# M.Sc.,COMPUTER SCIENCE



## **Program Code: PCS**

## 2021-2022 onwards



## MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC PASUMALAI, MADURAI – 625 004

#### **Eligibility for Admission**

Candidate for admission to Master's degree course in Computer Science should have Higher Secondary (+2) level Mathematics with Bachelor's degree in Computer Science/ Information Technology or BCA of Madurai Kamaraj University or any other University recognized by the Syndicate of Madurai Kamaraj University as equivalent thereto.

Candidate should have passed the Degree with a minimum of 55% marks in Part-III. In case of SC/ST candidates, they should have passed the degree with a minimum of 50% marks in Part-III.

#### **Duration of the course**

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

#### **Subjects of Study**

The courses offered under the PG programs belong to the following categories:

- 1. Core Subjects
- 2. Electives
- 3. Non Major Electives (NME)

#### Pattern of the question paper for the Continuous Internal Assessment Note: Duration – 1 hour 30 minutes

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	2 x 10 = 20 Marks
Total	40 Marks

#### The scheme of Examinations:

The components for continuous internal assessment are:

(40 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 fr	om 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					
Totul		, e 1/1uix5					

#### **Minimum Marks for a Pass**

50% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

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

#### VISION

To empower students of Computer Science Department to be technologically adept, innovative, self-motivated and responsible global citizens possessing human values and enable them to contribute in industrial development innovation, high quality technical education and research with the ever-changing world.

#### MISSION

- To provide a strong theoretical and practical background across the computer science discipline with an emphasis on software development
- To achieve excellence in the field of computing through quality education and equip the skills in computer science that they need to take up real-world challenges
- To strengthen the Industry-Academia interface that will help the graduates to emerge as leaders in academics or an inspiring revolutionary in entrepreneurship.
- To evolve as a center of excellence in the field of Computer Science for developing technically competent professional with ethical values to serve the needs of industry and society
- To provide quality education to meet the need of profession and society

#### 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 &
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.	Investigation
WA10 WA3	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. 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 events of a societal	Communication Skills & Design
	and economic, environmental, cultural and societal considerations.	

WAY	An ability to work effectively as a member and leader in	Individual and Team			
	teams, preferably in a multi-disciplinary setting.	Work			
WA6	An understanding of the roles and responsibilities of the				
	professional engineer in society, especially the primary	Duefersionalism			
	role of protection of the public and the public interest.	Professionalism,			
WA8	Ethics and equity: An ability to apply professional ethics,	Ethics and equity			
	accountability, and equity.	¥ V			
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	Life long learning			
	contribute to the advancement of knowledge				
WA5	An ability to create, select, apply, adapt, and extend				
	appropriate techniques, resources, and modern				
	engineering tools to a range of engineering activities	Usage of Tools			
	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	Impost on Society			
	cultural aspects of society, the uncertainties in the	impact on Society			
	prediction of such interactions; and the concepts of				
	sustainable design and development and environmental				
	stewardship.				
WA11	An ability to appropriately incorporate economics and				
	business practices including project, risk, and change	Drojaat Managamant			
	management into the practice of engineering and to	r toject wianagement			
	understand their limitations				

PROGR	RAMME EDUCATIONAL OBJECTIVES (PEOs)					
PEO1:	Graduates of the programme will be employed in the field Computer Science.					
PEO2:	Graduates of the programme will pursue higher studies.					
PEO3:	Graduates of the programme will apply new technologies in Computer Science to serve the needs of industry, and society.					
PEO4:	Graduates of programme will have successful career in technology in Computer Science.					
PEO5:	Graduates of the programme will have skills to develop applications with innovation.					
PEO6:	Graduates of the programme will be efficient team leaders, effective communicators and capable of working in multi-disciplinary environment following ethical values.					

PO NO	PROGRAMME OUTCOMES (POs)	
At the end	l 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

PROG	RAM SPECIFIC OUTCOMES (PSOs)
PSO1:	Students to have knowledge and expertise in at least one procedure-oriented and
	object
	oriented programming language
PSO2:	Students to have wide perspective on software development including web based
	applications as well as graphic applications.
PSO3:	Students will be aware of the design principles of Operating Systems specializing
	on at
	Least one popular operating System
PSO4:	Students to have the ability to design and implement optimal databases using
	current
	technologies.
<b>PSO5</b> :	Students design algorithms as per need by relating the data structure.
PSO6	Students identify and describe the communication networks technologies
	in local area networks and the internet and counter measures for security threats.



C U Vanderbilt University Center for Teaching

## MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous), Pasumalai M.Sc., COMPUTER SCIENCE. Curriculum

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

Course	Title of the Course	Title of the Course     Hours     Credits     M			Maximum Marks		
Code				Int	Ext	Total	
	FIRST SEMES	TER					
21PCSC11	Advanced Web Technology	6	4	25	75	100	
21PCSC12	Design and Analysis of	6	4	25	75	100	
	Algorithm			23	75	100	
21PCSC13	Operations Research	6	4	25	75	100	
21PCSCP1	Advanced Web Technology Lab	6	4	40	60	100	
21PCSCP2	Algorithms Lab	6	4	40	60	100	
	Total	30	20	155	345	500	
	SECOND SEME	STER					
21PCSC21	Advanced Java Programming	6	4	25	75	100	
21PCSC22	Object Oriented Analysis and Design	6	4	25	75	100	
21PCSC23	Distributed Operating System	6	4	25	75	100	
21PCSCP3	Advanced Java Programming Lab	6	4	40	60	100	
	Non Major Elective Course						
21PCSNP1	Introduction to Internet	6	6	40	60	100	
	Total	30	22	155	345	500	

THIRD SEMESTER									
21PCSC31	Machine Learning	6	4	25	75	100			
21PCSC32	Theory of Computation	6	4	25	75	100			
21PCSCP4	Machine Learning using Python Lab	6	4	40	60	100			
	Elective I								
21PCSE31	Mobile Communication	6	6	25	75	100			
21PCSE32	Software Project Management								
21PCSE33	Soft Computing								
	Elective II								
21PCSE34	Embedded Systems	6	6	25	75	100			
21PCSE35	Data Mining and DataWare Housing								
21PCSE36	Cyber Security								
	Total	30	24	140	360	500			
	Total FOURTH SEME	30 STER	24	140	360	500			
21PCSC41	Total FOURTH SEME Big Data Analytics	30 STER 6	<b>24</b> 4	<b>140</b> 25	<b>360</b> 75	<b>500</b>			
21PCSC41 21PCSC42	Total         FOURTH SEME         Big Data Analytics         Wireless Sensor Networks	30 STER 6 6	<b>24</b> 4 4	140 25 25	<b>360</b> 75 75	<b>500</b> 100 100			
21PCSC41 21PCSC42 21PCSCP5	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining Lab	30 <u>STER</u> 6 6 6 6	24 4 4 4	140           25           25           40	<b>360</b> 75 75 60	<b>500</b> 100 100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProject	30 STER 6 6 6 6 6	24 4 4 6	140           25           25           40           40	<b>360</b> 75 75 60 60	<b>500</b> 100 100 100 100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProjectElective III	30 STER 6 6 6 6	24           4           4           6	140           25           25           40           40	<b>360</b> 75 75 60 60	500           100           100           100           100           100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1 21PCSE41	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProjectElective IIICloud Computing	30 STER 6 6 6 6	24           4           4           6	140           25           25           40           40	<b>360</b> 75 75 60 60	500           100           100           100           100           100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1 21PCSE41 21PCSE42	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProjectElective IIICloud ComputingBlock Chain Fundamentals	30 <u>STER</u> 6 6 6 6 6	24           4           4           6           6	140           25           25           40           40           25	<b>360</b> 75 75 60 60 75	<b>500</b> 100 100 100 100 100 100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1 21PCSE41 21PCSE42 21PCSE43	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProjectElective IIICloud ComputingBlock Chain FundamentalsDigital Image Processing	30 STER 6 6 6 6 6 6	24       4       4       6       6	140           25           25           40           40           25	<b>360</b> 75 75 60 60 75	500           100           100           100           100           100           100           100			
21PCSC41 21PCSC42 21PCSCP5 21PCSPR1 21PCSE41 21PCSE42 21PCSE43	TotalFOURTH SEMEBig Data AnalyticsWireless Sensor NetworksData mining LabProjectElective IIICloud ComputingBlock Chain FundamentalsDigital Image ProcessingTotal	30 STER 6 6 6 6 6 30	24       4       4       6       6       24	140       25       25       40       40       25       25       140	<b>360</b> 75 75 60 60 75 75 <b>360</b>	<b>500</b> 100 100 100 100 100 500			





## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	ADVANCED WEB TEC	CHN	OLOGY				
Course Code	21PCSC11				L	Р	С
Category	Core				6	-	4
Nature of course:EMPLOYABILITY✓SKILLORIENTEDENTREPR						JRSI	HIP
COURSE OBJEC	CTIVES:						
• Students are able to develop a dynamic webpage by the use of java script and DHTML							
• Students will be	able to write a well formed	d / v	alid XML document.				
• Students will be operations on D	able to connect a java pro BMS table.	gran	n to a DBMS and perfor	rm insert, up	date a	and d	elete
• Students will be	able to write a server side	java	a application called Ser	vlet to catch	form	data	sent
from client, proc	cess it and store it on datab	ase.	11				
• Students will be	e able to write a server sid	le ja	va application called J	SP to catch	form	data	sent
from client and s	store it on database.	·					
Unit: I Web	Essentials:					18 H	lours
Clients, Servers, a	nd Communication. The Ir	ntern	et-Basic Internet Protoc	cols The Wo	rld W	'ide '	Web-
HTTP request n	nessage-response message	e-We	eb Clients Web Serv	vers-Case S	tudy.	Ma	ırkup
Languages: XHTI	ML. An Introduction to	HTN	AL History-Versions-B	asic XHTN	IL Sy	ntax	and
Semantics Some 1	Fundamental HTML Elem	nents	s-Relative URLs-Lists-	tables-Frame	es-Foi	ms-2	XML
Creating HTML D	ocuments Case Study.						
Unit: II Style	Sheets : CSS –					18 E	lours
Cascading Style S	Sheet Features-Core Synta	ax-St	tyle Sheet and HTML-	Style Rule	Casca	nding	g and
Inheritance-Text	Properties-Box Model-Co	lors	-Background Image-N	ormal Flow	Box	La	yout-
Beyond the Norma	al Flow-Other Useful Prop	ertie	es-Java Script-Basic Co	oncepts-Var	iables	and	Data
Types-Operators-	Conditional Statement	and	Loops-Functions-Arra	ys-Standard	Obje	ects-	Form
Processing in Java	Script-JavaScript Debugge	ers.				10.1	r
Unit: III Host	Objects :					18 F.	lours
Browsers and the	DOM-Introduction to the	Do	cument Object Model	DOM Histo	ry an	d Le	vels-
Intrinsic Event H	and ing-Modifying Eleme	nt 2	Style-The Document T	ree-DOM E	vent	Han	aling
Accommodating	Noncompliant Browsers	Pro	operties of window-	case Sludy	. se	rver	Side
Frogramming: Ja	iva Serviels- Architecture	-01	UDI Dowriting Other	Conshilition			nem-
Servelets and Con	currency_Case Study_ Rela	cs- ited '	Technologies	Capabilitie	s-Data	1 50	лаge
Unit: IV Renre	sonting Wah Data	licu	reennoiogies.			18 E	Ours
Advantages of X	XML_Documents and V	ocat	ularies-XMI Version	and XMI	De	clara	tion-
Namesnace-DTD-	Introduction to DOM and		X-DOM based XMI	Processing_	5 DC Event	Orie	ented
Parsing: $SAX - X$	SLT: Displaying XML De	ocun	nents in Browsers-Disp	laving XMI		umer	nts in
Browser using CS	S-Separating Programmi	ing a	and Presentation – The	e Problem w	ith Se	ervlet	-The
Anatomy of JSP P	age-Working of JSP-JSP A	Appl	ication Design with MV	VC	/		
Unit: V Web S	Services –	11	0			18 H	lours
Concept of web s	services-installation of a J	WS	DP-writing the Web-Se	ervice-Writin	ng a	java	Web
service client- W	SDL-XML Schema-SOA	P-St	oring java Objects as	files-Datab	ases	and	Java
Servlets.							

Total Lecture Hours	90 Hours
Books for Study:	
1 Jeffrey Clackson "Web Technologies A Computer Science Perspective" Pearson	Education
<b>1.</b> Jenney C.Jackson, web reenhologiesA computer science respective, reason in 2007	Suucation,
2006.	
Books for Reference:	
1. C.Xavier, World Wide Web Design with HTML, Tata McGraw-Hill Publishing	Company
Limited, New Delhi, 2000.	
2. N.P. Gopalan and J. Akilandeswari, Web Technology: A Developer's Perspective, PH	I Learning
Private Limited Delhi, Second Edition 2014	0
Web Reference	
1 https://www.gool/aforgool/a.org/web_toohnology/	
1. <u>https://www.geeksiorgeeks.org/web-technology/</u> 2. https://www.geeksiorgeeks.org/web-technologies/	
2. <u>https://www.goodcore.co.uk/biog/web-technologies/</u>	
<b>3.</b> <u>https://en.wikibooks.org/wiki/introduction_to_information_1echnology/web_1echnolo</u>	<u>gies</u>
4. <u>https://nptel.ac.in/courses/106/105/106105084/</u>	
5. <u>https://freevideolectures.com/course/3140/internet-technologies</u>	
COURSE OUTCOMES:	K Level
At the end of the Course the students will be able to	
<b>CO1:</b> Understand the basic concepts of internet, internet standards and protocols.	K3
<b>CO2:</b> Develop a dynamic webpage by the use of java script and DHTML.	K3
Analyze, identify and define the technology required to build and implement a	IZ A
website	K4
<b>CO4:</b> Implement a web page using development tools to design a webpage	K4
CO5: Design a dynamic webpage.	K4

#### CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	2	2	3	2	2	3
CO 2	3	2	3	2	3	2
CO 3	2	1	3	3	3	3
<b>CO 4</b>	2	3	3	2	2	2
CO 5	3	3	2	3	3	3

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

	<b>LESSON</b>	<b>PLAN</b>
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UNIT	AVANCED WEB TECHNOLOGIES	Hrs	Mode
Ι	Web Essential -Markup Languages-Tables-Forms-Frames	18	Chalk & Talk, PPT
II	Style Sheets : CSS – Java Script-Variables and Data Types-Operators- Conditional Statement and Loops-Functions-ArraysJavaScript Debuggers.	18	Chalk & Talk, PPT
III	Host Objects - Server Side Programming- Servlets - HTTP-GET and POST Request-Session Tracking Techniques- Database Connectivity	18	Chalk & Talk, PPT
IV	Representing Web Data- XML Documents in Browser using CSS- Separating Programming and Presentation -Working of JSP-JSP Application Design with MVC	18	Chalk & Talk, PPT
V	Web Services – Concept of web services-installation of a JWSDP- writing the Web-Service-Writing a java Web service client- WSDL- XML Schema-SOAP-Storing java Objects as files.	18	Chalk & Talk, PPT

Course Designed by: Dr.S.Shaik Parveen & Dr.G.Devika

Learning Outcome Based Education & Assessment (LOBE)

Formative Examination - Blue Print											
	Articulation Mapping – K Levels with Course Outcomes (COs)										
			Section	n A	Section	n B	Section	Section			
Internal	Cog	<b>K</b> L ovol	MCC	)s	Short Ans	swers	С	D			
mternar	COS	K Level	No. of.	K -	No. of.	K –	Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
		No. of									
	Que	stions to be	4		3		4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	CIA I & answered										
II Marks for ea question		ks for each	1		2		5	10			
		juestion	1		<u> </u>		3	10			
	Tota	l Marks for			6		10	10			
	eac	ch section	4		U		10	10			

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

	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 %		
	K1	2	2	-	-	4	8	20		
	K2	2	4	-	-	6	12	20		
СТА	K3	-	-	20	20	40	80	80		
	K4	-	-	-	-	-				
1	Marks	4	6	20	20	50	100	100		
	K1	2	2	-	-	4	8	20		
	K2	2	4	-	-	6	12	20		
CIA	K3	-	-	10	10	20	40	40		
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course								
			MC	Qs	Short An	swers	Section C	Section D	
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)	
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)	
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
No. of Questions to be Asked		ions to be ed	10		5		10	5	
No. of Questions to be answered		10		5		5	3		
Marks for each question		1		2		5	10		
Total N	Marks for	each section	10		10		25	30	
	(Figures	in parenthesi	s denotes, qu	estions sl	nould be ask	ked 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			
K2	5	10	-	-	15	12	10			
K3	-	-	30	20	50	41.67	42			
K4	-	-	20	30	50	41.67	42			
Marks	10	10	50	50	120	100	100			
NB: Higher level of performance of the students is to be assessed by attempting higher level										
or K lev	eis.									

Section	A (Mu	iltiple Cho	ice Questions)
Answei	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answei	r All Q	uestions	(5x2=10 marks)
Q.No	СО	K Level	Questions
11	CO1	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
Section	C (Eit	her/Or Ty	pe)
Answei	r All Q	uestions	(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: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher
level of	K leve	ls	
Section	D (Op	en Choice	
Answei	r Any T	<b>Three ques</b>	tions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K4	
24	CO4	K4	
25	CO5	K4	

## **Summative Examinations - Question Paper – Format**



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

Course Name	DESIGN AND ANA	LYSIS OF ALGORITH	IM			
Course Code	21PCSC12			L	Р	С
Category	Core			6	-	4
Nature of course:	EMPLOYABILITY	SKILL ORIENTED	✓ ENTREPRI	ENEU	RSHI	P
COURSE OBJE	CTIVES:					
• To provide ma	thematical approach fo	or Analysis of Algorithms	S			
• To solve probl	ems using various stra	tegies				
• To analyze str	ategies for solving prol	blems not solvable in poly	ynomial time.			
To Conceptual	lize and design efficien	and effective algorithm	ic solutions for d	ifferen	t real	l
world problem	IS.	C				
• To understand	the variations among t	tractable and intractable p	problems.			
Unit: I Fund	amentals of Algorithr	n:		18 H	ours	
Notion of an Alg	orithm – Fundamental	s of Algorithmic Probler	n Solving – Imp	ortant	Prob	lem
Types – Fundam	entals of the Analysi	is of Algorithm Efficie	ncy – Analysis	Fram	ewor	k –
Asymptotic Nota	tions and its properti	es – Mathematical ana	lysis for Recurs	ive a	nd N	on-
recursive algorithm	ns		-			
Unit: II Brute	Force and Exhaustiv	e Search:		18 H	ours	
Brute Force –	Selection sort and E	Bubble Sort-Closest-Pair	and Convex-H	ull P	roble	ms-
Exhaustive Search	- Divide and conquer	r methodology – Merge	sort – Quick sort	– Bin	ary T	ree
Traversal and R	elated Properties- M	ultiplication of Large	Integers – Stra	ssen''s	Ma	trix
Multiplication-Clo	sest-Pair and Convex-	Hull Problems.	C			
Unit: III Dyna	mic Programming:			18 H	ours	
Three basic exam	ples- Knapsack Proble	m and Memory functions	s- Optimal Binary	Searc	h Tre	ees-
Warshall"s and Fl	oyd" algorithm.					
Unit: IV Greed	ly Technique:			18 H	ours	
Prim"s algorithm	- Kruskal's Algorithm-	Dijkstra's Algorithm-Hut	ffman Trees and	codes.	Itera	tive
Improvement: The	e Simplex Method-The	Maximum-Flow Probler	n			
Unit: V Limit	ations of Algorithm <b>F</b>	ower:		18 H	ours	
Lower-Bound An	guments-Decision Tre	ees-P, NP and NP-Com	plete Problems-	Chall	enges	s of
Numerical Algori	thms. Coping with t	he Limitations of Algo	orithm power: .	Appro	xima	tion
Algorithms for NI	Hard Problems – Alg	orithms for Solving Nonl	linear Equations.			
		Total	Lecture Hours	90		
<b>Books for Study:</b>						
1. Anany Levitin,	"Introduction to the De	esign and Analysis of Alg	gorithms", Third	Editio	1,	
Pearson Education, 2012.						
Unit I : Chapter 1, Chapter 2						
Unit II : Chapter 3.1.3.3, 3.4, Chapter 4						
Unit III: Chapter 8,						
Unit IV: Chapter 9, 10.1, 10.2.						
Unit V : Chapter 11.3,11.4,12.3,12.4						
Books for Reference:						
1. Thomas H.Co	rmen, Charles E.Leiser	rson, Ronald L. Rivest a	nd Clifford Stein	, "Intr	oduct	tion
Academic Cour	cil Meeting Held On	29.04.2021			Page	8

Page 8

to Algorithms", Third Edition, PHI Learning Private Limited, 2012.				
Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and A	lgorithms",			
Pearson Education, Reprint 2006	C ,			
Donald F. Knuth "The Art of Computer Programming" Volumes 1& 3 Pearson	Education			
2000	Education,			
2009.				
Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 200	)8			
eb Resources:				
http://www2.its.strath.ac.uk/courses/c/				
http://www.stat.cmu.edu/~hseltman/Computer.html				
http://www.princeton.edu/~achaney/tmve/wiki100k/docs/C_%28programmin	<u>g_languag</u>			
e%29.html				
COURSE OUTCOMES: K Level				
t the end of the Course the students will be able to				
<b>D1:</b> Analyze the running time and space complexity of algorithms.	K3			
<b>D2:</b> Describe, apply and analyze the complexity of divide and conquer strategy.	К3			
<b>O3:</b> Describe, apply and analyze the complexity of dynamic programming.	K4			
Apply Greedy Technique for problem solving and identify the	K A			
computational issues and apply suitable algorithms to solve it effectively.	<b>K</b> 4			
Describe the classes P, NP, and NP Complete and be able to prove that a	17.4			
certain problem is NP-Complete	K4			
	to Algorithms", Third Edition, PHI Learning Private Limited, 2012. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and A Pearson Education, Reprint 2006. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 200 eb Resources: http://www.stat.cmu.edu/~hseltman/Computer.html http://www.stat.cmu.edu/~hseltman/Computer.html http://www.princeton.edu/~achaney/tmve/wiki100k/docs/C_%28programmin e%29.html DURSE OUTCOMES: the end of the Course the students will be able to D1: Analyze the running time and space complexity of algorithms. D2: Describe, apply and analyze the complexity of divide and conquer strategy. D3: Describe, apply and analyze the complexity of dynamic programming. Apply Greedy Technique for problem solving and identify the computational issues and apply suitable algorithms to solve it effectively. D5: Describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete			

#### CO & PO Mappings:

COs	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	2	2	1	3	2	2
CO 2	2	3	2	3	3	3
CO 3	3	2	2	2	2	3
<b>CO 4</b>	2	3	3	3	3	2
CO 5	3	3	3	2	3	3

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

UNIT	DESIGN AND ANALYSIS OF ALGORITHM	Hrs	Mode
I	Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non- recursive algorithms.	18	Black Board/ PPT
II	Brute Force – Selection sort and Bubble Sort-Closest-Pair and Convex- Hull Problems-Exhaustive Search - Divide and conquer methodology – Merge sort – Quick sort – Binary Tree Traversal and Related Properties– Multiplication of Large Integers – Strassen <sup>*</sup> s Matrix Multiplication-Closest-Pair and Convex-Hull Problems.	18	Black Board/ PPT
III	Three basic examples- Knapsack Problem and Memory functions- Optimal Binary Search Trees- Warshall"s and Floyd" algorithm .	18	Black Board/ PPT
IV	Greedy Technique– Prim <sup>*</sup> 's algorithm- Kruskal's Algorithm-Dijkstra's Algorithm-Huffman Trees and codes.The Simplex Method-The Maximum-Flow Problem	18	Black Board/ PPT
V	Limitations of Algorithm Power: Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems- Challenges of Numerical Algorithms. Coping with the Limitations of Algorithm power: Approximation Algorithms for NP Hard Problems – Algorithms for Solving Nonlinear Equations.	18	Black Board/ PPT

#### LESSON PLAN

Course Designed by: Dr.G.Devika & Dr.S.Shaik Parveen

Learning Outcome Based Education & Assessment (LOBE)											
		F	ormative Ex	aminatio	n - Blue Pri	nt					
Articulation Mapping – K Levels with Course Outcomes (COs)											
			Section	n A	Section	n B	Section	Section			
Internal	Cos	K L ovol	MCC	)s	Short Ans	swers	С	D			
	COS	K Level	No. of. K -		No. of. K –		Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
	No. of										
	Que	stions to be	4		3		4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	a	nswered									
II	Mar	ks for each	1		2		5	10			
	Q	uestion	1		2		3	10			
	Tota	l Marks for	4		6		10	10			
	eac	ch section	+		U		10	10			

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

		Dist	ribution of <b>M</b>	Iarks 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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
СТА	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-		
1	Marks	4	6	20	20	50		100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
CIA	K3	-	-	10	10	20	40	40
II	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.

