

DEPARTMENT OF COMPUTATIONAL STUDIES

M.Sc. COMPUTER SCIENCE

Academic Regulations 2023(R-2023)

Batch-2023-2025

		Sem	ester – III							
SL.				P	Perio	ods		Μ	ax Mark	S
SL. No	Course Code	Course Title	Category	L	Т	Р	Credits	CAM	ESM	Tota l
Theor	ry									
1	A23PCPT307	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	DSC	4	0	0	4	25	75	100
2	A23PCPT308	WEB TECHNOLOGY	DSC	4	0	0	4	25	75	100
3	A23PCPT309	BLOCK CHAIN TECHNOLOGY	DSC	4	0	0	4	25	75	100
	A23PCPE307	DATA MINING								
4	A23PCPE308	CYBER SECURITY	DSE	4	0	0	4	25	75	100
	A23PCPE309	DIGITAL MARKETING								
Practi	ical									
5	A23PCPL305	WEB TECHNOLOGY LAB	DSC	0	0	4	2	50	50	100
Skill l	Enhancement Co	Durse				-				
6	A23PCPS303	ETHICAL HACKING	SEC	0	0	4	2	100	0	100
							20	250	350	600

R.D. Mounthingor

Semester Third Course Code End Semester Exam Type: Transport Course Code A23PCPT307 I T P C CAM ESE TM Course Name ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING 4 0 0 4 25 75 100 Prerequisite Basic Knowledge in AI and ML 4 0 0 4 25 75 100 Prerequisite Basic Knowledge in AI and ML After the completion of this course, the students will be able to: BT Mapping (Highest Leevel) (Highest Leevel) <td< th=""></td<>
Course Code A23PCPT307 L T P C CAM ESE TM Course Name ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING 4 0 0 4 25 75 100 Prerequisite Basic Knowledge in AI and ML Basic Knowledge in AI and ML BT Mapping (Highest Level) BT Mapping (Highest Level) BT Mapping (Highest Level) BT Mapping (Highest Level) BT Mapping (Highest Level) K2 Course Outcome CO1 Apply AI techniques to find solutions to a variety of engine=ring applications. K2 CO2 Understand the fundamental concepts involved in developing effective AI systems. K2 CO3 Interpret the various classification algorithms and its efficie=recepter and the end to models of machine learning. K4 UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Interpret Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI =Role of Machine Learning Tools & Package. CO1 ARTIFICIAL INTELLIGENCE Periods: 12 Protost: 12 Interpret Agent -Search Methods and Knowledge representation- Use cases of AI =Role of Machine Learning Tools & Package. CO1 CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12
Acts = C + 1307 L T P C CAM ESE TM Course Name ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING 4 0 0 4 25 75 100 Prerequisite Basic Knowledge in AI and ML After the completion of this course, the students will be able to: BT Mapping (Highest Level) BT Mapping (Highest (Highest Level) Vertice Vertice<
MACHINE LEARNING 4 0 0 4 25 75 100 Prerequisite Basic Knowledge in AI and ML
Prerequisite Basic Knowledge in AI and ML Course Outcome After the completion of this course, the students will be able to: CO1 BT Mapping (Highest Level) C01 Apply AI techniques to find solutions to a variety of engineering applications. K2 C02 Understand the fundamental concepts involved in developing effective AI systems. K2 C03 Interpret the various classification algorithms and its efficiency. K3 C04 Demonstrate proficiency in applying scientific method to models of machine learning. K4 UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning- Machine Learning Tools & Package. C01 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. C02
Course Outcome After the completion of this course, the students will be able to: BT Mapping (Highest Level) C01 Apply AI techniques to find solutions to a variety of engineering applications. K2 C02 Understand the fundamental concepts involved in developing effective AI systems. K2 C03 Interpret the various classification algorithms and its efficiency. K3 C04 Demonstrate proficiency in applying scientific method to models of machine learning. K4 C05 Investigate the issues involved in building solutions for real-world applications. K4 UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning- Machine Learning Tools & Package. C01 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. C02
CO2 Apply Aftechniques to find solutions to a valiety of engineering applications. K12 CO2 Understand the fundamental concepts involved in developing effective AI systems. K2 CO3 Interpret the various classification algorithms and its efficiency. K3 CO4 Demonstrate proficiency in applying scientific method to models of machine learning. K4 CO5 Investigate the issues involved in building solutions for real-world applications. K4 UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO2
CO3 Interpret the various classification algorithms and its efficiency. K3 CO4 Demonstrate proficiency in applying scientific method to models of machine learning. K4 CO5 Investigate the issues involved in building solutions for real-world applications. K4 UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO2
CO4 Demonstrate proficiency in applying scientific method to models of machine learning. K4 CO5 Investigate the issues involved in building solutions for real-world applications. K4 UNIT-I INTROUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to Al- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO2
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UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE Periods: 12 Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO2
Introduction to AI- Intelligent Agent -Search Methods and Knowledge representation- Use cases of AI –Role of Machine Learning- Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO2
Machine Learning - Machine Learning Tools & Package. CO1 UNIT-II ARTIFICIAL INTELLIGENCE Periods: 12 Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding. CO1
Plotting for exploratory data analysis (EDA) - Linear Algebra- Probability and Statistics- Dimensionality reduction and CO2 Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding.
Visualization: PCA (principal component analysis) - (t-SNE) T-distributed Stochastic Neighborhood Embedding.
UNIT-III REAL WORLD PROBLEM Periods: 12
Real world problem: Predict rating given product reviews on Amazon- Classification and Regression Models: K-
Nearest Neighbors- Classification algorithms in various situations- Performance measurement of models- Naive CO3
Bayes- Logistic Regression- Linear Regression- Solving Optimization Problems.
UNIT-IV MACHINE LEARNING ALGORITHMS Periods: 12
Support Vector Machines (SVM) - Decision Trees-Ensemble Models- Random Forest-Unsupervised Learning- K-Means CO4 Clustering – Ridge Regression.
UNIT-V CASE STUDIES Periods: 12
Quora question Pair Similarity Problem- Personalized Cancer Diagnosis-Facebook Friend Recommendation using Graph
Mining-Taxi demand prediction in Indian Cities-Stack overflow tag predictor- Microsoft Malware Detection.
Lecture Periods: 60 Tutorial Periods: - Practical Periods: - Total Periods: 60
Text Books
1. Stuart Russell and peter Norvig," Artificial Intelligence a Modern Approach", 4th Edition, Pearson Education, 2022.
2. Em Alpaydin,"Introduction to Machine Learning", MIT Press, 4th Edition, 2020. Reference Books
1. "Machine Learning Yearning" by Andrew Ng (2018) - Provides practical advice and guidelines for machine
learning practitioners.
2. "Artificial Intelligence: A Guide for Thinking Humans" by Melanie Mitchell (2019) - Explores the fundamentals
of AI and its implications for society. 3. "Grokking Deep Learning" by Andrew W. Trask (2019) - Focuses on understanding deep learning concepts
through practical examples.
4. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron (2019) - A
 "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron (2019) - A practical guide to machine learning using popular Python libraries. "Artificial Intelligence Basics: A Non-Technical Introduction" by Tom Taulli (2020) - Introduces AI concepts to

