PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637018 (AUTONOMOUS)

REGULATIONS 2023

CHOICE BASED CREDIT SYSTEM

M.E. - COMPUTER SCIENCE AND ENGINEERING

(Applicable to the candidates admitted during the academic year 2023-2024 onwards)

SEMESTER-III

S.No.	Category	Ory Course Code Course Title			L	T	P	C
			Theory					
1	PC	PCE23301	Security Practices	3	0	0	3	
2	PE	PCE231**	Professional Elective IV		3	0	0	3
3	PE	PCE231**	Professional Elective V		3	0	0	3
4	OE	******	Open Elective I		3	0	0	3
			Practical					
1	PC	PCE23302	Project Work (Phase I)		0	0	12	6
				TOTAL	12	0	12	18

SEMESTER-IV

S.No.	Category	Course Code	Course Title	L	T	P	C
			Practical				
1	PC	PCE23401	Project Work (Phase II)	0	0	24	12
			TOTA	L 0	0	24	12

PROFESSIONAL ELECTIVE

, S.No.	No. Category Course Code Course Title		L	T	P	C	
			Theory				
1	PE	PCE23163	Data Visualization Techniques	3	0	0	3
2	PE	PCE23164	Speech and Natural Language Processing	3	0	0	3
3	PE	PCE23165	Cloud Computing Technologies	3	0	0	3
. 4	PE	PCE23166	High Performance Computing for Big Data	3	0	0	3
5	PE	PCE23167	Web Analytics	3	0	0	3
6	PE	PCE23168	Social Network Analysis	3	0	0	3
7	PE	PCE23169	Randomized Algorithms	3	0	0	3
8	PE	PCE23170	Compiler Optimization Techniques	3	0	0	3



OPEN ELECTIVE

S.No.	Category	Course Code	Course Title	L	Т	P	C
			Theory		-		
1	OE	PED23901	Industrial Safety	3	0	0	3
2	OE	PSE23901	Climate change and Adaptation	3	0	0	3
3	OE	PPS23901	Alternate Energy Sources	3	0	0	3
4	OE	PCS23901	Design of Digital Elements	3	0	0	3
5	OE	PCE23901	Big Data Analytics	3	0	0	3

Approved
BOARD OF STUDIES
Computer Science & Engineering

COURSE OBJECTIVES	3 0 0	3
To enable the students to		
learn the core fundamentals of system and web security concepts		
2 have through understanding in the security concepts related to networks		
3 deploy the security essentials in IT Sector	,	
4 be exposed to the concepts of Cyber Security, Cryptography and cloud securit	ty	
5 perform a detailed study of Privacy and Storage security and related Issues		
UNIT I SYSTEM SECURITY		9
Information Security in the Modern Enterprise; Building a secure organization;	A Cryptogra	phy
primer; Verifying User and Host Identity; Intrusion detection system; Intrusion Pr	revention sys	stem
;Security web applications; Case study: OWASP ,Top 10 Web Application Security Ri	sks.	
UNIT II NETWORK SECURITY		9
Internet Security ;Botnet Problem; Intranet security; Local Area Network Security ; V	Vireless Netw	vork
Security ; Wireless Sensor Network Security; Cellular Network Security ; IOT security	ty; Case Stud	dy -
Kali Linux.		
UNIT III SECURITY MANAGEMENT		9
Information security essentials for IT Managers; Security Management System ;Police	y Driven Sys	stem
Management; IT Security; Online Identity and User Management System; Intrusion	on Detection	and
Prevention System; Case study- Metasploit.		
UNIT IV CYBER SECURITY, CRYPTOGRAPHY AND CLOUD SECURIT	Y	9
Cyber Forensics and Incidence Response; Securing e-Discovery; Hard Drive Im	aging; Metac	data
Forensics ;Data Encryption; Satellite Encryption; Password based authenticated Ko	ey establishn	nent
Protocols, Best security practices for automate Cloud infrastructure management – Est	ablishing trus	st in
IaaS, PaaS, and SaaS Cloud types.		
UNIT V PRIVACY AND STORAGE SECURITY		9
Privacy on the Internet ;Privacy Enhancing Technologies ; Personal privacy Policies	es ; Detection	n of
Conflicts in security policies; privacy and security in environment monitoring system	ns; Storage A	Area
Network Security ;Storage Area Network Security Devices ;Risk management ;P	hysical Secu	ırity
Essentials.		
TOTAL	PERIODS	45
COURSE OUTCOMES		-13
At the end of this course, students will be able to BT	Mapped	
(High	tanding (K2)	
	tanding (K2)	
CO1 understand the core fundamentals of system security Unders	tanding (NZ)	
CO1 understand the core fundamentals of system security Unders CO2 understand the security concepts to wired and wireless networks Unders	lying (K3)	
CO1 understand the core fundamentals of system security CO2 understand the security concepts to wired and wireless networks CO3 implement and manage the security essentials in it sector Apple		

- 1. John R. Vacca, Computer and Information Security Handbook, Third Edition, Elsevier 2017.
- 2. Michael E. Whitman, Herbert J. Mattord, Principles of Information Security, Seventh Edition, Cengage Learning, 2022.
- 3. Richard E. Smith, Elementary Information Security, Third Edition, Jones and Bartlett Learning, 2019.
- Mayor, K.K.Mookhey, Jacopo Cervini, Fairuzan Roslan, Kevin Beaver, Metasploit Toolkit for Penetration Testing, Exploit Development and Vulnerability Research, Syngress publications, Elsevier, 2007.
 - 5. Siani Pearson, George Yee "Privacy and Security for Cloud Computing" Computer Communication and Networks, Springer, 2013.

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

COs	Programme Outcomes(POs)										
COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2			
CO1	2	1	3	1	1	1	1	1			
CO2	1	1	2	2	1	1	1	1			
CO3	3	2	2	3	1	1	1	1			
CO4	2	2	3	1	1	1	1	1			
CO5	1	1	2	1	2	1	1	1			



PCF	E23302		PROJECT WORK (PHASE I)	0	0	12	6
COU	RSE OBJ	ECTIVES					
To ena	able the st	udents to					
1		ne fundamental to curriculum	knowledge for understanding state of the art info	ormation	about	t any	topic
2			lem for the current need of the society and collecting eview of literatures	informat	ion re	lated to	o the
3	develop	the methodolog	gy to solve the identified problems.				
4		the presentation the problems.	n and documentation skills in order to disseminate so	olution to	the re	al wor	ld

The project topic should be selected to ensure the satisfaction need to establish a direct link between education, national development and productivity and reduce the gap between the world of work and the world of study.

