

Scheme – 2022

Department of Computer Science & Engineering

G. Pulla Reddy Engineering College (Autonomous): Kurnool

Accredited by NBA of AICTE and NAAC of UGC

Affiliated to JNTUA, Anantapuramu

Scheme and Syllabus for Two Year M.Tech. Program

in

Computer Science and Engineering(CSE)

(With Effect from the Batch Admitted in 2022-23)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING TWO YEAR M.TECH DEGREE PROGRAM Scheme of Instruction and Examination (Effective from 2022-2023)

M.Tech I Semester CSE

111.1 0	ch i Semes							Scheme-	
				So In per	cheme c structio iods/we	of n æk	Scheme of Examination Maximum Marks		
S.No	Category	Course Title	Credits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks
Ι	Theory		•				•		•
1.	PC	Advanced Data Structures & Algorithms	3	3	0	0	60	40	100
2.	PC	Software Engineering and Applications	3	3	0	0	60	40	100
3.	PC	Artificial Intelligence	3	3	0	0	60	40	100
4.	PE	Professional Elective - I	3	3	0	0	60	40	100
5.	PE	Professional Elective - II	3	3	0	0	60	40	100
6.	MC	Research Methodology and IPR	2	2	0	0	0	100	100
7.	AC	Audit Course - I	0	2	0	0	0	0	0
Π	Practical								
8.	PCL	Software Lab - I	2	0	0	4	60	40	100
9.	PCL	Software Lab - II	2	0	0	4	60	40	100
			21	19		8	420	380	800

M.Tech II Semester CSE

Scheme-2022

Scheme_2022

				So In per	cheme structi iods/w	of on reek	Scheme of Examination Maximum Marks			
S.No	Category	Course Title	Credits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks	
Ι	Theory									
1.	PC	Mobile Computing	3	3	0	0	60	40	100	
2.	PC	Data Science	3	3	0	0	60	40	100	
3.	PE	Professional Elective - III	3	3	0	0	60	40	100	
4.	PE	Professional Elective - IV	3	3	0	0	60	40	100	
5.	PE	Professional Elective - V	3	3	0	0	60	40	100	
6.	AC	Audit Course - II	0	2	0	0	0	0	0	
Π	Practical									
7.	PCL	Software Lab - III	2	0	0	4	60	40	100	
8.	PCL	Software Lab - IV	2	0	0	4	60	40	100	
			19	17		8	420	280	700	

M.Tech III Semester CSE

Scheme-2022

				S Ir per	cheme istructi riods/w	of on veek	Scheme of Examination Maximum Marks			
S.No	Category	Course Title	Credits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks	
1.	OE	Open Elective*	2	0	0	0	0	0	100	
2.	PR	Technical Seminar & Dissertation Phase-I	10	0	0	20	0	100	100	
3.	CAA	Co-Academic Activities	2	0	0	0	0	100	100	
			14	2	0	20	0	200	300	

* Open elective will be offered through MOOCs

M. Tech IV Semester CSE

M.Tech l	V Semester	CSE					Scheme-2	2022	
				Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
S.No	Category	Course Title	Credits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks
1.	PR	Dissertation Phase-II	16	0	0	32	60	40	100

Description	Course Title				
	Free Open Source Software				
DE I	Quantum Computing				
$\mathbf{L} = \mathbf{I}$	Cloud Computing				
	Cryptography and Network Security				
	Natural Language Processing				
DE II	Information Retrieval System				
$FL = \Pi$	Distributed Databases				
	Wireless and Mobile Networks				
	Big Data				
DE III	Machine Learning				
$\mathbf{FE} = \mathbf{III}$	Data Mining				
	Object Oriented Analysis & Design				
	Advanced Computer Architecture				
DE IV	Image and Video Processing				
$\Gamma \Sigma = \Gamma V$	Soft Computing				
	Digital Forensics				
	Computer vision				
DE V	High Performance Computing				
$\Gamma L = V$	Deep Learning				
	Design Patterns				

List of Professional Elective Courses

List of Audit Courses

	1. English for Research Paper Writing
	2. Disaster Management
AC-I	3. Sanskrit for Technical Knowledge
	1. Stress Management by Yoga
AC-II	2. Pedagogy Studies
	3. Personality Development through Life Enlightenment Skills