R. D. Maulhuge

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COs		Program Outcomes (POs)						ecific PSOs)
COS	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3
1	2	2	3	3	3	2	2	2
2	2	3	2	3	2	3	2	2
3	3	2	3	3	2	3	3	2
4	3	2	2	2	2	3	2	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contin	uous Ass	sessment Marks	End		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

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R. D. Maulhager

	Comp	outational Studies	Progra	mme: I	M.Sc CO	MPUTER	SCIENCE		
Semester	Third		Course	e Categ	ory Code	e: DSC*End TE	d Semeste	er Exam	туре:
Course Code	A23PC	PT308	Per	iods / W	/eek	Credit		mum N	larks
			L	Т	P	С	CAM	ESE	TM
Course Name		ECHNOLOGY	4	0	0	4	25	75	100
Prerequisite	Basic	knowledge about Web Techno	ology						
Course Objectives	 Ex Im Un 	eate and style static web page plain the roles of clients and s plement Object-Oriented Prog nderstand XML fundamentals a plementing AJAX for creating	ervers ir Irammino and to cr	n web co g (OOP) eate a >	ommunic) concep KML doc	ation. ts in PHP. uments.			
		e completion of this course, th							lapping
Course Outcome		To Creating and styling static	weh na	nes lisii	na HTMI	and CSS		····	st Leve K2
	CO1	To Explaining the roles of clie	•	•	•				
	CO2	To Implement Object-Oriente							K3 K3
	CO3	To Understand XML fundame	•		· · · · ·	•			
	CO4	To Implement AJAX for creat					1115.		K4
UNIT-I	CO5 Rovier	w of the Internet technologi				Periods:	12		K4
ntroduction to stati Sheets. UNIT-II	c web p	Firewall - Proxy - Internet Se bage creation using HTML (Ta -Side Scripting duction - JavaScript – Data	ables, Fr	rames,	Forms) a	and Casca Periods:	ding Style		:01
		unctions. Windows Manipulat						C	:02
UNIT-III		r-Side Scripting				Periods:		•	
		duction – PHP Language Ba		ata Typ				· ·	· ~ ^
		uage Constructs – OOP with atabase manipulation with PH			/lanagen	nent – Auth	entication	Ľ	:03
and Security – Repo UNIT-IV	orting. D	atabase manipulation with P⊢	IP and N	IYSQL.	.	Periods:	12		,03
and Security – Repo UNIT-IV (ML: Introduction -	orting. D XML XML S		IP and M arser an	IYSQL. d Proce	essors -	Periods:	12		:03
and Security – Repo UNIT-IV (ML: Introduction -	orting. D XML XML S	Patabase manipulation with PH yntax - XML basics - XML Pa IL Schema. SOAP - Creating S	IP and M arser an	IYSQL. d Proce	essors -	Periods:	12 Elements		
and Security – Repo UNIT-IV KML: Introduction - and Attributes – Typ UNIT-V AJAX: Introduction ·	orting. D XML XML S bes - XM AJAX	Patabase manipulation with PH yntax - XML basics - XML Pa IL Schema. SOAP - Creating S	IP and M arser an Simple w	IYSQL. d Proce eb serv	essors - ices.	Periods: XML DTD: Periods:	12 Elements 12	C	
And Security – Report UNIT-IV (ML: Introduction - and Attributes – Typ UNIT-V AJAX: Introduction - vith PHP. Lecture Periods:	orting. D XML XML S bes - XM AJAX - creatin	Patabase manipulation with P⊢ yntax - XML basics - XML Pa IL Schema. SOAP - Creating S	IP and M arser an Simple w L in Java	IYSQL. d Proce eb serv	essors - ices. and AJA	Periods: XML DTD: Periods:	12 Elements 12 side AJAX	C	:04
and Security – Repo UNIT-IV KML: Introduction - and Attributes – Typ UNIT-V AJAX: Introduction - with PHP. Lecture Periods: Text Books 1. "Internet and V 2. "Eloquent Jav 3. "PHP Objects, Reference Books 1.Computer Net 2."Web Technol	orting. D XML XML S bes - XM AJAX - creatin 60 World W aScript: , Pattern tworking	Patabase manipulation with P⊢ yntax - XML basics - XML Pa IL Schema. SOAP - Creating S ig and sending requests - XMI	IP and M arser and Simple w L in Java Praction Paul De gramming Istra 6th ames F. I	IYSQL. d Proce eb serv Script a cal Peri eitel anc g" by M Edition, Kurose	essors - ices. and AJA iods: - d Harvey arijn Hav , 2021. and Keit	Periods: XML DTD: Periods: (– server- Deitel 6th verbeke 3rd	12 Elements 12 side AJAX Tota Edition, 20 I Edition, 2	C Al Peric 021. 2018.	:04 :05 ods: 60
And Security – Report UNIT-IV KML: Introduction - and Attributes – Typ UNIT-V AJAX: Introduction - with PHP. Lecture Periods: Text Books 1. "Internet and N 2. "Eloquent Jav 3. "PHP Objects, Reference Books 1.Computer Net 2."Web Technolow Neb References	orting. D XML XML S bes - XM AJAX - creatin 60 World W aScript: , Pattern tworking ogy Refe	yntax - XML basics - XML Pa IL Schema. SOAP - Creating S Ig and sending requests - XMI Tutorial Periods: - /ide Web: How to Program" by A Modern Introduction to Prog ns, and Practice" by Matt Zanc	IP and M arser and Simple w L in Java Practic Paul De gramming Istra 6th ames F. I ive Hanc	IYSQL. d Proce eb serv Script a cal Peri eitel anc g" by M Edition, Kurose Ibook" T	essors - ices. and AJAX iods: - I Harvey arijn Hav , 2021. and Keit Fhird Edi	Periods: XML DTD: Periods: X – server- Deitel 6th verbeke 3rd h W. Ross. tion, 2003.	12 Elements 12 side AJAX Tota Edition, 20 I Edition, 2 8th Editio	C Al Peric 121. 2018. n 2020	:04 :05 ods: 60