The student should complete the following for Phase I

- Literature survey and formulate the problem.
- · Develop preliminary design approaches.
- Implement and verify the project.
- Prepare a detailed report and presentation.
- Present findings in reputable journals and international conferences

	TOTAL PERIODS	180
COU	RSE OUTCOMES	BT MAPPED
At the	end of this course, the students will be able to	(Highest Level)
CO1	identify, analyze, interpret and formulate the problem and conceptualize the methodology of the project in research areas.	Applying (K3)
CO2	create a suitable method from different methodologies and forms of analysis to produce research design.	Applying (K3)
CO3	demonstrate the developed /implemented system in the form of hardware and/or software and complement to the society.	Applying (K3)
CO4	present the technical findings in written report/ product and be able to present the ideas in reputed journals and/or International Conferences.	Applying (K3)

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

COs	Programme Outcomes(POs)									
COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2		
CO1	3	3	3	2	3	3	2	2		
CO2	3	3	3	2	3	3	2	1		
CO3	3	3	3	2	3	3	2	3		
CO4	3	3	3	2	3	3	2	3		



PC	E23401	PROJE	CCT WORK (PHASE II)	0	0	24	12
COU	RSE OBJECT	IVES	·				
To en	able the studen	s to	4				
1	apply the fu		e for understanding state of the art	information	abou	t any	topic
2		cific problem for the detailed review of lit	current need of the society and collecteratures	eting informa	tion re	elated t	o the
3	develop the	nethodology to solve t	the identified problems.				
4	enhance the challenging		mentation skills in order to dissemina	te solution to	the re	eal wo	rld

The project topic should be selected to ensure the satisfaction need to establish a direct link between education, national development and productivity and reduce the gap between the world of work and the world of study.

The student should complete the following for Phase II

- Literature survey and formulate the problem.
- Develop preliminary design approaches.
- Implement and verify the project.
- Prepare a detailed report and presentation.
- Present findings in reputable journals and international conferences

	TOTAL PERIODS	360
COUI	RSE OUTCOMES	BT MAPPED
At the	end of this course, the students will be able to	(Highest Level)
CO1	identify, analyze, interpret and formulate the problem and conceptualize the methodology of the project in research areas.	Applying (K3)
CO2	create a suitable method from different methodologies and forms of analysis to produce research design.	Applying (K3)
CO3	demonstrate the developed /implemented system in the form of hardware and/or software and complement to the society.	Applying (K3)
CO4	present the technical findings in written report/ product and be able to present the ideas in reputed journals and/or International Conferences.	Applying (K3)

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific
Outcomes PSO's

COs	Programme Outcomes(POs)							
COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	3	3	3	2	3	3	2	2
CO2	3	3	3	2	3	3	2	1
CO3	3	3	3	2	3	3	2	3
CO4	3	3	3	2	3	3	2	3



PCI	E23163	DA'	TA VISUALIZATIO	N TECHN	IQUES	3	0	0	3
COUL	RSE OB	JECTIVES			el Europe				
To ena	able the s	tudents to							
1	develo	p skills to both de	ign and critique visuali	zations.	<u> </u>				
2	introdu	ce visual percepti	on and core skills for vi	sual analysis.					
3 -	unders	and technologica	advancements of data	visualization					
4	unders	and various data	risualization techniques						
5	unders	and the methodol	ogies used to visualize	large data sets	5				
UN	IT I	INTRODUCTION	ON OF VISUALIZAT	TION					9
Histor	y of Da	a Visualization;	Data Visualization Th	ough Their (Graph Representati	ons; (Graph	-thec	retic
Graph	ics; High	n-dimensional Da	a Visualization; Multiv	variate Data (Glyphs; Principles	and P	ractic	e; Li	nked
Views	for Visu	al Exploration; Li	nked Data Views- Visu	alizing Trees	and Forests.				
UNI	IT II	METHODOLO	GIES						9
			ivariate Visualization	by Density I	Estimation; Structu	red S	ets o	f Gra	phs:
			g by Propagation;						
		-	n via Kernel Machine			_		•	
			Tables ; Parallel Coordi		•				
		nsional Data ;Matı		,	r				
UNI	TIII	DATA TO VISI	JALIZATION						9
10,000,000	5 (50) (50 (50 (50 (50 (50 (50 (50 (50 (50 (50	A DATE OF THE SECOND SE	onto Aesthetics; Coor	dinate System	ns and Axes; Color	Scale	s; Di	recto	ry of
Visual	izations;	Visualizing Amo	unts; Visualizing Dist	ributions-Hist	ograms and Densi	ty Plo	ts; V	isual	izing
Many	Distribu	itions at Once;	Visualizing Proportion	ons- Visualiz	zing Nested Prop	ortion	s; V	isual	izing
Associ	iations A	mong Two or Mo	e Quantitative Variable	es.					
UNI	TIV	PRINCIPLES O	F FIGURE DESIGN						9
The Pi	rinciple o	of Proportional In	; Handling Overlappir	ng Points; Con	mmon Pitfalls of C	olor U	Jse; F	Redur	dant
Coding	g ;Multip	anel Figures ;Title	s, Captions, and Tables	s-Balance the	Data and the Conte	ext			
UNI	IT V	APPLICATION	IN VISUALIZATIO	N .					9
Visual	ization f	or Genetic Netwo	rk Reconstruction, Rec	construction;	Visualization and	Analy	sis o	f Me	dical
Images	s; Explor	atory Graphics of	a Financial Dataset; G	raphical Data	Representation in	Bankı	uptcy	/ Ana	lysis
; Visua	alizing Fu	ınctional Data wit	h an Application- Visua	alization Tool	s for Insurance Ris	k Proc	esses		
					TOTA	AL PI	ERIO	DS	45
					I .				

At the	end of this course, students will be able to	BT Mapped (Highest Level)
CO1	represent the objects in different dimensions.	Understanding (k2)
CO2	analyze and process the data for Visualization.	Analyzing (k4)
CO3	apply the visualization techniques in physical sciences, computer science, applied mathematics and medical sciences.	Applying (k3)
CO4	apply the virtualization techniques for research projects	Applying (k3)
CO5	identify appropriate data visualization techniques given particular requirements imposed by the data.	Understanding (k2)

- 1. Robert Spence "Information visualization Design for interaction", Pearson Education, 2nd Edition, 2007.
- 2. Alexandru C. Telea, "Data Visualization: Principles and Practice," A. K. Peters Ltd, 2008
- 3. Michael Fry, Jeffrey Ohlmann, Jeffrey Camm, James Cochran, Data Visualization: Exploring and Explaining with Data, South-Western College Publishing, 2021
- 4. Stephen Few, "Information Dashboard Design: The Effective Visual Communication of Data", 1st Edition, O'Reilly, 2006.
- 5. Claus O.wilke, Orilly "Fundamentals of Data Visualization", 1st Edition, 2019.

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO	Programme Outcomes(POs)										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2			
CO1	1	1	1	2	2	1	2	1			
CO2	1	1	1	2	2	1	2	1			
CO3	2	1	2	2	1	1	1	2			
CO4	1	1	1	3	1	1	1	1			
CO5	1	1	2	2	2	1	2	1			