Summ	native Exa	mination – Bl	ue Print Artic	ulation Ma	pping – K L	evel with	Course Outc	omes (COs)
			MCC	Qs	Short An	swers	Section C	Section D
S.No	COs	K - Level	No. of	K –	No. of	K –	(Either /	(Open
			Questions	Level	Question	Level	or Choice)	Choice)
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
No. of	Questions	s to be Asked	10		5		10	5
No	o. of Quest	ions to be	10		5		5	3
		1		2		5	10	
Marks for each question		1		2		5	10	
Total Marks for each section		10		10		25	30	
	(Figu	res in parenthe	esis denotes, q	uestions sh	ould be aske	d with th	e given K lev	el)

		D	istribution 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				
K2	5	10	-	-	15	12	10				
K3	-	-	30	20	50	41.67	42				
K4	-	-	20	30	50	41.67	42				
Marks	10	10	50	50	120	100	100				
NB: Hig	NB: Higher level of performance of the students is to be assessed by attempting higher level										
of K lev	els.				-						

Section	Section A (Multiple Choice Questions)									
Answer	All Qu	estions	(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 (Shor	rt Answers)								
Answer	All Qu	estions	(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 (Eith	er/Or Type								
Answer	All Qu	estions	(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: Hig	gher lev	el of perfor	mance of the students is to be assessed by attempting higher level of							
K levels										
Section D (Open Choice)										
Answer	Any II	iree questio	0 (3x10=30 marks)							
<b>Q.N0</b>	$\frac{CO}{CO1}$	K Level	Questions							
21		KJ V2								
22	$\frac{CO2}{CO2}$	KJ V4								
23	$\frac{003}{004}$	<u></u> κ4 <u></u> <i>K</i> 4								
24	CO4	Κ4 Κ1								
23	COS	<b>N</b> 4								

## **Summative Examinations - Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nam	e	<b>OPERATIONS RESE</b>	AR	КСН						
Course Code	e	21PCSC13					L	Р	С	
Category		Core					6	-	4	
Nature of Co	urs	e:EMPLOYABILITY	✓	SKILL ORIENTED	$\checkmark$	ENTREPRENE	EURS	HIP	✓	
Course Obj	ject	ives:		I						
This module	air	ns to introduce student	s to	o use quantitive meth	nods	and techniques	s for	effec	tive	
decisions-making, model formulation and applications that are used in solving business decision										
problems.										
Unit: I I	Line	ear Programming Prob	oler	n				15	5	
Linear Programming Problem: Graphical solution : Graphical solution method – Some										
exceptional c	ase	s – General L.P.P. – Car	non	ical and Standard forn	ns of	L.P.P Simple	ex me	thod	(	
Problems On	ly).									
Unit: IITransportation and Assignment problem15									5	
Transportatio	n p	roblem : Introduction	– In	itial basic feasible sol	utio	n: North West C	Corner	· Met	hod	
– Least Cost	Me	thod – Vogel's Approxin	mat	tion Method – Test for	Op	timality - MOD	OI Met	thod	-	
Assignment p	oroł	elem : Introduction – Ma	the	matical formulation o	f the	e problem – Solu	ution	meth	ods	
of Assignment Problem: Hungarian method.										
Unit: III Games and Strategies								15	5	
Introduction – Two – Person Zero Sum Games – Some Basic Terms - The Maximin – Minimax										
Principle – G	am	es without saddle Points	- <u>ş</u>	graphic Solution of 2 x	x n a	nd m x 2 games	– Do	mina	nce	
Property						U U				
Unit: IV N	Net	work Routing Problem	S					15	5	
Introduction-	- Ne	etwork notations and De	fini	tions – Minimal Span	ning	Tree problems	-Shc	ortest		
Route Proble	ms.									
Unit: V N	Net	work scheduling by PE	RT	C/CPM				15	5	
Introduction -	- N	etwork basic component	s –	Logical sequencing -	- Ru	les of Network	Const	ruction	ons	
- Concurrent	Ac	tivities - Critical Path A	nal	ysis - Probability con	side	rations in PERT	<b>`</b>			
					То	tal Lecture Ho	urs	60 H	rs	
Books for St	udy	/:								
KantiSwarup	, P	K Guptha and Man Moh	ian,	<b>"Operations Resear</b>	ch"	, Sultan Chand	& Sor	ns, Ne	ew	
Delhi, Edition	n, 2	013.								
			2	1.25						
Unit I: Ch	apt	r 3 - Sections: 3.2, 3.3,	3.4	1, 3.5						
	apte	r 4 - Sections: 4.3	0.0	10.12						
Unit II : Cha	pte	r = 10 - Sections : 10.1, 10	J.9,	10.13						
Cha	apte	r 11 - Sections : 11.1, 1	1.2	2, 11.3 (4)	. 17	-				
Unit III : Chapter $17 - $ Sections : $17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7$										
Unit IV : Ch	apt	24 - Sections : 24.1, 2	4(`2	2.2), 24.3, 24.4		7				
Unit $V$ : Cha	pte	$r_{25} - Sections : 25.1, 25$	5.2,	, 25.3, 25.4, 25.5, 25.6	, 25	./				
BOOKS for Re	eter	rences:		<b>.</b>		<b>(</b> '11 ) ) ''	1.	C	<b>C</b> 1	
1. Hamdy A	<b>1</b> .	ana, "Operations Res	ear	cn-An Introduction	΄, Ν	lacmillan Publi	shing	Co,	5th	
Edition,	198	/.								

2. P.K.Gupta, Man Mohan, "**Operations Research and Quantitative Analysis**", Sultan Chand & Sons, New Delhi First Edition, 1987.

Web F	Resources:						
https:/	//nptel.ac.in/courses/111/107/111107128/https://onlinecourses.swayam2.ac.ir	/cec20_ma1					
0/preview							
COUR	RSE OUTCOMES:	K Level					
At the	end of the Course the students will be able to						
CO1:	Develop the skills in Mathematical formulation and Solving of LPP.	K3					
<b>CO2:</b>	Solve specialized LPP like transportation and assignment problems.	K3					
CO3:	Evaluate the challenges in building networks and solutions to those.	K5					
CO4.	Identify the activities, schedule the Project and finding time of completion	V2					
CO4:	Introduce about Network problems.	KJ					
CO5:	Distinguish a game situation from a pure individual's decision problem	K4					

#### CO & PO Mapping:

COs	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	PO 5	PO 6
CO 1	3	3	3	2	2	2
CO 2	3	2	3	2	2	3
CO 3	3	3	3	2	3	2
<b>CO 4</b>	3	2	2	3	3	2
CO 5	3	2	3	3	3	3

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

#### LESSON PLAN

Unit	Course Name	Hrs	Pedagogy
Ι	Introduction – Linear Programming Problem – Graphical solution : Graphical solution method – Some exceptional cases – General L.P.P. – Canonical and Standard forms of L.P.P Simplex method (Problems Only).	15	Chalk & Talk
п	Transportation problem : Introduction Initial basic feasible solution: North West Corner Method Least Cost Method Vogel's Approximation Method Test for Optimality MODI Method Assignment problem : Introduction Mathematical formulation of the problem Solution methods of Assignment Problem: Hungarian method.	15	Chalk & Talk
ш	Introduction – Two – Person Zero Sum Games – Some Basic Terms - The Maximin – Minimax Principle – Games without saddle Points – graphic Solution of 2 x n and m x 2 games – Dominance Property	15	Chalk & Talk
IV	Introduction – Network notations and Definitions – Minimal Spanning Tree problems – Shortest Route Problems.	15	Chalk & Talk
V	Introduction - Network basic components – Logical sequencing – Rules of Network Constructions – Concurrent Activities - Critical Path Analysis - Probability considerations in PERT	15	Chalk & Talk

Course Designed by: Dr. P. Visvanathan

	Learning Outcome Based Education & Assessment (LOBE)											
		F	ormative Ex	aminatio	n - Blue Pri	nt						
Articulation Mapping – K Levels with Course Outcomes (COs)												
			Section	n A	Section	n B	Section	Section				
Internal	Cos	K L ovol	MCQ	)s	Short Ans	swers	С	D				
memai	CUS	K Level	No. of.	К -	No. of.	К –	Either or	Open				
			Questions	Level	Questions	Level	Choice	Choice				
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)				
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)				
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)				
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)				
	No. of											
	Que	stions to be	4		3		4	2				
		asked										
Question		No. of										
Pattern	Que	stions to be	4		3		2	1				
CIA I &	a	nswered										
II	Mar	ks for each	1		2		5	10				
	question		T		4		3	10				
	Tota	l Marks for	1		6		10	10				
	eac	ch section	4		U		10	10				

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

		Dist	ribution of M	larks with	K Level (	CIAI&	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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
СТА	K3	-	-	20	20	40	80	80
	K4	-	-	-	-	-		
1	Marks	4	6	20	20	50	100	100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
CIA	K3	-	-	10	10	20	40	40
Π	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)											
S.No	COs	K - Level	MCQs       No. of     K –       Questions     Level		Short An No. of Question	swers K – Level	Section C (Either / or Choice)	Section D (Open Choice)				
1	CO 1	K1	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 Quest. Aske	ions to be ed	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				
	(Figures	in parenthesi	s denotes, qu	estions s	hould be asl	ked 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	42		
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 <i>K</i> levels									
	C15.								

Section	A (Mu	ıltiple Cho	ice Questions)					
Answei	r All Q	uestions	(10x1=10 marks)					
Q.No	CO	K Level	Questions					
1	CO1	K3						
2	CO1	K2						
3	CO2	K3						
4	CO2	K2						
5	CO3	K3						
6	CO3	K2						
7	CO4	K3						
8	CO4	K2						
9	CO5	K2						
10	CO5	K3						
Section	B (She	ort Answer	rs)					
Answei	r All Q	uestions	(5x2=10 marks)					
Q.No	CO	K Level	Questions					
11	CO1	K2						
12	CO2	K2						
13	CO3	K3						
14	CO4	K3						
15	CO5	K3						
Section	C (Eit	her/Or Ty	pe)					
Answei	r All Q	uestions	(5  x 5 = 25  marks)					
Q.No	CO	K Level	Questions					
16) a	CO1	K2						
16) b	CO1	K3						
17) a	CO2	K3						
17) b	CO2	K2						
18) a	CO3	K3						
18) b	CO3	K2						
19) a	CO4	K2						
19) b	CO4	K3						
20) a	CO5	K3						
20) b	CO5	K3						
NB: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher					
level of	K leve	ls						
Section	Section D (Open Choice)							
Answei	r Any T	Three ques	tions (3x10=30 marks)					
Q.No	CO	K Level	Questions					
21	CO1	K3						
22	CO2	K3						
23	CO3	K3						
24	CO4	K4						
25	CO5	K4						

## **Summative Examinations Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nan	ne ADVANCED WEB TECHNOLOGY LAB								
Course Cod	e 21	21PCSCP1							
Category	C	ore			-	6	4		
Nature of C	ourse:	EMPLOYABILITY	SKILL ORIENTED	✓ ENTREPR	ENEU	JRSH	IP		
Course Obj	ectives								
• To under	rstand	the web technologies to	create adaptive web page	es for web applic	ation.				
• To know	the co	oncept and implementation	on of cookies as well as a	related privacy c	oncer	ns.			
• Understa	and the	web technologies to cre	eate adaptive web pages f	for web applicati	on.				
• Use CSS	S to im	plement a variety of pre	sentation effects to the w	veb application					
• Know th	e conc	ept and implementation	of cookies as well as rela	ated privacy con	cern				
S. No.			List of Programs			Hou	rs		
1.		Write an HTML code	to display your profile of	n a web page.					
2		Create a table to show	your class time-table.	ting on image					
۷.		takes user to other page		king on image					
3		Write an HTML code	to create a Home nage h	aving three links					
5.		About Us. Our Service	es and Contact Us. Creat	e separate web	•				
4.		pages for the three lin	ks.	F					
5.		Write an HTML code	to create a Registration I	Form. On					
		submitting the form, the	he user should be asked t	o login with this					
		new credential.							
6.		Write an HTML code	to create a login form. O	n submitting the					
_		form, the user should	get navigated to a profile	page.					
7.		Write a JavaScript pro	ogram to count the num	ber of vowels in	а				
Q		Write a java script pro	arom to test the first cha	ractor of a string	ic	90			
0.		uppercase or not	grain to test the first cha		15				
9.		Write a pattern that ma	atches e-mail addresses.						
10.		To write a program the	at parses an XML docum	ent using DOM					
		and SAX parsers.	-	-					
11.		To write a XML progr	cam and DTD for a docur	ment.					
12.		Create a web page wit	h some text in using som	ne color. Change					
		the color of the text on click of a button or on mouse over.							
13		Client-side scripts for	validating web form con	trols Using					
13.		To write a YML progr	cam for creating a ad acts	log					
14		To create an html n	and to apply style	uog. formatting usi	nσ				
17.		external Cascading St	vle Sheet.	iormatting usi	-5				
15.		To write a servlet pros	gram using HTTP Servle	t.					
		1 2	Tot	tal Lecture Hou	rs	90			

Books	for Reference:						
1.	https://www.w3schools.com/html/html_exercises.asp						
2.	https://www.w3resource.com/javascript-exercises/						
3.	https://www.javatpoint.com/dhtml						
Web F	Reference						
1.	https://nptel.ac.in/courses/106/105/106105084/						
2.	https://freevideolectures.com/course/3140/internet-technologies						
COUR	COURSE OUTCOMES: K Level						
At the	end of the Course the students will be able to						
<b>CO1:</b>	Understand best technologies for solving web client/server problems	K2					
<b>CO2:</b>	Analyze and design real time web applications	K4					
CO3:	To have a Good grounding of Web Application Terminologies, Internet Tools, $E$ – Commerce and other web services.	K3					
CO4:	To develop a Web site using text, images, links, lists, and tables for navigation and layout.	K4					
<b>CO5</b> :	To create web applications using web controls.	K4					

#### CO & PO Mappings:

COs	<b>PO 1</b>	<b>PO 2</b>	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	2	2	3	3	3	3
CO 2	2	1	2	3	3	3
CO 3	3	3	3	2	2	3
<b>CO 4</b>	1	2	2	1	3	2
CO 5	3	2	3	2	3	2

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

#### LESSON PLAN

S. No.	List of Programs	Hrs	Mode
1.	Write an HTML code to display your profile on a web page.		
2.	Create a table to show your class time-table.		
3.	Insert an image and create a link such that clicking on		
	image takes user to other page		
4.	Write an HTML code to create a Home page having three		
	links: About Us, Our Services and Contact Us. Create		
	separate web pages for the three links.		
5.	Write an HTML code to create a Registration Form. On		
	submitting the form, the user should be asked to login with		
6.	this new credential.		
	Write an HTML code to create a login form. On submitting		
7.	the form, the user should get navigated to a profile page.		
	Write a JavaScript program to count the number of vowels		
8.	in a given string.		Lah
	Write a java script program to test the first character of a	90	Lau
9.	string is uppercase or not.		Demonstration
10.	Write a pattern that matches e-mail addresses.		
	To write a program that parses an XML document using		
11.	DOM and SAX parsers.		
12.	To write a XML program and DTD for a document.		
	Create a web page with some text in using some color.		
	Change the color of the text on click of a button or on		
13.	mouse over.		
14.	Client-side scripts for validating web form controls Using		
	DHTML		
15.	To write a XML program for creating a cd catalog.		
	To create an html page, and to apply style formatting using		
	external Cascading Style Sheet.		
	To write a servlet program using HTTP Servlet.		

Course Designed by: Dr.S.Shaik Parveen & Dr.G.Devika



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name		AL	GORITH	IMS LAP	3						
Course Coo	le 2	21PCSCP2 L							Р	С	
Category	Cor	e						-	6	4	
Nature of C	Course	se:	EMPLOY	ABILITY		SKILL ORIENTED	~	ENTREPRI	ENEU	JRSH	IP
COURSE (	OBJE	ECT	IVES:								
• Design	and in	mple	ment var	ious algori	ith	ms in programming					
Employ	vario	ous d	esign stra	ategies for	pr	oblem solving.					
Measure	e and	com	pare the	performan	ce	of different algorithms					
• Demons	strate	a fai	miliarity	with major	r al	lgorithms					
Apply in	mport	tant	algorithm	ic design p	paı	radigms and methods of a	ınal	lysis.			
S. No.						List of Programs				H	ours
1	Writ	ite pı	ogram to	perform N	Ma	thematical analysis for R	ecu	rsive algorit	.hm.		
1.	Writ	ite pı	ogram to	perform N	Ma	thematical analysis Non-	rec	ursive algori	thm.		
2.	Writ	ite pi	ogram to	Sort a g	ive	en set of n integer eleme	nts	using Quick	Sort	,	
5.	meth	thod	and comp	oute its tim	ne	complexity analysis: wo	rst	case, average	e case		
	and	best	case.	~					~		
4.	Writ	Write program to Sort a given set of n integer elements using Merge Sort									
	meth	thod	and comp	pute its tim	ne	complexity analysis: wo	rst	case, average	e case	:	
	and	best	case.	• 1		ח' דד ד ו					
5.	Writ	ite pi	ogram to	Impleme	nt	Binary Tree Traversal	1.1.	m usina Du			
6.		aron	ogram to	thod	en	t the 0/1 Knapsack pro	oble	in using Dy	namic		
	Writ	ite n	nning me	uiou. Implem	on	ot the 0/1 Knansack pr	obl	em using G	reedu	,	
7.	meth	thod.	logram u	) implem		it the 0/1 Khapsack pr	001	chi using O	neeuy		
0	Writ	ite p	rogram,	From a gi	ive	en vertex in a weighted of	con	nected graph	, find		
8.	shor	rtest	paths to	other vertic	ces	s using Dijkstra's algorith	m.	• •			
0	Writ	ite pı	ogram to	Find Mir	nin	num Cost Spanning Tree	of	a given conr	nected		90
9.	undi	lirect	ed graph	using Kru	ska	al'salgorithm.					
10	Writ	ite pı	ogram to	Find Mir	nin	num Cost Spanning Tree	of	a given conr	nected		
10.	undi	lirect	ed graph	using Prin	n's	algorithm.					
11.	Writ	Write program to implement All-Pairs Shortest Paths problem using									
	Floy	yd's a	algorithm	l. T1		T		L1			
12.	Writ Dun	ite pi	ogram to	Impleme	nt	Travelling Sales Person	pro	blem using			
	Dyn Writ	ito pr	c program to	Design a	nd	implement to find a sub	not d	of a given set	S –		
13. $\begin{cases} s_1 \\ s_2 \\ s_1 \\ s_1 \\ s_1 \\ s_2 \\ s_1 \\ s_1 \\ s_2 \\ s_1 $											
positive integer d											
Write program Design and implement program to find all Hamiltonian											
14.	Cvc	cles i	n a conne	cted undir	ec	ted Graph G of n vertices	s us	ing backtrac	king		
1.7	prin	nciple	e.			I		0	0		
15	Writ	ite <sup>-</sup> p	rogram l	Design and	d	implement program for	N·	-Queen's Pro	oblem	L	
	usin	ng ba	cktrackir	ng principle	e.						

	Total Lecture Hours	<b>3</b> 90
Web R	Reference:	
https:/	/online.stanford.edu/courses/cs161-design-and-analysis-algorithms	
https:/	/www.classcentral.com/course/swayam-design-and-analysis-of-algorithms-398	<u>4</u>
COUR	SE OUTCOMES:	K Level
At the	end of the Course the students will be able to	
<b>CO1:</b>	Design algorithms using appropriate design	K2
CO2:	Implement a variety of algorithms such assorting, graph related, combinatorial in a high level language	K4
CO3:	Develop solutions for Greedy method, Dynamic Programming	K3
CO4:	Apply and implement learned algorithm design techniques to solve real-world problems	K4
CO5:	Analyze and compare the performance of algorithms using different features	K4

## CO & PO Mapping:

COs	<b>PO 1</b>	PO 2	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	2	1	3	2	2	3
CO 2	2	2	2	3	3	2
CO 3	2	2	3	3	1	3
<b>CO 4</b>	3	3	3	1	3	3
CO 5	3	2	3	3	3	3

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

#### **LESSON PLAN**

S. No.	List of Programs	Hrs	Mode
	Write program to perform Mathematical analysis for Recursive		
1.	algorithm.		
	Write program to perform Mathematical analysis Non-recursive		
2.	algorithm.		
	Write program to Sort a given set of n integer elements using		
3.	Quick Sort method and compute its time complexity analysis:		
	worst case, average case and best case.		
	Write program to Sort a given set of n integer elements using		
4.	Merge Sort method and compute its time complexity analysis:		
	worst case, average case and best case.		
	Write program to implement Binary Tree Traversal		
5.	Write program to Implement the 0/1 Knapsack problem using		
6.	Dynamic Programming method.		
	Write program to Implement the 0/1 Knapsack problem using		
7.	Greedy method.		
	Write program, From a given vertex in a weighted connected		
8.	graph, find shortest paths to other vertices using Dijkstra's	90	Lab
	algorithm.	20	Demonstration
0	Write program to Find Minimum Cost Spanning Tree of a given		
9.	connected undirected graph using Kruskal'salgorithm.		
10	Write program to Find Minimum Cost Spanning Tree of a given		
10.	connected undirected graph using Prim's algorithm.		
11	Write program to implement All-Pairs Shortest Paths problem		
11.	using Floyd's algorithm.		
10	while program to implement travening Sales Person problem		
12.	Using Dynamic programming. Write program to Design and implement to find a subset of a		
13	while program to Design and implement to find a subset of a given set $S = \{S_1, S_2, \dots, S_n\}$ of a positive integers whose SUM		
15.	given set $S = \{SI, S2, \dots, SI\}$ of it positive integers whose SOW is equal to a given positive integer d		
	Write program Design and implement program to find all		
14	Hamiltonian Cycles in a connected undirected Graph G of n		
1 7,	vertices using backtracking principle		
15	Write program Design and implement program for N-Queen's		
	Problem using backtracking principle.		

Course Designed by: Dr.G.Devika & Dr.S.Shaik Parveen





## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	ADVANCED JAVA PRO	<b>)GR</b> A	AMMING				
Course Code	21PCSC21				L	Р	С
Category	Core				6	-	4
Nature of Course:EMPLOYABILITY✓SKILLORIENTEDENTREPRE							IP
<b>COURSE OBJ</b>	ECTIVES:						
• To learn how	w to use Core Java Technolog	gies.					
• To impleme	nt OOP Concept.						
• To get know	ledge in Classes, Fundament	tals, l	Methods, Constructors a	and Garbage	e Coll	ectio	ns.
• To analyze t	he current Thread and Synch	nroniz	zation.				
• To cover Ap	plet, AWT Controls, Swing	and J	Java Beans.				
Unit: I The	Genesis of Java: Java's Lineage	e -				18 H	ours
Why java is imp	ortant to Internet - Java's Mag	gic -	The Java Buzz words. A	n overview	of Jav	a: O	bject-
Oriented Program	ming - Data types, Variables a	and A	rrays: Simple type - Vari	ables - Type	e conv	ersio	n and
casting - Arrays.	- Operators: Arithmetic- bit y	wise	- relational - Logical - A	ssignment –	- ,,?" (	Opera	ntor –
Operator Precede	nce Control statements - Sele	ction	- Iteration - Jump stateme	ents		10.11	
Unit: II Inti	oducing Classes: Class fund	amer	ntals -			18 H	ours
Declaring objects	s - Introducing methods - Co	nstru	ctors - this keyword - C	Barbage coll	ection	- fii	nalize
method. Inheritar	ce: Basics - Using super - Mu	iltilev	el Hierarchy - Method ov	verriding - A	bstrac	t clas	sses -
final with inheri	ance. Packages and Interface	s: Pa	ickages - Access protect	ion - Impor	ting I	acka	ges -
finally	ion Handling: Fundamentals -	types	- Uncaught exception - I	Nested try -	unrow	- unro	JWS -
Unit: III Mu	tithreaded Programming:					18 H	ours
Java Thread mod	el - Main thread - creating a th	hread	- Multiple threads - prior	ities - Syncl	ironiz	ation	- I/O
basics - reading/v	vriting console – PrintWriter c	lass -	- reading and writing file	s - The App	let cla	lss: A	pplet
Basics – Applet	Architecture - Applet Skeleton	- App	plet display methods - Re	questing - re	painti	ng - S	Status
window - HTML	APPLET tag – Passing parame	eter to	Applets.				
Unit: IV Usin	ng AWT Controls,					18 H	ours
Layout manage	rs and Menus: Control fur	ndam	entals - labels, button	s, check b	oxes,	choi	ice
controls, lists, so	croll bar, textfield, textarea, l	ayou	t manager, menubars an	d menus, d	ialog	boxe	s -
Handling event	s using AWT components.	A to	our of Swing: JApplet	– Icons a	nd L	abels	_
Buttons – Comb	o Boxes – Trees – Exploring	g Swi	ng.				
Unit: V Java	a Beans: What is a Java Bear	n? –				18 H	ours
Advantages of	Java Bean – Application Bu	uildei	Tools – BDK – JAR	Files – Int	rospe	ction	ı —
Developing sim	ple Bean Using BDK – Usi	ing E	Bound Properties – Usin	ng BeanInfe	o Inte	rface	e —
JavaBean API.	Servlets: Background – Lifec	cycle	of servlet – Simple serv	vlet – The S	lervle	t AP	— ]
javax.servlet pa	ckage – Reading servlet para	imete	ers				
– javax.servlet.	nttp package – Handling H	ITTP	requests and response	s – Cookie	es –	Sessi	on
tracking.			- <b>-</b>				
			Total I	Lecture Ho	urs	90	
<b>Books for Stu</b>	dy:	_					
Herbert Schildt	Java 2 - The Complete Re	ferer	nce, TMH, New Delhi, 5	5 <sup>th</sup> Edition, 2	2005.		
#### **Books for Reference:**

- 1. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India(P) Ltd, NewDelhi, 2002.
- 2. Paul Tremblett, "Instant Enterprise Java y Beans", Tata McGraw HillPublishing company, New Delhi,2001.
- 3. Platt S David, "Introducing Micorsoft .Net", Prentice Hall of India, NewDelhi,2003.

### Web Resources:

- 1. https://www.w3schools.com/
- 2. https://www.tutorialspoint.com/java
- 3. https://www.geeksforgeeks.org/java/

COUR	SE OUTCOMES	K Level				
At the	At the end of the Course the students will be able to					
CO1	Understand the functionality of the Core Java	K2				
CO2	Apply the concept of OOP.	К3				
CO3	Apply and implementation of Thread services.	K4				
<b>CO4</b>	Examine the features of Applet and AWT Various applications	K4				
CO5	Execute Java Beans and Servlet in development.	K4				

### CO & PO Mapping:

CO's/PO's	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	3	2	2	2	2
CO2	3	1	3	3	3	3
CO3	2	3	3	2	2	3
CO4	2	2	3	3	1	2
CO5	3	2	2	3	3	2

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

### **LESSON PLAN**

UNIT	ADVANCE JAVA PROGRAMMING	Hrs	Mode
I	The Genesis of Java: Java's Lineage - Why java is important to Internet - Java's Magic - The JavaBuzz words. An overview of Java: Object-Oriented Programming - Data types, Variables and Arrays: Simple type - Variables - Type conversion and casting - Arrays Operators: Arithmetic- bit wise - relational - Logical - Assignment – "?" Operator – Operator Precedence Control statements - Selection - Iteration - Jump statements	18	Lecture and Chalk board instruction
II	Introducing Classes: Class fundamentals - Declaring objects - Introducing methods -Constructors - this keyword - Garbage collection - finalize method. Inheritance: Basics - Using super - Multilevel Hierarchy - Method overriding - Abstract classes - final with inheritance. Packages and Interfaces: Packages - Access protection - Importing Packages - Interfaces.Exception Handling: Fundamentals - types - Uncaught exception - Nested try - throw - throws - finally.	18	Lecture and Chalk board instruction
III	Multithreaded Programming: Java Thread model - Main thread - creating a thread - Multiple threads - priorities - Synchronization - I/O basics - reading/writing console – PrintWriter class - reading and writing files - The Applet class: Applet Basics – Applet Architecture - Applet Skeleton - Applet display methods - Requesting - repainting - Status window - HTML APPLET tag – Passing parameter to Applets.	18	Lecture and Chalk board instruction
IV	Using AWT Controls, Layout managers and Menus: Control fundamentals - labels, buttons, check boxes, choice controls, lists, scroll bar, textfield, textarea, layout manager, menubars and menus, dialog boxes - Handling events using AWT components. A tour of Swing: JApplet – Icons and Labels – Buttons – Combo Boxes – Trees – Exploring Swing.	18	Lecture and Chalk board instruction
V	Java Beans: What is a Java Bean? – Advantages of Java Bean – Application Builder Tools – BDK – JAR Files – Introspection – Developing simple Bean Using BDK – Using Bound Properties – Using BeanInfo Interface – JavaBean API. Servlets: Background – Lifecycle of servlet – Simple servlet – The Servlet API – javax.servlet package – Reading servlet parameters – javax.servlet.http package – Handling HTTP requests and responses – Cookies – Session tracking.	18	Lecture and Chalk board instruction

Course Designed by: Dr.S.Bharani Sethu Pandian & Mr.P.Ganesh Babu

Learning Outcome Based Education & Assessment (LOBE)											
Formative Examination - Blue Print											
Articulation Mapping – K Levels with Course Outcomes (COs)											
			Section	n A	Section	n B	Section	Section			
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D			
memai	CUS	K Level	No. of.	К -	No. of.	К –	Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
		No. of			3						
	Que	stions to be	4				4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	I & answered										
II	Mar	ks for each	1		2		5	10			
	question		1		2		3	10			
	Tota	l Marks for	1		6		10	10			
	eac	ch section	+		U		10	10			

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

	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
СТА	K3	-	-	20	20	40	80	80	
	K4	-	-	-	-	-	-	-	
1	Marks	4	6	20	20	50	100	100	
	K1	2	2	_	_	4	8	20	
	K2	2	4	-	-	6	12	20	
CIA	K3	-	-	10	10	20	40	40	
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course										
			MC	liteonies () Js	Short An	swers	Section C	Section D			
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)			
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)			
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
No.	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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			
K2	5	10	-	-	15	12	10			
K3	-	-	30	20	50	41.67	42			
K4	-	-	20	30	50	41.67	42			
Marks	10	10	50	50	120	100	100			
NB: Hig of K lev	NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.									