R. D. Maulhuge

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3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5787626/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
1	3	2	3	3	2	2	2	2	3	
2	3	2	2	3	3	3	2	2	2	
3	2	2	2	2	3	3	3	2	2	
4	3	3	2	2	2	2	2	2	3	
5	2	3	2	2	3	3	3	3	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Conti	nuous Ass	essment Marks	(CAM)	End Somostor To			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks		
Marks	1	0	5	5	5	75	100		

R.D. Mounthingor

	Com	outational Studies	Program	nme: M .	Sc. Co					
Semester	Third Course Category Code: DSC *End Semester Exam Type A23PCPT309 Periods / Week Credit Maximum M									
Course Code	∆ 23Þ	CPT309	Pe	T						
			L	Т	Р	С	CAM	ESE	TM	
Course Name	Block	Chain Technology	4	0	0	4	25	75	100	
Prerequisite	Basic	knowledge in Block chain tec	chnology							
		ne completion of this course, th						(Hi Le	lapping ghest evel)	
Course	CO1	To know differences between embedded system	the general corr	puting	system	and the			K2	
Outcome	CO2	Ability to recognize the classif	fication of embed	lded sy	stems.				K3	
	CO3	Become aware of interrupts, h	hyper threading a	and soft	tware op	timization.			К3	
CO4 Design real time embedded systems using the concepts of RTOS.									K4	
	CO5	Students can able to enhance	e the future study	in Emb	bedded \$	System.			K4	
UNIT-I	Intro	duction				Periods: 12		i		
leed for Distri	ibuted F	Record Keeping, Modeling fau	ults and adversa	ries, B	yzantine	Generals p	roblem	, Consens	us	
-		alability problems, Nakamoto'					-	-	es CO 1	
	····· 7 ······	n – hash pointers, consensus,	-		distribut		-	l cash etc.		
UNIT-II		Distributed Computing &an				Periods: 12				
		sensus, Byzantine Models of f					•		CO2	
	-	ignatures, public key crypto, ve	erifiable random	functio	ns, ∠ero	-	-	8		
UNIT-III	Bitco	in basics								
	I		· · · · · · ·			Periods: 12				
Bitcoin block ch scripting langua	hain, Ch age and	allenges and solutions, proof o their use. Blockchain Networ				es to Bitcoin	conse			
Bitcoin block ch scripting langua	nain, Ch age and ain.	allenges and solutions, proof o				es to Bitcoin	conse d Fork			
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Bitcoin block ch scripting langua Public block ch UNIT-IV Ethereum and E Jsing smart co smart contracts UNIT-V Pseudo-anonyr attacks, selfish attacks, case S Lecture Peric Text Books 1. Naraya Introdu 2. Josh T	hain, Ch age and ain. Ether Smart Contracts susing S busing S Priva mity vs. mining Studies: ods: 60 anan, Bo ation", F hompso	allenges and solutions, proof of their use. Blockchain Networ reum basics contracts, The Turing Complete to enforce legal contracts, cor Solidity & JavaScript cy, Security issues in Blockch anonymity, Zcash and Zk-SNA , 51% attacks advent of algo Block chain in Financial Service Tutorial Periods: -	k, Life of Blockc eness of Smart (mparing Bitcoin s nain ARKS for anonyr orand; Sharding ce, Supply Chain Practica d feder, "Bitcoin a 21. ain for Beginnin	hain ap Contrac scripting based Manag al Peric and Cry gs, Gu	pplication t Langua g vs. Eth servatio consens gement a ods: -	ves to Bitcoin n, Soft & Har Periods: 12 ages and ver hereum Smar Periods: 12 n, attacks on sus algorithm and Governm To ency Techno	ification t Contr Block as to p hent Se tal Per logies -	Private an challenge acts, Writin chains: Sy revent the rvices iods: 60 – A Compr	hd CO3	
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Bitcoin block ch scripting langua Public block ch UNIT-IV Ethereum and E Jsing smart co smart contracts UNIT-V Pseudo-anonyr attacks, selfish attacks, selfish attacks, case S Lecture Peric Text Books 1. Naraya Introdu 2. Josh T Progra 3. Imran explain Reference Boo	hain, Ch age and ain. Ether Smart C ontracts s using S using S Privation mity vs. mining Studies: ods: 60 anan, Bo ots: 70 anan, Bo	allenges and solutions, proof of their use. Blockchain Networ reum basics contracts, The Turing Complete to enforce legal contracts, cor Solidity & JavaScript cy, Security issues in Blockch anonymity, Zcash and Zk-SNA , 51% attacks advent of algo Block chain in Financial Service Tutorial Periods: - Inneau, Felten, Miller and Gold Princeton University Press, 202 on, 'Blockchain: The Blockcha Create Space Independent Pu "Mastering Blockchain: Dis	k, Life of Blockc eness of Smart (mparing Bitcoin s nain ARKS for anonyr orand; Sharding ce, Supply Chain Practica d feder, "Bitcoin a 21. ain for Beginnin ublishing Platforr stributed ledger	hain ap Contrac scripting based Manag al Peric and Cry gs, Gu n, 2019 techno	pplication t Langua g vs. Eth servatio consens gement a pds: - rpto curr ild to B b blogy, c	ves to Bitcoin n, Soft & Har Periods: 12 ages and ver ereum Smar Periods: 12 n, attacks on sus algorithm and Governm To ency Techno lockchain Te lecentralizatio	ification ification t Contr Block is to p hent Se tal Per logies - echnolo on, an	Private an challenge acts, Writin chains: Sy revent the rvices iods: 60 – A Compr gy and Bl d smart	hd CO3	