PCE2	3104	SPEECH AND N		- Roc	Loonid			0
COUF	RSE OBJEC	ΓIVES						
To ena	ble the stude	nts to						
1	understand	he fundamentals of kno	wledge in speech and l	language pr	ocessing.			
2	learn about	automatic speech recogn	ition systems and their	r underlying	g mechanism.			
3	understand	statistical parsing metho	ds and their application	n in natural	language unders	standir	ng.	
4	know about	lexical semantics and it	role in computational	l linguistics.				
5	explore info	rmation extraction techn	iques and their applica	ations in tex	t analysis.			Sc. A
UNIT	I INTRO	DUCTION						
Introdu	ection to Kno	owledge in Speech and	Language Processing	g – Regular	r Expressions an	nd Au	itom	ata
Words	& Transduce	rs; N-grams – Hidden M	larkov and Maximum	Entropy mo	dels.			
UNIT	II SPEEC	СН	- N =	4		Y T THE		
Phonet	ics-Speech	Synthesis, Automatic s	peech Recognition; S	Speech Rec	cognition: Adva	nced	Top	oics
Compu	tational Phor	ology.						
UNIT	III SYNTA	X						
Formal	Grammars	of English– Parsing wit	h Content Free Gram	marc Sta	tictical Parcina	Foot	urac	01
			ii Content Tiec Grain	mars – Sta	usucai i aising	-r-can	ures	aı
		age and Complexity						
		age and Complexity. NTICS AND PRAGMA	ANTICS					
UNIT		NTICS AND PRAGMA	ANTICS					
UNIT	IV SEMA	15 5		Semantics	s; Computation	al Di	isco	ırs
UNIT Repres	IV SEMA	NTICS AND PRAGMA		Semantics	s; Computation	al Di	isco	ırs
UNIT Repres	SEMA enting Mear	NTICS AND PRAGMA		Semantics	s; Computation	al Di	isco	urs
UNIT	SEMA enting Mean rence Resolut V APPLI	ing – Computational ion.	Semantics, Lexical					
UNIT Repress Corefer UNIT	SEMA enting Mean rence Resolut V APPLI	ing – Computational ion. CATIONS on – Question Answeri	Semantics, Lexical					
UNIT Repress Corefer UNIT	enting Mear rence Resolute V APPLI	ing – Computational ion. CATIONS on – Question Answeri	Semantics, Lexical		e and conversat	ional	ager	nts
UNIT Repress Corefer UNIT	enting Meanurence Resolute V APPLI Attion Extraction Translation	ing – Computational ion. CATIONS on – Question Answeri	Semantics, Lexical			ional	ager	nts
UNIT Repress Corefee UNIT Information Machine	IV SEMA enting Mean rence Resolut V APPLI ation Extraction Translation SE OUTCO	NTICS AND PRAGMA ing — Computational ion. CATIONS on — Question Answeri	Semantics, Lexical		e and conversat	ional	ager	nts
UNIT Repress Corefee UNIT Information Machine	IV SEMA enting Mean rence Resolut V APPLI ation Extraction Translation SE OUTCO	ing – Computational ion. CATIONS on – Question Answeri	Semantics, Lexical		e and conversat TOTAL PE	RIOD	ager	nts
Repress Corefer UNIT Information Machine COUR At the content of th	enting Mear rence Resolut V APPLI ation Extract ate Translation SE OUTCO and of this co	NTICS AND PRAGMA ing — Computational ion. CATIONS on — Question Answeri	Semantics, Lexical	n – Dialogu	TOTAL PE BT Map (Highest I	RIOD pped Level)	ager	nts
UNIT Repress Corefee UNIT Information Machine	enting Mear rence Resolut V APPLI ation Extract ate Translation SE OUTCO and of this co	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab	Semantics, Lexical	n – Dialogu	e and conversat TOTAL PE	RIOD pped Level)	ager	nts
Repress Corefee UNIT Information Machine COUR At the COI	enting Mean rence Resolute APPLI retion Extraction Extr	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab	Semantics, Lexical ng and Summarization le to of knowledge in spe	n – Dialogu	TOTAL PE BT Map (Highest I	RIOD pped Level)	ager OS (C2)	nts
Repress Corefer UNIT Information Machine COUR At the content of th	enting Mean rence Resolute APPLI retion Extraction Extr	ing – Computational ion. CATIONS on – Question Answeri MES urse, students will be ab concepts and principles cessing.	Semantics, Lexical ng and Summarization le to of knowledge in specific synthesizing specific	n – Dialogu	TOTAL PE BT Map (Highest I	RIOD pped Level)	ager OS (C2)	
Repress Corefee UNIT Informa Machin COUR At the c	enting Meanurence Resolute V APPLI ation Extraction ETranslation SE OUTCO end of this co explain the language production of the company of th	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab concepts and principles cessing. the practical experience	Semantics, Lexical ng and Summarization le to of knowledge in specied.	n – Dialogu	TOTAL PE BT Map (Highest I Understand	RIOD pped Level) ing (K	ager S2)	nts
Repress Corefer UNIT Information Machine COUR At the COI	enting Meanurence Resolute V APPLI ation Extraction ETranslation SE OUTCO end of this co explain the language production of the company of th	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab concepts and principles are practical experience g the techniques involve features and unification	Semantics, Lexical ng and Summarization le to of knowledge in specied.	n – Dialogu	TOTAL PE BT Map (Highest I	RIOD pped Level) ing (K	ager SS SS SS SS SS SS SS SS SS	nts
Repress Corefer UNIT Information Machine COUR At the CO1 CO2 CO3	enting Mean rence Resolute APPLI ration Extraction Extr	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab concepts and principles are practical experience g the techniques involve features and unification	Semantics, Lexical ng and Summarization le to of knowledge in special in synthesizing special.	n – Dialogu	TOTAL PE BT Map (Highest I Understand Applying	ional i	ager (S2)	nts
Repress Corefee UNIT Informa Machin COUR At the c	enting Mean rence Resolute V APPLI retion Extraction Ex	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab concepts and principles cessing. he practical experience g the techniques involve features and unification inplexity	Semantics, Lexical ng and Summarization le to of knowledge in special in synthesizing special.	n – Dialogu	TOTAL PE BT Map (Highest I Understand	ional i	ager (S2)	nts
Repress Corefer UNIT Information Machine COUR At the CO1 CO2 CO3	enting Mean rence Resolute V APPLI ation Extraction Ext	ing – Computational ion. CATIONS on – Question Answeri MES arse, students will be ab concepts and principles cessing. the practical experience g the techniques involve features and unification inplexity kills in computational states.	Semantics, Lexical and and Summarization and Summarization are to of knowledge in specied. In synthesizing specied. In syntax and their improvement and its appleantics and its appleantics and its appleantics.	ech and ech and inpact on	TOTAL PE BT Map (Highest I Understand Applying	ional ing (Kanana)	ager (22)	nts

- 1. James Allen, Benjamin / Cummings, "Natural Language Understanding", 2nd edition, 1995.
- 2. C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing", MIT Press. Cambridge, MA: 1999.
- 3. Bharati A., Sangal R., Chaitanya V.. Natural language processing: a Paninian perspective, PHI, 2000.
- 4. Siddiqui T., Tiwary U. S. Natural language processing and Information retrieval, OUP 2008.
- Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, 2nd Edition, 2008.
- 6. C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing", Massachusetts Institute of Technology, 2003.