Section	ı A (Mu	iltiple Cho	ice Questions)
Answe	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answe	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	(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: Hi	gher le	vel of perf	formance of the students is to be assessed by attempting higher
level of	K leve	ls	
Section	D (Op	en Choice	)
Answe	r Any T	Three ques	tions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K4	
24	CO4	K4	
25	CO5	K4	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	OB	JECT ORIENTED ANA	ALY	SIS AND DESIGN							
Course Code	21F	°CSC22				L	Р	С			
Category	Со	re				6	-	4			
Nature of Cour	se:	EMPLOYABILITY	✓	SKILL ORIENTED	ENTREPRE	NEUI	RSHI	Р			
<b>Course Objecti</b>	ves:										
• Learn the ba	• Learn the basics of OO analysis and design skills.										
• Learn the U	ML	design diagrams.									
• Learn to ma	p de	sign to code.									
• Be exposed	to th	e various testing techniqu	les.								
• Compare an	d Co	ontrast the UML Diagrams	s wit	h ER and Data Flow Dia	igrams.						
Unit: I An	over	view of Object-Oriented	l sys	tems Development:			18				
Introduction - 7	Гwo	Orthogonal Views of t	he S	oftware - Object-Orjer	ted systems	Deve	lopm	ent			
Methodology -	Why	an Object Orientation	- Ov	verview of the Unified	Approach. O	biect	Bas	ics:			
Introduction - A	n Ol	piect-Oriented Philosophy	/ - O	biects - Obiects - Obiec	ts are Groupe	d in C	Classe	es -			
Attributes - Ob	iect	Behavior and Methods	- Oł	piects Respond to Mes	sages - Encar	psulat	ion	and			
Information Hic	ling	- Class Hierarchy - Poly	vmoi	phism - Object Relation	onships and A	Associ	atior	IS -			
Aggregations a	nd	Object Containment. O	biect	t-Oriented Systems I	Development	Life	Cve	cle:			
Introduction - T	he So	oftware Development Pro	cess	- Building High-Ouality	Software.		- 0				
Unit: II Obj	iect-	Oriented Methodologies	:				18				
Introduction - s	urve	v of some of the Object	Orie	ented Methodologies -	Rumbaugh E	t al' s	s Ob	iect			
Modeling Tech	nique	e - The Booch Methodol	ogy	- The Jacobson et al.	Methodologie	s - Pa	atterr	ns -			
Frameworks -	The	Unified approach. Unif	fied	Modeling Language:	Introduction	- Sta	atic a	and			
Dynamic Mode	ls -	Why Modelling - Intro	oduct	ion to the Unified Mo	odeling Lang	uage	- Ul	ML			
Diagrams - UN	ЛL	Class Diagram - Use-C	Case	Diagram - UML Dyr	namic Model	ing -	Mo	del			
Management -	UMI	L Extensibility - UML Me	ta-M	lodel.		U					
Unit: III Ider	ntify	ing Use-Cases:					18				
Introduction - V	Why	Analysis is a Difficult A	Activ	ity - Business Object A	analysis - Use	e-Case	e dri	ven			
object oriented	anal	ysis – Business Process	Mod	lelling - Use-Case mod	lel – Develop	ing E	Effect	ive			
Documentation.	Cla	ssification: Introduction	– Cl	assifications Theory - 1	Approaches for	or Ide	ntify	ing			
Classes - Noun	Phra	ase Approach – Common	Clas	s Patterns Approach –	Use-Case Driv	ven A	ppro	ach			
- Classes, Respo	onsib	vilities and Collaborators -	– Na	ming Classes.			••				
Unit: IV Ide	ntify	ing Object Relationship	s, At	tributes, and Methods	:		18				
Introduction - A	ssoc	iations - Super-Sub Class	Rela	ationships – A-Part-of R	elationships-A	Aggre	gatio	n –			
Class Responsit	oility	: Identifying attributes a	und r	nethods - Defining At	tributes by A	nalyz	ing I	Jse			
Cases and Othe	r Ul	ML Diagrams – Object	Resp	onsibility:Methods and	Messages -	The	Obje	ect-			
Oriented Design Process and Design Axioms: Introduction - The Object-Oriented Design Process –											
The Object-Oriented Design Axioms – Corollaries – Design Patterns.											
Unit: V Des	Unit: VDesigning Classes:18										
Introduction - T	he c	bject Oriented Design P	hilos	ophy - UML Object Co	onstraint Lang	guage	- C	ass			
visibility – Des	signi	ng Classes: Refining att	ribut	tes - Designing Metho	ods and proto	ocols.	Obj	ect			
Storage And (	Obje	ct Interoperability: Dat	tabas	e Management System	is – Logical	and	Physi	ical			
Database Organ	izati	on and Access Control -	Dist	tributed Databases and	Client-Server	Com	putin	ıg -			

Distributed Objects Computing: The Next Generation of Client-Server Computing.	
Total Lecture Hours	90
Books for Study:	
1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition,	2008.
Unit I	
Chapter 1 - 1.1 to 1.6	
Chapter 2 - 2.1 to 2.12	
Chapter 3 - 3.1 to 3.3	
Unit II	
Chapter 4 - 4.1, 4.3 to 4.8	
Chapter 5 - 5.2, 5.5 to 5.10	
Unit III	
Chapter 6- 6.1 - 6.7	
Chapter 7 - 7.1 to 7.8	
Unit IV	
Chapter 8- 8.1 to 8.4, 8.6, 8.7, 8.9	
Chapter 9 - 9.1 to 9.5	
Unit V	
Chapter 10 - 10.1 - 10.6,10.8	
Chapter 11 - 11.3, 11.5	
Books for Reference:	
1 Craig Larman "Applying UML and Patterns" Second Edition Pearson Education 2002	

- man, "Applying UML and Patterns", Second Edition, Pearson Education, 2002. I.
- 2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.
- 3. Bernd Bruegge, Allen H. Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson Education, 2004.

#### Web Reference

- 1. https://www.tutorialspoint.com/object\_oriented\_analysis\_design/ooad\_uml\_analysis\_model. htm
- 2. https://www.powershow.com/view4/49c3e1-ZTQ2O/Object-
- **Orientation Concepts UML and OOAD powerpoint ppt presentation**

COUR	RSE OUTCOMES:	K Level
At the	end of the Course the students will be able to	
CO1:	Describe the modeling concept for object oriented development in the system.	K3
CO2:	Apply the concept of domain and application analysis for designing UML Diagrams.	К3
CO3:	Classify the different classes based on the classification theory and its approaches.	K4
CO4:	Evaluate the UML models for various development stages of System using the appropriate UML notation.	K4
CO5:	Develop and explore the conceptual model into various scenarios and applications.	K4

CO's/PO's	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	2	3	3
CO2	2	3	2	3	3	3
CO3	3	3	3	1	3	3
CO4	2	2	3	3	2	2
CO5	3	2	1	3	3	3

### CO & PO Mappings:

**\*3.** Advanced Applications 2. Intermediate Development 1.Introductory Level

### LESSON PLAN

UNIT	<b>OBJECT ORIENTED ANALYSIS AND DESIGN</b>	Hrs	Mode
Ι	An overview of Object-Oriented systems Development:IntroductionTwo Orthogonal Views of the SoftwareObject-Oriented systems Development MethodologyWhy an Object Orientation - Overview of the Unified Approach.Object Basics: IntroductionAn Object-Oriented PhilosophyObjects are Grouped in Classes - AttributesObject Behavior and MethodsObjects Respond to MessagesEncapsulation and Information HidingClass HierarchyPolymorphismObject Relationships and AssociationsAggregations and Object Containment.Object-Oriented Systems Development Life Cycle: IntroductionThe Software Development ProcessBuilding High-Quality Software	18	Blackboard & PPT
II	<b>Object-Oriented Methodologies:</b> Introductionsurvey of some of the Object Oriented MethodologiesRumbaugh Et al' s Object Modeling TechniqueThe Booch MethodologyThe Jacobson et al. MethodologiesPatterns, FrameworksThe Unified approach <b>Unified Modeling Language:</b> IntroductionStatic and Dynamic ModelsWhy Modelling, Introduction to the Unified Modeling LanguageUML Diagrams, UML Class DiagramUse-Case Diagram, UML Dynamic ModelingModel Management, UML Extensibility, UML Meta-Model.	18	Blackboard & PPT

III	Identifying Use-Cases: Introduction Why Analysis is a Difficult Activity Business Object Analysis Use-Case driven object oriented analysis Business Process Modelling Use-Case model Developing Effective Documentation Classification: Introduction Classification: Introduction Classifications Theory, Approaches for Identifying Classes Noun Phrase Approach Common Class Patterns Approach Use-Case Driven Approach Classes, Responsibilities and Collaborators, Naming Classes.	18	Blackboard & PPT
IV	Identifying Object Relationships, Attributes, and Methods: Introduction Associations, Super–Sub Class Relationships A-Part-of Relationships Aggregation, Class Responsibility: Identifying attributes and methods Defining Attributes by Analyzing Use Cases and Other UML Diagrams Object Responsibility:Methods and Messages The Object-Oriented Design Process and Design Axioms: Introduction The Object-Oriented Design Process The Object-Oriented Design Axioms Corollaries, Design Patterns.	18	Blackboard & PPT
V	Designing Classes: IntroductionThe object Oriented Design PhilosophyUML Object Constraint LanguageClass visibilityDesigning Classes: Refining attributesDesigning Methods and protocols.Object Storage And Object Interoperability: DatabaseManagement SystemsLogical and Physical Database Organization and Access ControlDistributed Databases and Client-Server ComputingDistributed Objects Computing: The Next Generation of Client-ServerComputing.	18	Blackboard & PPT

Course Designed by: Dr.P.Hemavathy & Dr.M.Karthika

	Learning Outcome Based Education & Assessment (LOBE)								
		F	ormative Ex	aminatio	n - Blue Pri	nt			
	Art	iculation M	apping – K l	Levels wi	th Course O	utcome	s (COs)		
			Section	n A	Section	n B	Section	Section	
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D	
memai	CUS	K Level	No. of.	К -	No. of.	К –	Either or	Open	
			Questions	Level	Questions	Level	Choice	Choice	
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)	
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)	
		No. of							
	Que	stions to be	4		3		4	2	
		asked							
Question		No. of							
Pattern	Que	stions to be	4		3		2	1	
CIA I &	a	nswered							
II	Mar	ks for each	1		2		5	10	
	q	uestion	1	2		3	10		
	Tota	l Marks for	1		6		10	10	
	eac	ch section	+		U		10	10	

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

	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
СТА	K3	-	-	20	20	40	80	80	
	K4	-	-	-	-	-			
-	Marks	4	6	20	20	50	100	100	
	K1	2	2	-	-	4	8	20	
	K2	2	4	_	_	6	12	20	
CIA	K3	-	-	10	10	20	40	40	
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course									
			MO	Qs	Short An	swers	Section C	Section D		
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No.	of Quest. Aske	ions to be ed	10		5		10	5		
No. of Questions to be answered			10		5		5	3		
Marks for each question		1		2		5	10			
Total N	Marks for	each section	10		10		25	30		
	(Figures	in parenthesi	s denotes, qu	estions sl	nould be ask	ked 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				
K2	5	10	-	-	15	12	10				
K3	-	-	30	20	50	41.67	42				
K4	-	-	20	30	50	41.67	42				
Marks	10	10	50	50	120	100	100				
NB: Hig of K lev	gher level of p els.	erformance o	of the students	s is to be asse	essed by a	attempting	higher level				

Section	ı A (Mu	iltiple Cho	ice Questions)
Answe	r All Q	uestions	(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 (She	ort Answei	rs)
Answe	r All Q	uestions	(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	n C (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	(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: Hi	gher le	vel of perf	formance of the students is to be assessed by attempting higher
level of	K leve	ls	
Section	n D (Op	en Choice	)
Answe	r Any T	Three ques	tions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K4	
24	CO4	K4	
25	CO5	K4	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	DISTRI	BUTED OPERA	TIN	NG SYSTEM				
Course Code	21PCSC2	3				L	Р	С
Category	Core	Core					-	4
Nature of Cour	se: EMP	LOYABILITY	✓	SKILL ORIENTED	ENTREPRE	ENEU	RSH	IP
Course Objecti	ves:							
<ul> <li>This course assuming th</li> <li>The structur</li> <li>To provide I</li> <li>To get knorreplication,</li> <li>To analyze the analyzed</li> <li>Unit: I Int</li> <li>What Operating</li> <li>Operating-System</li> </ul>	e provides e availabili e of distrib nardware a owledge ir fault tolera he current <b>roduction</b> Systems E m Structu Storage M s – Compu	an introduction ty of facilities for uted systems usin ad software issue distributed arc nce, security, and popular distribute 00? - Computer-S re - Operating-S anagement - Pro- ting environment	to t r dat ng m s in chite l dis l dis Syste yste tect	he fundamentals of di ta transmission. nultiple levels of softwa modern distributed sys ecture, naming, synch tributed file systems. ystems such as peer-to- em Organization - Com em Operations - Proce tion and Security - Di	stributed con re is emphasi tems. ronization, co peer (P2P) sy puter- Systen ess Managem stributed Sys	nputer zed onsist stems n Arcl nent - tems	ency will 18 He hitect Me – Sp	and also ours cure - mory pecial
Unit: II Dis	stributed (	<b>Derating System</b>	ns:				18 He	ours
Motivation - Ty	pes of Dis	tributed Operatir	ng S	ystems - Network Stru	cture - Netw	ork T	opole	ogy -
Communication	Structure	- Communication	Pro	otocols – Robustness - I	Design Issues	- An	Exar	nple:
Networking.								
Unit: III Dis	stributed F	<u>'ile Systems:</u>					<u>18 H</u>	ours
File Replication Atomicity - C Agreement.	aming and - An Exa	Transparency - F mple - Distribute Control - Dea	ed C adlo	ote File Access - State Coordination: Event Ore ck Handling - Electi	dering - Mutu on Algorithr	iteless ial Ex ns -	Read	ion – ching
Unit: IV Rea	ll-Time Sy	stems:					18 He	ours
Overview - Sys Operating Syste Compression - Network Manag	tem Chara ms - Real Requirement - Ar	cteristics - Featu Time CPU Sche ents of Multime Example.	ures eduli dia	of Real-Time Kernels ing - Multimedia Syste Kernels - CPU Scheo	- Implemen ems: What Is duling - Disl	ting I Mult k Sch	Real-'	Time lia? - ing -
Unit: V Th	e Linux Sy	stem:					18 He	ours
Linux History	- Design H	rinciples - Kerr	el I	Modules - Process Ma	nagement -	Sched	luling	g -
Memory Manag	gement –	FileSystems - Ir	put	and Output - Inter	process Com	munic	atior	1 -
Network Structu	Network Structure - Security - Windows XP: History - Design Principles - System Components							
-Environmental Subsystems - File System - Networking - Programmer Interface.								
Total Lecture Hours     90								
Books for Stud 1. Silbersehatz Wiley Sons, Unit I : Chapter	y: A., Galw New Delh 1 (Full)	in P.B., Greg G i, 2005.	agne	e, Operating System P	Principles, 7th	n Edit	ion,	John

Unit II : Chapter 14 (Full)	
Unit III : Chapter 15 (Full) Chapter 16 (Full)	
Unit IV:Chapter 19 (Full) Chapter 20 (Full)	
Unit V : Chapter 21 (Full) Chapter 22 (Full)	
Books for Reference:	
1. A.S.Tanenbaum., Modern Operating System, 2 <sup>nd</sup> Edition, PHI, New Delhi, 2007.	
2 A.S.Tanenbaum, Distributed Operating System, Pearson Education, New Delhi, 20	05.
Web Reference	
1. http://www.tutorialsspace.com/Operating-System/04-Distributed-operating-sys	tem.aspx
2. https://www.ics.uci.edu/~cs230/lectures/DistributedOSintro.pdf	
3. http://www.darshan.ac.in/Upload/DIET/Documents/CE/2160710_Distributed_0	<u>Operating</u>
System_GTU_Study_Material_2017_22042017_033831AM.pdf	
4. <u>https://www.tutorialspoint.com/operating_system/index.htm</u>	
Course Outcomes	K Level
At the end of the Course the students will be able to	
<b>CO1:</b> Understand the basic concepts of Linux operating system.	K3
CO2: Understand Scheduling of operating system.	K3
Study I/O management, Memory Management and File System and	V A
Distributed Systems	<b>N</b> 4
<b>CO4:</b> Understand the system level and support required for Distributed System.	K4
CO5: Learn Synchronization and Deadlock	K4

# CO & PO Mappings:

COs	PO 1	PO 2	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	2	2	3	2
CO 2	3	3	3	3	1	3
CO 3	2	2	3	2	3	3
<b>CO 4</b>	3	3	2	2	2	3
CO 5	2	3	3	3	2	2

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

### **LESSON PLAN**

UNIT	SUBJECT NAME	Hrs	Mode
Ι	Introduction: What Operating Systems Do? - Computer-System Organization - Computer- System Architecture - Operating-System Structure - Operating-System Operations - Process Management - Memory Management - Storage Management - Protection and Security - Distributed Systems – Special Purpose Systems – Computing environment.	18	Chalk & Talk ,ICT
II	<b>Distributed Operating Systems:</b> Motivation - Types of Distributed Operating Systems - Network Structure - Network Topology - Communication Structure - Communication Protocols – Robustness - Design Issues - An Example: Networking.	18	Chalk & Talk ,ICT
ш	Distributed File Systems: Background - Naming and Transparency - Remote File Access - Stateful Versus Stateless Service - File Replication - An Example - Distributed Coordination: Event Ordering - Mutual Exclusion – Atomicity - Concurrency Control - Deadlock Handling - Election Algorithms - Reaching Agreement	18	Chalk & Talk ,ICT
IV	<b>Real-Time Systems:</b> Overview - System Characteristics - Features of Real-Time Kernels - Implementing Real-Time Operating Systems - Real- Time CPU Scheduling - Multimedia Systems: What Is Multimedia? - Compression - Requirements of Multimedia Kernels - CPU Scheduling - Disk Scheduling - Network Management - An Example.	18	Chalk & Talk ,ICT
V	<b>The Linux System:</b> Linux History - Design Principles - Kernel Modules - Process Management - Scheduling - Memory Management – FileSystems - Input and Output – Inter process Communication - Network Structure – Security - Windows XP: History - Design Principles - System Components -Environmental Subsystems - File System - Networking - Programmer Interface.	18	Chalk & Talk ,ICT

Course Designed by: Dr.M.Karthika & Dr.P.Hemavathy

Learning Outcome Based Education & Assessment (LOBE)									
	Formative Examination - Blue Print								
	Art	iculation M	apping – K l	Levels wi	th Course O	utcome	s (COs)		
			Section	n A	Section	n B	Section	Section	
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D	
memai	CUS	K Level	No. of.	К -	No. of.	K –	Either or	Open	
			Questions	Level	Questions	Level	Choice	Choice	
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)	
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)	
		No. of							
	Que	stions to be	4		3		4	2	
		asked							
Question		No. of							
Pattern	Que	stions to be	4		3		2	1	
CIA I &	a	nswered							
II	Mar	ks for each	1		2		5	10	
	Q	uestion	L		2		3	10	
	Tota	l Marks for	1		6		10	10	
	eac	ch section	+		U		10	10	

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

		Distr	ibution of M	arks with	K Level C	CIAI&(	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
	K3	-	-	20	20	40	80	80	
CIA I	K4	-	-	-	-	-			
	Marks	4	6	20	20	50	100	100	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
CIA	K3	-	-	10	10	20	40	40	
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)									
			MC	Qs	Short An	swers	Section C	Section D		
S.No	S.No COs K - Level		No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No.	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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			
K2	5	10	-	-	15	12	10			
K3	-	-	30	20	50	41.67	42			
K4	-	-	20	30	50	41.67	42			
Marks	10	10	50	50	120	100	100			
NB: Hig of K lev	NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.									

Section	Section A (Multiple Choice Questions)									
Answe	r All Q	uestions	(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 (Sho	ort Answei	rs)							
Answe	r All Q	uestions	(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 (Eit	her/Or Ty	pe)							
Answe	r All Q	uestions	(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: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher							
level of	K leve									
Section	Section D (Open Choice)									
Answe	Answer Any Three questions (3x10=30 marks)									
<b>Q.N0</b>		K Level	Questions							
21		K3 K2								
22	CO2	K3								
23	CO3	K4								
24	C04	K4								
25	CO5	K4								

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course	e Name	AV	ANCDED JAVA PRO	)GR	AMMING LAB					
Course	e Code	21P	PCSCP3				L	Р	С	
Catego	ory	Co	re				-	6	4	
Nature	e of Cou	rse:	EMPLOYABILITY	✓	SKILL ORIENTED	ENTREP	RENI	EURS	HIP	
COUR	SE OB.	JECT	TIVES:			•				
•	<ul> <li>To get hands on experience in developing applications in OOPS Concepts.</li> </ul>									
•	Learn th	ne bas	sics of Inheritance and i	ts typ	bes.					
•	Experim	nent t	he exception handling t	echn	iques.					
•	To impl	lemen	it thread and its types.							
•	Be expo	osed to	o the various advanced	java	techniques.					
<b>S.</b> N	0.		Li	st of ]	Programs			Ho	urs	
1.			OOPS – Class, Obj	ects.	<b>D</b>					
2.			OOPS – Polymorph	hism	, Encapsulation.					
3.			Inheritance and typ	es.						
4.			Strings.							
5.		Exception Handling.								
6. 7			I nreads.					9	0	
/.			Applets.	faar	wan aida maatha da					
0. 0			RIVII - Invocation o	n ser	ver side methods	the alignt				
9. 10			Client/Server Drog	g mi	vina	the chefit.				
10.			ISP use of java be	anne	ning					
11			FIR Session Real	5a115. n						
12			EIB = Session Bean EIB = Entity Bean	11.						
15			Lib Linky Doun		Total I	ecture Ho	urs	9	0	
Web I		Ce			100011		uis	,	U	
1.	https:/	<u>cc</u> /www	v.oracle.com/tools/te	chno	ologies/building-i2ee	-web-appl	icati	ons.h	tml	
2.	https:/	/pdfs	lide.net/documents/j	2ee-	lab-manual.html					
COUI	RSE O	UTC	OMES					KL	evel	
At the	end of	the (	Course the students	will	be able to					
CO1:	Ability	to un	derstand the Java					K	2	
<b>CO2:</b>	Unders	tand t	the usage of Exception	Hanc	lling			K	2	
CO3:	Ability applica	to in tions	plement the concept of	serv	lets, client and server ba	ased		K	2	
<b>CO4:</b>	Exami	ne the	use of Controls in App	let a	nd GUI			K	3	
CO5:	Develo	p Ser	vlets, JSP and Net Bear	ns Ap	oplications			K	3	

#### CO & PO Mappings:

CO's/PO's	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	3	3	2	3
CO2	3	2	3	1	3	3
CO3	2	2	2	3	1	2
CO4	3	3	3	2	3	3
CO5	3	3	2	2	2	3

\*3. Advanced Applications 2. Intermediate Development 1. Introductory Level

### **LESSON PLAN**

S. No.	List of Programs	Hrs	Mode
1.	OOPS – Class, Objects.		
2.	OOPS – Polymorphism, Encapsulation.		
3.	Inheritance and types.		
4.	Strings.		
5.	Exception Handling. Threads. Applets.		
6.			Laboratory
7.			
8.	RMI - Invocation of server side methods	90	Experiments
9.	Servlets - Returning Information received from the		
	client.		
10.	Client/Server Programming		
11	JSP - use of java beans.		
12	EJB – Session Bean.		
13	EJB – Entity Bean		

Course Designed by: Mr.P.Ganeshbabu & Dr.S.BharaniSethupandian



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nan	ne IN <sup>7</sup>	FRODUCTION TO I	NTI	ERNET					
Course Cod	le 21F	PCSNP1					L	Р	С
Category	No	on Major Elective					-	6	6
Nature of Co	ourse:	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTREP	RENE	URS	HIP
Course Obj	ectives:								
Introduces the basic features of Microsoft Office									
Develop	s familia	arity with Word, Excel	, Po	werPoint, email, and In	tern	et basics.			
• Learn th	e definit	ion of the Internet and	Wo	orld Wide Web					
• Understa	and how	to access the Internet a	and	Web					
• Perform	Internet	and Web-related tasks	, in	cluding email, searching	g, aı	nd commu	nicati	ng	
accurate	ly using	real-world tools							
S. No.		List of Programs						E	Iours
$ \begin{array}{c} 1.\\ 2.\\ 3.\\ 4.\\ 5.\\ 6.\\ 7.\\ 8.\\ 9.\\ 10.\\ 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 18\end{array} $	.Create tags. Create Create Create Displa Desig Create Create Create Create Create Create Create Create Create Create Create Create Create Create	e webpage with Colorf e Ordered list and Unor e College Time Table u e Internal and External ment the concept of Fr e Login Form ay image on the web br n Bio data e webpage with differer e webpage with all char e CSS program to displa e CSS program Displa e CSS program Displa te CSS program Displa e CSS program Displa e CSS program Displa e CSS program Displa	ul te rder ising Hyj ame cows tract ilay y te y te y te y w ay in Form n lin	ext and Background colored List of data using HT g HTML. Also put Bord perlinks. es. ser with hyperlink yle sheet er elements in html text with color xt with Background color xt with border ith text box mage with text nage with text nage with box n n shopping.	lor u FMI der a	1sing HTM	IL table		90
20					n	otal Lab	Нош	<b>x</b>	00
						Utal LaD	11001	3	90