R. D. Maulhuge

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COs		Program Outcomes (POs)					ram Sp omes (F	ecific PSOs)
CUS	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3
1	2	2	3	3	3	2	2	2
2	2	3	2	3	2	3	2	2
3	3	2	3	3	2	3	3	2
4	3	2	2	2	2	3	2	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

	Continuous Assessment Marks (CAM)					End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks		
Marks	1	0	5	5	5	75	100		

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Department	Compu	utational Studies	Progran	nme: M.	Sc Con	nputer Sci	ence		
Semester	Third		Course DSE	Categor	y Code:	*End \$ TE	Semeste	r Exam	Туре:
Course Code			Pe	riods / V	Veek	Credit	M	laximum	Marks
	A23PC	PE307	L	Т	Р	С	CAM	ES E	ТМ
Course Name	DATA	MINING	4	0	0	4	25	75	100
Prerequisite	Basic M	(nowledge in Data Mining							
	After coi	mpletion of the course, the stude	ents will be able a	to					apping st Level
Course Outcome	CO1	To learn about data mining Co	oncepts					k	(2
Outcome	CO2	To study the different data mir	ning techniques					k	(2
	CO3	To have knowledge in Data m	ining concepts					k	(3
	CO4	To apply Data mining concept	ts in different field	ds				k	(4
UNIT-I		S OF DATA MINING				Periods: '		1	
	-	s – Data Mining Versus Knowle Implications of Data Mining – D					g Issues	s – Data	CO1
UNIT-II	DATA	MINING TECHNIQUES				Periods: 2	12		
Data Mining Teo Networks – Gen	•	 A Statistical Perspective on c orithms. 	lata mining – Sin	nilarity N	leasure	s –Decisior	n Trees -	– Neura	CO2
UNIT-III	DATA N	MINING CLASSIFICATION				Periods: '	12		
Classification: Ir	troductio	on – Statistical – Based Algorith	ms – Distance Ba	ased Alg	orithms	-Decision.			CO3
UNIT-IV	L	MINING CLUSTERING TREE B		-		Periods: 2			
-		Algorithms – Neural Network Ba	-			-		-	CO4
Techniques: Intr Algorithms.	oduction	 Similarity and Distance Meas 	sures –Outliers –	Hierarch	nical Alg	jorithms. Pa	artitioned		
UNIT-V		MINING ASSOCIATION RULES	S			Periods: ²	2		
Association Rule	es: Introc	luction - Large Item Sets – Basi – Incremental Rules – Advanced	c Algorithms – Pa			ited Algoritl	nms –	uality of	CO5
Rules.					-		_	-	
Lecture Perio	ds: 60	Tutorial Periods: -	Practic	al Perio	ds: -	•	Total Pe	riods: 6	60
	es of Da	Data Mining" by Pang-Ning Tan, ta Mining" by David J. Hand, He							
		C courses titled Data Mining							
		n/courses/106105174/							

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COs		Progr	Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contir	nuous Asse	essment Marks	(CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

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R. D. Maulhager

Department	Comp	utationa	l Studies	Progra	mme: I	M.Sc (Co	omputer Sc	ience	2)		
Semester	Third			Course	e Catego	ory Code	: DSE *En	d Sen	nestei	r Exam	Type: TE
Course Code	A23P0	CPE308		Per	iods / W	/eek	Credit		Maxir	num N	larks
	/1201 \	. 2000		L	Т	P	С	CAN	Л	ESE	TM
Course Name	CYBE	R SECURI	ТҮ	4	0	0	4	25		75	100
Prerequisite	Basic	knowled	ge about Cyber Secu	urity							
Course Objectives	 U U ai U 	nderstan nderstan nd wirele nderstan	n understanding of d the historical back d security challeng ss computing. d the security risks d data privacy attac	kground a es posed and perils	nd need by mob	d for cyb bile devi al media	er forensic ces and cre marketing	s. edit c		ations	•
	After th	e complet	ion of this course, the	students v	vill be ab	le to:					apping st Level)
	CO1	Define	and explain basic co	oncepts ar	nd lavers	s of cvbe	er security.			····	K2
Course	CO1		the significance of	•	•	•	•				КЗ
Outcome	02		trends in mobility		-			hile	and		K3
	CO3		s computing.	and analy				Joine	ana	•	
	CO4		e measures to mitig	ate securi	ty risks	in organ	izational se	etting	s.		K4
	CO5	Explain attacks	fundamental data	privacy co	oncepts	and rec	ognize data	a priv	acy	1	K4
UNIT-I	INTRO	DUCTIO	N TO CYBER SECUR	ITY			Periods:	12	i.		
Governance – (Threat, motive of	Challeng attack yber V	ges and ers, acti Varfare,	ivers of security, \ Constraints, Com ve attacks, passive Cyber Crime, C licy.	nputer Cr attacks, 3	iminals, Software	CIA e attacks	Triad, Ass s, hardware	ets e attao	and	C	01
UNIT-II	CYBE	RSPACE /	AND THE LAW & CY	BER FORE	NSICS		Periods:	12			
National Cyber Se Forensics Science	ecurity I ce, The s of Ema	Policy. In e Need f	ulations, Roles of I troduction, Historica or Computer Foren al Forensics Lifecy	al backgro sics, Cyb	ound of er Fore	f Cyber nsics ar	forensics nd Digital e	, Dię evider	gital nce,	С	:02
UNIT-III		RCRIME					Periods:	12			
Trends in Mobil Challenges Posed	ity, Cre ⊨by Mol on Mobi	edit caro bile Devi	Introduction, Prolif d Frauds in Mob ces, Registry Setting hones, Organization	oile and gs for Mo	Wireles bile Dev	ss Comp vices, Au	outing Era, Ithenticatio	Secu n serv	urity vice	c	03
UNIT-IV	7	R SECUR	ТҮ				Periods:	12			
organizations, se	curity	and priv	luction, cost of cyb /acy implications, puting and the asso	social n	nedia m	arketing	: security r			c	:04
UNIT-V	PRIVA	ACY ISSU	ES				Periods:				
	policies	and the	undamental Concer ir specifications, pr	rivacy pol	icy lang	juages,		-		c	:05
Lecture Periods: 6	0		Tutorial Periods: -	Practi	cal Perio	ods: -			Tota	l Perio	ds: 60
Text Books											
1. "Computer	Security	y: Princip	les and Practice" by	v William S	Stallings	and Lav	vrie Brown	, Foui	rth Ed	ition (2	.018).