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

		PO's	O's			PS	O's	
CO's	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	3	2	1	1	2	1	1	2
CO2	2	1	1	1	1	1	2	2
CO3	1	1	3	2	2	1	1	2
CO4	2	3	2	1	2	1	1	2
CO5	1	1	1	2	2	1	2	1



PCE23165	5	CLOU	D COMPUTING T	ECHNOLO	GIES	3	0	0	3
COURSE	OBJECT	IVES							
To enable the	he student	s to							
1 3	articulate	the differences	between deployment	model and serv	rice model of	cloud	compi	ıting	
2.		tualization tec	nnologies, resource m	anagement tec	hniques and	sched	uling so	chemo	es in
3 1	understand	d the architectu	re, infrastructure and	delivery model	s of cloud co	mputi	ng		-7
4 1	understand	the various is	sues in cloud computi	ng					
5		nowledge on d the cloud	fferent types of progr	amming model	s to deploy v	veb ap	plication	ons w	ith
UNIT	I CI	LOUD COMP	UTING BASICS						9
Defining Cl	loud comp	outing - Cloud	Types, Characteristics	s of Cloud com	puting; Clou	d Arc	hitectur	e - C	loud
Computing	Stack; In	frastructure as	a service- Platform	as a Service, S	oftware as a	Servi	ice, Ide	ntity	as a
Service, Co	mpliance	as a Service.							
UNIT I	II PI	LATFORMS A	AND VIRTUALIZA	ΓΙΟΝ				T	9
Abstraction	and Virt	tualization -	Load Balancing and	Virtualization	; Hypervisor	rs; M	achine	Imag	ging;
n									
Porting App	plications;	Capacity Plan	ning- Defining Baselin	ne and Metrics,	Network Ca	pacity			
UNIT II	1 0		Ding- Defining Baseling SERVICES AND T		Network Ca	распу	·.	T	9
UNIT II	II CI	LOUD BASEI	SERVICES AND T	TOOLS				olicati	
UNIT II	II CI	LOUD BASEI	SERVICES AND To	COOLS e Web Service	s- Exploring	g Goog	gle App		ons;
UNIT II Defining Se Google Too	II CI ervices; Pa olkit; Ama:	as Application	D SERVICES AND To a Frameworks; Google ces - Amazon Web Se	e Web Service	s- Exploring	g Goog	gle App	n Sto	ons;
UNIT II Defining Se Google Too	ervices; Pa	as Application	SERVICES AND To	e Web Service	s- Exploring	g Goog	gle App	n Sto	ons;
UNIT II Defining Se Google Too Systems; M	II CI ervices; Pa olkit; Ama: ficrosoft C ive.	as Application zon Web Servi	D SERVICES AND To a Frameworks; Google ces - Amazon Web Se	e Web Service ervice Compon Services; Wind	s- Exploring	g Goog	gle App	n Sto	ons;
UNIT II Defining Se Google Too Systems; M Windows Li UNIT II	ervices; Pa elkit; Ama: ficrosoft C ive. V M.	aS Application zon Web Services	D SERVICES AND To a Frameworks; Google ces - Amazon Web Se - Microsoft Cloud Services ND SECURING TH	e Web Serviceservice Compon Services; Wind	s- Exploring ents and Servious Azure	g Goog vices; Platfo	gle App Amazo rm, SQ	n Sto	ons; rage zure,
UNIT II Defining Se Google Too Systems; M Windows Li UNIT IV	ervices; Parollikit; Amar ficrosoft Caive.	as Application zon Web Services Cloud Services ANAGING A	D SERVICES AND To a Frameworks; Google ces - Amazon Web So - Microsoft Cloud S ND SECURING THE magement Products, C	e Web Serviceservice Compon Services; Wind	s- Exploring ents and Servious Azure	g Goog vices; Platfo	gle App Amazo rm, SQ	n Sto	ons; rage zure,
UNIT II Defining Se Google Too Systems; M Windows Li UNIT IV Administrat Securing Da	ervices; Pa colkit; Ama: ficrosoft Colive. V M. ting the cla ata; Establ	as Application zon Web Services Cloud Services ANAGING A oud-Cloud Ma ishing Identity	Poservices and The Frameworks; Google ces - Amazon Web Science - Microsoft Cloud Science - Micro	e Web Serviceservice Compon Services; Wind	s- Exploring ents and Servious Azure	g Goog vices; Platfo	gle App Amazo rm, SQ	n Sto	ons; rage zure, 9 oud;
UNIT II Defining Se Google Too Systems; M Windows Li UNIT IV Administrat Securing Da	ervices; Pa colkit; Ama: ficrosoft Colive. V M. ting the cla ata; Establ	as Application zon Web Services Cloud Services ANAGING A boud-Cloud Ma ishing Identity LOUD BASEI	D SERVICES AND To Frameworks; Google Ces - Amazon Web Science - Microsoft Cloud Science - Micros	e Web Service ervice Compon Services; Wind E CLOUD	s- Exploring ents and Serv lows Azure	g Goog vices; Platfo	gle App Amazo rm, SQ curing t	n Sto	ons; rage zure, 9 oud;
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UNIT II Defining Se Google Too Systems; M Windows Li UNIT II Administrat Securing Da UNIT V Digital Unit Mobile Cloud	ervices; Parollikit; Amar flicrosoft Colive. V M. ting the cleata; Estable V CI verse; Produd: Mobil	aS Application zon Web Services Cloud Services ANAGING A coud-Cloud Maishing Identity LOUD BASEI ovisioning Cloud Market; Sm	D SERVICES AND To Frameworks; Google ces - Amazon Web Securing The magement Products, Cand Presence. D STORAGE and Storage; Cloud B	e Web Service ervice Compon Services; Wind	s- Exploring ents and Services- lows Azure	g Goog vices; Platfo ds; Sec orage Service	gle App Amazo rm, SQ curing t	the closerabi	ons; rage cure, 9 oud; 9 llity.
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UNIT II Defining Se Google Too Systems; M Windows Li UNIT IV Administrat Securing Da UNIT V Digital Unit Mobile Cloud Discover. COURSE C	ervices; Parollikit; Amarian Microsoft Colive. V M. ting the cleata; Estable V CI verse; Production of this countries o	as Application zon Web Services ANAGING A coud-Cloud Maishing Identity LOUD BASEI covisioning Cloue Market; Sm IES rse, students w	D SERVICES AND TO Frameworks; Google ces - Amazon Web Sec Microsoft Cloud Sec Microso	e Web Service ervice Compon Services; Wind	s- Exploring ents and Services Azure and Standard standar	g Goog vices; Platfo ds; Sec orage Servic	gle App Amazo Amazo rm, SQ curing t Interope types	the closes; Ser	ons; rage cure, 9 oud; 9 llity.
UNIT II Defining Se Google Too Systems; M Windows Li UNIT IV Administrat Securing Da UNIT V Digital Unit Mobile Cloud Discover. COURSE C At the end o	ervices; Parollikit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkite. V M.	as Application as Application web Services and Services and Anaging A coud-Cloud Maishing Identity and Double Market; Smarket; Sm	D SERVICES AND To Frameworks; Google ces - Amazon Web Sec Microsoft Cloud Sec Microso	e Web Service ervice Compon Services; Wind E CLOUD Cloud Managemackup Solution oud; Mobile w	s- Exploring ents and Services Azure for the services TOTO B (High Under the services of the s	g Goog vices; Platfor ds; Secons orage Service TAL I	gle App Amazo rm, SQ curing t Interope types	the closes; Ser	ons; rage cure, 9 oud; 9 llity.
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UNIT II Defining Set Google Too Systems; M Windows Lit UNIT IV Administrat Securing Dat UNIT V Digital Unit Mobile Clot Discover. COURSE C At the end of CO1 et CO2 at CO3 at	ervices; Parollikit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Amazolkit; Establic V CI verse; Product Mobil of this countemploy the capply t	as Application zon Web Services Cloud Services ANAGING A coud-Cloud Maishing Identity LOUD BASEI ovisioning Cloue Market; Smarket; Smarket	D SERVICES AND To Frameworks; Google ces - Amazon Web Sec Microsoft Cloud Sec Microso	e Web Service ervice Compon Services; Wind E CLOUD Cloud Managem ackup Solution oud; Mobile w	s- Exploring ents and Services Azure for the services TOTO B (Hi Unde A)	g Goog vices; Platfo ds; Sec orage Service TAL I T Ma ighest erstand pplyin pplyin	gle App Amazo rm, SQ curing t Interope te types PERIO pped Level) ding (K g (K3)	the closes; Ser	ons; rage cure, 9 oud; 9 llity.