Web I	Web Reference					
1. <u>htt</u>	ps://www.w3schools.com/html/html_editors.asp					
2. htt	ps://www.w3schools.com/css/default.asp					
3. htt	ps://www.w3schools.com/js/default.asp					
COU	COURSE OUTCOMES:					
At the	At the end of the Course the students will be able to					
<b>CO1:</b>	To compare the different packages of MS Office	K2				
<b>CO2:</b>	To apply the format and design tools in the document	K3				
CO3:	To simplify the data using MS –Excel	K4				
<b>CO4:</b>	To evaluate application in online using Google forms	K4				
CO5:	To interpret the MS- Office package and Google Tools	K4				

### CO & PO Mappings:

COs	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	3	3	3	3
CO 2	2	2	3	3	3	2
CO 3	3	3	3	2	2	3
<b>CO 4</b>	3	3	2	3	2	2
CO5	3	2	3	3	3	3

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

### **LESSON PLAN**

S.No.	List of Programs	Hrs	Mode
1.	.Create webpage with Colorful text and Background color using HTML tags.		
2.	Create Ordered list and Unordered List of data using HTML tags.		
3.	Create College Time Table using HTML. Also put Border around the table.		
4.	Create Internal and External Hyperlinks.		
5.	Implement the concept of Frames.		
6.	Create Login Form		
7.	Display image on the web browser with hyperlink		Lah
8.	Design Bio data	00	Demonstration
9.	Create webpage with different style sheet	70	Demonstration
10.	Create webpage with all character elements in html		
11	Create CSS program to display text with color		
12	Create CSS program Display text with Background color		
13	Create CSS program Display text with border		
14	Create CSS program Display with text box		
15	Create CSS program Display image with text		
16	Create CSS program Display image with box		
17	Create Online Application Form		
18	Create Simple Website for on line shopping.		
19			
20			

Course Designed by: Mr. M. Rameshkumar & Mrs. T.C. Sujitha





# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	MACHINE LEARNIN	G							
Course Code	21PCSC31					L	Р	С	
Category	CORE					6	-	4	
Nature of course:	EMPLOYABILITY	<	SKILLORIENTED	<b>~</b>	ENTREP	RENI	EURS	SHIP	
COURSE OBJECTIVES:									
• Students will be able to know the basic concepts and techniques of Machine Learning									
• Students will be	able to understand the Su	perv	vised and Unsupervised	lear	ning tech	nique	s.		
• Students will be	able to study the various	prob	ability based learning t	echr	niques.	-			
• Students will be	able to understand the Su	perv	vised learning technique	es an	d Neural	Netw	orks		
• Students will be	able to understand the U	isup	ervised learning technic	ques	and Neur	ral Ne	etwor	ks	
Unit: I Intro	duction	-	0	1			18 H	lours	
Learning – Types	of Machine Learning -	App	lications of Machine L	earn	ing – To	ols in	Mae	chine	
Learning– Machir	e Learning Activities –	Basi	c Types of Data in Ma	achir	ne Learni	ng -	Expl	oring	
Structure of Data -	- Data Quality and Remed	liatio	on – Data Pre-Processir	ıg.		C	1	U	
Unit: II Linea	r Models						18 H	lours	
Selecting a Mode	l – Training a Model – M	Mod	el Representation and	Inter	pretabilit	y – E	Evalu	ating	
Performance of a	Model – Improving Perfo	rma	nce of a Model – Featu	ire T	ransform	ation	– Fe	ature	
Subset Selection.	1 0								
Unit: III Overv	view of Probability						18 H	lours	
Importance of Sta	atistical Tools in Machin	ne L	earning – Concept of	Pro	bability -	- Free	quent	and	
Bayesian Interpre	tation – Random Variał	oles	- Some Common Di	scret	te Distrit	oution	- S	Some	
Common Continu	ous Distribution - Mul	tiple	Random Variables -	Ce	ntral Lin	nit T	heore	em –	
Sampling Distribu	tion – Hypothesis Testing	g - N	Ionte Carlo Approxima	tion					
Unit: IV Supe	rvised Learning						18 H	lours	
Classification Mo	del – Classification Lear	ming	g Steps – Classification	n A	lgorithms	– Si	mple	and	
Multiple Linear R	Regression – Polynomial	Reg	ression Model - Logis	stic ]	Regressio	n – 1	Maxi	mum	
Likelihood Estima	tion								
Unit: V Unsu	pervised Learning						18 H	lours	
Introduction - Ap	oplications of Unsuperv	ised	Learning – Clusterin	ıg –	Finding	patt	ern 1	using	
Association Rule -	<ul> <li>Types of Activation Fun</li> </ul>	nctio	ns – Early Implementa	tion	of ANN	– Arc	hitec	tures	
of Neural Network	<ul> <li>Learning Process in A</li> </ul>	NN	<ul> <li>Backpropagation – D</li> </ul>	eep	Learning				
			Tota	l Le	cture Ho	urs	90 H	lours	
<b>Books for Study:</b>									
2. Saikat Dutt, S	Subramanian Chandramo	uli,	Amit Kumar Das, "M	lachi	ine Learr	ning",	Pea	rson,	
2019									
<b>Books for Refere</b>	nce:								
3. Stephen Marslan	nd, "Machine Learning –	An A	Algorithmic Perspective	e", S	econd Ed	ition,			
4. Chapman and H	Iall/CRC Machine Learni	ng a	nd Pattern Recognition	Seri	es, 2014.				
5. Tom M Mitchel	l, "Machine Learning", F	irst ]	Edition, McGraw Hill I	Educ	cation, 20	13.Pe	eter F	lach,	
"Machine Learn	ing: The Art and Science	of A	Igorithms that Make Se	ense	of				
Data", First Edit	ion, Cambridge Universit	y Pr	ess, 2012.						

6. Jason	5. Jason Bell, "Machine learning – Hands on for Developers and Technical Professionals", First				
Editi	on, Wiley, 2014				
7. Ethe	mAlpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Ma	chine			
Lear	ning Series)", Third Edition, MIT Press, 2014.				
Web R	leference:				
1. <u>htt</u>	ps://www.geeksforgeeks.org/machine-learning/				
2. <u>htt</u>	ps://www.tutorialspoint.com/machine_learning/index.htm				
3. <u>htt</u>	ps://hackr.io/blog/best-machine-learning-books				
4. <u>htt</u>	ps://jonathan-hui.medium.com/machine-learning-graphical-model-b68b0c27a749				
Cours	e Outcomes:	K Level			
At the	end of the Course the students will be able to				
CO1	Understand the basic concepts and techniques of Machine Learning.	Upto,K3			
<b>CO2</b>	Apply different models on datasets and design suitable problem solutions.	UptoK3			
CO3	Study the various probability based learning techniques	UptoK3			
CO4	Apply specific supervised machine learning techniques for a particular	Unto K/			
04	problem	OptoK4			
CO5	Understand the Supervised and Unsupervised learning techniques, design of				
003	Neural Networks.	Optors4			

### CO & PO Mappings:

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	1	3	3	3	3	2
CO 2	2	2	2	2	2	2
CO 3	2	3	2	2	1	2
<b>CO 4</b>	3	2	3	1	2	1
CO 5	2	2	3	2	2	1

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

UNIT	MACHINE LEARNING	Hrs	Mode
I	Learning – Types of Machine Learning – Applications of Machine Learning – Tools in Machine Learning – Machine Learning Activities – Basic Types of Data in Machine Learning - Exploring Structure of Data – Data Quality and Remediation – Data Pre-Processing.	18	Chalk & Talk, PPT
II	Selecting a Model – Training a Model – Model Representation and Interpretability – Evaluating Performance of a Model – Improving Performance of a Model – Feature Transformation – Feature Subset Selection.	18	Chalk & Talk, PPT
ш	Importance of Statistical Tools in Machine Learning – Concept of Probability – Frequent and Bayesian Interpretation – Random Variables – Some Common Discrete Distribution – Some Common Continuous Distribution – Multiple Random Variables – Central Limit Theorem – Sampling Distribution – Hypothesis Testing – Monte Carlo Approximation.	18	Chalk & Talk, PPT
IV	Classification Model – Classification Learning Steps – Classification Algorithms – Simple and Multiple Linear Regression – Polynomial Regression Model – Logistic Regression – Maximum Likelihood Estimation	18	Chalk & Talk, PPT
V	Introduction - Applications of Unsupervised Learning – Clustering – Finding pattern using Association Rule – Types of Activation Functions – Early Implementation of ANN – Architectures of Neural Network - Learning Process in ANN – Backpropagation – Deep Learning.	18	Chalk & Talk, PPT

Course Designed by: Dr.G.Devika & Dr.M.MuthuLakshmi

Learning Outcome Based Education & Assessment (LOBE)											
	Formative Examination - Blue Print										
	Art	iculation M	apping – K l	Levels wi	th Course O	utcome	s (COs)				
	Section	Section									
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D			
miernai	COS	K Level	No. of.	К -	No. of.	K –	Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
		No. of									
	Que	stions to be	4		3		4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	answered										
II	Marks for each		1		2		5	10			
	question		1		2		3	10			
	Tota	l Marks for	4		6		10	10			
	eac	ch section	-		Ň		<b>A V</b>	<b>-</b> v			

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

	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 %		
	K1	2	2	-	-	4	8	20		
	K2	2	4	-	-	6	12	20		
	K3	-	-	20	20	40	80	80		
CIA I	K4	-	-	-	-	-				
	Marks	4	6	20	20	50	100	100		
	K1	2	2	-	-	4	8	20		
	K2	2	4	-	-	6	12	20		
CIA	K3	-	-	10	10	20	40	40		
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)									
			MCC	<u>)</u> s	Short Answers		Section C	C D		
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No.	of Quest Aske	ions to be ed	10		5		10	5		
No. of Questions to be answered		10		5		5	3			
Marks for each question		1		2		5	10			
Total N	Marks for	each section	10		10		25	30		
	(Figures	in parenthesi	s denotes, qu	iestions sh	ould be ask	ed 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	4.17	17			
K2	5	10	-	-	15	12.5	1/			
K3	-	-	30	30	60	50	50			
K4	-	-	20	20	40	33.33	33			
Marks	10	10	50	50	120	100	100			
NB: Hig of K lev	NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.									

Section	Section A (Multiple Choice Questions)						
Answei	· All Qu	estions	(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 (Sho	rt Answers	5)				
Answei	· All Qu	estions	(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 (Eith	her/Or Typ	be)				
Answei	· All Qu	estions	(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: Hi	gher lev	el of perfo	ormance of the students is to be assessed by attempting higher				
level of	K level	S					
Section	D (Ope	en Choice)					
Answei	· Any T	hree quest	ions (3x10=30 marks)				
Q.No	CO	K Level	Questions				
21	CO1	K3					
22	CO2	K3					
23	CO3	K3					
24	CO4	K4					
25	CO5	K4					

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	THEORY OF COMPUT	ΓΑΤΙΟΝ					
Course Code	21PCSC32			L	Р	С	
Category	Core			6	-	4	
Nature of cours	e EMPLOYABILITY	SKILL ORIENTED	✓ ENTREPRE	ENEU	JRSH	HIP	
COURSE OBJ	ECTIVES:						
• To give	an overview of the theore	tical foundations of compu	ter science from	the			
perspect	ive of formal languages.						
• To illust	rate finite state machines	to solve problems in comp	uting.				
• To expla	ain the hierarchy of proble	ems arising in the computer	r sciences.				
• To famil	liarize Regular grammars,	context free grammar.					
Io under	rstand Turing machines and	their capability.					
Unit: I Fi	nite Automata (FA)				18 I	Hrs	
Introduction,	Deterministic Finite Aut	tomata (DFA) -Formal d	efinition, simple	r no	tatio	ns	
(state transiti	on diagram, transition t	able), language of a DF.	A. Nondetermin	istic	Fini	ite	
Automata (NI	-A)- Definition of NFA, I	anguage of an NFA, Equiv	alence of Detern	ninis	tic ai	nd	
Nondetermini	stic Finite Automata, Ap	plications of Finite Autor	mata, Finite Auto	omat	a wi	th	
Epsilon Trans	sitions, Eliminating Epsil	lon transitions, Minimizat	ion of Determin	1stic	Fini	ite	
Automata, Fir	nite automata with output	(Moore and Mealy machin	es) and Inter con	vers	on.		
Unit: II R	egular Expressions And	Grammars			181	Hrs	
Regular Exp	ressions (RE): Introduction	on, Identities of Regular E	xpressions, Finite	e Au	toma	ita	
and Regular	Expressions- Converting	g from DFA's to Regula	ar Expressions,	Con	verti	ng	
Regular Exp	pressions to Automata,	applications of Regul	ar Expressions	K	egul	ar	
Grammars:	Definition, regular gran	nmars and FA, FA for	regular gramma	Ir, K	egul	ar	
grammar for	FA. Proving languages	to be non-regular -Pun	iping lemma, a	ppiic	atior	18,	
	rities of regular languages	•			101	Tur	
Content Fre	ontext Free Grammar	National Contact	:-1 E D:-1	4	181	Hrs	
Context Fre	e Grammar (CFG): L	perivation Trees, Sentent	tian of CEC's (	IUMO	st al	na E	
Dumping Lom	valions of Strings. Amol	guily in CFG s, Minimiza	lion of CFG s, ( Preaf's amitted)	JNF,	GN	г,	
	inia ioi CFL S, Enumeran	Turing Machines	rioor s offitted )		101	Inc	
Duchdown A	using with Automata and	Lal Accortance of CEL A	acontonco hy Ein	al Ct	101	nis nd	
A soonton so h	utomata: Definition, Mod	ivelance Equivalence of CFL, A	CCEPtance by Fin	ai Si	ate a	na	
Turing Mac	binos (TM): Eormal det	finition and behaviour I	anguages of a	тм	тм	0.0	
<b>Turing Machines (TM)</b> : Formal definition and behaviour, Languages of a TM, TM as							
Unit. V R	ecursive And Recursivel	v Enumerable Language	V15.		181	Hrs	
Recursive An	d Recursively Fnumer	ble I anguages (RFL).	Properties of r	Poliro	ive	and	
recursively en	umerable languages I	Iniversal Turing machi	ne The Haltir	ocuis	rohl	em	
Undecidable problems about TMs Context sensitive language and linear bounded automata							
(LBA), Chome	ky hierarchy Decidability	v. Post's correspondence p	roblem (PCP) 11	ndec	idahi	ilitv	
of PCP.		,, i sets conceptinence p					
		7	<b>Fotal Lecture Ho</b>	urs	90		

#### **Book for Study:**

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2008), Introduction to Automata Theory Languages and Computation, 3<sup>rd</sup> edition, Pearson Education, India.

#### **Books for Reference:**

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2<sup>nd</sup>edition, Prentice Hall of India, India.

#### Web Reference:

- 1. https://www.w3schools.com/
- 2. https://www.tutorialspoint.com/automata\_theory/
- 3. https://nptel.ac.in/courses/106/104/106104028/

### Ant

Cours	e Outcomes:	K Level				
At the end of the Course the students will be able to						
CO1	Use basic concepts of formal languages of finite automata techniques	Upto K3				
CO2	Design Finite Automata's for different Regular Expressions and Languages	Upto K3				
CO3	Construct context free grammar for various languages	Upto K3				
CO4	Solve various problems of applying normal form techniques, push down automata and Turing Machines	UptoK4				
CO5	Create various algorithms in due with techniques.	Upto K4				

#### **CO & PO Mappings:**

COs	PO 1	<b>PO 2</b>	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	3	3	2	3
CO 2	2	3	2	3	3	2
CO 3	3	1	3	3	2	3
<b>CO 4</b>	2	2	1	3	3	2
CO5	3	3	3	3	2	3

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

#### LESSON PLAN

UNIT	THEORY OF COMPUTATION	Hrs	Mode
I	<b>Finite Automata (FA):</b> Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- Definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion.	18	Chalk &Talk, PPT
Π	<ul> <li>Regular Expressions (RE): Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular expressions.</li> <li>Regular Grammars: Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.</li> </ul>	18	Chalk &Talk, PPT
III	<b>Context Free Grammer (CFG):</b> Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL ( Proof's omitted ).	18	Chalk &Talk, PPT
IV	<ul> <li>Pushdown Automata: Definition, Model, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stackand its Equivalence, Equivalence of CFG and PDA.</li> <li>Turing Machines (TM): Formal definition and behaviour, Languages of a TM, TM as accepters, and TM as a computer of integer functions, Types of TMs.</li> </ul>	18	Chalk &Talk, PPT
V	<b>Recursive And Recursively Enumerable Languages (REL):</b> Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.	18	Chalk &Talk, PPT

Course Designed by: Dr.S.ShaikParveen & Mrs.M.MuthuLaksmi

Learning Outcome Based Education & Assessment (LOBE)

Formative Examination - Blue Print								
	Articulation Mapping – K Levels with Course Outcomes (COs)							
		V L arral	Section A		Section B		Section	Section
Intornal	Cos		MCC	ls Short Ans		swers	С	D
memai	COS	K Level	No. of.	К -	No. of.	K –	Either or	Open
			Questions	Level	Questions	Level	Choice	Choice
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
No		No. of						
	Que	stions to be	4		3		4	2
		asked						
<b>Ouestion</b> No. of		No. of						
Pattern	Questions to be		4		3		2	1
CIA I &	answered							
II	Mar	ks for each	1		2		5	10
		juestion	1		2		5	10
	Total Marks for each section		4		6		10	10

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

	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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
	K3	-	-	20	20	40	80	80
CIA I	K4	-	-	-	-	-		
	Marks	4	6	20	20	50	100	100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
CIA	K3	-	-	10	10	20	40	40
II	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	Section D
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
5	CO 5	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			or 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	5		-	-	5	4.17	17
K2	5	10	-	-	15	12.5	17
K3	-	-	30	30	60	50	50
K4	-	-	20	20	40	33.33	33
Marks	10	10	50	50	120	100	100
ND. High on lovel of nonformance of the students is to be assessed by attempting bigh on lovel							

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

Section	Section A (Multiple Choice Questions)						
Answer	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 (Shor	t Answers)					
Answer	All Que	estions	(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 (Eith	er/Or Type					
Answer	All Qu	estions	(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: Hig	gher lev	el of perfor	mance of the students is to be assessed by attempting higher level of				
K levels							
Section	D (Ope	n Choice)					
Answer	Any Th	ree questio	ons (3x10=30 marks)				
Q.No	CO	K Level	Questions				
21	CO1	K3					
22	CO2	K3					
23	CO3	K3					
24	CO4	K4					
25	CO5	K4					

# **Summative Examinations - Question Paper – Format**


## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nam	e MA	MACHINE LEARNING USING PYTHON LAB							
Course Code	e 21P	CSCP4					L	Р	С
Category	Cor	·e					-	6	4
Nature of Co	ourse:	EMPLOYABILITY	~	SKILL ORIENTED	<	ENTRE	PREN	IEURS	HIP
Course Obje	ectives:								
• Students algorithm	will be ns.	able to understand the	ir	nplementation procedur	es	for the n	nachii	ne lear	ning
• Students	will be	able to design Python pro	ogı	rams for various Machin	e L	earning a	lgorit	hms.	
• Students	will be	able to apply appropriate	e da	ata sets to the Machine L	lear	rning algo	orithm	IS.	
• Students	will be	able to identify and ap	pl	y Machine Learning alg	gor	ithms to	solve	real w	vorld
problems	•								
• Students	will be	able to develop the abilit	y t	o write database application	tio	ns in Pyth	on.		
S. No.	List o	f Programs		-			H	lours	
1. 2. 3. 4. 5. 6. 7. 8. 8. 9. 10.	Impler given s file. Impler Apply Impler dataset Assum Classif precisi To co demon Diseas Impler Build Backp	nent and demonstrate the set of training data samp ment Decision Tree to cla nent Regression algorith SVM algorithm to clusted ment K-Nearest neigh t. ning a set of documen fier model to perform on, and recall for your da nstruct a model consid- ustrate the diagnosis o e Data Set. ment clustering technique an Artificial Neur propagation algorithm an	he bles m er a bo ts th ata eri f f al ad	most specific hypothes s. Read the training data ify the English text with appropriate dataset. a set of data stored in a .G rs classification using that need to be classi- nis task. Calculate . set ng medical data. Use heart patients using st with a Data Set Network by imple test the same using ap	is from the second seco	based on om a .CS V file. appropria d, use the accurac s model dard Hea enting the priate da	a V te ne y, to urt ne ta	90	
+	5015.				Т	otal Hou	rs 9	0	
	0				1	viai 1100		v	

#### **Books for Reference:**

- 1. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", First Edition, Cambridge University Press, 2012.
- Jason Bell, "Machine learning Hands on for Developers and Technical Professionals", First Edition, Wiley, 2014

3. EthemAlpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", Third Edition, MIT Press, 2014.

#### Web Reference:

- 1. <u>https://www.tutorialspoint.com/machine\_learning\_with\_python/machine\_learning\_with\_python\_tutorial.pdf</u>
- 2. https://archive.ics.uci.edu/ml/datasets.html
- 3. https://usermanual.wiki/Document/RNSIT20MACHINE20LEARNING20LAB20MAN UAL202018201.354079817/help

#### **Course Outcomes:**

K Level

At the	end of the Course the students will be able to	
CO1	Understand best technologies for solving classification problems	UptoK2
CO2	Make use of Data sets in implementing the machine learning algorithms	Upto K3
<b>CO3</b>	Apply different models on datasets and design suitable problem solutions	Upto K3
CO4	Study the various probability based learning techniques	Upto K4
CO5	Understand neural network algorithms	Upto K4

#### CO & PO Mappings:

COs	<b>PO 1</b>	PO 2	<b>PO 3</b>	PO 4	PO 5	PO 6
CO 1	2	2	1	2	3	2
CO 2	3	2	2	3	3	2
CO 3	3	1	2	2	3	1
<b>CO 4</b>	2	2	2	2	1	2
CO 5	3	3	3	3	2	3

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

#### LESSON PLAN

S. No.	Machine Learning Using Python Lab	Hrs	Mode
1. 2.	Apply probability concepts for a dataset. Implement and demonstrate the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.		
3. 4. 5. 6. 7. 8. 9. 10.	Implement Decision Tree to classify the English text Implement Regression algorithm with appropriate dataset. Apply SVM algorithm to cluster a set of data stored in a .CSV file. Implement K-Nearest neighbors classification using appropriate dataset. Assuming a set of documents that need to be classified, use the Classifier model to perform this task. Calculate the accuracy, precision, and recall for your data set To construct a model considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. Implement clustering techniques with a Data Set Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets	90	Lab Demonstration

## Course Designed by: Dr.G.Devika & Mr.M.Rameshkumar



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	ADVANCED DATA STRUCTURES								
Course Code	21PCSE31	L	Р	С					
Category	ELECTIVE	6	-	6					
Nature of Cour	Nature of Course EMPLOYABILITY SKILL ORIENTED ✓ ENTREPRENEURSHIP								
<b>COURSE OBJ</b>	ECTIVES:								
To under	rstand the concept of Datastructures and arrays.								
• To under	rstand basic data structures such as linked lists, stacks and queues.								
To descr	ibe the hash function and concepts of collision and its resolution met	hods							
To deser     To Solve	problem involving graphs trees and heaps	nous							
To solve     To apply	Algorithm for solving problems like sorting searching insertion	and d	eleti	on of					
data	regorithm for solving problems like solung, searching, insertion	una a	CICLIN	511 01					
Init. I Int	roduction and Overview	18	R Hor	irs					
			<u> </u>						
Definition – Co	ncept of Data Structures – Overview of Data Structures– Impleme	ntatio	n of	Data					
Structures. Arra	ys: Definition – Terminology – One dimensional array – Multidimen	siona	l arra	ys.					
Unit: II Lin	ked List	18	3 Hou	Irs					
Definition – Si	ngle linked list – Circular Linked list – Double Linked lists – C	Circula	ar Do	ouble					
Linked List – A	pplications of Linked Lists.								
Unit: III   App	Dications of Stacks& Queues	18	8 Hou	ırs					
Applications of	Stacks: Evaluation of Arithmetic Expressions-Code Generation for St	ack N	Iachi	nes –					
Implementation	of Recursion-Factorial Calculation – Quick Sort. Queues: Introduction	– D	efinit	ion –					
Representation of	Queues – Various Queue Structures – Application of Queues.								
Unit: IV Ta	bles & Graph	18	8 Hou	ırs					
Tables: Rectangu	lar Tables- Jagged Tables- Inverted Tables - Hash Tables. Trees: Basic	Termi	nolog	gies –					
Definition and Co	oncepts – Representation of Binary Tree – Operations on aBinary Tree –	Types	s of E	Sinary					
Irees - Irees at	Id Forests - B Trees - B+ Tree Indexing Graph: Introduction – Graph	Iermi	nolog	gies –					
Representation of	Graphs – Operations on Graphs - Application of Graph Structure.	10							
Unit: v Set		10	s Hot	irs					
Definition and	erminologies – Representation of Sets – Operations of Sets – Appli	cation	18 01	Sets.					
Sorting: Basic	terminologies – Sorting Techniques.		<u> </u>						
	Total Lecture Hou	rs 90	)						
Books for Stud									
1.DebasisSamant	a, Classic Data Structures, 2nd Edition, PHI, New Delhi, 2013.								
Unit	1: Chapter 1 (Full) Chapter 2 (Full)								
Unit	II. Chapter 5(Full)								
Chapter 5 (Full)									
Unit IV:Chapter 6 (Full) Chapter 7: Section – 7.1 to 7.8									
Chapter 8; Section $-8.1$ to $8.5$									
Unit	V: Chapter 9 (Full)								
Chap	oter 10 (Full)								
<b>Books for Refe</b>	rence:								
1Ellis Ho	rowitz, SartajSahni, SanguthevarRajasekaran, Fundamentals of Computer	Algor	ithms	, 2nd					
Edition, U	Jniversities Press, New Delhi, 2007.								