R.D. Moundlings



2. "Network Security Essentials: Applications and Standards" by William Stallings, Seventh Edition (2020).

Reference Books

- "Cyber security: A Practical Guide to the Law of Cyber Risk" by David G. Ries, Daniel J. Solove Updated Edition (2019).
- 2. "Principles of Computer Security: CompTIA Security+ and Beyond" by Wm. Arthur Conklin, Gregory White, Chuck Cothren, Roger Davis, Dwayne Williams, Fourth Edition (2020).

Web References

- 1. https://www.ibm.com/topics/cybersecurity
- 2. https://www.geeksforgeeks.org/cyber-security-types-and-importance/
- 3. https://www.cisco.com/c/en/us/products/security/what-is-cybersecurity.html
- 4. https://www.coursera.org/articles/what-is-cyber-security
- 5. https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-cyber security

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs				Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	2	3	3	2	2	2	2	3
2	3	2	2	3	3	3	2	2	2
3	2	2	2	2	3	3	3	2	2
4	3	3	2	2	2	2	2	2	3
5	2	3	2	2	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Conti	nuous Ass	(CAM)	End		
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

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		utational Studies				omputer S			
Semester	Third		Course	e Catego	ory Code	e: DSE *End TE		ter Exam	Туре:
Course Code	A23PC	PE309	Per	ods / W	eek	Credit	Max	kimum Ma	arks
			L	Т	Р	С	CAM	ESE	TM
Course Name	DIGIT	AL MARKETING	4	0	0	4	25	75	100
Prerequisite ourse Objectives Course Dutcome	 Ur Ex Le too Ur Ide 	knowledge about Digital Mark iderstand the landscape of inte- plore YouTube advertising strategols. Inderstand the concept of search entify key metrics and learn ho <i>e completion of this course, th</i> Identify and develop essentia Explain the concept and type Develop strategies for succe Implement on-page and off-p Understand different types	ernet use ategies a gies, inc ch engine ow to ma ne studer al skills r as of disp assful soc	and tech luding of es and the ke web a nts will b equired blay adv blay adv blay adv	niques. context s he funda analytics <i>e able to</i> in digita ertising. ia marke n technic	strategy, T amentals of s actionable o: I marketing eting. ques.	witter ad	s, analyt BT Ma (Highes M M M	appinę
UNIT-I		mobile analytics.		·		Periods:			
Digital Marketing Advertising - Type	- Digital s of Dis	keting: Internet Users – Digit Marketing Plan. Display Adv play Ads - Buying Models - Dis	vertising: splay Pla	Introdu	iction - (Concept of lake a Goo	Display		01
UNIT-II		NCED DISPLAY ADVERTISI				Periods:			
Programmatic Di		lvertising - Analytics Tools		ube Ac					02
Advertising: Intro Understanding Ad	duction Ranks.	- Pay for Search Advert Social Media Marketing: Intro				cessful Stra	ategy.		
Advertising: Intro Understanding Ad UNIT-III	duction Ranks. FACE	Social Media Marketing: Intro BOOK MARKETING	duction -	- To buil	d a Suco	cessful Stra Periods:	ategy. 12		
Advertising: Intro Understanding Ad UNIT-III Introduction - Fac Tools - Other Ess Context Strategy	Auction Ranks. FACE cebook f entials. - Twitte	Social Media Marketing: Intro	duction - Ad Carr n - Getti itter Ana	- To buil paign - ng Start lytics -	d a Succ Adverts ed with Twitter	cessful Stra Periods: - Other M Twitter - B Tools and	ategy. 12 Iarketing uilding a Tips for	C	03
Advertising: Intro Understanding Ad UNIT-III Introduction - Fac Tools - Other Ess Context Strategy Marketers. Instagr	Aduction Ranks. FACE cebook f entials. - Twitte ram and	Social Media Marketing: Intro BOOK MARKETING for Business- Anatomy of an Twitter Marketing: Introduction or Usage - Twitter Ads – Tw	duction - Ad Carr n - Getti itter Ana	- To buil paign - ng Start lytics -	d a Succ Adverts ed with Twitter	Periods: - Other M Twitter - B	ategy. 12 Iarketing uilding a Tips for	C	
Advertising: Intro Understanding Ad UNIT-III Introduction - Fac Tools - Other Ess Context Strategy Marketers. Instagr UNIT-IV Introduction - Sea	oduction Ranks. FACE cebook f entials. - Twitte ram and SEAR arch Eng	Social Media Marketing: Intro BOOK MARKETING for Business- Anatomy of an Twitter Marketing: Introduction rr Usage - Twitter Ads – Tw Snap chat: Introduction- Insta	duction - Ad Cam n - Getti itter Ana agram- si gine Opt	- To buil paign - ng Start lytics - nap chai	d a Succ Adverts ed with Twitter t n- SEO	Periods: - Other M Twitter - B Tools and Periods:	ategy. 12 Marketing uilding a Tips for 12	C	
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Advertising: Intro Understanding Ad UNIT-III Introduction - Fac Tools - Other Ess Context Strategy Marketers. Instagr UNIT-IV Introduction - Sea optimization- Off p UNIT-V Introduction - Dat Tracking codes - M Lecture Periods:	oduction Ranks. FACE cebook f entials. - Twitte ram and SEAR arch Eng oage Op age Op Web A ta Colle Mobile A	Social Media Marketing: Intro BOOK MARKETING for Business- Anatomy of an Twitter Marketing: Introduction or Usage - Twitter Ads – Tw Snap chat: Introduction- Insta CH ENGINE OPTIMIZATION gine - Concept of Search Eng timization- Social Media Reac Analytics ction - Key Metrics - Marke	duction - Ad Cam n - Getti itter Ana agram- si gine Opt h - Main eting We	- To buil paign - ng Start lytics - nap cha imisation cenance	d a Succ Adverts ed with Twitter t n- SEO rtics Acti	ressful Stra Periods: - Other M Twitter - B Tools and Periods: Phases - Periods:	ategy. 12 Marketing uilding a Tips for 12 On page 12 Types of	C	03 04 05
Advertising: Intro Understanding Ad UNIT-III Introduction - Fac Tools - Other Ess Context Strategy Marketers. Instagr UNIT-IV Introduction - Sea optimization- Off p UNIT-V Introduction - Dat Tracking codes - N Lecture Periods: ext Books 1.Gupta, S. (20 2.Deiss, R., &ar teference Books 1.Dodson, I. (20 2.Kamat, N.C., o	oduction Ranks. FACE cebook f entials. - Twitte ram and SEAR arch Eng bage Op age Op ta Colle Mobile A 60	Social Media Marketing: Intro BOOK MARKETING for Business- Anatomy of an Twitter Marketing: Introduction or Usage - Twitter Ads – Tw Snap chat: Introduction- Insta CH ENGINE OPTIMIZATION gine - Concept of Search Eng timization- Social Media Reac Analytics ction - Key Metrics - Marke nalytics.	duction - Ad Cam n - Getti itter Ana agram- si gine Opt h - Main eting We Praction raw Hill, rketing for ey, New C	- To buil paign - ng Start lytics - nap cha imisation cenance b Analy cal Peri New De or Dumn	d a Succ Adverts ed with Twitter t n- SEO tics Acti ods: -	cessful Stra Periods: - Other M Twitter - B Tools and Periods: Phases - Phases - Phases - Phases - d Ed.). Joh	ategy. 12 Marketing uilding a Tips for 12 On page 12 Types of To an Wiley8	C C tal Perio	03 04 05 ds: 6(
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- <u>https://mailchimp.com/marketing-glossary/digital-marketing/</u>
 <u>https://digitalmarketinginstitute.com/blog/what-is-digital-marketing</u>
- 5. https://www.salesforce.com/marketing/what-is-digital-marketing/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs				Program Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	2	3	3	2	2	2	2	3
2	3	2	2	3	3	3	2	2	2
3	2	2	2	2	3	3	3	2	2
4	3	3	2	2	2	2	2	2	3
5	2	3	2	2	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Conti	nuous Ass	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