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- 1. Barrie Sosinsky, "Cloud Computing Bible", 1st Edition, Wiley Publishing, 2015.,
- 2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
- 3. Rajkumar Buyya, James Broberg & Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms", Wiley, 2013
- 4. Danielle Ruest, Nelson Ruest, "Virtualization: A Beginner"s Guide", McGraw-Hill Osborne Media, 2009.
- 5. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", McGraw-Hill Osborne Media, 2009

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

CO	Programme Outcomes(POs)									
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2		
CO1	1	1	3	3	2	2	1	2		
CO2	1	1	3	3	2	2	1	2		
CO3	2	2	3	3	2	2	1	2		
CO4	1	2	3	3	2	2	1	2		
CO5	1	1	2	2	1	2	1	2		



PCE2316	66 HIGH PERFORMANCE COMPUTING FOR I	BIG DATA 3 0	0 3
COURSE	E OBJECTIVES	mitted in anciet	
To enable	the students to	in the particular of the contract of the contr	
1	familiarize students with high-performance technologies used	in big and fast data analytic	cs.
2	explore the network, storage infrastructures for high-performa	nce big data analytics	
3	study various high-performance, database processing, memory	analytics in big data analy	tics.
4	explore visualization techniques crucial for high-performance	big data analytics.	
5	examine the use of big data analytics in healthcare applications	S	
UNIT	INTRODUCTION OF IT LANDSCAPE & BIG DAT	ГА	
Trends an	nd Transformations in the IT Landscape; The High-Performance	e Technologies for Big an	d Fas
	lytics; Big and Fast Data Analytics Yearning for High Performand		
UNIT	II NETWORK INFRASTRUCTURE FOR HIGH PER	FORMANCE BDA	
Network	Infrastructure for High-Performance Big Data Analytics; St	State of the Control	High
	nce Big Data Analytics; Real-Time Analytics Using High-Perform		- 0
UNIT			
			IONS COMM TO MA
	formance Computing (HPC) Paradigms; In-Database Processing a	and In-Memory Analytics;	High
Performan	nce Integrated Systems, Databases and Warehouses for Big and Fa	ast Data Analytics.	
Performan UNIT		sst Data Analytics.	9
UNIT	IV HPC USING GRIDS AND CLUSTERS		
UNIT			
UNIT	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics.		nsion
UNIT : High-Perfo for High- F UNIT	IV HPC USING GRIDS AND CLUSTERS ormance Grids and Clusters; High-Performance Peer-to-Peer System of the Performance Big Data Analytics.	stems; Visualization Dime	
UNIT : High-Perfo for High- F UNIT	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. V BIG DATA APPLICATIONS	stems; Visualization Dime	nsion
UNIT High-Perfor for High- F UNIT Social Med	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. V BIG DATA APPLICATIONS	stems; Visualization Dimensions of the stems	nsion
UNIT High-Perfor for High- F UNIT Social Med	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. FV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped	nsion
UNIT High-Perfor for High- F UNIT Social Med	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS	nsion
UNIT High-Perfor for High- F UNIT Social Med	IV HPC USING GRIDS AND CLUSTERS ormance Grids and Clusters; High-Performance Peer-to-Peer System of the Peer System of the Pee	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end	IV HPC USING GRIDS AND CLUSTERS ormance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics.	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data processing in big data environments.	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end CO1 CO2	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2) Analyzing (K4)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. IV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data processing in big data environments.	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end CO1 CO2 CO3	HPC USING GRIDS AND CLUSTERS ormance Grids and Clusters; High-Performance Peer-to-Peer System Performance Big Data Analytics. V BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data processing in big data environments. apply integrated systems and data warehouses designed for	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2) Analyzing (K4) Applying (K3)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end CO1 CO2	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer Systems and Clusters; High-Performance Peer-to-Peer Systems and data warehouses designed for handling big and fast data analytics tasks.	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2) Analyzing (K4)	nsion
UNIT High-Perfor for High- F UNIT Social Med COURSE At the end CO1 CO2 CO3	IV HPC USING GRIDS AND CLUSTERS formance Grids and Clusters; High-Performance Peer-to-Peer Systemance Big Data Analytics. FV BIG DATA APPLICATIONS dia Analytics for Organization Empowerment; Big Data Analytic OUTCOMES of this course, students will be able to understand various technologies employed in big and fast data analytics. analyze different storage solutions tailored for efficient data processing in big data environments. apply integrated systems and data warehouses designed for handling big and fast data analytics tasks. apply visualization techniques to effectively interpret and	stems; Visualization Dimensions for Healthcare. TOTAL PERIODS BT Mapped (Highest Level) Understanding (K2) Analyzing (K4) Applying (K3)	nsion

- Pethuru Raj, Anupama Raman, Dhivya Nagaraj and Siddhartha Duggirala, "High- Performance Big-Data Analytics: Computing Systems and Approaches", Springer, 1st Edition, 2015.
- "Big Data Management and Processing", Kuan-Ching Li, Hai Jiang, Albert Y. Zomaya, CRC Press, 1st Edition, 2017.
- "HighPerformanceComputingforBigData:MethodologiesandApplications", Chao wang, CRC Press, 1st Edition, 2018

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs			s)					
COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	3	2	3	3	1	2	1	2
CO2	2	2	3	3	1	2	1	2
CO3	2	2	3	3	- 1 -	2	1	2
CO4	2	3	3	3	1	2	2	2
CO5	2	2	3	3	2	2	1	2