ADVANCED DATA STRUCTURES & ALGORITHMS (ADSA)												
I Semester : M. Tech Scheme : 2022												
Course Code	Category	Но	ours/W	eek	Credits	s Maximum Marks						
CS801	РС	L	Т	Р	С	Continuous Internal Assessment	End Exam TOT					
		3	0	0	3	40	60	100				
Sessional E	xam Duration :	2 Hrs				En	d Exam Du	ration: 3 Hrs				
Course Out	tcomes :At the er	nd of th	e cours	se the stu	udent will b	be able to						
CO1: Under	rstand the operati	ons and	d appli	cations of	of basic dat	a structures.						
CO2: Expl	ain non linear o	lata st	ructur	es -bina	ary trees,	binary search tr	ee, AVL tr	rees,				
B trees,Red-Black trees and splay trees.												
CO3: Under	rstand the operati	ons of	heaps a	and their	r application	ns.						
CO4: Organ	nize the data in th	e comp	outer m	emory	using hash	tunctions						
CO5: Analy	ze the time comp	plexitie	s of alg	gorithms	s for solving	g problems						
Oranyiany a	f Linear Data St											
Review of A	Arrays Linked lis	ts Stac	es:	$e_1 e_2 = O_1$	nerations at	ad applications						
Non Linear	· Data Structure	s - Tree		cues- O		id applications.						
Non Linear Data Structures – Trees: Introduction Binary trees Binary tree Traversals, Threaded binary trees, Binary Search Trees, AVI												
Trees, B Tr	ees, Red – Black	Trees a	and Spl	lay Tree	s - Operatio	ons and application	ns.					
Priority Qu	Priority Oueues(Heaps):											
Binary Hear	ps-Min and Max	Heaps,	operati	ions and	application	ns. D-heaps, Leftis	st heaps, Ske	ew heaps and				
Binomial Q	ueues.	-	-		••	-	-	-				
Hash Table	es: Introduction,	Hash	Function	ons, Ha	shing Tech	niques-Open Has	hing (separ	ate chaining				
method), Cl	osed Hashing (op	en add	ressing	g), Rehas	shing and E	xtendible Hashing	5.					
Divide and	Conquer: Gene	ral Me	thod, E	Binary S	earch, Find	ling Maximum ar	id Minimun	n, Strassen's				
Matrix Mu	Itiplication.	1 1	<i>x</i> ,1 1	A 11 D		$\mathbf{D} = (1 \circ 0 + 1)\mathbf{V}$	1 11	D 1. 1.1.				
Dynamic P	rogramming :Ge	eneral N	/lethod	, All Pa	irs Shortest	Path, 0 / 1 Knaps	ack problem	n, Reliability				
Design, Tra	vening Sales Pers	thad 8	Oue	on's Dro	hlom Gran	h Coloring						
Dack Track	ang. General Me	uiou, o	-Que		oleni, Olap	n Colornig.						
Text Books	•											
1. Data Str Tenenba	uctures Using C a um Pearson Edu	and C+ cation.	+ by Y	edidyah	Langsam,	Moshe J. Augenst	ein, Aaron I	М.				
2. Fundam	entals of Compu	ter Alg	orithm	s by Ell	lis Horowit	z, Sartaj Sahni &	Sangutheva	ar.Rajasekaran				
Reference I	Books:	U	·			, <u> </u>	U	5				
1. Classic	Data Structures b	y D. Sa	amanta	L								
2. Design	and Analysis of (Comput	ter Alg	orithms	by Aho							
3. Introduc	ction to the Desig	n and A	Analysi	is of Alg	gorithms by	Goodman						
4. Design	and Analysis of A	Algorith	ıms by	E. Horo	owitz							
Question Po	aper Pattern:											
Internal A	Assessment: The	questi	on pap	er for in	nternal exai	mination shall cor	nsist of Six	questions and				
student has	to answer any \mathbf{F}	our que	estions		,• • • •		, •	1 . 1 . 1				
End Exan	n: The question	n paper	tor end	d examin	nation shall	consist of Eight	questions ai	nd student has				
to answer a	iny Five question	S.										

	SOFTW	ARE I	ENGIN	IEERIN	IG AND A	PPLICATIONS(SEA)					
I Semester:	M. Tech						S	cheme : 2022				
Course Code	Category	Н	ours/W	eek	Credits	Maximum Marks						
CS802	РС	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL				
Sossional F	vam Duration: 7	J Hrs	U	U	3	40 En	00 d Even Du	100				
Course Out	tcomes: At the er	<u>d of th</u>	e cour	se the sti	l ident will b	e able to	u Exam Du					
CO1: Unde	rstand the phases	$\frac{1001}{100}$	ftware	project								
CO2: Understand fundamental concepts of requirements engineering and Analysis Modelling												
CO3: Unde	CO3: Understand the various software design methodologies											
CO4: Learr	various testing a	nd mai	ntenan	ce meas	ures							
CO5: Estin	ate the project ris	sk and	project	Metrics								
	1 5											
Software P	rocess And Agile	e Devel	lopmer	nt: Intro	duction to S	Software Engineer	ring, Softwa	re Process,				
Perspective	and Specialized I	Process	Mode	ls –Intro	duction to	Agility-Agile prod	ess-Extrem	e				
programmir	ng-XP Process.											
Requireme	nts Analysis And	d Speci	ficatio	n: Softv	vare Requir	ements: Function	al and Non-J	Functional,				
User require	ements, System re	equiren	ients, S	Software	Requireme	ents Document – I	Requirement	t Engineering				
Process: Fea	asibility Studies,	Require	ements	elicitati	on and anal	lysis, requirement	s validation,	requirements				
managemen	t Classical analys	sis: Stru	ictured	system	Analysis, I	etri Nets- Data D	ictionary.	1. , 1				
Software D	esign: Design pro	- ocess A robit	Desig	n Conce	pts-Design	Model – Design H	euristic – A	rchitectural				
Interface De	esion: Interface at	nalvsis	Interf	ace Desi	gn _Compo	nent level Design	e Data Plow	Class based				
components	traditional Com	nonent	S.		gii compe	field level Design	. Designing	Cluss bused				
Testing An	d Maintenance:	Softwa	re testi	ng fund	amentals-Ir	nternal and externa	al views of 7	Testing-white				
box testing	– basis path testir	ng-cont	rol stru	icture tes	sting-black	box testing- Regr	ession Testi	ng – Unit				
Testing –Int	tegration Testing	– Valio	lation [Festing -	- System To	esting And Debug	ging –Softw	are				
Implementa	tion Techniques:	Coding	g practi	ices-Ref	actoring-M	aintenance and Re	engineering	g-BPR model-				
Reengineeri	ng process mode	l-Reve	rse and	Forwar	d Engineeri	ng.						
Project Ma	nagement: Softv	vare Pr	oject N	lanagem	ent: Estima	ation – LOC, FP E	Based Estima	ation,				
Make/Buy I	Decision COCON	10 I &	II Moo	lel – Pro	ject Schedu	uling – Scheduling	g, Earned Va	alue Analysis				
Planning –P	Project Plan, Plani	ning Pr	ocess,	RFP Ris	k Managen	nent – Identificatio	on, Projectio	on – Risk				
Managemer	it-Risk Identificat	tion-RN	AMM .	Plan-CA	SE TOOLS	5.						
1 Dresserve	$\mathbf{P} = \mathbf{P} \cdot $	Callena	. Fue		. 1 Decementiati	an anta Arana a ata	MaCharry II:	11 N				
1. Pressma Vork N	\mathbf{N} , Koger (2010) λ	sojiwai	re Engl	neering.	A Pracilli	oner's Approacn,	McGraw HI	II, New				
$\frac{101K, N}{2}$	$\frac{1}{2}$	Softwa	ro Ena	inoorino	Addison	Wesley Roston I	ЛΛ					
2. Sommer	Rooks•	sojiwa	ie Eng	meering	, Auuisoii-		VIA.					
1. Stenhen	s. Rod (2015) Ro	oinnina	Softw	are Eno	ineerino W	rox						
2. Tsui Fr	ank . Orlando Ka	ram an	d Barh	ara Bern	al (2013) F	Essentials of Softw	are Enginee	ring. Jones &				
Bartlett	Learning . Sudbu	ry. MA			(=010) L							
3. Pfleeger River, N	r, Shari (2001) <i>So</i> IJ.	ftware	Engine	eering: T	Theory and	Practice, Prentice	Hall , Uppe	er Saddle				
1												