R.D. Mounthingor

Semester	Compu	itational Studies				MPUTER SCI			
	Third		Course	Categor	y Code	: DSC *En	d Semest	er Exam 🛛	Гуре: Ll
Course Code	A23PCI	PL305	Perio	ods / We	ek	Credit	N	laximum	Marks
			L	Т	Р	С	IM	ESE	TM
Course Name	WEB TE	ECHNOLOGY LAB	0	0	4	2	50	50	100
Prerequisite		Knowledge in HTML, JavaScrip	-						
	:	eate and style static web page							
Course	1	plain the roles of clients and s plement Object-Oriented Pro							
Objectives		nderstand XML fundamentals		-	•				
		plementing AJAX for creating							
		completion of the course, the s	-						apping st Leve
6	CO1	To Creating and styling stat	ic web pages	using H	ML and	d CSS.			(3
Course Outcome	CO2	To Explaining the roles of cl	ients and serv	vers in w	veb con	nmunication		I	(3
Outcome	CO3	To Implement Object-Orien	ted Programn	ning (OC	DP) con	cepts in PHP		I	(3
	CO4	To Understand XML fundam	nentals and to	create	a XML o	documents.		I	〈 4
	CO5	To Implement AJAX for crea	ating dynamic	web ap	plicatio	ns.		I	< 4
ist of Experime	ent							<u>-</u>	
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R. D. Maulhuge

*LE – Lab Exam

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	
1	3	2	3	3	2	2	2	2	
2	2	2	2	3	2	3	2	2	
3	2	2	2	2	2	3	3	2	
4	3	3	2	2	2	2	2	2	
5	3	2	2	2	3	3	3	3	

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Assessment		Internal	Marks	End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance	50	100
Marks	30	10	10	50	100

XZ

R.D. Mounthings

Department	Compu	tational Studies		Program	nme: M.	Sc. Cor	nputer Sc	ience		
Semester	Third			Course SEC	Category	/ Code:	*End \$ TE	Semeste	r Exam	Туре:
Course Code				Perio	ds / Wee	ək	Credit	Ma	ximum	Marks
	A23PC	PS303		L	Т	Р	С	CAM	ES E	ΓМ
Course Name	Ethical	Hacking		0	0	4	2	100	-	100
Prerequisite	Basic k	nowledge in Ethica	l Hacking					.4	,	
-		npletion of the course	-							lapping st Leve
Course Outcome	C01	Ability to understan	•			•			l	K2
	CO2			-	practices in their use of hardware.					K2
	 CO3 To Understand the Ethical Hacking Process. CO4 To Get familiarized with Tools and Techniques of Ethical Hacking 								K3	
	CO4 To Get familiarized with Tools and Techniques of Ethical Hacking.							l	K 4	
UNIT-I		ction to Ethical Hac	<u> </u>				Periods:6	5		
		view – skills of an eth		•	•	-				СО
Types of atta	acks – In	formation Security th	nreats, attack v	vectors, and	controls	s – Info	ormation A	ssurance	e (IA) -	- 00
nformation Se	curity Lav	vs and Standards -	Security Policie	es types, H	R/legal i	mplicat	ions – Phy	ysical Se	ecurity -	_
hreat Modellin	g –Enterp	orise Information Sec	urity Architectur	re (EISA) – N	Vetwork	Security	y Zoning.			
UNIT-II	Foot Pr	inting & Reconnais	sance				Periods:	6		
							· – ·	e Foot	Printing	g CO2
oot printing co	oncepts, t	hreats, attack vector	rs and controls,	, Foot printii	ng throu	gn Sea	rch Engine	55, 1 001		-
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hrough Social	Networkin		t printing, Comp	petitive Intell	igence, \	NHOIS	Foot printi	ng, Foot	Printing	9
hrough Social ools. Scanning	Networkin Network	g sites, Website Foo	t printing, Comp logy, technique	petitive Intell es, and coun	igence, \ termeas	WHOIS ures -T	Foot printi echniques	ng, Foot for IDS (Printing evasion) I,
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R. D. M. R. Mayor

Text Books

- 1. "The Hacker Playbook 3: Practical Guide to Penetration Testing" by Peter Kim in 2020
- 2. "CEH Certified Ethical Hacker All-in-One Exam Guide, Fourth Edition" by Matt Walker in 2020.
- "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard and Marcus Pinto (Third Edition, in 2021).

Reference Books

- 1. "Penetration Testing: A Hands-On Introduction to Hacking" by Georgia Weidman in 2020
- "Metasploit: The Penetration Tester's Guide" by David Kennedy, Jim O'Gorman, Devon Kearns, and Mati Aharoni, Third Edition, in 2020.