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PCE23167		WEB ANALYTICS	= 1	3	0	0	3
COURSE OBJE	CTIVES						
To enable the stu	dents to	neriasite, a					
1	understand the	fundamentals and classification	s of web analytics.				
2	mastering click	stream analysis for actionable in	nsights		440		
3	enhancing prof	iciency in web testing and analy	ysis				
4	applying optima	al solutions to identify and over	come hidden web	analytic	cs traps		
5	building a succe	essful career in web analytics					
UNIT I	INTRODUCT	ION					
The Bold New W	orld Of Web A	nalytics 2.0;State of the Analytics	tics Union, State o	f the In	dustry-	Rethir	ıkin
Web Analytics; N	Meet Web Anal	ytics 2.0, Clickstream, Multiple	e Outcomes Analy	sis, Ex	perime	ntation	ı an
Testing; The Op	timal Strategy f	for Choosing Your Web Anal	ytics Soul Mate;	The A	wesome	Wor	ld c
Clickstream Ana	lysis: Metrics-F	Eight Critical Web Metrics, E	Bounce Rate, Exit	Rate,	Conver	sion	Rate
Starting with Mac	ero Insights						
UNIT II	THE POWER	OF CLICKSTREAM ANAL	VSIS				0
		ream Analysis-A Web Analytic		Stuff at	nd Savii	ng Ma	nev
		es, -Everyday Clickstream Ana				_	•
		ization (SEO) Analysis, Direction					
Micro Conversion	ns/Examples –S	Surveys-Types of Surveys, Thi	ree Greatest Surve	y Ques	stions E	ver, V	Web
Enabled Emerging	g User Research	Options					
UNIT III	TESTING ANI	D ANALYSIS	Tij antsisi) -2		1300		
Unleashing the F	ower of Testir	ng and Experimentation-A Pri	mer on Testing (Options	: A/B :	and N	AVT
		Culture; Competitive Intellige		•			
		s, Search and Keyword Analysi				• •	
		Blogs; Analyzing Performance		ytics. 5	ociai, iv	ioone	, ап
			STATES TO SECURE SECURE STATES	mp . p			
	-	LUTIONS FOR HIDDEN W					
A Six-Step Proce	ss for Dealing	with Data Quality; Five Rules	for High-Impact	Dashbo	ards; O	nline	Data
Mining and Predi	ctive Analytics-	Type of Data, Number of Var	iables, Multiple Pr	imary	Purpose	s, Mi	ssin
Primary Keys and	d Data Sets; Co	omparing KPI Trends Over Ti	me; Four In actio	nable 1	КРІ Ме	asure	men
Techniques; Mult	ichannel Analyt	ics					
UNIT V	THE WEB AN	ALYTICS CAREER					9
Planning a Web	Analytics Caree	r; Cultivating Skills for a Suc	cessful Career in	Web A	nalysis:	Chan	gin
		ltures; Five Rules for Creating					
Barriers to Web N		Tuito for Crouming	, Zam Ziivoii, D	Tatogn	-5 to DI	our D	. U W
		37					
			тот	AT DE	ERIODS		4:

COUR	SE OUTCOMES	
At the	end of this course, students will be able to	BT Mapped (Highest Level)
CO1	understand the evolution to web analytics 2.0 and its significance	Understanding (K2)
CO2	understand the foundational principles of clickstream analysis in web analytics	Understanding (K2)
CO3	implement A/B and multivariate testing (MVT) techniques effectively to optimize outcomes.	Applying (K3)
CO4	apply online data mining and predictive analytics techniques, considering types of data, variables, primary purposes, and handling missing primary keys.	Understanding (K2)
CO5	develop strategies to overcome barriers and challenges in web measurement.	Applying (K3)

- Avinash Kaushik, Web Analytics 2.0, The Arts Of Online Accountability And Science Of Customer Centricity- Copyright © 2010 by Wiley Publishing,
- 2. Michael Beasley,-Practical Web Analytics For User Experience: How Analytics Can Help You Understand Your User||, Morgan-Kaufmann, 2013
- 3. Justin Cutroni,-Google Analytics||,O'Reilly,2010

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(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

60	Programme Outcomes(POs)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2				
CO1	2	2	3	2	1	2	1	2				
CO2	2	2	3	2	1	2	1	2				
CO3	2	2	3	2	1	2	1	2				
CO4	2	3	3	2	1	2	1	2				
CO5	2	2	3	2	2	2	1	2				



	23168		SOCIA	AL NETWO	RK ANALYS	SIS	3	0	0	3
COURSE	С ОВЈЕСТ	IVES							73	
To enable	the studen	s to					77			
1	transform	n data for a	nalysis u	ising graph-ba	sed and statistic	s-based socia	l networ	k meas	sures	
2	choose a	mong socia	l networ	k behavior ba	sed on research	goals				
3	analysis				nciples of diffe					
4	informat	ion appropr	riately.		end user sentir					
5		nd the fund ial network		concepts in a	nalyzing the lar	ge-scale data	models	that ar	e deri	ved
UNIT I	SOC	IAL NETW	VORK A	AND GRAPH						9
Introduction	on-Importa	nt tools and	analysis	s of online net	work data; Pytł	non libraries a	nd assoc	iated	packag	ges,
Execution	of SNA in	real time a	application	on, SNA and	Graph represen	tation; Real-t	ime proc	luct fr	om SN	VA-
Indices en	nployed in	Social Netv	vork-To	ols to analyze	Network-Scop	e of python in	n SNA-	Use C	ase-R	eal-
Time prod	uct from Sl	NA- Aspects	s of the 1	network-Grapl	n-Scale free net	works-Netwo	rk Data S	Sets.		
UNIT II	I CAS	CADING B	EHAVI	OR AND PR	AGMATIC A	NALYSIS				9
Introduction	on; User be	havior; Cas	scaded b	ehavior; Socia	al Media Analy	tics; Convent	ional str	ategie	s in D	ata
Mining tec	chniques; R	esearch Gap	ps in the	current scena	rio; Introductio	n to Pragmati	c analysi	s; Bac	kgrou	ınd;
Proposed r	nodel; Buil	ding Social	Ontolog	gy under the ag	griculture Doma	in-Validation				
UNIT II	I CLAS	CCIEICATI								
		SSIFICATI	ION OF	ANOMALO	US ACTIVITI	ES AND AL	GORIT	HMS		9
	on; Method	ology; Imp	lementat		Machine learn				word	
	on; Methodia related w	ology; Imp /orks; TF-II	lementat DF Tech	tion; Basis of	Machine learr				word	
social med	on; Method ia related w	ology; Imporks; TF-II	lementat DF Techi NALYS	tion; Basis of nique, Time se	Machine learneries.	ing approach	; Foreca	st the		l in
social med UNIT IV Sentiment	on; Method ia related w V SENT Analysis; T	ology; Imporks; TF-IICIMENT A	lementat DF Techi NALYS in sentin	tion; Basis of nique, Time se SIS AND MOD nent Analysis;	Machine learneries. DELS Implementation	n of sentimer	; Foreca	st the	l Resu	l in 9 ults;
Sentiment Future Sco	on; Methodia related www. SENT Analysis; Tope; Introduction	ology; Imports; TF-II TIMENT A Techniques in action to C	lementate DF Techn NALYS in sentine Cascades;	tion; Basis of nique, Time se SIS AND MOD nent Analysis; Cascade Net	Machine learneries. DELS Implementation works-Importa	n of sentimer	nt Analys	sis and	l Resu	l in 9 ults;
UNIT IV Sentiment Future Sco	on; Methodia related w SENT Analysis; Tope; Introduction	ology; Imports; TF-II CIMENT A Techniques auction to C ascades, Ce	DF Technology NALYS in senting ascades;	tion; Basis of nique, Time se SIS AND MOD nent Analysis; Cascade Net Cascading fai	Machine learneries. DELS Implementation	n of sentimer	nt Analys	sis and	l Resu	l in 9 ults;
UNIT IV Sentiment Future Second Models of UNIT V	on; Methodia related www. SENT Analysis; Tope; Introduction Network C	ology; Imports; TF-II TIMENT A Techniques a Lection to C ascades, Ce LORING S	NALYS in senting ascades; entrality,	tion; Basis of nique, Time set IS AND MODE nent Analysis; Cascade Net Cascading fair NETWORK	Machine learneries. DELS Implementation works-Importation Behavior	n of sentimer nce of Casca example usin	nt Analysides; Cas	sis and cade (n.	l Resu Capac	9 llts;
Sentiment Future Sco Models of UNIT V Introductio	on; Method ia related w SENT Analysis; Tope; Introde Network Company EXPI	ology; Imports; TF-II TIMENT A Techniques a Lection to C ascades, Ce LORING S	NALYS in senting ascades; entrality, al Netwo	tion; Basis of nique, Time set and MOD ment Analysis; Cascade Net Cascading fair NETWORK ork; Connective	Machine learneries. DELS Implementation works-Importation	n of sentimer nce of Casca example usin	nt Analysides; Cas	sis and cade (n.	l Resu Capac	9 llts;
Sentiment Future Sco Models of UNIT V Introductio	on; Method ia related w SENT Analysis; Tope; Introde Network Company EXPI	ology; Imp vorks; TF-II TIMENT A Techniques a action to C ascades, Ce LORING S ming a Social	NALYS in senting ascades; entrality, al Netwo	tion; Basis of nique, Time set and MOD ment Analysis; Cascade Net Cascading fair NETWORK ork; Connective	Machine learneries. DELS Implementation works-Importation Behavior	n of sentimer nce of Casca example usin	nt Analysides; Cas	sis and cade (l Resu Capac	9 llts;
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CO5	performing on large social networks and illustrate the	Analying (K4)
	results	
REFE	RENCES	
1.	Social Network Analysis: Theory and Applications, Mohamm	nad GouseGalety, Sachi Nandan
	Mohanty, Chiai Al Atroshi, Buni Balabantaray, John Wiley & Son	s,2022.
2.	John Scott, Peter J. Carrington, "The SAGE Handbook of Social I	Network Analysis", Sage
	Publication	
3.	Social network analysis: methods and applications, Stanley V	Wasserman, and KatherineF'Aust.
	Cambridge university press.	
4.	Social Network Analysis: History, Theory and Methodology by C	Christina Prell, SAGE Publications
	1 st edition.	
5.	Sentiment Analysis in Social Networks, Federico Alberto Pozzi,	Elisabetta Fersini, Enza Messina,
	and Bing.LiuElsevierInc, 1stedition.	
CO-P	O MAPPING:	
Maj	pping of Course Outcome (CO's) with Programme Outcomes (I Outcomes PSO's	PO's) and Programme Specific
		A. P 1 XV and