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

ARTIFICIAL INTELLIGENCE (AI)												
I Semester	: M. Tech						S	cheme : 2022				
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks				
CS803	РС	L	Τ	P	C	Continuous Internal Assessment	End Exam	TOTAL				
Sessional F	vam Duration •	J 2 Hrs	U	U	3	40 Fn	60 d Evem Du	100 ration: 3 Hrs				
Course Out	comes • At the er	$\frac{2}{11}$ $\frac{11}{5}$	e cours	se the sti	l Ident will b	e able to	u Exam Du					
CO1: Dem	onstrate knowl	edge o	of the h	ouilding	p blocks o	f AI as presente	d in terms	of				
intelligent	intelligent agents.											
CO2: Anal	yze and formal	lize the	e prob	lem as	a state spa	ace, graph, desi	gn heuristi	icsand				
select amo	ngst different s	search	or gai	me bas	ed technic	jues to solve the	em.					
CO3: Deve	lop intelligent	algori	thms f	or cons	straint sati	sfaction probler	ns and also)				
design inte	elligent system	s for (Game	Playing	5.							
CO4: Attai	n the capability	y to rej	presen	t variou	us real life	e problem doma	ins using					
logic based	d techniques ar	1d use	this to	perfor	rm inferer	ice or planning.	1					
CU5: Solve	e problems wit	n unce	ertain i	niorma	uion using	g Bayesian appr	oaches.					
Introduct	ion to artifici	al int	elligei	nce: In	troduction	n, history, intel	ligent syst	ems,				
current tre	is of AI, applied d_{1}	cations	s, tic-t	ac-tie	game play	mg, developme		inguages,				
Problem s	olving: state-s	mace	search	1 and co	ontrol str	ategies: Introdu	iction, gen	eral				
problem so	olving, characte	eristics	s of pr	oblem,	exhaustiv	ve searches, heu	ristic searc	ch				
techniques	, iterative-deep	bening	a*, co	onstrair	nt satisfact	tion.						
Problem re	duction and gan	ne play	r ing: In	troducti	on, problen	n reduction, game	playing, alp	oha-beta				
pruning, two	o-player perfect in	nforma	tion ga	mes.								
Logic conce	epts: Introduction	n, propo	ositiona	al calcul	us, proporti	onal logic, natural	deduction	system,				
axiomatic sy	stem, semantic t	ableau	system	in prop	ortional log	gic, resolution refu	tation in pro	oportional				
logic, predic	ate logic		4					· ·				
knowledge	e representation	lon: Ir	troau	ction, a	pproaches	to knowledge	representa	for				
KIOwledge	ledge represent	tation	isino	frames	twork, ex	lendedsemantie	networks	101				
Advanced	knowledge re	prese	ntatio	n techi	niaues: In	troduction. con	ceptual					
dependenc	y theory, scrip	t struc	ture, c	cyc the	ory, case	grammars, sema	antic web.					
Uncertain	ty measure: p	robab	oility t	heory:	Introduct	ion, probability	theory, B	ayesian				
belief netw	vorks, certainty	facto	r theor	ry, dem	pster-sha	fer theory.						
Fuzzy sets a	and fuzzy logic:	Introdu	iction, 1	fuzzy se	ts, fuzzy se	t operations, types	s of member	ship				
functions, m	ulti valued logic	, fuzzy	logic, l	inguisti	c variables	and hedges, fuzzy	proposition	is, inference				
rules for fuz	rules for fuzzy propositions, fuzzy systems.											
1. Artificial intelligence- Saroj Kausnik, UENGAGE Learning												
3 Artificial	Intelligence- 3rd	1 editio	n Rich	Kevin	Knight Sh	iv Shankar R Nair	\cdot TMH					
Janunola	intenigence- 510		,	, 120 / 111	15111211, 511		, 1 17111					

4. Introduction to Artificial Intelligence, Patterson, PHI

Reference Books:

1. Artificial intelligence, structures and Strategies for Complex problem solving 5th edition, George F Lugar, PEA

2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer.

3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier.

Web References:

1. https://ai.google/.

2. https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/

3. https://www.w3schools.com/ai/

Question Paper Pattern:

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

RE	SEARC	H ME	ГНО	DOLOGY	AND IPR (RM &	IPR)							
I Semester : Common f	I Semester : Common for all branches Scheme : 2022												
Course Code	Hours	Week	·	Credits	Max	imum Marks							
	110 011 57			Creates	Continuous								
	L	T/D	Р	С	Internal	End Exam	TOTAL						
MC101			-		Assessment								
	2	0	0	2	100	-	100						
Sessional Exam Dura	tion:2	Hrs	Ţ		End Exa	m Duration:							
Course Outcomes : At	t the end	of the c	ourse	the studer	nt will be able to								
CO1: Understand the M	eaning, t	ypes of	resea	rch, resear	ch problems and re	search design.							
CO2: To know the basic	data col	lection 1	metho	ods and sar	npling design.	0							
CO3: Know the basic co	ncepts in	tellectu	al pro	operty righ	ts and patent design	l							
CO4: Understanding that when IPR would take such important place in growth of individuals & nation,													
it is needless to emphasize	ise the n	eed of	inforr	nation abc	out Intellectual Prop	perty Right to l	be promoted						
among students in genera	al & engi	neering	in pa	rticular.	1		1						
CO5: Understand that IP	'R protec	tion pro	vides	s an incenti	ve to inventors for	further research	work and						
investment in R & D, wh	ich leads	s to crea	tion o	of new and	better products, and	d in turn brings	about,						
economic growth and soc	cial bene	fits.											
Chapter-I													
Meaning of research pro	blem, So	ources o	f rese	arch probl	em, Criteria Charac	cteristics of a go	ood research						
problem, Errors in selecting a research problem, scope, and objectives of research problem. Approaches													
of investigation of soluti	ions for	researcl	1 prol	blem. data	collection. analysi	s, interpretation	n. Necessarv						
instrumentations			1)	, ,	, I	, j						
Instrumentations													
Chapter-II													
Effective literature stud	lies app	roaches	, ana	lysis Plag	iarism, Research	ethics, Effectiv	ve technical						
writing, how to write re	port, Paj	per Dev	elopi	ng a Rese	arch Proposal, Form	nat of research	proposal, a						
presentation and assessm	ent by a	review	comn	nittee									
Chapter-III													
Nature of Intellectual P	roperty:	Patents	s, De	signs, Tra	de and Copyright.	Process of Pa	atenting and						
Development: technolog	gical res	earch,	innov	ration, pat	enting, developme	nt. Internationa	al Scenario:						
International cooperation	n on Inte	ellectua	l Pro	perty. Pro	cedure for grants of	of patents, Pate	enting under						
PCT.													
Chapter-IV													
Patent Rights: Scope of	Patent F	Rights. 1	Licen	sing and t	ransfer of technolo	gy. Patent info	rmation and						
databases. Geographical	Indicatio	ons											
Chapter-V													
New Developments in	IPR: Ad	ministra	ation	of Patent	System. New dev	elopments in l	PR; IPR of						
Biological Systems, Com	nputer Sc	oftware	etc. T	raditional	knowledge Case St	udies, IPR and	ITs.						
Text Books :													
1. Stuart Melville ar	ıd Wayn	e Godda	ard, "I	Research n	nethodology: an int	roduction for sc	eience &						
engineering students'"													
2. Wayne Goddard a	and Stuar	rt Melvi	lle, "	Research N	Aethodology: An In	troduction"							
Reference Books :													
1. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners													
2. Halbert, "Resistin	ng Intelle	ctual Pr	opert	y", Taylor	& Francis Ltd	,2007.							
3. Mayall, "Industria	al Design	1", McC	iraw]	Hill, 1992.									
4. Niebel, "Product	Design",	McGra	w Hi	II, 1974.									

Question Paper Pattern: Internal Assessment: The question paper for internal examination shall consist of **Six** questions and has to answer any **Four** questions.

SOFTWARE LAB –I												
I Semeste	er : M. Tech	l			Scheme : 2022							
Course	Category	Hours	s/Wee	k	Credits	Maximum Marks						
Code				T								
CS804	PCL	L	Т	Р	С	Continuous Internal Assessment	Continuous Internal Assessment					
		0	0	4	2	40	60	100				
End Exam Duration: 3 Hrs												
Course Outcomes : At the end of the course students will be able to												
CO1: Implement programs on linear data structures												
CO2: Implement operations on binary search trees.												
CO3: Develop programs for all pairs shortest path and travelling sales person's problems												
using dynamic programming												
CO4: De	velop a prog	gram for	r solvi	ing 8-0	Queen's pro	oblem using bac	k tracking te	chnique.				
				List	of Experi	ments						
1. a) Imple	ementation of	of Merg	ing of	f two s	orted array	/S.						
b) Imple	ementation o	of Polyn	omial	manij	pulation us	ing Linked Lists	5.					
2. a) Imple	ementation of	of Oper	ations	on St	ack using I	Linked Lists.						
b) Impl	ementation of	of Oper	ations	on Ci	rcular Que	ue using Arrays	•					
3. Implem	entation of l	Postfix	Expre	ssion	Evaluation	•						
4. Implem	entation of (Operati	ons or	n Bina	ry Search T	Frees.						
5. Implem	entation of l	Heap So	ort.									
6. Implem	entation of l	oinary s	earch	techni	ique using	divide and conq	uer method					
7. Implem	entation of a	all pairs	short	est pat	th using dy	namic programi	ning.					
8. Implem	entation of 8	8-Queen	ns pro	blem ı	using back	tracking.						
9. Implem	nentation of	travelli	ng sal	espers	on problen	n using dynamic	programmi	ng.				

SOFTWARE LAB -II												
I Semest	er : M. Tech	1						Scheme :				
					202							
Course	Category	Hour	s/Wee	k	Credits	Maximum Marks						
Code			1			Continuo						
CS805	PCL	L	Т	Р	С	Continuous Internal Assessment	ernal End Exam TO					
		0	0	4	2	40	60	100				
End Exam Duration: 3 Hrs												
Course Outcomes : At the end of the course students will be able to												
CO1: Id	CO1: Identify suitable software development process model for a given scenario											
CO2: C	CO2: Create a UML diagrams for a specified problem											
CO3: A	CO3: Apply testing methodologies for validating design models											
	List of Experiments											
1. F	ole of Softw	are & S	Softwa	are De	evelopmen	t Model: Identi	fy the role o	f the software				
iı	ı today's wor	ld & si	uitable	softw	vare develo	pment model fo	or the given s	scenario.				
2. R	lequirement	Develo	opmen	t: Ide	ntify the v	various requiren	nent develop	ment activities				
v	iz. elicitation	, analy	sis, sp	ecifica	ation and v	verification for	the given sco	enario, develop				
a	n SRS docum	nent.										
3. I	ntroduction	to UM	L: To	create	a UML di	agram of ONLI	NE BOOK S	SHOP				
4. T	o create a UN	ML diag	gram o	f ELE	VATOR P	ROBLEM						
5. T	o create a UN	ML diag	gram o	f STU	DENT MA	ARK ANALYS	ING SYSTE	M				
6. T	o create a UN	ML diag	gram o	f E-M	AIL CLIE	NT SYSTEM						
7. S	oftware Tes	ting: D	esign	the To	est cases f	or triangle prob	olem with So	oftware Testing				
Т	echnique: Bo	oundary	Value	e Anal	ysis using	Java						
8. T	o Implement	Size O	rienteo	d Metr	rics write J	ava Code and fi	nd the Cyclo	omatic				
C	omplexity.				~ 1 .							
9. S	tudy of any v	veb test	ing to	ol (e.g	. Selenium) with a given s	cenario					
10.	To create GIT	accou	nt for '	Festin	g to Versic	on Control						