- 2. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Data Structure using C and C++, Second Edition, PHI, New Delhi, 2006.
- 3. A.A.Puntambekar, Advanced Data Structures and Algorithms, 1st Edition, Technical Publications, Pune, 2008.

## Web Reference:

- 1. https://www.geeksforgeeks.org/overview-of-data-structures-set-1-linear-data-structures/
- 2. <u>https://www.tutorialspoint.com/data\_structures\_algorithms/dsa\_quick\_guide.htm</u>
- 3. https://docs.oracle.com/cd/E19199-01/817-1835-10/npgstruct.html

Course	e Outcome	K Level
CO1	To study various data structure concepts like Stacks, Queues, Linked List, Trees and Graphs.	Upto K3
CO2	To be familiar with utilization of data structure techniques in problem solving.	Upto K3
<b>CO3</b>	To have a comprehensive knowledge of data structures.	Upto K3
<b>CO4</b>	To provide the skill in advanced data structures.	Upto K4
CO5	To introduce various techniques for representation of the data in the real world.	Upto K4

#### CO & PO Mappings:

COS	<b>PO 1</b>	PO 2	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	2	2	3	2
CO 2	2	2	2	2	3	3
CO 3	3	1	2	2	2	2
CO 4	2	2	2	2	1	2
CO 5	3	3	2	2	2	3

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

#### LESSON PLAN

UNIT	ADVANCED DATA STRUCTURES	Hrs	Mode
Ι	<b>Introduction and Overview:</b> Definition – Concept of Data Structures – Overview of Data Structures– Implementation of Data Structures. Arrays: Definition – Terminology – One dimensional array – Multidimensional arrays.	18	Chalk & Talk
Π	<b>Linked List:</b> Definition – Single linked list – Circular Linked list – Double Linked lists – Circular Double Linked List – Applications of Linked Lists.	18	Chalk & Talk
ш	Applications of Stacks& Queues: Evaluation of Arithmetic Expressions-Code Generation for Stack Machines –Implementation of Recursion-Factorial Calculation – Quick Sort. Queues: Introduction – Definition – Representation of Queues – Various Queue Structures – Application of Queues.	18	Chalk & Talk
IV	<b>Tables &amp; Graph:</b> Rectangular Tables- Jagged Tables- Inverted Tables – Hash Tables. Trees: Basic Terminologies – Definition and Concepts – Representation of Binary Tree – Operations on a Binary Tree – Types of Binary Trees - Trees and Forests - B Trees - B+ Tree Indexing Graph: Introduction – Graph Terminologies – Representation of Graphs – Operations on Graphs - Application of Graph Structure.	18	Chalk & Talk
v	<b>Sets &amp; Sorting:</b> Definition and Terminologies – Representation of Sets – Operations of Sets – Applications of Sets. Sorting: Basic Terminologies – Sorting Techniques.	18	ICT

#### Course Designed by Dr.R.Bagavathi Lakshmi & Dr.S.ShaikParveen

Learning Outcome Based Education & Assessment (LOBE)										
Formative Examination - Blue Print										
Articulation Mapping – K Levels with Course Outcomes (COs)										
Section A Section B Section Section										
Cog	<b>K</b> I ovol	MCQ	)s	Short Ans	swers	С	D			
COS	K Level	No. of.	K -	No. of.	K –	Either or	Open			
		Questions	Level	Questions	Level	Choice	Choice			
CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
CO4	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
	No. of									
Questions to be		4		3		4	2			
	asked									
	No. of									
Ques	stions to be	4		3		2	1			
ar	nswered									
Marl	ks for each	1		2		5	10			
q	uestion	1		<u> </u>		3	10			
Tota	l Marks for	4		6		10	10			
	Art Cos CO1 CO2 CO3 CO4 Ques au Mar Tota eac	LearningFeArticulation MCosK LevelCo1Up to K2Co2Up to K3Co3Up to K3Co4Up to K4No. ofQuestions to beaskedNo. ofQuestions to beansweredMarks for eachquestionTotal Marks foreach section	Learning Outcome Ba Formative ExArticulation Mapping – K IGeneration Mapping – K ISectionCosK LevelMCCNo. of. QuestionsCO1Up to K22CO1Up to K22CO2Up to K32CO2Up to K32CO2Up to K32CO3Up to K32CO4Up to K32CO4Up to K42CO4Up to K42CO4Up to K42CO4Up to K42CO4Up to K42CO4Up to K42O4Marks for eachMarks for eachMarks for eachquestionTotal Marks for each section4	Learning Outcome Based Educ Formative ExaminatioArticulation Mapping – K Levels wi Section AMarks for each QuestionsSection AMCQsNo. of.K LevelCosK LevelCo1Up to K2C K1,K2CO2Up to K32K1,K2CO3Up to K32K1,K2CO4Up to K32K1,K2CO4Up to K42K1,K2CO4Up to K42K1,K2CO4Up to K42K1,K2CO4Up to K42K1,K2CO4Up to K42K1,K2No. ofQuestions to be answered4Marks for each question4	Learning Outcome Based Education & Ass Formative Examination - Blue Prin Articulation Mapping – K Levels with Course OArticulation Mapping – K Levels with Course OMarks for each QuestionsCosK LevelSection ASection ASection MCQsShort Ans Outcome Based Education - Blue Prin Articulation Mapping – K Levels with Course OMarks for each 	<th>Learning Outcome Based Education &amp; Assessmen Formative Examination - Blue PrintArticulation Mapping – K Levels with Course OutcomeSection ASection ASection ASection ASection ASection ASection ASection BMCQsShort AnswersNo. of.K -QuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsCO1Up to K22K1,K21K1CO2Up to K32K1,K21K1CO3Up to K32K1,K21K1CO4Up to K42K1,K22K2No. of3Questions to be433asked</th> <th>Learning Outcome Based Education &amp; Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)CosSection ASection BC MCQsShort AnswersCCosMCQsShort AnswersCCosMCQsShort AnswersCCosSection ASection BSectionCOsSection ASection Colspan="4"&gt;CNo. of.K -Section CCSection CCosSection K -Section CCSection CCSection CCSection CCCCCCCCCCCCCCCCCCCCCCCCCC<td c<="" th=""></td></th>	Learning Outcome Based Education & Assessmen Formative Examination - Blue PrintArticulation Mapping – K Levels with Course OutcomeSection ASection ASection ASection ASection ASection ASection ASection BMCQsShort AnswersNo. of.K -QuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsLevelQuestionsCO1Up to K22K1,K21K1CO2Up to K32K1,K21K1CO3Up to K32K1,K21K1CO4Up to K42K1,K22K2No. of3Questions to be433asked	Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)CosSection ASection BC MCQsShort AnswersCCosMCQsShort AnswersCCosMCQsShort AnswersCCosSection ASection BSectionCOsSection ASection Colspan="4">CNo. of.K -Section CCSection CCosSection K -Section CCSection CCSection CCSection CCCCCCCCCCCCCCCCCCCCCCCCCC <td c<="" th=""></td>		

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

	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 %			
	K1	2	2	-	-	4	8	20			
	K2	2	4	-	-	6	12	20			
	K3	-	-	20	20	40	80	80			
CIA I	K4	-	-	-	-	-					
	Marks	4	6	20	20	50	100	100			
	K1	2	2	-	-	4	8	20			
	K2	2	4	-	-	6	12	20			
CIA	K3	-	-	10	10	20	40	40			
II	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	Castian D	
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)	
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
No	of Quest. Aske	ions to be ed	10		5		10	5	
No	of Quest answe	ions to be red	10		5		5	3	
Marks for each question			1		2		5	10	
Total I	Total Marks for each section10102530								
	(Figures	in parenthesi	s denotes, qu	estions sl	nould be ask	ked 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	4.17	17				
K2	5	10	-	-	15	12.5	17				
K3	-	-	30	30	60	50	50				
K4	-	-	20	20	40	33.33	33				
Marks	10	10	50	50	120	100	100				
NID. II!	l l	C	641 4 1 4	• 4 1		44	1.1.1				

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

Section	A (Mul	tiple Choic	e Questions)
Answer	All Qu	estions	(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 (Shor	rt Answers)	
Answer	All Qu	estions	(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 (Eith	er/Or Type	
Answer	All Qu	estions	(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: Hig	gher lev	el of perfor	mance of the students is to be assessed by attempting higher level of
K levels			
Section	D (Ope	n Choice)	
Answer	Any Th	ree questio	ons (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

## **Summative Examinations - Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	SOFTWARE ENGINEERING					
Course Code	21PCSE32	L	Р	С		
Category	ELECTIVE	6	-	6		
Nature of courses	EMPLOYABILITY 🖌 SKILLORIENTED ENTREP	RENE	URS	HIP		
COURSE OBJE	CTIVES:					
To provid	e the idea of decomposing the given problem into Analysis	, Des	signii	ng,		
Implement	ation, Testing and Maintenance phases.					
To provide	e an idea of using various process models in the software industry	accor	rding	to		
given circu	imstances.					
• To gain	the knowledge of how Analysis, Design, Implementation,	Testi	ng a	ind		
Maintenan	ce processes are conducted in a software project.					
• To acquir	e skills and knowledge to support a professional pathway, includ	ling a	nalyt	ic,		
and technic	cal skills					
To gain kn	owledge about the methodologies behind the software engineering	g and t	estin	g		
Unit: I Intro	duction:		18 H	lours		
Definition of sof	ftware and software engineering – Software myths – Softwa	re Er	ngine	ering		
paradigms: Linea	r Sequential Model & Prototyping Model- Software Project	Mana	geme	ent –		
Software Metrics	– Software Cost Estimation – Software					
Unit: II Softw	vare Requirement Analysis:		18 H	lours		
Software Risks – Software Configuration Management- System Analysis – Modeling the System						
Architecture – S	System Specification – Fundamentals of Requirement Analys	sis –	Soft	ware		
Prototyping – Prot	totyping method sand tools specification – Software requirements	Specit	ficati	ons		
Unit: III Struc	tured Analysis:		18 H	lours		
Introduction – the	e elements of the analysis model - data objects, attributes and	relati	onsh	ips –		
Cardinality and M	Iodality – ERD – DFD – Classical Analysis Methods : DSSD, JSD	, SAE	DT.			
Unit: IV Softw	vare Design:		18 H	lours		
Software Design a	and Software Engineering – Design and Software Quality – Evolut	ion of	Soft	ware		
Design – Design	Principles. Design Concepts, Abstraction, Refinement, Modular	ity –	Effe	ctive		
Modular Design, I	Functional - Independence, Cohesion, Coupling.					
Unit: V Softw	vare Testing Methods:		18 H	lours		
Software Testing	Fundamentals – White Box Testing – Black Box Testing – Debugg	ging –	Soft	ware		
Quality: McCall's	Quality Factors					
	Total Lecture Ho	urs	90 H	lours		
<b>Books for Study:</b>						
1. Roger S. Pressman "Software Engineering – A Practioner's Approach" McGraw Hill, 4th						
Edition						
<b>Books for Refere</b>	nce:					
1. Software Engineering – Design Reliability and Management" by Richard Fairley						
2. Software H	Engineering " by Sommerville, Pearson Education, 7th Edition					
3. Software H	Engineering, Ian Sommerville, seventh edition, Pearson education.					
4. Software H	Engineering, A Precise Approach, PankajJalote, Wiley India, 2010					

Web Reference:         1. <u>https://www.tutorialspoint.com/software_engineering.htm</u> 2. <u>https://www.javatpoint.com/software-engineering</u>					
Course Outcomes:					
At the	end of the Course the students will be able to				
<b>CO1</b>	Decompose the given project in various phases of a lifecycle.	UptoK3			
CO2	Choose appropriate process model depending on the user requirements	UptoK3			
CO3	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.	Upto K3			
<b>CO4</b>	Know various processes used in all the phases of the product	Upto K4			
CO5	Apply the knowledge, techniques, and skills in the development of a software product	Upto K4			

#### CO & PO Mappings:

COs	PO 1	PO 2	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	3	2	2	3	2
CO 2	2	2	3	3	3	2
CO 3	3	2	3	2	2	3
<b>CO 4</b>	2	2	3	2	2	2
<b>CO 5</b>	3	3	2	3	3	3

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

#### LESSON PLAN

UNIT	Software Engineering	Hrs	Mode
I	Definition of software and software engineering – Software myths – Software Engineering paradigms: Linear Sequential Model & Prototyping Model. Software Project Management – Software Metrics – Software Cost Estimation – Software	18	Chalk & Talk, PPT
II	Fundamentals of Requirement Analysis – Software Prototyping – Prototyping method sand tools specification – Software requirements Specifications.	18	Chalk & Talk, PPT
ш	Structured Analysis: Introduction – the elements of the analysis model – data objects, attributes and relationships – Cardinality and Modality – ERD – DFD – Classical analysis Methods : DSSD, JSD, SADT	18	Chalk &Talk, PPT
IV	Software Design and Software Engineering – Design and Software Quality – Evolution of Software Design – Design Principles. Design Concepts, Abstraction, Refinement, Modularity – Effective Modular Design, Functional Independence, Cohesion, Coupling	18	Chalk & Talk, PPT
V	Software Testing Fundamentals – White Box Testing – BlackBox Testing – Debugging – Software Quality: McCall's Quality Factors.	18	Chalk & Talk, PPT

## Course Designed by:Mr.M.Ramesh Kumar&Mrs.T.Sujithra

Learning Outcome Based Education & Assessment (LOBE)									
Formative Examination - Blue Print									
Articulation Mapping – K Levels with Course Outcomes (COs)									
			Section	n A	Section	n B	Section	Section	
Intornal	Cos	K L ovol	MCC	)s	Short Ans	swers	С	D	
mernar	COS	K Level	No. of.	K -	No. of.	K –	Either or	Open	
			Questions	Level	Questions	Level	Choice	Choice	
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AI	<b>CO2</b>	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)	
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)	
		No. of							
	Que	stions to be	4		3		4	2	
		asked							
Question		No. of							
Pattern	Que	stions to be	4		3		2	1	
CIA I &	a	nswered							
II	Mar	ks for each	1		2		5	10	
	question		1		2		3	10	
	Tota	l Marks for	4		6		10	10	
	eac	ch section	4		U		10	10	

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

	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
СТА	K3	-	-	20	20	40	80	80	
	K4	-	-	-	-	-			
1	Marks	4	6	20	20	50	100	100	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
CIA	K3	-	-	10	10	20	40	40	
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)								
			MCO	Qs	Short An	swers	Section C	Seation D	
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)	
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
No	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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	4.17	17		
K2	5	10	-	-	15	12.5	17		
K3	-	-	30	30	60	50	50		
K4	-	_	20	20	40	33.33	33		
Marks	10	10	50	50	120	100	100		
NR. Hic	thar loval of n	arformanca	f the student	s is to be assu	beend by a	ttompting	higher level		

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

Section	A (Mu	iltiple Cho	ice 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 (Sho	ort Answei	rs)
Answei	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answei	r All Q	uestions	(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	<u>CO4</u>	K4	
20) a	<u>CO5</u>	K4	
20) b	<u>CO5</u>	K4	
NB: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher
level of	K leve		
Section	U) (Op	en Choice	) tiong (2-10, 20,, 1, )
Answei	$\frac{r \text{ Any } 1}{CO}$	Inree ques	uons (3x10=30 marks)
<b>Q.N0</b>		K Level	Questions
21		K5 1/2	
22	<u>CO2</u>	K3 V2	
23	<u>CO4</u>	KJ V4	
24	CO5	K4	
23	CUS	<b>K</b> 4	

# Summative Examinations - Question Paper – Format



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	SOFT COMPUTING					
Course Code	21PCSE33	L	Р	С		
Category	Elective	6	-	6		
Nature of Cou	rse EMPLOYABILITY SKILL ORIENTED ✓ ENTREP	RENE	URS	HIP		
COURSE OBJ	ECTIVES:					
• To have known	owledge about the basic working of a areas of Soft Computing includ	ing A	rtific	ial		
Neural Network	works, Fuzzy Logic and Genetic Algorithms.					
• To provide	the mathematical background for carrying out the optimization assoc	iated	with			
neural netw	ork learning.					
• To understa	nd Soft Computing concepts, technologies, and applications					
• To understa	nd the underlying principle of soft computing with its usage in variou	is app	licat	ion		
To understa	nd different soft computing tools to solve real life problems.					
Unit: I Int	roduction		18 H	Hours		
Introduction:	Hard Computing - Soft Computing - Hybrid Computing. Introduct	tion to	o Ge	netic		
Algorithms: W	orking Cycle of a Genetic Algorithms - Binary-Coded GA - GA	4 - p	aram	eters		
Setting-Constra	ints Handling in GA - Advantages and Disadvantages of Genetic	c Alg	orith	ms -		
Combination of	local and Global Optimum Search Algorithms.					
Unit: II Int	roduction to Fuzzy Sets		18 H	Hours		
Introduction to	<b>D</b> Fuzzy Sets:Crisp Sets-Measures of Fuzziness and Inaccuracy of Fu	izzy s	ets F	uzzy		
Reasoning and	Clustering:Introduction-Fuzzy Logic Controller-Fuzzy Clustering.					
Unit: III Fu	ndamentals of Neural Networks		18 H	Hours		
Fundamentals	of Neural Networks: Introduction-Static vs. Dynamic Neural Netwo	orksT	rainii	ng of		
Neural Networ	k. Some Examples of Neural Networks: Introduction - Multilayer	Feed	l-For	ward		
Neural Networl	(MLFFNN)-Radial Basis Function Network (RBFN) - Self Organiz	ing M	lap(S	OM)		
- Counter – Pro	pagation Neural Network(CPNN) - Recurrent Neural Network(RNNs	s).				
Unit: IV Ge	netic Algorithms		18 H	Hours		
Genetic Algo	rithms: Fuzzy Logic-Introduction-Fuzzy -Genetic Algorithm	-Gene	tic-F	uzzy		
System.Genetic	Algorithms:Neural Networks-Introduction-Working Principle of a	Gene	eticN	eural		
System.			10.1	*		
Unit: V Ne	ural Networks		181	Hours		
Neural Netwo	ks: Fuzzy Logic-Introduction – Neuro-Fuzzy System Working base	d on	Man	ndani		
Approach-Neur	o Fuzzy System based on Takagi and Sugeno"sApproach.Appli	cation	1 of	Soft		
Computing:Intr	oduction-Application of Soft Computing in Design and Developmen	t of Ir	ntellig	gent-		
Application of a	Son Computing in Data Analysis.		0	0		
Doole for Street		ours	9	0		
BOOK IOF SLUC		D 11	1 .			
1. DilipK.Pratihar, "SoftComputing, Fundamenatals and Applications", Narosa Publishing						
House,	2014, New Delli. Unit L. Chapter 1/Eull) Chapter 2/Eully					
	Unit I- Chapter 7(Full), Chapter 9(Full).					
Unit III- Chapter9(Full) Chapter10(Full)						

Unit IV-Chapter11(Full), Chapter12(Full).

#### Unit V-Chapter13(Full), Chater14(Full).

#### **Books for Reference:**

1.Rajasekaran. S and Pai. G.A.V, NeuralNetworks, Fuzzy Logic and Genetic Algorithms, PHI, 2003

Jang.J.S.R, Sun. C.T and Mizutani, Neuro Fuzzy and Soft Computing, Pearson Education, 2004
 Deepa. S. N and Sivanandam.S. N, Principles of Soft Computing, Wiley publication, 2nd Edition

#### Web Reference:

1. http://www.vssut.ac.in/lecture\_notes/lecture1423723637.pdf

2. https://nptel.ac.in/courses/106105173/

### 3. http://www.myreaders.info/01\_Introduction\_to\_Soft\_Computing.pdf

Course Outcome:			
CO1:	Learn about soft computing techniques and their applications	Upto K3	
<b>CO2:</b>	Know about the fuzzy logic concepts	Upto K3	
CO3:	Understand perceptrons and counter propagation networks	Upto K3	
<b>CO4:</b>	Evaluate the genetic algorithms and their applications	Upto K4	
CO5:	Analyze various neural network architectures	Upto K4	

#### CO & PO Mappings:

COs	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	3	2	2	3	2
CO 2	2	2	3	3	3	2
CO 3	3	2	3	2	2	3
<b>CO 4</b>	2	2	3	2	2	2
CO 5	3	3	2	3	3	3

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

#### LESSON PLAN

UNIT	SOFT COMPUTING	Hrs	Mode
I	<b>Introduction:</b> Hard Computing - Soft Computing - Hybrid Computing. Introduction to Genetic Algorithms: Working Cycle of a Genetic Algorithms - Binary-Coded GA – GA - parameters Setting-Constraints Handling in GA - Advantages and Disadvantages of Genetic Algorithms - Combination of local and Global Optimum Search Algorithms.	18	Chalk & Talk
II	<b>Introduction to Fuzzy Sets</b> :Crisp Sets-Measures of Fuzziness and Inaccuracy of Fuzzy sets Fuzzy Reasoning and Clustering:Introduction- Fuzzy Logic Controller-Fuzzy Clustering.	18	Chalk & Talk
III	<b>Fundamentals of Neural Networks</b> : Introduction-Static vs. Dynamic Neural NetworksTraining of Neural Network. Some Examples of Neural Networks: Introduction - Multilayer Feed-Forward Neural Network(MLFFNN)-Radial Basis Function Network (RBFN) - Self Organizing Map(SOM) - Counter – Propagation Neural Network(CPNN) - Recurrent Neural Network(RNNs).	18	Chalk & Talk
IV	<b>Genetic Algorithms</b> : Fuzzy Logic-Introduction-Fuzzy -Genetic Algorithm-Genetic-Fuzzy System.GeneticAlgorithms:Neural Networks- Introduction-Working Principle of a GeneticNeural System.	18	Chalk & Talk
V	<b>Neural Networks</b> : Fuzzy Logic-Introduction – Neuro-Fuzzy System Working based on Mamdani Approach-Neuro Fuzzy System based on Takagi and Sugeno"sApproach.Application of Soft Computing:Introduction-Application of Soft Computing in Design and Development of Intelligent-Application of Soft Computing in Data Analysis.	18	ICT

Course Designed by: Mrs.K.Sandya&Mr.M.Rameshkumar

Learning Outcome Based Education & Assessment (LOBE)									
Formative Examination - Blue Print									
	Art	iculation M	apping – K l	Levels wi	th Course O	utcome	s (COs)		
			Section	n A	Section	n B	Section	Section	
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D	
miernai	COS	K Level	No. of.	К -	No. of.	K –	Either or	Open	
			Questions	Level	Questions	Level	Choice	Choice	
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)	
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	<b>1(K3)</b>	
AII	CO4	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)	
		No. of			3			2	
	Que	stions to be	4				4		
		asked							
Question		No. of							
Pattern	Que	stions to be	4		3		2	1	
CIA I &	a	nswered							
II	Mar	ks for each	1		2		5	10	
	Q	uestion	1		2		5	10	
	Tota	l Marks for	4		6		10	10	
	eac	ch section	4		0		10	10	

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

		Distri	bution of Ma	rks with <b>H</b>	K Level C	IA I & C	IA 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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
	K3	-	-	20	20	40	80	80
CIA I	K4	-	-	-	-	-		
	Marks	4	6	20	20	50	100	100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
ста п	K3	-	-	10	10	20	40	40
UIA II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)									
			MCQs		Short An	swers	Section C			
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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	4.17	17				
K2	5	10	-	-	15	12.5	17				
K3	-	-	30	30	60	50	50				
K4	-	-	20	20	40	33.33	33				
Marks	10	10	50	50	120	100	100				
ND. Hic	than lovel of n	arformance	f the student	ic to be acco	and by a	ttomating	higher lovel				

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

Section	A (Mu	iltiple Cho	ice Questions)
Answei	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answei	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answei	r All Q	uestions	(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	<u>CO4</u>	K4	
20) a	<u>CO5</u>	K4	
20) b	<u>CO5</u>	K4	
NB: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher
level of	K leve		
Section	U) (Op	en Choice	) tiong (2-10, 20,, 1, )
Answei	$\frac{r \text{ Any } 1}{CO}$	Inree ques	uons (3x10=30 marks)
<b>Q.N0</b>		K Level	Questions
21		K5 1/2	
22	<u>CO2</u>	K3 V2	
23	<u>CO3</u>	KJ V4	
24	CO5	K4	
23	CUS	<b>K</b> 4	

## **Summative Examinations - Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	DATABASE MANAGEMENT SYSTEM			
Course Code	21PCSE34	L	Р	С
Category	Elective	6	-	6
Nature of Cour	se EMPLOYABILITY SKILL ORIENTED ✓ ENTREPR	ENE	URS	HIP
<b>COURSE OBJ</b>	ECTIVES:			
• To know	the basic concepts of database systems.			
• To unde	stand the basics of SQL and construct queries using SQL.			
• To unde	rstand the file organization concepts.			
To unde	rstand the relational database storage systems.			
• To fami	liar with the basic issues of transaction processing and concurrence	v co	ntro	and
normal f	orms.	<b>j</b> •••		
Unit: I Ove	erview of Database Systems:		18 H	ours
Managing Data	– A Historical Perspective – Purpose of database systems- Data base	Arch	itect	ure
Advantages of a	DBMS – File Systems versus DBMS– Transaction Management I	ntroc	lucti	on to
Database Desig	n: Database Design and ER Diagrams – Entities, Attributes, and	Enti	ty S	ets –
Relationships an	d Relationship Sets – Additional Features of the ER Model – Conc	eptu	al D	esign
with the ER Mo	del - Conceptual design for large Enterprises – The Unified Modeling	Lan	guag	e
Unit: II The	Relational Model:		18 H	ours
Introduction to	the Relational Model – Integrity Constraints– Querying Relational I	Data	- Lo	gical
Database Desig	n: ER to Relational - Introduction to Views - Destroying /Alterir	ng Ta	ables	and
Views. Relation	al Algebra and Calculus: Relational Algebra - Relational Calculus	– E	xpre	ssive
Power of Algeb	ra and Calculus. SQL: Queries, Constraints, Triggers: The Forms of	f a B	asic	SQL
Query – UNIO	N, INTERSECT, and EXCEPT – Nested Queries – Aggregate Ope	erato	rs –	Null
Values – Compl	ex Integrity Constraints in SQL- Triggers and Active Databases.			
Unit: III Ove	rview of Storage and Indexing:		18 H	ours
Data on Extern	al Storage – File Organizations and Indexing – Index Data structures	- Co	mpa	rison
of File Organiz	ations - Indexes and Performance Tuning. Storing Data: Disks a	nd F	iles:	The
Memory Hierar	chy - Redundant Arrays of Independent Disk - Disk Space Manager	ment	– B	uffer
Manager – Files	of Records – Page Formats – Record Formats			
Unit: IV Ov	erview of Transaction Management:		18 H	ours
The ACID Prop	perties - Transactions and Schedules - Concurrent Execution of T	Frans	actic	ons –
Lock-Based Co	ncurrency Control - Performance of Locking - Transaction Supp	ort i	n SC	QL –
Introduction to	Crash Recovery. Crash Recovery: Introduction to ARIES - The	e log	- (	Other
Recovery-Relate	ed Structures – The Write-Ahead Log Protocol – Check pointing - Re	cove	ring	from
a System Crash	- Media Recovery - Serializability and concurrency Control			
Unit: V Sch	ema Refinement and Normal Forms:		18 H	ours
Introduction to	Schema Refinement-Functional Dependencies-Normal Forms-I	Prop	erties	sof
Decompositions	-Normalization - Schema Refinement in Database Design - Other	er ki	nds	of
Dependencies. I	'hysical Database Design and Tuning: Introduction to Physical Datab	base	Desi	gn
- Guidelines for	IndexSelection - Basic Examples of Index Selection - Clustering and	nd In	dexi	ng
– Indexes that	Enable ofIndex selection - Tools to Assist in Index Selection - C	)verv	view	of
Database Tunin	g - Choices inTuningthe Conceptual Schema-Choicesin Tuning (	Queri	es a	nd
Views–Impact of	f Concurrency.			