COs/POs/PSOs Mapping

CO 2		Program Outcomes (POs)						
COs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

ſ		Con	Continuous Assessment Marks (CAM)					
	Assessment	Exam	Report	Assignment*	Attendance	Marks		
	Marks	70	10	10	10	100		

R.D. Mounthingor





DEPARTMENT OF COMPUTATIONAL STUDIES

M.Sc. COMPUTER SCIENCE

Academic Regulations 2023(R-2023)

Batch-2023-2025

		Sem	ester – IV							
SL.N	Course Code	Course Title	Categor	F	Perio	ods	Credits	M	ax Marks	6
ο	Course Coue	Course Title	у	L	Τ	Ρ	Credits	CAM	ESM	Total
Theory	y									
1	A23PCPT410	ADVANCED SOFTWARE ENGINEERING	DSC	4	0	0	4	25	75	100
2	A23PCPT411	BIG DATA ANALYTICS	DSC	4	0	0	4	25	75	100
Practio	cal									
3	A23PCPP401	PROJECT WORK AND VIVA VIOCE	DSC	0	0	4	2	50	50	100
Skill E	nhancement Cou	irse								
4 A23PCPS404 RESEARCH		RESEARCH METHODOLOGY	SEC	0	0	4	2	100	0	100
							12	200	200	400

R.D. Mounthingor



Department	Compi	utational Studies	Progran	nme: M.	Sc Com	puter Sci	ence		
Semester	Four		Course DSC	Categor	y Code:	*End : TE	Semeste	r Exam	Гуре:
Course CodeA23PCPT410Course NameADVANCED SOFTWAREPrerequisiteBasic knowledge in AdvaPrerequisiteCourseAfter completion of the courseAfter completion of the courseCourseCO1Learn about the vOutcomeCO2Develop and impCO3Design the softwareCO4Analyze the codinaUNIT-ISOFTWARE ENGINEERISoftware Engineering Process ParadigmsEmpirical estimation models planning Risk atUNIT-IISYSTEM PROCESS AND		Peric	ods / We	ek	Credit	Ma	ximum N	/larks	
Course Coue	A23PC	PT410	L	Т	Р	С	CAM	ES E	ТМ
Pour DSC TE Course Code A23PCPT410 Image: Control of the course in the course, the students will be able to the course in the course in the course, the students will be able to the course in the course in the course, the students will be able to the course in the students will be able to the course in the course interve in the course inthe course interve interve interve inthe co		100							
Prerequisite	Basic k	nowledge in Advance Software Eng	gineering						
	After col	mpletion of the course, the students w	vill be able t	to				1	
	CO1	Learn about the various models and	d methods.					K2	
CO2 Develop and implement the software life cycle models. K2							2		
CO3 Design the software models. K3						3			
CO4 Analyze the coding techniques							K	4	
UNIT-I	SOFTV	VARE ENGINEERING PROCESS				Periods:	12		
System, Proces Analysis Model Function Deploy UNIT-III Software Desig Designs Archite	ss and F s: Conce yment, La SOFTV n Concep ectural De	Product Engineering Hierarchies Rec pts, Data Flow Model, Control Flow anguage and Tools, Requirements Va VARE DESIGN CONCEPT ots and Principles, Data Design, Softw esign Metrics, Design Structure Quality	quirement Model, Sta lidation Me vare Archite y Index Est	ate Cha trics. ectural Si imation,	ring and rts and tyles-An User int	d its phas Transition Periods: alysis of A erface des	Models Models 12 Architectu	, Quality Iral	
			and Notati	ons, Col				rics.	
-			and its Var	iants. Bl				es and	
•		• • •					qu		CO4
-			_						
Software Config				2					CO5
	ds: 60	Tutorial Periods: -	Practica	al Perio	ds: -		Total Pe	eriods: 6	0
. "Software En 2. "Software En	gineering								21).
-laruhiko Kaiya	, First Edi					ŗ		tsuo Tar	nai,

2. "Software Architecture in Practice" by Len Bass, Paul Clements, Rick Kazman, Third Edition (2012)

R.D. Mounthings



COs		Progr	am Outcomes (PC	Ds)			gram Spe comes (F	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contir	nuous Asse	essment Marks	(CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

X2

R.D. Mounthings

Department	Compu	itational Studies	Progran	nme: N	1.Sc Coi	mputer Sci	ence		
Semester	Four		Course	Categor	y Code	: DSE *End	Semeste	r Exam T	ype: T
Course Code	A23PCF	PT411	Perio	ods / We	eek	Credit	Ma	ximum l	Marks
			L	Т	Р	С	CAM	ESE	TM
Course Name	BIG DA		4	0	0	4	25	75	100
Prerequisite	Basic K	nowledge in Big Data						,	
	After co	mpletion of the course, the stude	nts will be able t	to					apping st Level)
Course	CO1	Recognize big data projects.						к	2
Outcome	CO2	Implement big data technology	y and tools					К2	
	CO3	Demonstrate MapReduce and	Hadoop and its	ecosyst	tem			К	3
	CO4	Implement a sample system us	ing Hadoop.					к	4
UNIT-I	INTRO	DUCTION TO BIG DATA				Periods:	12	1	
		ed file system – Big Data and it ations. Algorithms using map rec	•				-	-	CO1
UNIT-II	INTRO	DUCTION TO HADOOP				Periods:	12		•
	Reduce -	op & Hadoop EcoSystem – Movi - Data Serialization. DP ARCHITECTURE	ng Data in and o	out of H	ladoop	– Understa		outs and	CO2
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UNIT-III Hadoop Storage Secondary Nam Cluster Setup – UNIT-IV Hadoop ecosyst Availability, HD UNIT-V Hive Architectu Aggregating, M ndexing. Lecture Perioc Text Books 1. "Hadoop: The 2. "Big Data An (2018). Reference Bool	Reduce - HADO e: HDFS, heNode, a SSH & Ha SSH & Ha (HADO tem com FS Federa re and In ap Reduce ds: 60 e Definiti halytics: F	- Data Serialization. DP ARCHITECTURE Common Hadoop Shell command and DataNode,Hadoop MapRedu idoop Configuration – HDFS Adm OP ECOSYSTEM AND YARN ponents - Schedulers - Fair and C ation, MRv2, YARN, Running MRv ND HIVEQL,HBASE stallation, Comparison with Trad ce Scripts, Joins & Subqueries, HB Tutorial Periods: - ve Guide" by Tom White, Fifth Ec	ds , Anatomy of ce paradigm, M inistering –Mor apacity, Hadoo 1 in YARN. itional Databas base concepts A Practica dition (2021). el Minelli, Mich	File Wr lap and nitoring p 2.0 Ne e, Hive(dvanced al Period	ite and Reduce & Mair ew Feat QL – Qu d-Usage ds: -	Periods: Read., Nar e tasks, Job ntenance. Periods: tures Name Periods: nerying- Dat e, Schema I , and Ambi	12 ne Node, , Task trad 12 Node- H 12 ta - Sortin Design, Ad Total Per ga Dhiraj,	ckers - igh g And dvance riods: 6(CO3 CO4 CO5