00		Programme Outcomes(POs)							
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	
CO1	3	2	3	3	1	2	1	2	
CO2	3	2	3	3 ·	1	2	2	2	
CO3	3	2	3	3	1	2	2	2	
CO4	3	2	3	3	1	2	2	2	
CO5	3	2	3	3	1	2	2	2	



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COURSE	OBJECTIV	ES													
To enable	the students	0													
1	understand		ematica	al foundat	tions r	needed	for un	derstand	ling ar	d desi	gnin	grai	ndoı	nize	ed
2	expose the	inequaliti	es and p	probabilis	stic me	ethods.									
3	understand	the conce	pt of ra	ndom wa	ılk and	d Algeb	raic tec	hniques	S.						-
4	expose the	Data Stru	ctures a	ınd Graph	ı algor	rithms.									
5	implement	the Appro	oximate	counting	and P	Parallel	and dis	tributed	l algori	thms.					
UNIT I	INTROD MOMEN	JCTION, IS AND I	GAME DEVIA	E-THEOI TIONS	RETIO	C TEC	HNIQ	UES A	ND						9
Introduction	on-Min-Cut				ar Par	rtitions;	Gam	e-Theor	etic 7	echnic	ques-	-Gai	me	Tre	ee
Evaluation	, The Min	max prin	ciple,	Randomr	ness a	and No	on-unif	ormity;	Mom	ents A	And	De	evia	tion	S-
Occupancy	Problems	Markov	and	Chebysl	hev I	Inequal	ities,	Randor	nized	Select	ion,	T	wo-	poi	nt
Sampling,	Stable Marri	age Proble	m and (Coupon C	Collect	tor's Pro	oblem.								
UNIT II	TAIL INE	QUALIT	IES AN	ND THE	PROE	BABIL	ISTIC	METH	OD				T		9
Tail Inequ	alities-Chern									blem, N	Mart	inga	les:	Th	ne
	ic Method-														
			IVIUATI	mum Sati	isfiabi	ility, E	xpandii	ng Grap	hs, Lo	vasz L	ocal	Lei	nm	a an	d
Method of	Conditional			mum Şat	isfiabi	ility, E	xpandii	ng Grap	hs, Lo	vasz L	ocal	Lei	nm	a an	ıd
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UNIT III	MARKOV TECHNIC	Probabiliti CHAINS OUES	es. S AND	RANDO	OM WA	ALKS	AND A	LGEB	RAIC						9
UNIT III Markov C	MARKOV TECHNIC hains and R	Probabiliti CHAINS OUES andom W	es. S AND Yalks-A	RANDO 2-SAT	M WA	ALKS	AND A	LGEB	RAIC	om Wa	alks	on	Gr	aph	9 s,
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UNIT III Markov C Electrical 1 Algebraic	MARKOV TECHNIC hains and R Networks, C techniques-F	Probabiliti CHAINS QUES andom W over Time	es. S AND Valks-A es, Graping and	RANDO 2-SAT bh Conne	Exampectivity	ALKS ple, Management	AND A arkov nders a e, verif	Chains, and Rap	RAIC Rand oidly N	om Wa	alks Ran	on don	Gr n W	aph	9 s,
UNIT III Markov C Electrical I Algebraic matchings	MARKOV TECHNIC hains and R Networks, C techniques-F in graphs, v	Probabiliti CHAINS QUES andom W over Time ingerprinti rerifying e	es. S AND Yalks-A es, Graping and	2-SAT oh Conne	Exampectivity ds Tec	ple, May, Expa	arkov arkov nders a c, verificatching	Chains, and Rapying p	RAIC Rand oidly N	om Wa	alks Ran	on don	Gr n W	aph alk: erfe	9 s,
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UNIT III Markov C Electrical I Algebraic matchings UNIT IV Data Struct	MARKOV TECHNIC hains and R Networks, C techniques-F in graphs, v	Probabiliti CHAINS QUES andom W over Time ingerprinti rerifying e RUCTUR mental Da	es. S AND Valks-A es, Graping and equality ES AN	RANDO 2-SAT ch Connect freivald of string D GRAP cturing p	Exampectivity ds Tec gs, pat PH AL problem	ple, May, Expa chnique ttern ma	arkov arkov nders a c, verifiatching	Chains, and Rapying p, Interaction	RAIC Rand pidly M olynon etive pr	om Wanial id	alks Ran lenti stem	on don ties, ss.	Gr W pe	aph alk	9 s, s; ct
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COURSE	COUTCOMES	
At the end	of this course, students will be able to	BT Mapped (Highest Level)
CO1	identify the need for randomized algorithms	Understanding (K2)
CO2	discuss the different probabilistic methods used for designing randomized algorithms	Analyzing (K4)
CO3	present the various paradigms for designing randomized algorithms	Understanding (K2)
CO4	design with data structures and graph algorithms	Applying (K3)
CO5	apply the techniques studied to design algorithms for different parallel and distributed algorithms	Applying (K3)

- 1. Michael Mitzenmacher and EliUpfal ,"Probability and Computing: Randomized Algorithms and Probabilistic Analysis",
- 2. Grimmett and Stirzaker, "Probability and Random Processes", Oxford, 2001.
- 3. Rajeev Motwani and Prabhakar Raghavan, "Randomized Algorithms", 1st Edition, Cambridge University Press, Reprint 2010.