	Total Lecture Hours	90				
Books	for Study:					
1. Rag	nu Ramakrishnan and Johnannes Gehrke, Database Management Systems, 3rd Edition	l,				
Tata M	cGraw-Hill, New Delhi, 2014.					
Unit I :	Chapter 1 Section 1.1 to 1.9					
Chapte	r 2 Section 2.1 to 2.7					
Unit II	: Chapter 3 Section 3.1 to 3.7					
Chapte	r 4 Section 4.1 to 4.4					
Chapte	r 5 Section 5.2 to 5.8					
Unit II	I: Chapter 8 Section 8.1 to 8.5					
Chapte	r 9 Section 9.1 to 9.7					
Unit IV	T: Chapter16Section 16.1 to 16.7					
Chapte	r18 Section 18.1 to 18.8					
Unit V	: Chapter 19 Section 19.1to 19.8					
Chapte	r 20 Section 20.1 to 20.10					
Books	s for Reference:					
1. Sil	berschatz, Henry F.Korth, S.Sudarshan, Database System Concepts, 3rd Edition, Tata	a McGraw-				
Hi	ll, New Delhi, 1997.					
2. C.	J. Date, An Introduction to Database Systems, 8th Edition, Pearson Education, N	New Delhi,				
20	07.					
3. Ra	mez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, 7	th Edition,				
Pe	arson India, New Delhi, 2016.					
Web 1	Reference:					
<u>http</u>	s://www.db-book.com/slides-dir/index.html					
<u>http</u>	s://mrcet.com/downloads/digital_notes/ECE/III%20Year/DATABASE%20MA	ANAGE				
ME	NT%20SYSTEMS.pdf					
<u>http</u>	<u>s://www.tutorialspoint.com/dbms/index.htm</u>					
<u>http</u>	s://www.geeksforgeeks.org/dbms/					
Cours	e Outcome	K Level				
CO1	Explain the structure and model of the relational database system.	Upto K3				
CO2	Make a study of SQL and Relational database design.	Upto K3				
	Analyze different information about the organization requiring an database and	-				
CO3	CO3 translate them to user requirements.					
	Interpret knowledge in transaction processing with relational database design.	- 1				
	Analyze different information about the organization requiring an database and					
CO4	translate them to user requirements.	UptoK4				
	Create and populate a RDBMS for a real life application, with constraints keys					
CO5	using SOL.	Upto K4				

## CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	2	2	3	2
CO 2	2	2	2	2	3	3
CO 3	3	1	2	2	2	2
CO 4	2	2	2	2	1	2
CO 5	3	3	2	2	2	3

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

#### LESSON PLAN

UNIT	DATABASE MANAGEMENT SYSTEM	Hrs	Mode
I	Managing Data – A Historical Perspective – Purpose of database systems- Data base Architecture-– Advantages of a DBMS – File Systems versus DBMS– Transaction Management - Introduction to Database Design: Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of the ER Model – Conceptual Design with the ER Model - Conceptual design for large Enterprises – The Unified Modeling Language.	18	Chalk & Talk
Ш	Introduction to the Relational Model – Integrity Constraints– Querying Relational Data - Logical Database Design: ER to Relational – Introduction to Views – Destroying /Altering Tables and Views. Relational Algebra and Calculus: Relational Algebra – Relational Calculus – Expressive Power of Algebra and Calculus. SQL: Queries, Constraints, Triggers: The Forms of a Basic SQL Query – UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL- Triggers and Active Databases.	18	Chalk & Talk
III	Data on External Storage – File Organizations and Indexing – Index Data structures – Comparison of File Organizations – Indexes and Performance Tuning. Storing Data: Disks and Files: The Memory Hierarchy – Redundant Arrays of Independent Disk – Disk Space Management – Buffer Manager – Files of Records – Page Formats – Record Formats.	18	Chalk & Talk
IV	The ACID Properties – Transactions and Schedules – Concurrent Execution of Transactions – Lock-Based Concurrency Control – Performance of Locking – Transaction Support in SQL – Introduction to Crash Recovery. Crash Recovery: Introduction to ARIES – The log – Other Recovery-Related Structures – The Write-Ahead Log Protocol – Check pointing - Recovering from a System Crash – Media Recovery – Serializability and concurrency Control	18	Chalk & Talk
V	Introduction to Schema Refinement – Functional Dependencies–Normal Forms – Properties of Decompositions - Normalization – Schema Refinement in Database Design - Other kinds of Dependencies. Physical Database Design and Tuning: Introduction to Physical Database Design – Guidelines for Index Selection – Basic Examples of Index Selection – Clustering and Indexing – Indexes that Enable of Index selection – Tools to Assist in Index Selection - Overview of Database Tuning – Choices in Tuning the Conceptual Schema – Choices in Tuning Queries and Views – Impact of Concurrency.	18	ICT

Course Designed by:Mrs.K.Sandya & Dr.S.Shaik Parveen

Learning Outcome Based Education & Assessment (LOBE)									
	Formative Examination - Blue Print								
	Art	iculation M	apping – K l	Levels wi	th Course O	utcome	s (COs)		
			Section	n A	Section	n B	Section	Section	
Intornal	Cog	<b>W</b> Lovel	MCC	)s	Short Ans	swers	С	D	
mternar	COS	K Level	No. of.	К-	No. of.	K –	Either or	Open	
			Questions	Level	Questions	Level	Choice	Choice	
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)	
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)	
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)	
		No. of							
	Que	stions to be	4		3		4	2	
		asked							
Question		No. of							
Pattern	Que	stions to be	4		3		2	1	
CIA I &	a	nswered							
II	Mar	ks for each	1		2		5	10	
	C	uestion	1		2		3	10	
	Tota	l Marks for	1		6		10	10	
	eac	ch section	4		U		10	10	

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

		Distr	ibution of M	arks with	K Level C	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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
	K3	-	-	20	20	40	80	80
CIA I	K4	-	-	-	-	-		
	Marks	4	6	20	20	50	100	100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
CIA	K3	-	-	10	10	20	40	40
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)										
			MCO	MCQs		swers	Section C	Section D			
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)			
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
No. of Questions to be Asked		ions to be ed	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 parenthesi	s denotes, qu	estions sl	ould be ask	ed 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	4.17	17					
K2	5	10	-	-	15	12.5	17					
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.

Section	A (Mul	tiple Choice	e Questions)
Answer	All Qu	estions	(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 (Shor	t Answers)	
Answer	All Qu	estions	(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 (Eith	er/Or Type	
Answer	All Qu	estions	(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: Hig	gher lev	el of perfor	mance of the students is to be assessed by attempting higher level of
K levels			
Section	D (Ope	n Choice)	
Answer	Any II	Iree questio	Overficer
<b>Q.NO</b>	CO1	K Level	Questions
21		KJ V2	
22	$CO_2$	KJ V2	
23	$CO_4$	KJ K4	
24	C04	<u></u> κ4 Κ4	
23	COS	K4	

# **Summative Examinations - Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	DATA WAREHOUSIN	G AND DATA MININ	G							
Course Code	21PCSE35				L	Р	С			
Category	ELECTIVE				6	-	6			
Nature of Cours	e EMPLOYABILITY	SKILLORIENTED	✓	ENTREP	RENE	URSF	ΗP			
<b>COURSE OBJE</b>	CTIVES:									
Differentiate Online Transaction Processing and Online Analytical processing										
Learn Multidimensional schemas suitable for data warehousing										
• Understand various data mining functionalities										
• Inculcate	knowledge on data mining	query languages.								
• Know in o	letail about data mining al	gorithms								
Unit: I Data	Warehouse	e				18 H	Iours			
Data Warehous	e: Introduction to Data V	Ware House, Differences	betv	ween oper	ationa	l data	base			
systems and data	Ware House, Data Ware	House characteristics, Da	ita W	are House	Arch	itectur	e and			
its components, I	Extraction-Transformation	-Loading, Logical (Mulit	- Dii	mensional)	, Data	a Mod	eling,			
Schema Design,	star and snow-Flake Scher	na, Fact Constellation, Fa	act Ta	able, Fully	Addic	ctive, S	Semi-			
Addictive, Non-A	Addictive Measures; Fact-	Less-Facts, Dimension	Table	e character	istics;	Fact-	Less-			
Facts, Dimension	Table characteristics; OL	LAP cube, OLAP Operati	ons,	OLAP Ser	ver A	rchite	cture-			
ROLAP, MOLA	and HOLAP.									
Unit: II Intro	duction to Data Mining					18 H	Hours			
Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges,										
Data Mining Tas	ks,Data Preprocessing- Da	ata Cleaning, Missing Da	ita, D	imensiona	lity R	educti	on,			
Feature Subset S	election, Discretization a	and Binaryzation, Data	Tran	sformation	; Mea	asures	of			
similarity and dis	similarity-Basics.									
Unit: III Asso	ciation Rules					18 H	Iours			
Association Rul	es: Problem Definition, F	requent Item Set Genera	tion,	The APRI	ORI I	Princip	ple,			
Support and Co	nfidence Measures, Asso	ociation Rule Generation	n, Al	PRIORI A	lgorit	hm, 🛛	Гhe			
Partition Algorit	hms, FP-Growth Algorith	hms, Compact Represen	tatior	n of Frequ	ient I	tem S	Set-			
Maximal Frequer	t Item Set, Closed Frequer	nt Item Set.				10.7	-			
Unit: IV Clas	sification	1 4 1 1 1		1		181	lours			
Classification:	Problem definition, Gene	eral Approaches to sol	ving	a classifi	catior	n prol	olem,			
Evaluation of C	lassifiers, Classification (	techniques, Decision tre	es-De	ecision Tr	ee Co	onstruc	ction,			
Methods for expr	essing attribute test condit	ions, Measures for Select	ing t	he Best spl	it, Alg	gorithi	n for			
Decision tree In	auction, Naive-Bayes Cla	assifier, Bayesian Belief	Net	works; K-	neares	st neig	gnbor			
classification-Alg	orithm and characteristics	•				10 1	T			
Chartenin and Day	tering			- f - 1 f -		181	tours			
Clustering: Pro	olem Definition, Cluste	ring overview, Evalua		of cluste	ring	Alcor	unins,			
Hierorophical Clu	stering <b>A</b> lgorithm Agon	unin, K-means Addition	nd	Divisivo	'ANI Math	Algoi	Dagia			
Agglomerative L	istering-Aigorithin- Agg	nonithm Specific technic		Key Icene	c in I	Jus, Jiorar	pasic			
Clustering Stren	oths and weakness Outlier	Detection	iues,	ixcy issue	5 11 1	incial	lincal			
Total Lecture Hours 90										
			a otal	Lecture 1	tours	70				

Books	for Study:					
	1. Data Mining-Concepts and Techniques- Jiawei Han, MichelineKamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.	1				
	2. Introduction to Data Mining, Pang-NingTan, VipinKumar, Michael Steinbanch, Pearson Education.					
Books	for Reference:					
	<ol> <li>Data Mining Techniques, Arun K Pujari, 3<sup>rd</sup>Edition, UniversitiesPress.</li> <li>Data Ware Housing Fundamentals, PualrajPonnaiah, Wiley StudentEdition.</li> <li>The Data Ware House Life Cycle Technik, Belph Kimbell, Wiley StudentEdition.</li> </ol>					
	<ol> <li>I ne Data ware House Life Cycle Toolkit- Ralph Kimball, wiley StudentEdition.</li> <li>Data Mining, VikaramPudi, P Radha Krishna, OxfordUniversity.</li> </ol>					
Web F	Reference:					
1.	https://www.w3schools.com/					
2.	https://www.javatpoint.com/data-warehouse					
3.	https://nptel.ac.in/courses/106/105/106105174/					
Cours	e Outcome	K Level				
CO1	Understand the functionality of the various data mining and data warehousing component	Upto K3				
CO2	Appreciate the strengths and limitations of various data mining and data warehousing models	Upto K3				
CO3	Explain the analyzing techniques of various data	Upto K3				
CO4	Describedifferent methodologies used in data mining and data ware housing.	Upto K4				
CO5	Compare different approaches of data ware housing and data mining with various technologies.	Upto 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	2	2	3	3
CO 3	3	1	2	2	2	2
CO 4	2	2	2	2	1	2
CO 5	3	3	2	2	2	3

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

#### LESSON PLAN

UNIT	DATA WAREHOUSING AND DATA MINING	Hrs	Mode
Ι	<b>Data Warehouse:</b> Introduction to Data Ware House, Differences between operational data base systems and data Ware House, Data Ware House characteristics, Data Ware House Architecture and its components, Extraction- Transformation-Loading, Logical (Mulit- Dimensional), Data Modeling, Schema Design, star and snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non-Addictive Measures; Fact- Less-Facts, Dimension Table characteristics; Fact-Less-Facts, Dimension Table characteristics; OLAP cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP	18	Chalk& Talk, Presentation
п	Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks,Data Preprocessing- Data Cleaning, Missing Data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of similarity and dissimilarity-Basics.	18	Chalk& Talk,Presentation
III	Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation, APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.	18	Chalk& Talk,Presentation
IV	<b>Classification:</b> Problem definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision trees-Decision Tree Construction, Methods for expressing attribute test conditions, Measures for Selecting the Best split, Algorithm for Decision tree Induction, Naïve-Bayes Classifier, Bayesian Belief Networks; K-nearest neighbor classification-Algorithm and characteristics.	18	Chalk& Talk,Presentation
V	<b>Clustering:</b> Problem Definition, Clustering overview, Evaluation of clustering algorithms, Partitioning clustering K- Means Algorithm, K-Means Additional Issues, PAM Algorithm, Hierarchical Clustering-Algorithm- Agglomerative Methods and Divisive Methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and weakness, Outlier Detection.	18	Chalk& Talk,Presentation

Course Designed by: Mrs.K.Sandya & Dr.M.Karthika

Learning Outcome Based Education & Assessment (LOBE)

	Formative Examination - Blue Print										
Articulation Mapping – K Levels with Course Outcomes (COs)											
			Section	n A	Section	n B	Section	Section			
Intornal	Cos	K L ovol	MCQs		Short Answers		С	D			
memai	CUS	K Levei	No. of.	K -	No. of.	K –	Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
		No. of									
	Que	stions to be	4		3		4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	a	nswered									
II	Mar	ks for each	1		2		5	10			
	C	juestion	1		2		3	10			
	Tota	l Marks for	4		6		10	10			
	eac	ch section	4		0		10	10			

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

	Distribution of Marks with K Level CIA I & CIA II											
	K 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 %				
	K1	2	2	-	-	4	8	20				
	K2	2	4	-	-	6	12	20				
	K3	-	-	20	20	40	80	80				
CIA I	K4	-	-	-	-	-						
	Marks	4	6	20	20	50	100	100				
	K1	2	2	-	-	4	8	20				
	K2	2	4	-	-	6	12	20				
CIA II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)										
			MCQs		Short Answers		Section C	Section D			
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)			
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
No	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked with	the given K	level)			

		D	istribution 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	4.17	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: Hig of K lev	NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels									

Section	Section A (Multiple Choice Questions)							
Answer	· All Qu	iestions	(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 (Sho	rt Answers	5)					
Answer	· All Qu	estions	(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 (Eith	her/Or Typ	be)					
Answer	· All Qu	iestions	(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: Hi	gher lev	vel of perfo	rmance of the students is to be assessed by attempting higher					
level of	K level	S						
Section	D (Ope	en Choice)						
Answer	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						

# **Summative Examinations - Question Paper – Format**



## MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	CYBER SECURITY								
<b>Course Code</b>	21PCSE36	L	Р	С					
Category	ELECTIVE	6	-	6					
Nature of Cour	se: EMPLOYABILITY 🖌 SKILLORIENTED ENTREP	RENE	URS	HIP					
COURSE OBJECTIVES:									
Provide	knowledge for protecting damaged systems, protecting personal data	and s	ecur	ing					
compute	r networks in an organization.			_					
Practice	using academic knowledge to design and implement security solution	ns.							
Understa	and key cryptography, governance, and compliance terms and concer	ots.							
<ul> <li>Develop</li> </ul>	ment of cyber security strategies and guidelines.								
• Understa	and the principles of web security and keep the network secure by mo	nitor	ing a	nd					
analyzin	g the nature of attacks using cyber / computer forensics software / to	ols.	8						
Unit: I Cvl	per Security Fundamentals	18	8 Hou	rs					
Cyber Securit	<b>v Fundamentals:</b> Network and Security Concept- Information	ion	4 5 5 1 1	ance					
Fundamentals –	Basic Cryptography - Symmetric Encryption - Public Key Encryptio	n -Th	e Do	main					
Name System (	DNS) - Firewalls -Microsoft Windows Security Principles - Win	dows	Tok	ens -					
Window Messa	ying - Windows Program Execution - The Windows Firewall	40 11 5	IOK	0115					
Unit: II Att	acker Techniques and Motivations	18	3 Hot	rs					
Attacker Tech	niques and Motivations: How Hackers Cover Their Tracks (A	ntifo	rensi	- (22					
Tunneling Tech	niques - Fraud Techniques - Phishing Smishing Vishing and Mo	bile	Mali						
Code - Rogue A	ntivirus - Click - Threat Infrastructure			.10 u.5					
Unit: III Exp	bloitation	18	8 Hou	rs					
Exploitation: F	Format String Vulnerabilities - SOL Injection –Protecting against	SOL	iniec	tion-					
Malicious PDF	Files- PDF File format-Creating malicious PDF Files-Reducir	ng th	e ris	k of					
Malicious PDF	file- Race Conditions	-0							
Unit: IV Ma	licious Code	18	8 Hou	rs					
Malicious Cod	e: Self-Replicating Malicious Code - Rootkits -Spyware -Token	Kid	nappi	ng -					
Stealing Inform	ation and Exploitation - Form Grabbing - Man-in-the-Middle	Attack	- s	DLL					
Injection - Brow	vser Helper Objects								
Unit: V Def	ense and Analysis Techniques	18	8 Hou	rs					
Defense and A	nalysis Techniques: Memory Forensics - Why Memory Forensics	Is In	nport	ant -					
Capabilities of I	Memory Forensics - Memory Analysis Frameworks - Dumping Phys	sical	Mem	ory -					
Installing and U	sing Volatility - Finding Hidden Processes - Volatility Analyst Pack	- Hor	neypo	ots					
<b>Total Lecture Hours</b> 90									
<b>Books for Stud</b>	v:								
1. James Graham, Richard Howard and Ryan Olson "CYBER SECURITY ESSENTIALS" CRC									
Press, Auerbach , Publications, First Edition, 2011									
	Unit I : Chapter :1 - Section : 1.1.1-1.1.6,1.2.1-1.2.4								
	Unit II : Chapter: 2 - Section : 2.1.1-2.3.3								
	Unit III : Chapter: 3 - Section : 3.1.4-3.1.7								
	Unit $V$ : Chapter: 4 - Section : 4.1, 4.2.4, 4.2.5, 4.2.7, 4.3								
Unit: VDefDefense and ACapabilities of IInstalling and UBooks for Stud1. James OPress, Au	Procession         Rense and Analysis Techniques         nalysis Techniques: Memory Forensics - Why Memory Forensics         Memory Forensics - Memory Analysis Frameworks - Dumping Physing Volatility - Finding Hidden Processes - Volatility Analyst Pack         Total Lecture Hour         y:         Graham, Richard Howard and Ryan Olson "CYBER SECURITY ESSEN         erbach , Publications, First Edition, 2011         Unit I       : Chapter :1 - Section : 1.1.1-1.1.6,1.2.1-1.2.4         Unit II       : Chapter: 2 - Section : 2.1.1-2.3.3         Unit III       : Chapter: 3 - Section : 3.1.4-3.1.7         Unit IV       : Chapter: 4 - Section : 4.1, 4.2.4,4.2.5,4.2.7,4.3         Unit V       : Chapter: 5 - Section : 5.1,5.2	18Is Irsical 1- Horrs 90TIAL	3 Hou nport Mem neypo ) S" C	ant - ory - ots RC					

K Level

#### **Books for Reference:**

- 1. Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.
- 2. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition, Pearson Education, 2015

#### Web Reference:

- 1. https://onlinecourses.swayam2.ac.in/ugc19\_hs25/preview
- 2. https://onlinecourses.swayam2.ac.in/nou19\_cs08/preview
- 3. https://www.javatpoint.com/cyber-security-tutorial

# **Course Outcome**

<b>CO1:</b>	To describe the fundamentals of cyber security	Upto K3
CO2:	To classify various network attacks, describe their sources, and mechanisms of	
001	prevention.	
CO3.	To determine and analyze software vulnerabilities and security solutions to reduce the	Unto K3
005:	risk of exploitation.	Ομιο Κ3
<b>CO4:</b>	To measure the performance and troubleshoot cyber security systems.	Upto K4
CO5:	To design the cyber security needs of an organization	Upto K4

#### **CO & PO Mappings:**

COS	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	2	2	3	2
CO 2	2	2	2	2	3	3
CO 3	3	1	2	2	2	2
<b>CO 4</b>	2	2	2	2	1	2
CO 5	3	3	2	2	2	3

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

#### LESSON PLAN

UNIT	CYBER SECURITY	Hrs	Mode
I	<b>Cyber Security Fundamentals:</b> Network and Security Concept- Information Assurance Fundamentals –Basic Cryptography - Symmetric Encryption - Public Key Encryption -The Domain Name System (DNS) - Firewalls -Microsoft Windows Security Principles - Windows Tokens - Window Messaging - Windows Program Execution - The Windows Firewall	18	ICT
II	Attacker Techniques and Motivations: How Hackers Cover Their Tracks (Antiforensics) - Tunneling Techniques - Fraud Techniques - Phishing, Smishing, Vishing, and Mobile Malicious Code - Rogue Antivirus - Click - Threat Infrastructure	18	ICT
III	<b>Exploitation</b> : Format String Vulnerabilities - SQL Injection –Protecting against SQL injection- Malicious PDF Files- PDF File format-Creating malicious PDF Files-Reducing the risk of Malicious PDF file- Race Conditions	18	ICT
IV	Malicious Code: Self-Replicating Malicious Code - Rootkits -Spyware - Token Kidnapping - Stealing Information and Exploitation - Form Grabbing - Man-in-the-Middle Attacks - DLL Injection - Browser Helper Objects	18	ICT
V	<b>Defense and Analysis Techniques</b> : Memory Forensics - Why Memory Forensics Is Important - Capabilities of Memory Forensics - Memory Analysis Frameworks - Dumping Physical Memory - Installing and Using Volatility - Finding Hidden Processes - Volatility Analyst Pack – Honeypots	18	ICT

#### Course Designed by:Mrs.T.Sujithra&Mrs.M.Muthulakshmi

Learning Outcome Based Education & Assessment (LOBE)											
Formative Examination - Blue Print											
	Articulation Mapping – K Levels with Course Outcomes (COs)										
			Section	n A	Section	n B	Section	Section			
Internal	Cos	K I ovol	MCC	)s	Short Ans	swers	С	D			
memai	CUS	K Level	No. of.	К-	No. of. K -		Either or	Open			
			Questions	Level	Questions	Level	Choice	Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	3 2 <b>K1,K2</b> 2 <b>K2</b>		K2	2(K3,K3)	1(K3)				
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
		No. of			3						
	Que	stions to be	4				4	2			
		asked									
Question		No. of									
Pattern	Que	stions to be	4		3		2	1			
CIA I &	a	nswered									
II	I Marks for each question		1		2		5	10			
			L		4		3	10			
	Tota	l Marks for	1		6		10	10			
	eac	ch section	4		U		10	10			

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

	Distribution of Marks with K Level CIA I & CIA II										
	K 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 %			
	K1	2	2	-	-	4	8	20			
	K2	2	4	-	-	6	12	20			
СТА	K3	-	-	20	20	40	80	80			
	K4	-	-	-	-	-					
L	Marks	4	6	20	20	50	100	100			
	K1	2	2	-	-	4	8	20			
	K2	2	4	-	-	6	12	20			
CIA	K3	-	-	10	10	20	40	40			
Π	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)										
			MCO	Qs	Short Answers		Section C			
S.No COs	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No. of Questions to be Asked		ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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	4.17	17			
K2	5	10	-	-	15	12.5	17			
K3	-	-	30	30	60	50	50			
K4	-	-	20	20	40	33.33	33			
Marks	10	10	50	50	120	100	100			
NB: Hig	NB: Higher level of performance of the students is to be assessed by attempting higher level									

of K levels.
Section	A (Mu	ıltiple Cho	ice Questions)
Answe	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answe	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	(5  x  5 = 25  marks)
Q.No	CO	K Level	Questions
16) a	CO1	K3	
16) b	C01	K3	
17) a	CO2	K3	
17) b	<u>CO2</u>	K3	
18) a	<u>CO3</u>	K3	
18) b	<u>CO3</u>	K3	
19) a	<u>CO4</u>	K4	
19) b	<u>CO4</u>	K4	
20) a	<u>C05</u>	K4	
20) b	05		
NB: HI	gher le	vel of perf	ormance of the students is to be assessed by attempting higher
level of	K leve		<u>\</u>
Section	D (Op	en Choice	) tiona (2x10, 20 montra)
Answei	$\frac{r \text{ Any } I}{CO}$	I I T T areal	uous (5x10=30 marks)
21	$\frac{CO1}{CO1}$	K Level	Questions
21		KJ K2	
22	$\frac{CO2}{CO2}$	K3 K2	
23	<u>CO4</u>	KJ KA	
24	<u>CO4</u>	<u></u> <u> </u>	
23	005	<b>N</b> 4	