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COs		Progr	am Outcomes (PO	Ds)			ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

		Contir	nuous Asse	essment Marks	(CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	1	0	5	5	5	75	100

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Department	Computational Studies	Progran	nme: M	.Sc Co	mputer Sci	ence		
Semester	Fourth	Course Category Code: DSC *End Semester Exam Type:						
Course Code	A23PCPP401	Periods / Week Credit Maximum Ma					/larks	
	AZJF CFF401	L	Т	Р	С	CAM	ESE	TM
Course Name	Project work and Viva-voce	0	0	4	2	50	50	100

Domains:

- Social Network Analysis Business Analysis E-Commerce Analysis 0
- 0
- 0
- o Banking Analysis
- Digital Marketing Analysis 0

SI.NO		Guide5view 3Review Committee15Guide15			
1	Continuous Assessm	ent Marks	·		
a.	Review 1	Review Committee	5	10	
а.		Guide	5	10	
b.	Review 2	Review Committee	5	10	
0.		Guide	5	10	
C.	Review 3	Review Committee	15	30	
0.	Iteliew o	Guide	15	00	
Total CA	AΜ			50	
2	End Semester Marks				
a.	Evaluation of Mini	Internal Examiner	20	40	
а.	Project report	External Examiner	20	40	
b.	Outcome	Publication of Papers/ Conference Presentations/ Patents/ Prototypes etc.	10	10	
			Total ESM	50	
			Total Marks	100	

R. D. Moham Burger



Department	Comp	utational Studies	Program	me: M.S	Sc. Com	puter Sci	ence		
Semester	Fourth		Course (SEC	Category	Code:	*End \$ TE	Semeste	r Exam T	уре:
			Per	iods / W	eek	Credit	М	aximum	Marks
Course Code	A23PC	PS404	L	Т	Р	С	CAM	ES E	ТМ
Course Name	RESEA	RCH METHODOLOGY	0	0	4-	2	100	-	100
Prerequisite	Basic k	nowledge in Research Method	ology				•		
Course		mpletion of the course, the studer						BT Ma (Highes	t Level)
Outcome	CO1	Students are able to demonstra (reading, evaluating, and devel	•	r researc	n proce	sses		K	2
	CO2	Students are able to perform lit databases;	• • • •	using pri	int and c	online		K	2
	CO3	Students are able to identify, exercise elements of a research propose		and pre	pare the	e key		K	3
	CO4	Students are able to compare a research	and contrast qua	ntitative	and qua	alitative		K	4
UNIT-I	FOUND	ATIONS OF RESEARCH			l	Periods: 1	l 2		
	of scient	 Motivation - Utility. Concept of ific method –Understanding the I cess 						-	CO1
UNIT-II		EM IDENTIFICATION & FORMU				Periods: 1	10		
-	1	estigation Question –Measureme		othesis -				thesis –	
		ative Hypothesis. Hypothesis Tes							
UNIT-III		ARCH DESIGN			-	Periods: 1	· —		
•	•	e in Research –Features of a , Descriptive Research Designs –	0	0	•	atory Res	earch D	•	CO3
UNIT-IV	QUALI	TATIVE AND QUANTITATIVE R	ESEARCH		I	Periods: 1	2		
Qualitative rese	earch –C	Quantitative research -Concept	of measureme	ent, cau	sality, g	eneralizat	tion, rep	lication.	CO4
Merging the two	approad	ches.							
UNIT-V	MEASU	REMENT				Periods: 1	2		
Concept of me	asureme	nt-what is measured? Problem	s in measurem	ent in r	esearch	-Validity	and Re	eliability.	005
Levels of measu	irement -	-Nominal, Ordinal, Interval, Ratio	•						
Lecture Perio	ds: 60	Tutorial Periods: -	Practica	I Period	ls: -		Fotal Pe	riods: 6	D
Text Books	oh Docia	n: Qualitative, Quantitative, and	Mixed Methods		whee h	/ John W/	Crocow	all and	Dovid
	ll (2021).			Appioa	iches by	y John VV	. Cleswe		. Daviu
2. Researd	ch Metho	dology: A Step-by-Step Guide for	r Beginners by F	Ranjit Ku	mar (202	22).			
3. Researd	ch Metho	ds in Education by Louis Cohen,	Lawrence Manie	on, and I	Keith Mo	orrison (20	20).		
4. Qualitat Poth (20	•	ry and Research Design: Choos	ing Among Five	e Approa	ches by	[,] John W.	Creswe	ll and Cl	neryl N.
1 001 (20									

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5. Social Research Methods: Qualitative and Quantitative Approaches by W. Lawrence Neuman (2021).

Reference Books

- 1. Introduction to Research Methods in Education by Keith F. Punch (2020).
- 2. Doing Quantitative Research in Education with SPSS by Daniel Muijs (2022).
- 3. Research Methods for Business: A Skill Building Approach by Uma Sekaran and Roger Bougie (2023).
- 4. Research Design and Methods: A Process Approach by Kenneth S. Bordens and Bruce B. Abbott (2020).
- 5. Qualitative Research: A Guide to Design and Implementation by Sharan B. Merriam and Elizabeth J. Tisdell (2021).

COs/POs/PSOs Mapping

COs		Progra	m Outcomes (F	POs)			ram Sp omes (F	
COS	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)				Total
	Exam	Report	Assignment*	Attendance	Marks
Marks	70	10	10	10	100

R.D. Mounthingor