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's

COs			P	rogramme C	outcomes(PO			
COS	PO1	PO2	PO6	PSO1	PSO2			
CO1	3	1	3	2	1	2	1	2
CO2	3	2	3	2	1	2	1	2
CO3	3	2	3	2	1	2	1	2
CO4	3	2	3	2	1	2	1	2
CO5	3	2	3	2	1	2	1	2



PCE2317	0	COMPILER	OPTIMIZATION	ON TECHNIC	CES	1	100	0	3
COURSE	OBJECTIVE	ES							
To enable t	he students to								
1	understand	the optimiza	tion techniques u	ised in compile	r design.				
2	be aware of	the various	machine-indepen	ndent optimizat	ions.				
3	aware of th	e various coi	nputer architectu	res that suppor	t parallelisi	m			
4	become fan	niliar with th	e theoretical back	kground needed	l for code o	ptimizat	tion.		
5	understand	the techniqu	es used for identi	ifying parallelis	m in a seq	uential p	rogram.		
UNIT	I INTR	ODUCTIO	N						9
Language F	rocessors; Th	e Structure o	of a Compiler; Th	ne Evolution of	Programm	ing Lang	guages;	The Sc	ience
of Building	a Compiler;	Application	s of Compiler T	echnology; Pro	gramming	Langua	ge Basi	cs; Iss	ue ir
			et language; Add						
and Flow	Graphs - Opt	imization o	f Basic Blocks;	A simple Co	de generat	or; Peep	hole O	ptimiza	ation;
			Instruction select					•	
UNIT I	I MAC	HINE-INDI	PENDENT OP	TIMIZATION	IS				9
Principle S									
Timespie 5	ources of Op	timization;	Data flow analy	ysis ; Foundat	ion of Da	ta flow	analysi	s: Con	stant
			Data flow analy nination; Loops i						
			Data flow analy nination; Loops i						
Propagation	; Partial Redu	ındancy Elin		in Flow Graphs					bolic
Propagation Analysis. UNIT I	; Partial Redu	ndancy Elin	nination; Loops i	in Flow Graphs	; Region	– based .	Analysi	s; Sym	bolic 9
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Propagation Analysis. UNIT II Processor	; Partial Redu I INST	RUCTION-	nination; Loops i	in Flow Graphs LLELISM traints – Bas	; Region	– based .	Analysi	s; Sym	bolic 9 Code
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CO3	modify the existing architecture that supports parallelism.	Understanding (K2)
CO4	modify the existing data structures of an open source optimizing compiler	Applying (K3)
CO5	Design and implement new data structures and algorithms for code optimization	Applying (K3)

- 1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, "Compilers:Principles, Techniques and Tools", Second Edition, Pearson Education, 2008.
- 2. Andrew W. Appel, Jens Palsberg, "Modern Compiler Implementation in Java", Cambridge University Press, Second Edition, 2002.
- 3. Keith Cooper, Linda Torczon, "Engineering a Compiler", Morgan Kaufmann, Second Edition, 2011.
- 4. Randy Allen and Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence based Approach", Morgan Kaufman, 2002.

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific
Outcomes PSO's

2802000		Programme Outcomes(POs)							
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	
CO1	3	2	3	2	1	2	1	2	
CO2	3	2	3	2	1	2	1	2	
CO3	3	2	3	2	1	2	1	2	
CO4	3	2	3	2	1	2	1	2	
CO5	3	2	3	2	1	2	1	2	



PCE2	3901		BIG DATA	ANALYTICS		3 (0 0	3
COUF	RSE OBJEC	ΓIVES		*				
To ena	ble the stude	its to						
1	gain insight	s into explorator	y data analysis an	d statistical evaluati	on methods			
2	understand	the concepts and	architecture of da	ata stream processing	g			
3	learn about	input and output	formats, features	, and library classes	used in MapRe	duce		
4				HDFS) and its desig				
5				Data processing and				
UNIT	I INTI	RODUCTION T	TO BIG DATA		•			9
Big Da				cs; Key Roles for th	ne New Big Da	ata Eo	cosyst	em:
				Lifecycle - Data A			•	,
				Building, Commun				
			al Methods for Ev		reate Results, C	Эрсга	tionai	120,
	T			aruation.				
UNIT .		ING DATA STI	400 AND COMPANY (1904) 15 COMPANY (1904)	1.1 . 1 A . 1 '	C 1: D			9
				del and Architecture				
				ream; Estimating M		_		
				atform (RTAP) App	olications. Case	Stud	ies - F	teal
Time S	entiment Ana	lysis, Stock Mar	rket Predictions.					
UNIT	III MAP	REDUCE						9
MapRe	duce Types;	Input formats;	Output formats;	MapReduce features	s – Counters; S	Sortin	g; jo	ins;
Side Da	ata Distributio	on; Map reduce	Library Classes. I	MapReduce and new	software stack	ς – Αl	goritl	ıms
using N	MapReduce; E	Extension to Map	Reduce.					
UNIT I	IV HAD	OOP					T	9
History	of Hadoop-	- Components o	of Hadoop; Analy	zing the Data with H	Iadoop; Scaling	g Out	; Had	оор
				OFS Concepts; Hado				-
				g with distep; Ha		10		
	ession; Serial							,,
UNIT	1	MEWORKS		-				9
		CANCELOUS CONTRACTOR XMCCCOMPANION CONTRACTOR	ig and Hive: D	ata processing oper	ators in Dia: 1	Uivo	convi	
				HBase Versus RDB				
					vis; Zookeepei	r – Z0	окее	per
Service	, building ap	meations with Z	Lookeeper; Zooke	eeper in production.				
				200	TOTAL PE	RIOI	os	45
COUR	SE OUTCO	MES						
At the e	end of this cou	ırse, students wi	ll be able to		BT Ma			
CO1	apply data ar	alysis technique	es to analyze and	nterpret data.	(Highest Understan			
	1-0-0			e for real-time data	Understan			
CO2	processing			and dutt	J. I. Goldin		(112)	
		I utiliza vonice	in input and -	utput formats in	A1. *	- (T7	2)	
003	identity and	utilize variot	as input and 0	utput formats in	Applyii	ng (K	٥)	

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	MapReduce	
CO4	explain the architecture and design of HDFS and its role in data storage	Understanding (K2)
CO5	apply Pig and Hive for data processing	Applying (K3)

- EMC Education Services (Editor), "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", 1st Edition, John Wiley & Sons, 2015.
- 2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 3rd edition 2020.
- 3. Tom White, "Hadoop The Definitive Guide", O'Reilly Publications, Fourth Edition, 2015
- 4. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, John Wiley & sons, 2012.
- Michael Minelli, Michele Chambers, Ambiga Dhiraj, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley Publications, 2013

CO-PO MAPPING:

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

co. '.		Programme Outcomes(POs)									
COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2			
CO1	2	2	3	3	1	2	2	3			
CO2	3	1	1	2	1	2	3	2			
CO3	2	1	2	3	1	2	2	3			
CO4	3	1	1	2	1	2	3	2			
CO5	2	1	2	3	1	2	2	3			