# Summative Examinations - Question Paper – Format





# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name BIG DATA AN	<b>\LYTI</b>	ICS								
Course Code 21PCSC41								L	Р	С
Category CORE								6	-	4
Nature of course: <b>EMPLOYABI</b>	ITY	✓ §	SKILLO	<b>DRIEN</b>	TED	✓ E	NTREP	RENE	URS	HIP
<b>COURSE OBJECTIVES:</b>										
• To provide an overview of a	ı excitir	ing gr	rowing	field of	big dat	a anal	ytics.			
• To introduce the tools requi MapReduce.	ed to ma	nanag	ge and an	nalyze b	oig data	ı like I	Hadoop,	NoSq	1	
• To teach the fundamental te with scalability and streaming	hniques g capab	es and bility.	l princip	oles in a	chievir	ng big	data ana	lytics		
• To enable students to have s	cills tha	at wil	ll help th	nem to s	solve co	omple	x real-w	orld		
problems in for decision sup	oort.									
• To teach the Big Data Platfo	m and	l its U	Jse cases	8.						
Unit: I Introduction to Big D	ta		1.5	~	<u> </u>				18 H	lours
Types of Digital Data: Classificat	pn of D	Digita	al Data.	Charac	cteristic	s of I	Data – E	voluti	on o	f Big
Data – Definition of Big Data	- Chall	llenge Tre	es in E	Big Dat	ia — E	ig Da	ata defii	nition	– ( Dote	Jther
typical Data Warehouse environme	z Data -	tvnic	autional	n Dusing	vironme	mg = 1	New thir	/5 DIg 105 - (	Chan	a – A ges -
Realms of Big Data.		typic	Jui muu		nomik			<b>15</b> 0	Chun	500
Unit: II Big Data Analytics									18 H	Iours
Big Data Analytics – Classification	of Anal	lytics	s – Grea	test cha	llenges	thatp	revent b	usines	s fro	m
capitalizing on Big Data – Top chai	enges fa	facing	g Big D	ata – In	nportan	ce ofE	Big Data	Analy	ytics	_
Data Science – Data Scientist – Ter	ninolog	gies u	used in H	Big Data	aEnviro	onmen	t – BAS	E – A	nalyt	tics
tool.										
Unit: III The Big Data Techno	ogy Lar	ndsca	ape						18 H	lours
NoSQL – Types of NoSQL Data	ase – I	Need	d of No	SQL? -	– Adva	antage	s of No	SQL	- U	se of
NoSQL in Industry – SQL vsNoSQ	L – Con	mpari	ison of S	SQL, No	oSQL a	and Ne	ewSQL.			
Hadoop: Features of Hadoop -	Advant	itages	of Ha	.doop -	- Over	view	of Had	oop -	- Ha	doop
distribution - Hadoopvs SQL - Inte	grated H	Hado	op Syst	em - Cl	loud-Ba	ased H	ladoop S	Solutio	ons.	
Unit: IV Introduction to Hado	р								18 H	lours
Introducing Hadoop - Need of Ha	loop –	- Nee	ed of RI	OBMS	– RDE	BMS v	sHadoo	p – D	Distril	outed
computing challenges - History of	Hadoor	op – H	Hadoop	overvie	ew – U	se cas	e of Ha	doop	– Ha	doop
distribution – HDFS – Processing	lata wit	ith Ha	adoop -	- Manag	ging re	source	es and A	pplica	ation	with
Hadoop YARN – Interacting with I	adoop I	Ecos	ystem							
Unit: V Introduction to Mang	DB								18 H	lours
What is MangoDB – Why Mango	B - T	Terms	s used i	n RDB	MS an	d Mai	ngoDB -	– Data	a typ	es in
MangoDB -MangoDB query lar	uage.	Intr	oductio	on to 1	Machi	neLea	rning:	Intro	duction	on –
Machine Learning Definition - I	lachine	e Lea	arning A	Algorith	nms –	Regre	ession N	Iodel	– L	inear
Regression – Clustering – Collabor	tive Filt	lterin	g - Ass	ociatior	n Rule I	Mining	g – Deci	sion T	ree.	
					Tot	al Lec	ture Ho	ours	90 H	lours

#### **Book for Study:**

1. SeemaAcharya, SubhashiniChellappan, 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), Chapter 12(Full).

#### **Books for Reference:**

1. C. 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 R	Web Reference:					
1. <u>https</u>	://www.slideshare.net/mohitsainirke/big-data-lecture-notes					
2. <u>http</u>	s://www.ntnu.no/iie/fag/big/lessons/lesson1.pdf					
3. <u>https</u>	://www.tutorialspoint.com/big data analytics/big data analytics pdf version	<u>n.htm</u>				
Course	e Outcomes:	K Level				
At the	end of the Course the students will be able to					
CO1.	Understand the key issues in big data management and its associated	Unto V2				
COI	applications in intelligent business and scientific computing.	Орю Кэ				
<b>CO</b> 2.	Acquire fundamental enabling techniques and scalable algorithms like Hadoop,	Unto V2				
CO2:	Map Reduce and NO SQL in big data analytics.	Οριο κο				
CO2.	Interpret business models and scientific computing paradigms, and apply	Unto V2				
005:	software tools for big data analytics.	Орю КЗ				
CO4.	Achieve adequate perspectives of big data analytics in various applications like					
CO4:	recommender systems, social media applications etc.	Upto K4				
005	Ability to understand and apply scaling up machine learning techniques and	Usta VA				
005:	associated computing techniques and technologies.	<b>Upto K4</b>				

#### CO & PO Mapping:

COS	<b>PO 1</b>	PO 2	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	1	3	3	3	3	2
CO 2	2	2	2	2	2	3
CO 3	2	3	2	2	1	3
<b>CO 4</b>	3	2	2	1	2	3
CO 5	2	2	3	2	2	3

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

UNIT	BIG DATA ANALYTICS	Hrs	Mode
I	<b>Types of Digital Data:</b> Classification of Digital Data. <b>Introduction to Big</b> <b>Data:</b> 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 (BI) vs Big Data – A typical Data Warehouse environment – A typical Hadoop environment – New things - Changes - Realms of Big Data.	18	ICT
п	<b>Big Data Analytics:</b> Big Data Analytics – Classification of Analytics – Greatest challenges thatprevent business from capitalizing on Big Data – Top challenges facing Big Data – Importance ofBig Data Analytics – Data Science – Data Scientist – Terminologies used in Big DataEnvironment – BASE – Analytics tool.	18	ICT
ш	<b>The Big Data Technology Landscape:</b> NoSQL – Types of NoSQL Database – Need of NoSQL? – Advantages of NoSQL – Use of NoSQL in Industry – SQL vsNoSQL – Comparison of SQL, NoSQL and NewSQL. <b>Hadoop:</b> Features of Hadoop – Advantages of Hadoop – Overview of Hadoop – Hadoop distribution – Hadoopvs SQL – Integrated Hadoop System – Cloud-Based Hadoop Solutions.	18	ICT
IV	<b>Introduction to Hadoop:</b> Introducing Hadoop – Need of Hadoop – Need of RDBMS – RDBMS vsHadoop – 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	18	ICT
V	<b>Introduction to MangoDB:</b> What is MangoDB – Why MangoDB – Terms used in RDBMS and MangoDB – Data types in MangoDB - MangoDB query language. <b>Introduction to MachineLearning:</b> Introduction – Machine Learning Definition – Machine Learning Algorithms – Regression Model – Linear Regression – Clustering – Collaborative Filtering – Association Rule Mining – Decision Tree.	18	ICT

## LESSON PLAN

Course Designed by:Dr.M.Karthika & Mr.M.Rameshkumar

Learning Outcome Based Education & Assessment (LOBE)								
	Formative Examination - Blue Print							
	Art	iculation M	apping – K l	Levels wi	th Course O	outcome	s (COs)	
			Section	n A	Section	n B	Section	Section
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	С	D
memai	CUS	K Level	No. of.	К -	No. of.	К –	Either or	Open
			Questions	Level	Questions	Level	Choice	Choice
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
		No. of						
	Que	stions to be	4		3		4	2
		asked						
Question		No. of						
Pattern	Que	stions to be	4		3		2	1
CIA I &	a	nswered						
II	I Marks for each		1		2		5	10
	q	uestion	T		4		3	10
	Tota	l Marks for	1		6		10	10
	eac	each section 4 b			10	10		

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

	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
СТА	K3	-	-	20	20	40	80	80	
	K4	-	-	-	-	-			
1	Marks	4	6	20	20	50	100	100	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
CIA	K3	-	-	10	10	20	40	40	
Π	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	Summativ	ve Examinatio	on – Blue Pri O	nt Articu utcomes (	lation Mapp COs)	oing – K	Level with (	Course
			MCO	Qs	Short An	swers	Section C	Section D
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
No	of Quest. Aske	ions to be ed	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	5		-	-	5	4.17	17
K2	5	10	-	-	15	12.5	17
K3	-	-	30	30	60	50	50
K4	-	-	20	20	40	33.33	33
Marks	10	10	50	50	120	100	100
NID. II!	ND. Higher level of nonformance of the students is to be assessed by attempting higher level						

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

Section	A (Mu	iltiple Cho	ice Questions)
Answei	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answei	r All Q	uestions	(5x2=10 marks)
Q.No	CO	K Level	Questions
11	COI	K2	
12	CO2	K2	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
Section	C (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	$(5 \times 5 = 25 \text{ marks})$
Q.No	<u>CO</u>	K Level	Questions
16) a	COI	K3	
16) b	<u>COI</u>	K3	
1/) a	<u>CO2</u>	K3	
1/) b	<u>CO2</u>	K3 K2	
18) a	<u>CO3</u>	K3 K2	
18) D	<u>CO3</u>	K5 K4	
19) a	<u>CO4</u>	K4	
19) b	C04 C05	K4	
20) a	<u>CO5</u>	K4 V4	
20) 0 ND. U:	ctos abor lo	N4 vol of porf	company of the students is to be accessed by attempting higher
IND: III	glier ie V lovo	ver or peri	ormance of the students is to be assessed by attempting ingher
Section	$\mathbf{D}(\mathbf{O}_{n})$	en Choice	)
Answei	r Anv T	Chree anes	tions (3x10-30 marks)
O.No	$\frac{1}{CO}$	K Level	Ouestions
21	CO1	K3	<u>Zutstions</u>
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	
20		12 1	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	WIRELESS SENSOR NETWORKS							
Course Code	PCSC42 L P C							
Category	CORE	6	-	4				
Nature of Cou	rse: EMPLOYABILITY SKILLORIENTED 🗸 ENTRE	PREN	EUR	SHIP				
COURSE OB.	IECTIVES:							
• Able to	list various applications of wireless sensor networks, describ	be the	con	cepts,				
protoco	ls, and differences underlying the design, implementation, and	use c	of wi	reless				
sensor r	networks.							
• To Imp	lement and evaluate new ideas for solving wireless sensor networ	k desi	gn is	sues.				
<ul> <li>Underst</li> </ul>	and the concepts and theories of networks and apply them in dif	ferent	situ	ations				
to Clas	sification of networks, performance analysis and impleme	ntatio	n of	new				
technolo	ogies.							
• To iden	tify the wireless sensor network platforms.							
To unde	erstand the WSN node Architecture and Network Architecture							
Unit: I	Overview Of Wireless Sensor Networks		18	Hours				
Overview Of V	Vireless Sensor Networks: Challenges for Wireless Sensor Netw	vorks,	Enal	oling				
Technologies F	or Wireless Sensor Networks.							
Unit: II	Architectures 18 Hours							
Architectures	Single-Node Architecture - Hardware Components, Energy con	sumpt	ion o	of				
Sensor Nodes,	Operating Systems and Execution Environments, Network Arch	itectur	e -Se	ensor				
Network Scena	rios, Optimization Goals and Figures of Merit, Gateway Concept	s.						
Unit: III	Networking Sensors		18	Hours				
Networking So	ensors: Physical Layer and Transceiver Design Considerations,	MAC	Pro	tocols				
for WirelessSer	nsor Networks, Low Duty Cycle Protocols And Wakeup Concept	s - S-	MAC	, The				
Mediation Dev	vice Protocol, Wakeup Radio Concepts, Address and Nam	e Ma	nage	ment,				
Assignment of	MAC Addresses, Routing Protocols- Energy-Efficient Rout	ing, C	deogr	raphic				
Routing.								
Unit: IV I	nfrastructure Establishment		18	Hours				
Infrastructure	<b>Establishment:</b> Topology Control, Clustering, Time Synchron	nizatio	on,					
Localization an	d Positioning, Sensor Tasking and Control.		,					
Unit: V S	ensor Network Platforms And Tools		18	Hours				
Sensor Netwo	ork Platforms And Tools: Sensor Node Hardware – E	Berkele	ey N	Aotes,				
Programming (	Challenges, Node-level software platforms, Node-level Simulate	ors, St	ate-c	entric				
programming.								
	Total Lecture H	Iours	90					
<b>Books for Stud</b>	ly:							
1. Holger	Karl & Andreas Willig, " Protocols And Architectures for Wirele	ss Ser	isor					
Networks", JohnWiley, 2005.								
2. Feng Zł	2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information							
Process Doolg for Def	ProcessingApproach",Elsevier,2007.							
DUUKS IOF KEIG								

1. KazemSohraby, Daniel Minoli, &TaiebZnati, "Wireless Sensor Networks-
Technology, Protocols, And Applications", John Wiley, 2007.

2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

2.11	ind fide, whereas bensor freework Designs, John whey, 2005.					
Web Re	ference:					
1. https:	//www.w3schools.com/					
2. https:	//www.electronicshub.org/wireless-sensor-networks-wsn/					
3. https://www.elprocus.com/architecture-of-wireless-sensor-network-and-applications/						
Course	Outcome	K Level				
CO1	Understand the basis of Sensors with its applications.	Upto K3				
CO2	To learn the architecture and placement strategies of Sensors.	Upto K3				
CO3	To analyze routing and congestion algorithms	Upto K3				
CO4	To design, develop, and carry out performance analysis of sensors on	Unto VA				
004	specific applications	0рю к4				
CO5	To explore and implement solutions to real world problems using sensor	Unto KA				
005	devices, enumerating its principles of working	000 K4				

## CO & PO Mappings:

COS	<b>PO 1</b>	PO 2	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	3	3	2	3	3
CO 2	2	2	2	3	3	3
CO 3	1	1	1	2	2	3
<b>CO 4</b>	2	3	3	3	3	2
CO5	3	3	3	1	2	3

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

UNIT	WIRELESS SENSOR NETWORKS	Hrs	Mode
Ι	<b>Overview Of Wireless Sensor Networks</b> : Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.	18	Chalk &Talk,PPT
п	Architectures :Single-Node Architecture - Hardware Components, Energy consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.	18	Chalk &Talk,PPT
ш	<b>Networking Sensors</b> : Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.	18	Chalk &Talk,PPT
IV	<b>Infrastructure Establishment</b> : Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.	18	Chalk &Talk,PPT
V	Sensor Network Platforms And Tools :Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming	18	Chalk &Talk,PPT

# Course Designed by:Mrs. K.Sandya&Mrs.T.Sujithra

	Learning Outcome Based Education & Assessment (LOBE)									
Formative Examination - Blue Print										
	Articulation Mapping – K Levels with Course Outcomes (COs)									
			Section	n A	Section	n B	Section	Section		
Intornal	Cos	<b>W</b> Lovel	MCC	)s	Short Ans	swers	С	D		
miernai	COS	K Level	No. of.	К -	No. of.	K –	Either or	Open		
			Questions	Level	Questions	Level	Choice	Choice		
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)		
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)		
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)		
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)		
		No. of								
	Que	stions to be	4		3		4	2		
		asked								
Question		No. of								
Pattern	Que	stions to be	4		3		2	1		
CIA I &	answered									
II	Mar	ks for each	1		2		5	10		
	question		1		2		3	10		
	Tota	l Marks for	4		6		10	10		
	eac	ch section	4		U		10	10		

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

	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 %	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
	K3	-	-	20	20	40	80	80	
CIA I	K4	-	-	-	-	-			
	Marks	4	6	20	20	50	100	100	
	K1	2	2	-	-	4	8	20	
	K2	2	4	-	-	6	12	20	
CIA II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)									
		V	MCO	Qs	Short An	swers	Section C	Section D		
S.No	COs	K - Lovol	No. of	K –	No. of	K –	(Either /	(Open		
		Level	Questions	Level	Question	Level	or Choice)	Choice)		
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)		
No.	of Questi	ons to be	10		5		10	5		
	Askee	b	10		5		10	5		
No.	of Questi	ons to be	10		5		5	3		
answered		ed	10		5		5	5		
Marks for each question		1		2		5	10			
Total Marks for each		10		10		25	30			
	sectio	n	10		10		23	50		
	(Figures	in parenthe	esis denotes,	questions	should be as	ked witl	n 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	4.17	17			
K2	5	10	-	-	15	12.5	17			
K3	-	-	30	30	60	50	50			
K4	-	_	20	20	40	33.33	33			
Marks	10	10	50	50	120	100	100			
NR · Hic	thar level of n	orformance	f the students	s is to be asse	seed by a	ttomnting	higher level			

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

Section	A (Mu	iltiple Cho	ice Questions)
Answe	r All Q	uestions	(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 (Sho	ort Answei	rs)
Answe	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answei	r All Q	uestions	(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: Hi	gher le	vel of perf	formance of the students is to be assessed by attempting higher
level of	'K leve	ls	
Section	D (Op	en Choice	)
Answe	r Any T	Three ques	tions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nan	ne	DATA MINING LAB					
Course Cod	le	21PCSCP5	L	Р	С		
Category	Category Core -						
Nature of Co	urse	EMPLOYABILITY 🗸 SKILLORIENTED 🗸 ENTREPRE	NEU	RSHIF	)		
Course Obj	ectiv	es:					
• Unde	erstar	nd the dataset functions.					
Unde	erstar	nd the data sets and data preprocessing					
• Learn	n to p	perform data mining techniques					
• Perfo	orm t	asks using a data mining toolkit					
Deme	onstr	ate the working of algorithms for data mining tasks such associatio	n ru	le mir	ing,		
	ificat	Lion, clustering and regression.		House			
5.1NO. 1		List of Programs Build Data Warehouse and Explore WEKA	-	Hour	S		
1.		Build Data Watehouse and Explore WERA					
2.		Create a Weather Table with the help of Data Mining Tool WEKA.					
3.		Create a employee Table with the help of Data Mining Tool WEKA.					
4.	<b>1.</b> Apply Pre-Processing techniques to the training data set of Weather Table						
5.	Apply Pre-Processing techniques to the training data set of Employee Table						
6.			90				
7.		Normalize Employee Table data using Knowledge Flow.					
8.		Demonstrate performing association rule mining on datasets					
9.		Demonstrate performing classification on data sets					
10.	Demonstrate performing clustering on data sets						
	Total Lecture Hours						
Books for R	lefer	ence:					
1. Par	rteek	Bhatia, Data Mining and Data Warehousing: Principles and Practical					
	cnnic brig J	jues, Camoriage University Press, 2019. Pal Jan Witten, Ebia Frank, Mark Hall Data Mining, Practical Machire		arnin	α.		
	s and	Techniques Morgan Kaufmann: 4th edition 2016		zarning	5		
Web Reference:							
1. https	s://w	ww.cs.waikato.ac.nz/ml/weka/					
2. https	s://w	ww.tutorialspoint.com/weka/index.htm					
3. https	s://w	ekatutorial.com/					
L							

Course Outcome					
CO1	Ability to understand the various kinds oftools.	Upto K2			
CO2	Demonstrate the classification, clustering and etc. in large datasets	Upto K3			
<b>CO3</b>	Ability to add mining algorithms as a component to the exitingtools.	Upto K3			
<b>CO4</b>	Ability to apply mining techniques for realisticdata.	Upto K4			
CO5	To obtain Practical Experience Working with all real datasets.	Upto K4			

## CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	2	2	3	3
CO 2	2	2	3	3	3	2
CO 3	2	1	2	2	2	3
<b>CO 4</b>	2	3	2	2	1	2
CO5	3	3	2	2	2	3

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

#### LESSON PLAN

S. No.	List of Programs	Hrs	Mode
1.	Build Data Warehouse and Explore WEKA		
2.	Create a Weather Table with the help of Data Mining Tool WEKA.	90	Lab Demonstr ations
3.	Create a employee Table with the help of Data Mining Tool WEKA.		
4.	Apply Pre-Processing techniques to the training data set of Weather Table		
5.	Apply Pre-Processing techniques to the training data set of Employee Table		
6.	Normalize Weather Table data using Knowledge Flow.		
7.	Normalize Employee Table data using Knowledge Flow.		
8.	Demonstrate performing association rule mining on datasets		
9.	Demonstrate performing classification on data sets		
10.	Demonstrate performing clustering on data sets		

# Course Designed by:Dr.M.Karthika & Mrs.M.MuthuLakshmi



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Nan	ne	PROJECT								
Course Cod	le	21PCSPR1				L	Р	С		
Category		CORE				-	6	6		
Nature of co	urse:	EMPLOYABILITY	<	SKILLORIENTED		NEUI	RSHI	P 🗸		
COURSE C	COURSE OBJECTIVES:									
• Students a	• Students are able to develop an ability to design and implement a software.									
• Students	will	be able to select ind	ivid	lually Commercial o	r Technical Pro	ject	based	d on		
Applicatio	on Dev	velopment Technologies	S.							
• Students v	vill be	e able to know the techn	olog	gies they can develop t	the software.					
• Students v	vill be	able to Facilitates expe	rien	itial learning.						
• Students v	vill be	able to do Real time pr	ojec	ets.						
		<ul> <li>Intle</li> <li>Symposia</li> </ul>								
		<ul> <li>Synopsis</li> <li>Introduction</li> </ul>								
		<ul> <li>Module description</li> </ul>								
		<ul> <li>Existing and propose</li> </ul>	ed sy	vstem						
	5	<ul> <li>Data Flow Diagram</li> </ul>	•	)						
		System Flow Diagra	m			9	0 Ho	ours		
		Entity Relationship I	Diag	gram						
	2	Form Design								
		Database Design								
		Testing								
		Implementation								
		Form Design		Tote	al Lactura Hour		0 Ho	ure		
Books for R	Refere	nce:		100		, ,	0 110	uis		
1. Mike H	olcon	be, "Running an Agile	Sof	tware Development Pr	oject" Wiley, 200	)8				
2. Laura M	A. Lev	venthal, Julie A. Barnes	"Us	sability Engineering: P	Process, Products,	and				
Examp	les,",	Pearson/Prentice Hall, 2	2008	8						
3. Orit Ha	zzan,	Yael Dubinsky, "Agile	soft	ware engineering", Sp	oringer,2014					
4. Jakob N	Vielser	n, "Usability Engineerin	ıg",	Academic Press, 199						
Web Refere	ence:									
1. <u>https://w</u>	ww.u	pgrad.com/blog/web-dev	<u>elor</u>	<u>pment-project-ideas-fo</u>	<u>r-beginners/</u>					
2. <u>https://w</u>	ww.g	eeksforgeeks.org/web-de	velo	<u>pment-project-ideas/</u>						
<b>3.</b> <u>https://ra</u>	addev	<u>on.com/articles/10-great</u> dx.org/course/project_m	-wei	<u>p-development-learning</u> sement_for_developmen	g-project-ideas/					
Course Out	tcome	s:					K Le	vel		
At the end of	of the	Course the students w	vill k	be able to						
Desi	ign an	d implement a software	e wi	ith a good aesthetic ser	nse of designing		TZ			
and	latest	technical know-how's.		U			K	)		
CO2 Pro	ject of	ne that involves practica	al w	ork for understanding	and solving		K			
prob	olems	in the field of computin	ıg.				IX.	,		

CO3	To familiar with any software and develop tools	К3
<b>CO4</b>	To develop a software or application.	K4
CO5	To create applications using Languages	K4

## CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	2	3	3	3	3
CO 2	2	2	2	2	3	2
CO 3	2	1	2	2	3	3
<b>CO 4</b>	2	3	2	3	1	2
CO 5	3	3	2	2	2	3

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

#### **LESSON PLAN**

Module	PROJECT	Hrs	Mode
т	• Title	18	Dreatical
1	<ul><li>Synopsis</li><li>Introduction</li></ul>		Fractical
п	Module description	18	Draatical
11	<ul> <li>Existing and proposed system</li> </ul>		Fractical
	Data Flow Diagram	10	
III	System Flow Diagram	18	Practical
	Entity Relationship Diagram		
IN/	• Form Design	18	Dreatical
1V	Database Design		riactical
V	• Testing	18	Practical
v	Implementation		Presentation

# Course Designed by: Dr.G.Devika & Dr.S.Shaik Parveen



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	CLOUD COMPUTING							
Course Code	21PCSE41	L	Р	С				
Category	ELECTIVE	6	-	6				
Nature of Cour	rse: EMPLOYABILITY SKILLORIENTED 🗸 ENTREP	RENE	URSI	HIP				
<b>COURSE OBJ</b>	ECTIVES:							
To understand	the concept of cloud computing.							
• To appreciate	the evolution of cloud from the existing technologies.							
• To have know	ledge on the various issues in cloud computing.							
• To be familiar	with the lead players in cloud.							
• To appreciate	the emergence of cloud as the next generation computing paradigm.							
Unit: I Int	roduction & Principles of Parallel and Distributed Computing	1	8 Ho	urs				
Introduction: ( Environments, Computing: Er Elements of Dis	Cloud computing at a glance, Historical Developments, Building C. Computing Platforms and Technologies. <b>Principles of Parallel a</b> as of Computing, Parallel Vs Distributed computing, Elements of Para tributed Computing, Technologies for Distributed Computing.	loud ( <b>nd D</b> allel C	Comp P <b>istri</b> t Compu	uting outed uting,				
Unit: II Vir	tualization and Cloud Computing Architecture	1	8 Ho	urs				
Virtualization ' Technology E: Types of cloud Unit: III And Aneka: Cloud Building Aneka Programming	Virtualization.Infoduction, Characteristics of Virtualized Environments, Taxonomy ofVirtualization.Technology Examples. Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.Types of clouds, Economics of the cloud, open challenges.Introduction, Cloud reference model, 18 HoursUnit: IIIAneka and Concurrent Computing18 HoursAneka: Cloud Application Platform:Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management.Concurrent Computing : Thread Programming :Introducing Parallelism for Single machine Computation, Programming Application							
Unit: IV Hic	inclutive adding with Alleka, Programming Applications with Alleka Th	reads.	8 Ho	urs				
	C C C C C C C C C C C C C C C C C C C	1						
Models, Anek Programming: Aneka MapRed	hput Computing: Task Programming: Task Computing, Task-ba a Task-Based Programming. <b>Data Intensive Computing:</b> Whatis Data-IntensiveComputing, Technologies for Data-Intens uceProgramming.	ised A Ma	Applic Ap-Re Compu	educe uting,				
Unit: V Clo Toj	pics in Cloud Computing	ea 1	8 Ho	urs				
<b>Cloud Platforms in Industry:</b> Amazon Web Services, Google AppEngine, Microsoft Azure, Observations. <b>Cloud Applications:</b> Scientific Applications, Business and Consumer Applications. <b>Advanced Topics in Cloud Computing:</b> Energy Efficiency in Clouds, Market Based Management of Clouds , Federated Clouds/ InterCloud, Third Party Cloud Services.								
	Total Lecture Hou	irs	ç	90				
<b>Books for Stud</b>	y:							
1. Rajku Com 2013	umarBuyya, Christian Vecchiola, S.ThamaraiSelvi, "Mastering Cloud puting Foundations and ApplicationsProgramming ", McGraw Hill Ed	lucatio	on,					

#### **Books forReference:**

- 1. Michael Miller, "Cloud Computing", Pearson Education, New
- 2. Haley Beard, Cloud Computing Best Practices for Managing and MeasuringProcesses for On- demand Computing, Applications and Data Centers in theCloud with SLAs, Emereo Pty Limited, July 2008.
- **3.** Cloud Application Architectures, George Reese, ISBN: 8184047142, Shroff/O' Reilly, 2009.