MOBILE COMPUTING (MC)

II Semester	·: M. Tech							Scheme : 2022			
Course Code	Category	Но	ours/W	'eek	Credits	Ma	ximum Ma	rks			
CS814	РС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration:	2 Hrs					End Exam l	Duration: 3 Hrs			
Course Out	tcomes : At the e	end of th	ne cour	se the st	udent will	be able to					
CO1: Under	rstand the basic c	concept	s of wi	reless co	ommunicati	on & mobile com	puting.				
CO2: Under	rstand the wireles	ss medi	um acc	ess cont	trolling me	chanisms and GSN	<u>M.</u>				
CO3: Under	rstand the WLAN	V Syster	m Arch	itecture	, Protocol A	Architecture, And	Physical Lay	yer.			
CO4: Acqu	iring knowledge	on the s	structu	$\frac{1}{2}$ e & con	cepts of M	obile IP.					
CO5: Unde	rstand the Traditi	ional T	CP and	Classic	al Improver	ments of TCP.					
Wireless t	Wireless transmission: Frequencies for radio transmission, Signals, Antennas, Signal propagation,										
Multiplexin	g, Modulation (A	SK, FS	SK, PSI	K) Sprea	d spectrum	, Cellular systems	5.				
Medium access control: Motivation for a Specialized MAC, SDMA, FDMA, TDMA (Fixed											
TDM, Classical Aloha, Slotted Aloha, CSMA), CDMA, Comparison of S/T/F/CDMA.											
GSM: Mo	obile services,	Syster	m Ar	chitectu	re, Radio	interface, Pro	otocols, Lo	ocalization and			
calling, Han	dover.										
Wireless L	AN : Infrared Vs]	Radio T	[ransm:	ission, Iı	nfra Red an	d ad-hoc network					
IEEE 802 .	.II: System are	chitectu	ire, Pr	otocol	architectur	e, Physical laye	r, Medium	access control			
layer, MAC	management.	•		F	1	1 ID	D 1 (1 ¹ A (
	Providentian 7	require	ments,	Entiti	es and i	Ontimizations	Packet o	envery, Agent			
Dynamic ho	st Configuration	protoco	$\log \alpha$	Enca	osulation,	Optimizations,	Reverse u	innening, 1Pv0,			
Traditional	TCP Conges	stion c	ontrol	Slow	start Fas	t retransmit/fast	recoverv	implications of			
mobility. Cl	assical TCP imp	roveme	nts.	510 W	start, 1 as	t Tetransmit/Tast	recovery,	implications of			
Text Books	:										
1. Jochen S	Schiller [2008], [3	Second	Edition	n], Mobi	ile Commu	nications, Low pr	ice edition, F	earson			
Reference I	Books:			J /		· · · · · ·	, , , , , , , , , , , , , , , , , , , ,				
1. Talukde	r [2008], Mobile	Compu	iting: T	echnolo	gy, Applic	ations & service c	reation, TM	H.			
Question Pe	aper Pattern:	i	U		0, 11		,				
Internal A	ssessment:										
The question	The question paper for internal examination shall consist of Six questions and student has to answer any										
Four quest	ions.							-			
End Exan	n:										

				DATA S	SCIENCE	(DS)					
II Semester	: M. Tech							Scheme : 2022			
Course Code	Category	Но	ours/W	eek	Credits	Ma	aximum Ma	rks			
CS815	РС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration: 2	2 Hrs					End Exam	Duration: 3 Hrs			
Course Out	tcomes : At the en	nd of th	e cours	se the stu	udent will b	be able to	1 0	. 1			
COI: Write	e python program	s using	the co	re conce	pts like Lis	ts, Dictionaries, s	ets, tuple, fu	nctions and			
regular expr	essions.	othoma	tical	noration	a on orroug	using NumPy					
CO2.Dello	CO2: Demonstrate various mathematical operations on arrays using NumPy										
CO4. Creati	ng static and inte	ractive	visuali	zations	using Matn	lotlib					
CO5:Enum	erate machine lea	arning a	lgorith	ms. Des	cribe the C	lassification and (Clustering				
Introductio	n to Python.	Data '	Types:	Strings	Numbers	Booleans Date	and Time	Lists Tuples			
Dictionaries	Operators.Cond	itional	Staten	nents. I	oops. Fun	ctions. Modules	and package	ves. Classes and			
Objects, Re	gular expressions	5	Staten				una puenag	,es, clusses and			
Introductio	on to NumPy: '	The Ba	asics o	f NumI	Py Arrays,	Computation or	n NumPy A	rrays: Universal			
Functions,	Functions, Aggregations: Min, Max, and Everything in Between, Computation on Arrays: Broadcasting,										
Comparisons, Masks, and Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data: NumPy's											
Structured A	Arrays										
Data Mani	pulation with Pa	andas:	Introdu	ucing Pa	indas Objec	ets, Data Indexing	g and Selection	on, Operating on			
Data in Pan	das, Handling M	lissing	Data, I	Hierarch	ical Indexi	ng, Combining D	atasets: Con	cat and Append,			
Combining	Datasets: Merge	and Jo	oin, Ag	ggregatio	on and Gro	ouping Planets Da	ata, Pivot Ta	ables, Vectorized			
String Oper	ations, High-Peri	ormanc	ve Panc	ias	for the Driv	a of One Simpl	a Lina Dlata	Simple Seatter			
Plots Visua	lizing Frors De	ensity a	nd Cor	tour Pla	ots Histor	ams Rinnings at	nd Density (Customizing Plot			
Legends, Ci	istomizing Color	bars. N	lultiple	Subplo	ts. Text and	1 Annotation. Cus	tomizing Ti	cks. Customizing			
Matplotlib:	Configurations a	nd Style	esheets	Three-	Dimension	al plotting in Mat	plotlib				
Machine L	earning: What]	ls Macl	nine Le	earning?	,Types of	machine learning	systems, In	troducing Scikit-			
Learn, Featu	ure Engineering,	Model	develo	pment, l	Linear Reg	ression: Simple L	inear Regres	sion, Example of			
model devel	lopment.										
Text Books	:										
1. Python 1	Basics: With Illus	stration	s from	the Fina	ncial Mark	et,VivekKrishnan	noorthy, Jay	Parmar, Mario			
Pisa Per	a,AQuantInsti®	Publica	$\frac{1}{2}$	$\frac{020}{100}$	C 117 1		X 7 1 D1	01 11			
2. Python	Data Science Har	idbook	Essent	ial Tool	s for Work	ing with Data, Jak	eVanderPlas	, O'reilly			
publicat	10ns, 2016										
1 Dython®	DUUKS:	re Daull	Joital I	Jarvov	Daital Daars	on Education In	2010				
2 Data Sci	ience & Big Data	$\Delta nalvi$	tics. Di	scoverir	ng Analyzi	ng Visualizing a	nd Presenting	o Data David			
Dietrich	. Barry Heller. B	eibei Y	ang. Pi	ublished	by John W	ilev & Sons. Inc.	2015	5 Dutu, Du Ma			
Ouestion P	aper Pattern:										
Internal Assessment: The question paper for internal examination shall consist of Six questions and student has to											
answer any	Four questions.										
End Exam	: The question p	paper fo	r end e	xaminati	on shall cor	nsist of Eight ques	tions and stud	lent has to answer			
any rive qu	esuons.										

