	**K Level**	**Section A**		**Section B**		**Section C Either or Choice**	**Section D Open Choice**
					Short Answers			
			No. of. Questions	**K - Level**	**No. of. Questions**	**K - Level**		
CI AI	**CO1**	**K3**	2	**K1**	1	**K2**	2(K3,K3)	1(K3)
	CO2	**K3**	2	**K1**	2	**K2**	2(K3,K3)	1(K3)
CI AII	**CO3**	**K3**	2	**K1**	1	**K2**	2(K3,K3)	1(K3)
	CO4	**K4**	2	**K1**	2	**K2**	2(K4,K4)	1(K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		3		4	2
		No. of Questions to be answered	4		3		2	1
		Marks for each question	4		3		5	10
		Total Marks for each section	4		6		10	10

Distribution of Marks with K Level CIA I & CIA II								
	K Level	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either / Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidate of %**
CIA I	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-	-	-
	Marks	4	6	20	20	50	100	100
CIA II	**K1**	4		-	-	4	8	20
	K2		3	-	-	6	12	
	K3	-	-	10	10	20	40	40
	K4	-	-	10	10	20	40	40
	Marks	4	6	20	20	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 | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
			No. of Questions	K – Level	No. of Question	K – Level		
1	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
2	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
3	**K3**	**2**	**K1**	**1**	**K2**	**2(K3,K3)**	**1(K3)**	**K3**
4	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
5	**K4**	**2**	**K1**	**1**	**K2**	**2(K4,K4)**	**1(K4)**	**K4**
No. of Questions to be Asked			**10**		**5**		**10**	**5**
No.of Questions to be answered			**10**		**5**		**5**	**3**
Marks for each question			**1**		**2**		**5**	**10**
Total Marks for each section			**10**		**10**		**25**	**30**
(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 (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	10		-	-	10	8.33	**17**
K2		10	-	-	10	8.33	
K3	-	-	30	30	60	50	**50**
K4	-	-	20	20	40	33.33	**33**
Marks	**10**	**10**	**50**	**50**	**120**	**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

Section A (Multiple Choice Questions)
Answer All Questions (10x1=10 marks)

Q. No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K1	
3	CO2	K1	
4	CO2	K1	
5	CO3	K1	
6	CO3	K1	
7	CO4	K1	
8	CO4	K1	
9	CO5	K1	
10	CO5	K1	

Section B (Short Answers)
Answer All Questions (5x2=10 marks)

Q. No	CO	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	

Section C (Either/Or Type)
Answer All Questions (5 x 5 = 25 marks)

Q. No	CO	K Level	Questions
16) a	CO1	K3	
16) b	CO1	K3	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO1	K3	
18) b	CO1	K3	
19) a	CO3	K3	
19) b	CO3	K3	
20) a	CO4	K4	
20) b	CO4	K4	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

Q. No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
(For those who joined in 2021-2022 and after)

Course Name	MONGODB LAB			
Course Code	21UITSP6	**L**	**P**	**C**
Category	Skilled	-	2	2
Nature of course: EMPLOYABILITY	✓ SKILL ORIENTED	✓ **ENTREPRENEURSHIP**		✓

Course Objectives:
- To Learn how to build a database and query it using open source tools.
- To Learn to perform flexible scheme design.
- To understand the load balancing and scalability.
- To demonstrate the working of aggregation of frame work.
- To perform complex analytics pipelines.

List of Programs	30 Hrs
1. Find all documents on the basis of category 2. Connect to your database. 3. CRUD operations. 4. Aggregation pipelines. 5. Create a Database. 6. Create collection using two methods 7. Insert, Delete and Update documents. 8. Find data(find( ) or findOne( ), projection). 9. Query operators. 10. Indexing and searching. 11. Scheme Valuation. 12. Read and write with data API. p	
	30 Hrs

Web Resources:
1. http://w3schools.com/mongodb/
2. https://www.tutorialspoint.com/mongodb/index.htm
3. https://mongodb.com/   a

Course Outcomes	K Level
CO1: Learn how to build a data base and query it	**K2**
CO2: Learn to perform schema Design	**K3**
CO3: Operates on the predication of the data	**K3**
CO4: Understand the scalability and load balancing of the data.	**K3**
CO5: Demonstrate the working of complex analytics and Aggregation Pipelines.	**K4**

a

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	3	2
CO 2	2	2	3	2	2	2
CO 3	3	2	3	3	2	2
CO 4	2	3	2	2	2	2
CO 5	2	3	2	2	3	3

*3 – Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

LESSON PLAN

S. No	MONGODB LAB	Hrs	Pedagogy
1.	Find all documents on the basis of category	**30**	**Laboratory experiments**
2.	Connect to your database.		
3.	CRUD operations.		
4.	Aggregation pipelines.		
5.	Create a Database.		
6.	Create collection using two methods		
7.	Insert, Delete and Update documents.		
8.	Find data (find( ) or find One( ), projection).		
9.	Query operators.		
10.	Indexing and searching.		
11.	Schema Valuation.		
12.	Read and write with data API.		

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