#### Web Reference:

- 1. https://www.w3schools.com/
- 2. https://www.javatpoint.com/cloud-computing-tutorial
- 3.https://www.simplilearn.com/cloud-computing-tutorial-video
- 4. https://onlinecourses.nptel.ac.in/noc21\_cs14/

Course	e Outcome	K Level
CO1	Understand the functionality of the various cloud and services provided by them.	Upto K3
CO2	Appreciate the strengths and limitations of various cloud models with virtualization.	Upto K3
CO3	Explain and implementation of task Scheduling algorithms.	Upto K4
<b>CO4</b>	Describe different methodologies used in cloud and cloud services.	Upto K4
<b>CO5</b>	Build a private cloud	Upto K4

#### CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	PO 5	PO 6
CO 1	3	3	3	2	3	3
CO 2	2	2	2	3	3	3
CO 3	2	3	2	3	3	2
<b>CO 4</b>	2	3	3	3	3	3
CO5	3	3	3	3	2	3

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

#### LESSON PLAN

UNIT	CLOUD COMPUTING	Hrs	Mode
I	<ul> <li>Introduction: Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies.</li> <li>Principles of Parallel and Distributed Computing: Eras of Computing, Parallel Vs Distributed computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing.</li> </ul>	18	Chalk & Talk, PPT, Online course
п	Virtualization: Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples Cloud Computing Architecture: Introduction, Cloud reference model Types of clouds. Economics of the cloud, open challenges	18	Chalk & Talk, PPT, Online course
III	Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management. Concurrent Computing: Thread Programming :Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.	18	Chalk & Talk, PPT
IV	<ul> <li>High- Throughput Computing: Task Programming: Task</li> <li>Computing, Task-based Application Models, Aneka Task-Based</li> <li>Programming.</li> <li>Data Intensive Computing: Map-Reduce Programming: Whatis</li> <li>Data-IntensiveComputing, Technologies for Data-Intensive</li> <li>Computing, Aneka MapReduceProgramming.</li> </ul>	18	Chalk & Talk, PPT
V	Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Observations. Cloud Applications: Scientific Applications, Business and Consumer Applications. Advanced Topics in Cloud Computing: Energy Efficiency in Clouds, Market Based Management of Clouds , Federated Clouds/ InterCloud, Third Party Cloud Services.	18	Chalk & Talk, PPT, Online course

# Course Designed by:Dr.S. ShaikParveen & Mrs.K.Sandya

Learning Outcome Based Education & Assessment (LOBE)												
Formative Examination - Blue Print												
Articulation Mapping – K Levels with Course Outcomes (COs)												
			Section	n A	Section	n B	Section	Section				
Intomol	Cos	<b>V</b> I ovol	MCC	)s	Short Ans	swers	С	D				
miernai	COS	K Level	No. of.		No. of. K –		Either or	Open				
			Questions	Level	Questions	Level	Choice	Choice				
CI	<b>CO1</b>	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)				
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)				
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)				
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)				
		No. of										
	Que	stions to be	4		3		4	2				
		asked										
Question		No. of										
Pattern	Que	stions to be	4		3		2	1				
CIA I &	& answered											
II	Marks for each		1		2		5	10				
	question		L		4		3	10				
	Tota	l Marks for	4		6		10	10				
	eac	ch section	4		U		10	10				

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

	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 %				
	K1	2	2	-	-	4	8	20				
	K2	2	4	-	-	6	12	20				
	K3	-	-	20	20	40	80	80				
CIA I	K4	-	-	-	-	-						
	Marks	4	6	20	20	50	100	100				
	K1	2	2	-	-	4	8	20				
	K2	2	4	_	-	6	12	20				
CIA	<b>K</b> 3	-	-	10	10	20	40	40				
II	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	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)										
			MCO	Qs	Short Answers		Section C	Seation D			
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)			
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)			
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)			
No	of Quest. Aske	ions to be ed	10		5		10	5			
No. of Questions to be answered		10		5		5	3				
Marks for each question		1		2		5	10				
Total I	Marks for	each section	10		10		25	30			
	(Figures	in parenthesi	s denotes, qu	estions sl	ould be ask	ked 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	4.17	17					
K2	5	10	-	-	15	12.5	17					
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.

Section	A (Mu	iltiple Cho	pice Questions)
Answe	er All Q	uestions	(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 (Sho	ort Answei	rs)
Answe	r All Qu	uestions	(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 (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	(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: Hi	gher le	vel of perf	formance of the students is to be assessed by attempting higher
level of	K leve	ls	
Section	D (Op	en Choice	)
Answe	r Any T	l'hree ques	tions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	<b>BLOCK CHAIN FUNDAMENTALS</b>				
Course Code	21PCSE42		L	Р	С
Category	Elective		6	-	6
Nature of course	EMPLOYABILITY 🖌 SKILLORIENTED	ENTREP	RENE	URS	HIP
<b>COURSE OBJE</b>	CTIVES:				
<ul> <li>Students a</li> </ul>	re able to decompose a block chain system's fundam	ental compon	ents, l	now t	hey
fit togethe	r and examine a decentralization using block chain.				
<ul> <li>Students v</li> </ul>	vill be able to explain how Crypto currency works, fr	om when a tra	ansact	ion is	5
created to	when it is considered part of the block chain.				
• Students v	vill be able to explain the components of Ethereum as	nd Programmi	ng La	ngua	ges
for Ethere	um.				
• Students v	vill be able to study the basics hyperledger and Web3	•			
• Students v	will be able to provide a details of alternative blockch	ain and block	chain	proje	cts
in differen	t.			10.1	r
Unit: I Intro	duction to block chain & Evolution of block chair	•		18 H	lours
Block chain Char	acteristics- Opportunities Using Block chain- Histor	of Block cha	ain – l	Evolı	ution
Of Block Chain:	Evolution of Computer Applications-Centralized A	pplications- I	Decen	traliz	ation
Applications– Sta	iges in Block chain –Consortia – Restriction on Sl	aring Ledger	s- Foi	rks-P	ublic
Block chain Envir	conments – Types of Players in Block chain Ecosyster	n.		40.7	-
Unit: II Block	c Chain Concepts :			18 H	lours
Introduction – C	Chaining of Blocks- Hashing-Merkle Tree-Conse	nsus-Mining	and	Final	izing
Blocks-Data Stora	age on Block chain-Wallets- Types of Block chain N	odes – Risk A	Assoc	iated	with
Block chain Solut	ions- Life Cycle of Block chain Transaction		r	10.1	r
Unit: III Arch	itecting block chain solutions:			18 H	lours
Introduction- Obs	tacles for Use of Block chain $-$ Block chain Releva	nce Evaluatio	n Fra	mewo	Ork - 1
Block chain Solu	tions Reference Architecture - Types of Block	chain Applica	ations	-1 y	pical
Dials aboin Diate	ture for Enterprises Use Cases- Architecture Const	derations –Al	cinte	clure	with
DIOCK Chain Flatio	nins – Approach for Designing Block chain Apprica	10115. Tom block ob	ain	19 L	loura
Unit: IV imple	ementation:	ger block ch		101	louis
Ethereum Virtua	l Machine – Smart Contract Programming	<ul> <li>Integrated</li> </ul>	Dev	elop	ment
Environment-Tru	ffle Framework – Unit Testing – Hyper ledger Bl	ock chain In	nplem	enta	tion:
Hyper ledger Fab	ric - FabCar Use Case Implementations - Invoking	Chain code F	Function	ons U	Jsing
Client Application	1.				
Unit: V Adva	nced concepts in block chain:			18 H	lours
Inter Planetary Fi	le System – Zero – Knowledge Proofs – Oracles	- Self –Sover	eign	Ident	ify –
Block chain with	IoT and AI / ML- Quantum Computing and Block c	hain – Initial (	Coin (	Offer	ings-
Blockchain and it	s Future Potential.				
	Tot	al Lecture Ho	ours	90 H	lours
Books for Study:					
1. Sham	M R, Ambadas Tulajadas Choudhari, Arshad Sa	tarzAriff, I	Deepal	C P	N,
AmıtJur	nankar, "Blockchain for Enterprise Application	Developers"	, Firs	t Ed	ition,

	Wiley Emerging Technology Series, 2020.	
	Unit I : Chapter 1 and 2 (Full)	
	Unit II : Chapter 3 (Full)	
	Unit III : Chapter 4 (Full)	
	Unit IV :Chapter 5 and 6(Full)	
	Unit V : Chapter 7 (Full)	
Books	for Reference:	
1. K	umar Saurabh, AshutoshSaxena, "Blockchain Technology Concepts and Applicati	ons",Wiley
In	dia.	
2. Sa	tyaPrakashYadav, SubiyaZaidi, "Blockchain and Cryptocurrency" Dreamtech Pr	ress.
Web R	Reference:	
1. 1	NPTEL online course : https://nptel.ac.in/courses/106/104/106104220/#	
2.	Udemy: <u>https://www.udemy.com/course/build-your-blockchain-az/</u>	
3.	EDUXLABS Online training : <u>https://eduxlabs.com/courses/blockchain-</u>	
1	technologytraining/?tab=tab-curriculum	
Course	e Outcomes:	K Level
At the	end of the Course the students will be able to	1
CO1:	Review the fundamental concepts of ablockchains and emerging trends in	Unto K3
	blockchain.	opto no
CO2:	Establish deep understanding of the Ethereum model, its consensus model,	Unto K3
	code execution.	opto no
CO3:	Analyze, identify and Aware of different approaches to developing	Unto K3
000	decentralized applications.	opto no
CO4·	Identify the architectural components of a Hyper ledger and its development	Unto K4
	framework.	opto 114
CO5:	Apply the learning of solidity and de-centralized apps on Ethereum.	Upto K4

## CO & PO Mappings:

COS	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	3	3	2	3	3
CO 2	2	2	2	3	3	3
CO 3	2	3	2	3	3	2
<b>CO 4</b>	2	3	3	3	3	3
CO5	3	3	3	3	2	3

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

UNIT	BLOCK CHAIN FUNDAMENTALS	Hrs	Mode
I	Block chain Characteristics- Opportunities Using Block chain- History of Block chain – Evolution Of Block Chain: Evolution of Computer Applications- Centralized Applications- Decentralization Applications – Stages in Block chain –Consortia – Restriction on Sharing Ledgers- Forks- Public Block chain Environments – Types of Players in Block chain Ecosystem.	18	Chalk & Talk, PPT
II	Introduction – Chaining of Blocks- Hashing-Merkle Tree-Consensus-Mining and Finalizing Blocks-Data Storage on Block chain-Wallets- Types of Block chain Nodes – Risk Associated with Block chain Solutions- Life Cycle of Block chain Transaction	18	Chalk & Talk, PPT
ш	Introduction- Obstacles for Use of Block chain – Block chain Relevance Evaluation Framework – Block chain Solutions Reference Architecture Types of Block chain Applications –Typical Solution Architecture for Enterprises Use Cases- Architecture Considerations –Architecture with Block chain Platforms – Approach for Designing Block chain Applications.	18	Chalk & Talk, PPT
IV	Ethereum Virtual Machine – Smart Contract Programming – Integrated Development Environment-Truffle Framework – Unit Testing – Hyper ledger Block chain Implementation: Hyper ledger Fabric – FabCar Use Case Implementations – Invoking Chaincode Functions Using Client Application.	18	Chalk & Talk, PPT
V	InterPlanetary File System – Zero – Knowledge Proofs – Oracles – Self – Sovereign Identify – Block chain with IoT and AI / ML- Quantum Computing and Block chain – Initial Coin Offerings- Blockchain and its Future Potential.	18	Chalk & Talk, PPT

### LESSON PLAN

## Course Designed by:Dr.R.Bagavathi Lakshmi & Mr.M.Rameshkumar

	Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print										
Articulation Mapping – K Levels with Course Outcomes (COs)											
			Section A		Section B		Section C	Section D			
Internal	Cos	K I ovol	MCQ	)s	Short Ans	swers	Fither or	Open			
inter nar	0.05	K Level	No. of.	К-	No. of.	К –	Choice	Choice			
			Questions	Level	Questions	Level		Choice			
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)			
CI	CO3	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)			
AII	CO4	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)			
	No.	of Questions	1		3		4	2			
	to	be asked	4		3		4	2			
Question	No.	of Questions	4		3		2	1			
Pattern	to b	be answered	4		3		4	I			
CIA I &	Ma	rks for each	1		2		5	10			
II		question	1		2		3	10			
	Tot	al Marks for	4		6		10	10			
	ea	ich section	-		U		10	10			

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

	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 %				
	K1	2	2	-	-	4	8	20				
	K2	2	4	-	-	6	12	20				
	K3	-	-	20	20	40	80	80				
CIA I	K4	-	-	-	-	-						
	Marks	4	6	20	20	50	100	100				
	K1	2	2	-	-	4	8	20				
	K2	2	4	-	-	6	12	20				
CIA	K3	-	-	10	10	20	40	40				
II	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	Seation D	
S.No	COs	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)	
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
3	CO 3	K4	2	K1&K2	1	K2	2 (K3&K3)	1(K3)	
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
5	CO 5	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)	
No	of Quest. Aske	ions to be ed	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 parenthesi	s denotes, qu	estions sl	nould be ask	ked 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	4.17	17				
K2	5	10	-	-	15	12.5	17				
K3	-	-	30	30	60	50	50				
K4	-	-	20	20	40	33.33	33				
Marks	10	10	50	50	120	100	100				
NID TT	1 1 1 0	0	<b>0</b> / <b>1</b> / <b>1</b> /	• 4 •							

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

Section	A (Mu	iltiple Cho	ice Questions)
Answe	r All Q	uestions	(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 (She	ort Answei	rs)
Answe	r All Q	uestions	(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 (Eit	her/Or Ty	pe)
Answe	r All Q	uestions	(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: Hi	gher le	vel of perf	ormance of the students is to be assessed by attempting higher
level of	K leve	ls	
Section	D (Op	en Choice	
Answe	r Any 'l	Three ques	tions (3x10=30 marks)
<b>Q.No</b>		K Level	Questions
21	COL	K3	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	

# **Summative Examinations - Question Paper – Format**



# MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF COMPUTER SCIENCE (For those who joined in 2021-2022 and after)

Course Name	SOFTWARE PROJECT MANAGEMENT			
Course Code	21PCSE43	L	Р	С
Category	ELECTIVE	6	-	6
Nature of course:	<b>EMPLOYABILITY V</b> SKILLORIENTED ENTREP	RENE	URS	HIP
<b>COURSE OBJEC</b>	CTIVES:			
• Identify the difference of t	fferent project contexts and suggest an appropriate management st	rategy	<b>'</b> .	
• Practice the ro	le of professional ethics in successful software development.			
• Identify and de	escribe the key phases of project management.			
• Determine an	appropriate project management approach through an evalu	ation	of t	he
business conte	xt and scope of the project.			
• Able to plan	and implement a software project management activity, and to	o com	plete	e a
specific projec	t in time with the available budget.		-	
Unit: I Intro	duction:		18 H	ours
Introduction – w	hy software project management important? - What is a project	ect? –	soft	ware
projects Vs other	type of project, Contract Management and Technical Project	Mar	nager	nent,
Activities covered	by Software Project Management, Plans, Methods and Methode	ologie	s, Pr	oject
Charter, Stakehold	ders, setting objectives, the business case, project success and t	failure	e, wh	at is
management?, Ma	nagement Control, project management life cycle, traditional Vs	Mode	rn Pr	oject
Management Prac	tices, Project Evaluation and Programme Management – B	usines	ss Ca	ıse –
Project Portfolio	Management, Evaluation of Individual Projects, Cost Bene	efit E	valu	ation
Techniques, Risk	k Evaluation, Programme Management, Managing the allocation	n of I	Reso	urces
within Programm	nes, strategic Programme Management, Creating a Program	nme,	Aid	s to
Programme Manag	gement, An overview of Project Planning – Introduction to Ste	p Wis	e Pr	oject
Planning – Selec	t Project, Identify Project Scope and objectives, identify project	infra	struc	ture,
Analyse Project C	haracteristics, Identify Project Products and Activities, Estimate	Effor	t for	each
Activity, Identify	Activity Risks, Allocate Resources, Review Publicize Plan.		10.11	r
Unit: II Select	ion of an Appropriate Project Approach		18 H	ours
Choosing Method	ologies and Technologies, Software Process and Process model	s, Str	uctur	e Vs
Speed of Delivery	, The Waterfall Model, The Spiral Model, Software Prototyping,	Othe	r wa	ys of
Categorizing Proto	otypes, incremental Delivery, Rapid Application Development, A	Agile	Meti	10ds,
Extreme Program	Iming, Scrum, Lean Software Development, Managing Iter	ative	Pro	cess,
Soliware Ellori	<b>Estimation</b> – where the Estimation Done?, Problems with O for Software Estimating Software Effort Estimation Technique	ver al		nder
Estimating The T	for Software Estimating, Software Errort Estimation Technique	etimot	ing 1	i Op
Analogy Albrach	t Function Point Analysis Function Points Mark II. Cosmic Full E	Sunnati	ing t on De	)y vinta
COCOMO II: A	Parametric Productivity Model Cost Estimation Staffing Pat	tern	Ffe	nins,
Schedule Compres	ssion Capers Jones Estimating rules of Thumb Activity Plannir	$\sigma = 0$	)hiec	tives
of Activity Planni	ng When to Plan Project Schedules Projects and Activities S	enner Seuner	ncino	and
Scheduling Activi	ties Network Planning Activities Formulating a Network Mod	el A	ddine	o the
Time Dimension	The Forward Pass. Identifying the Critical Path. Activity Float	Short	ening	g the
Project Duration. 1	Identifying Critical Activities			,
Unit: III Risk	Management		18 H	ours

Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risks, Risk Identification, Assessment, Planning, Management, Evaluating Risks to the Schedule, Boehms Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts, Resource Allocation - Nature of Resources - Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedule, Scheduling Sequence, Monitoring and Control Creating the Framework, Collecting the Data, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, SCM Unit: IV | Managing Contracts 18 Hours Types of Contract, Stages in Contract, Typical terms of Contract, Contract Management, Acceptance, Managing People in Software Environments – Understanding Behaviour, Organizational Behaviour, Selecting the Right Person for the job, Instruction in the Best Methods, Motivation, The Oldham-Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns, Working in Teams - Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leaderships

#### Unit: V Software Quality

18 Hours

The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product Vs Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans, **Project Control** – Reasons for Project Closure Process, Performing a Financial Closure, Project Closeout Report **Total Lecture Hours** 90 Hours

#### Books for Study:

- 2. Bob Hughes, Mike Cottrell, Rajib Mall, SOFTWARE PROJECT MANAGEMENT, Mc GRAW HILL.

#### **Books for Reference:**

- 1. Joel Henry, "Software Project Management", 1st Edition, Pearson Education, 2006.
- 2. PankajJalote, "Software Project Management in practice", 1st Edition, Pearson Education, 2005.

#### Web Reference:

1. <u>https://www.tutorialspoint.com/software_engineering/software_project_management.htm</u> 2. https://www.javatpoint.com/software-project-management					
Course Outcomes:					
At the end of the Course the students will be able to					
CO1	Apply project management concepts and techniques to an IT project.	UptoK3			
CO2	Identify issues that could lead to IT project success or failure	UptoK3			
CO3	Explain project management in terms of the software development process	Upto K3			
<b>CO4</b>	Describe the responsibilities of IT project managers	Upto K4			
CO5	Apply project management concepts through working in a group as team leader or active team member on an IT project	Upto K4			

## CO & PO Mappings:

COs	<b>PO 1</b>	<b>PO 2</b>	PO 3	PO 4	<b>PO 5</b>	<b>PO 6</b>
CO 1	3	3	2	2	3	2
CO 2	2	2	3	3	3	2
CO 3	3	2	3	2	2	3
CO 4	2	2	3	2	2	2
CO 5	3	3	2	3	3	3

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

### LESSON PLAN

UNIT	Software Project Management	Hrs	Mode
Ι	Introduction – why software project management important? – What is a project? – software projects Vs other type of project, Contract Management and Technical Project Management, Activities covered by Software Project Management, Plans, Methods and Methodologies, Project Charter, Stakeholders, setting objectives, the business case, project success and failure, what is management?, Management Control, project management life cycle, traditional Vs Modern Project Management Practices, <b>Project Evaluation and Programme</b> Management – Business Case – Project Portfolio Management, Evaluation of Individual Projects, Cost Benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing the allocation of Resources within Programmes, strategic Programme Management, Creating a Programme, Aids to Programme Management, An overview of Project Planning – Introduction to Step Wise Project Planning – Select Project, Identify Project Scope and objectives, identify project infrastructure, Analyse Project Characteristics, Identify Project Products and Activities, Estimate Effort for each Activity, Identify Activity Risks, Allocate Resources, Review Publicize Plan.	18	Chalk & Talk, PPT
П	<ul> <li>Selection of an Appropriate Project Approach – Choosing Methodologies and Technologies, Software Process and Process models, Structure Vs Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Other ways of Categorizing Prototypes, Incremental Delivery, Rapid Application Development, Agile Methods, Extreme Programming, Scrum, Lean Software Development, Managing Iterative Process, Software Effort</li> <li>Estimation – Where the Estimation Done?, Problems with Over and Under Estimates, Basis for Software Estimating, Software Effort Estimation Techniques, Bottom Up Estimating , The Top Down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point Analysis, Function Points Mark II, Cosmic Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating rules of Thumb, Activity Planning – Objectives of Activity Planning, When to Plan, Project</li> </ul>	18	Chalk & Talk, PPT

	Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Activities, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities.		
III	<b>Risk Management</b> – Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risks, Risk Identification, Assessment, Planning, Management, Evaluating Risks to the Schedule, Boehms Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts, <b>Resource Allocation</b> – Nature of Resources – Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedule, Scheduling Sequence, <b>Monitoring and Control</b> - Creating the Framework, Collecting the Data, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, SCM	18	Chalk & Talk, PPT
IV	Managing Contracts – Types of Contract, Stages in Contract, Typical terms of Contract, Contract Management, Acceptance, Managing People in Software Environments – Understanding Behaviour, Organizational Behaviour, Selecting the Right Person for the job, Instruction in the Best Methods, Motivation, The Oldham- Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns, Working in Teams - Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leaderships	18	Chalk & Talk, PPT
V	Software Quality – The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product Vs Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans, <b>Project Control</b> – Reasons for Project Closure Process, Performing a Financial Closure, Project Closeout Report	18	Chalk &Talk, PPT

## Course Designed by:Dr.BagavathiLakshmi & Mrs.T.Sujithra.

Learning Outcome Based Education & Assessment (LOBE)								
Formative Examination - Blue Print								
	Art	iculation M	apping – K l	Levels wi	th Course O	outcome	s (COs)	
		K Level	Section A		Section B		Section	Section
Internal	Cos		MCQs		Short Answers		С	D
memai	CUS		No. of.	К -	No. of. K –		Either or	Open
			Questions	Level	Questions	Level	Choice	Choice
CI	CO1	Up to K2	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AI	CO2	Up to K3	2	K1,K2	2	K2	2(K3,K3)	1(K3)
CI	<b>CO3</b>	Up to K3	2	K1,K2	1	K1	2(K3,K3)	1(K3)
AII	<b>CO4</b>	Up to K4	2	K1,K2	2	K2	2(K4,K4)	1(K4)
		No. of	4		3			2
	Que	stions to be					4	
		asked						
Question	Question No. of							
Pattern	<b>n</b> Questions to be		4		3		2	1
CIA I &	<b>k</b> answered							
II	Marks for each		1		2		5	10
	question		T		4		3	10
	Total Marks for		1		6		10	10
	each section		4		U		10	10

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

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 %
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
	K3	-	-	20	20	40	80	80
CIA I	K4	-	-	-	-	-		
	Marks	4	6	20	20	50	100	100
	K1	2	2	-	-	4	8	20
	K2	2	4	-	-	6	12	20
CIA	K3	-	-	10	10	20	40	40
II	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.
Volume IV - Science Syllabus / 2022 - 2023

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)								
S.No COs			MCQs		Short Answers		Section C	Seetter D
	K - Level	No. of Questions	K – Level	No. of Question	K – Level	(Either / or Choice)	(Open Choice)	
1	CO 1	K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
2	CO 2	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
3	CO 3	K3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)
4	CO 4	K4	2	K1&K2	1	K2	2 (K4&K4)	1(K4)
5	CO 5	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
(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	4.17	17
K2	5	10	-	-	15	12.5	17
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.

Section A (Multiple Choice Questions)					
Answei	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 (Sho	ort Answei	rs)		
Answei	r All Q	uestions	(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 (Eit	her/Or Ty	pe)		
Answei	r All Q	uestions	(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)					
Answei	r Any T	Three ques	tions (3x10=30 marks)		
Q.No	CO	K Level	Questions		
21	CO1	K3			
22	CO2	K3			
23	CO3	K3			
24	CO4	K4			
25	CO5	K4			

## **Summative Examinations - Question Paper – Format**

Academic Council Meeting Held On 17.05.2022