SOFTWARE LAB –III										
II Semester: M	. Tech						S	Scheme :		
		T			2022	Γ				
Course Code	Category	Hou	rs/Wee	ek	Credits	Maxin	num Mar	ks		
CS816	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		0	0	4	2	40	60	100		
End Exam Dur	ration: 3 Hrs	5						•		
Course Outcon	nes : At the e	nd of	the cou	rse the	e student wil	l be able to				
CO1: Examine	the process f	or imp	orting	and ex	porting the o	data.				
CO2: Apply ap	propriate dat	ta coll	ection a	and pre	e-processing	methods.				
CO3: Identify	different data	analy	vsis Tec	hniau	es suitable fo	or a given applic	ations			
CO4: Demonst	trate data visu	ualizat	ion tec	hnique	es for Data A	nalysis				
			List	t of Ex	periments	2				
1. a. Write prog	ram to create	a list.	manip	ulate a	nd slices it.					
b. Create a ne	w list and ad	ld eler	nents to	o it from	m another lis	st, and creates a	matrix fro	om two		
lists										
c. Create sam	e a, b steps f	or Tup	ole and	Dictio	nary					
2. Write a program for Accessing/Importing and Exporting Data with sample data										
3. Consider the	sample data									
Mean	velocity: 0.24	474, 0	.1235, 0	0.1737	, 0.1824					
Standa	rd deviation	of vel	ocity: ().3314,	, 0.2278, 0.2	836, 0.2645				
Write a Python	program to cr	reate t	oar plot	s with	error bars or	n the same figure	e. Attach a	a text		
4 Consider the	sample data	ing inv	Jan 5.							
people = $('G1', 'G1', $	G2'.'G3'.'G4'.'	'G5'.'C	6'.'G7'	.'G8')						
segments = 4	, - , , ,	-)	-) -) -)						
multi-dimension	nal data= [[3	.4002	2085, 7	.70632	2498, 6.4097	905, 10.516485	77, 7.5330)039,		
7.1123587, 12	77792868,	3.447	773477],	[11.248]	11149, 5.0377	8215, 6.	65808464,		
12.32220677,	7.45964195,	6.79	685302	2,7.245	578743, 3.6	9371847],	[3.	94253354,		
4.74763549, 11	.73529246, 4	.6465	543, 12	2.9952	182, 4.63832	2778, 11.168499	999,8.5688	83433], [
4.24409/99, 12	./1/46612, 1	1.377	2169, 9	9.0051	4257, 10.47	084185, 10.975	67589, 3.	98287652,		
8.80552122]] Write a Python	program to a	ranta	took be	n nlat	and add labe	1 to analy santiar				
5 Given the iris	dataset: http	s·//arc	hive ic	s uci e	du/ml/datase	ets/iris	1.			
a. How many	rows does it	conta	in? Ho	w man	v columns?	203/1113				
b. Compute t	he average pe	etal lei	ngth		<i>j</i> •••••••••					
c. Compute the average of all numerical columns										
d. Extract the	d. Extract the petal length outliers (i.e. those rows whose petal length is 50% longer than the									
average pe	tal length)									
e. Compute th	ne standard d	eviatio	on of al	l colur	nns, for each	n iris species				
t. Extract the	petal length	outlier	s (as al	ove) f	or each iris	species		.1		
g. Extract the	group-wise	petal l	ength o	outliers	1.e. find the	e outliers (as abo	ove) for ea	ch iris		
Species usi	ing groupby(), agg	regate() and	merge().					

Write a python program to compute all the functionalities of the above-mentioned data.

6. Consider the iris data set in Question 4, Write a python program to replace the missing values

in the data by comparing with the neighbouring data

7. Consider the Iris data set, write a python script to arrange the attributes in hierarchical structure

and perform clustering with similar attributes

8. Demonstrate Object detection in an image using python tools

9. Develop an application to Analyze twitter data with Python tools

SOFTWARE LAB –IV												
II Semester : M	I. Tech							Scheme :				
					2022							
Course Code	Category	Hou	rs/Wee	ek	Credits	Maximum Marks						
CS817	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		0	0	4	2	40	60	100				
End Exam Du	End Exam Duration: 3 Hrs											
Course Outcon	Course Outcomes : At the end of the course the student will be able to											
CO1: Impleme	CO1: Implement the preprocessing techniques on a given dataset.											
CO2: Apply machine learning algorithms for data analytics.												
CO3: Analyze	various text	catego	orizatio	n algo	rithms.							
CO4: Solve Bi	g Data Analy	tics p	roblem	s using	g Hadoop fra	mework.						
			Lis	st of E.	xperiments							
1. Preprocessir	ng: Removal	specif	ied attr	ibute,	discriminatio	on of a continuo	us valued	attribute,				
standardization	n and normal	12at101	<u>n of dat</u>	a.	1 • •		<u> </u>					
2. Association	Mining: Find	ding A	ssociat	tion Ri	iles using Aj	priori principle f	or given 1	ransaction				
3. Classification model.	on: Classify tl	he giv	en data	set rec	ords using D	Decision Tree bas	sed classif	ication				
4. Classificatio	on: Classify tl	he giv	en data	set rec	ords using N	Aultilayer Feed f	Forward N	etwork				
classification r	nodel.	Ū			C	-						
5. Clustering:	5. Clustering: Use k-means clustering technique to classify the given dataset.											
6. Hadoop file management: Adding files and directories, Retrieving files, Deleting files.												
7. Word Count	t application:	Map	Reduce	e progr	am to unders	stand Map Redu	ce Paradig	gm.				

FREE AND OPEN SOURCE SOFTWARE (FOSS)										
I Semester :	: M. Tech						S	cheme : 2022		
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks		
CS806	PE-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration :	2 Hrs				En	d Exam Du	ration: 3 Hrs		
Course Out	comes :At the er	nd of th	e cours	se the stu	udent will b	e able to				
CO1: Under	rstand Python syn	ntax, fl	ow con	trol and	looping.					
CO2: Create	e and run Python	progra	ms usi	ng in bu	ilt data stru	ctures.				
CO3: Under	rstand and impler	ment fu	inction	s to perf	orm I/O, fil	e and exception ha	andling.			
CO4: Under	rstand PHP synta	x, flow	contro	ol and lo	oping.					
CO5: Build	U5: Build simple client server applications using PHP.									
Ter dave der edte	later desting to Dethem Originary Engineering Designation Visibility to operation									
Introductio	Decision making Loops Numbers									
Built in data structures in Python: Strings Lists Tunles Dictionaries Date & Time										
I/O Files	a structures in I	l ython handlir	og in	25. Lisis Python:	Basic I/O	functions availa	ble in Pyth	on Opening		
reading, wri	ting and closing	files.	Creatin	g functi	ons and mo	odules. Programs	to demonstr	rate exception		
Introductio	n to DUD. Dasi	og of D	UD Sa	rinta Va	richles Do	to turnog Oporato	ra Evoraci	ong Decision		
making Loc	$\frac{11}{10} \frac{10}{111} \frac{111}{10} \frac{1}{10} \frac{1}{$.5 01 1	III SC	iipis. va	illaules. Da	la types. Operator	is. Explessi	olis. Decision		
Building an	onlications using	PHP	Arrays	Strings	Date & Ti	ime Building HT	ML forms w	vith PHP		
Text Books			1 may 2	- String:		Dunung III				
1. Allen D	owney, Jeffrey E	lkner,	Chris N	Aeyers,	Learning wi	ith Python				
2. Steven l	Holzner, PHP: Th	ne Com	plete F	Referenc	e.	2				
Reference H	Books:		-							
1. Program	nming and proble	em solv	ing wit	th Pytho	n by Ashok	Namdev Kamtha	ne, Amit As	hok		
Kamtha	ne (2018): McGr	aw Hil	1 Educa	ation (In	dia) Private	Limited				
2. Julie C	Meloni,PHP, My	SQL ar	nd Apa	che, Pea	rson Educti	on, 2012.				
Question Pa	iper Pattern:									
Internal A	ssessment:									
The questic	on paper for inter	nal exa	iminati	on shall	consist of S	Six questions and	student has	to answer any		
Four quest	ions.									
End Exam	1:									

	QUANTUM COMPUTING (QC)										
I Semester	: M. Tech						S	Scheme : 2022			
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks			
CS807	PE-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration :	2 Hrs				En	d Exam Du	ration: 3 Hrs			
Course Out	comes :At the er	nd of th	e cours	se the stu	udent will b	be able to					
CO1: Under	rstand the Quant	um Co	mputat	ion							
CO2: Under	rstand the Frame	work of	f Quan	tum Me	chanics						
CO3: Under	rstand Deutsch A	lgorith	m								
CO4: Under	rstand Amplitude	e Ampli	ficatio	n							
CO5: Imple	CO5: Implement Error Correction Codes										
	INTRODUCTION AND BACKGROUND: Computers and the Strong Church-Turing Thesis The										
INTRODU	INTRODUCTION AND BACKGROUND: Computers and the Strong Church–Turing Thesis, The Circuit Model of Computation A Linear Algebra Formulation of the Circuit Model Payarsible										
Circuit Mo	Circuit Model of Computation, A Linear Algebra Formulation of the Circuit Model Reversible										
Computation, A Preview of Quantum Physics, Quantum Physics and Computation.											
QUBITS A	QUBITS AND THE FRAMEWORK OF QUANTUM MECHANICS: The State of a Quantum										
System, 1in	ne-Evolution of a	Closed	1 Syste	m, Com	posite Syste	ems, Measuremen	it.	'(1 D1			
IN I KODU	CIORY QUAN	IUM	ALGU	OKIIHN Doutsch	IS: Probab	rithm	antum Algo	orithms, Phase			
ALCORIT	HMS BASED O	N A M	, THE L DI ITI	DE AN	IDI IFICA	TION · Grover's	Quantum S	aarah			
Algorithm	Amplitude Ampl	ification	n Ouan	$\mathbf{DE} \mathbf{A} \mathbf{V}$	nnlitude Es	timation and Qua	Qualituili S	ing			
Searching W	/ithout Knowing	the Su	rcess P	robabili	tv			ing,			
OUANTUN	ERROR CO	RREC		Classic	val Error (orrection The C	lassical Th	ree-Bit Code			
Fault Tolera	nce. Quantum Ei	TOT CO	rrection	1. Error	Models for	Ouantum Compu	ting. Encod	ing.			
Text Books				-,		C		8			
1. An Intro	duction to Ouan	tum Co	mputii	1g by Ph	nillip Kave.	Ravmond Laflam	me. Michel	e Mosca.			
Reference H	Books:		-	8 1		<u> </u>)				
1. Presskil	Lecture notes: Av	ailable	online	e: http://	www.theory	y.caltech.edu/~pre	eskill/ph229	/			
2. An Introd	duction to Quanti	ım Cor	nputing	g. P. Ka	ye.	1	i				
3. Quantum	Computer Scien	ce. N. I	David	Mermin	•						
Question Po	per Pattern:										
Internal A	ssessment:										
The question	on paper for inter	nal exa	minati	on shall	consist of S	Six questions and	student has	to answer any			
Four quest	ions.					-		-			
End Exan	1:										
The question	on paper for end	examir	nation s	shall cor	nsist of Eig	ht questions and	student has	to answer anv			
Five questi	ons.				8			5			

CLOUD COMPUTING (CC)											
I Semester	: M. Tech						S	cheme : 2022			
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks			
CS808	PE-I	L	Τ	Р	C	Continuous Internal Assessment	End Exam	TOTAL			
Sossional F	vam Duration .	שים 1 Ura	U	U	3	40	00 d Exam Du	100			
Course Out	teomes • At the er	$\frac{2}{1}$ nrs	e cours	e the sti	ıdent will h	e able to	u exam du	ration: 5 mrs			
CO1: State	the roots deploy	ment m	odels a	and feat	res of clou	d computing					
CO2: Sum	narize the usage a	and cha	racteri	stics of y	virtualizatio	n in a cloud com	uting envir	onment			
CO3: Illustr	ate thread. task a	ind mar	reduc	e progra	mming mo	dels using Aneka.					
CO4: Expla	CO4: Explain the steps involved in creating apps using Salesforce.com and Google App Engine.										
CO5: Understand Grep the Web architecture and ECG using Amazon cloud.											
Introductio	n to Cloud Cor	nputin	g: Roo	ots of C	loud Comp	outing, Layers of	cloud, Typ	es of Clouds,			
features of a	features of a Cloud, Challenges and Risks, Cloud Infrastructure Management, Infrastructure as a Service Provider										
Providers, Platform as a Service Providers, Software as Service Provider.											
Virtualization: Introduction, Characteristics of Virtualized Environments, Virtualization and Cloud											
Computing, Pros and Cons of Virtualization, VM Migration Services, VM Provisioning in the Cloud											
Context. Desgramming Enterprise Clouds using Analyse Introduction to Analyse Analyse Analyse Through											
Programmir	ing Enterprise (Ciouus Cask Pr	using	Aneka:	ng Aneka	Man Reduce Prog	ramming us	ing Aneka			
Developing	Cloud Annlica	tions.	Google	$\Delta nn F$	Ing Alleka,	eate and unloadi	ng the ann	Registration			
Salesforce.c	om: Create an ac	count.	create a	an obiec	t. make the	app and test it. W	indows Mi	crosoft Azure:			
Creation of	an app, Running	the app	locally	V.	.,						
Cloud App	lications and us	sage: I	ntegrat	ion of 1	private and	public clouds, C	GrepTheWel	o on Amazon			
cloud, ECG	, Hosting Massiv	ely Mu	ltiplaye	er Game	s on Cloud	, Hosting Twitter a	and Face bo	ok on Cloud.			
Text Books	:										
1. "Cloud	l Computing: Pri	inciples	s and I	Paradign	ns" by Raj	Kumar Buyya, J	ames Brobe	erg, and			
Andrze	ej Goscinski, Wil	ey Pres	s, New	York, U	JSA, Editio	on 2011.					
2. "Cloud	Computing: A P	ractica	l Appro	bach" by	Anthony	C.Velte, Toby J Vo	elte, , Rober	t Elsenpeter.			
McGra	w-Hill, Inc. New	York,	$\frac{NY, U}{1 \cdot 1}$	$\frac{SA, Ed_1}{G T}$	$\frac{1002010}{100}$		10				
3. Raj ku	mar Buyya, Chris	stian V	ecchiol	a, S.Tha	imarai Selv	i, "Mastering Clou	id Computii	ng", 1st			
Edition Deference	n, McGraw Hill P	uoncai	ions								
1 Rail	JUUKS. Kumar Buyya – Ia	mes R	roberg	"Cloud	Computing	Principles and P	aradiame"	John Wiley &			
Sons	Publications	incs D		Ciouu	Computing	g i merpies and i a	aradiginis , s	onn whey a			
2. Judit	2 Judith Hurwitz R Bloor M Kanfman F Halper "Cloud Computing for Dummies" 1st Edition										
Wile	y Publishers, 200)9.		,	- r		,	,			
Question Pa	per Pattern:										
Internal Assessment: The question paper for internal examination shall consist of Six questions and											
student has	student has to answer any Four questions.										
End Exan	n: The question	n paper	for end	1 examin	nation shall	consist of Eight	questions a	nd student has			
to answer a	my Five question	s.									

	CRYPTOGRAPHY AND NETWORK SECURITY (CNS)									
I Semester	: M. Tech						S	cheme : 2022		
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks		
CS809	PE-I		Τ	P	C	Continuous Internal Assessment	End Exam	TOTAL		
Sessional E	vam Duration •	2 Hrs	U	U	5		d Exam Du	ration: 3 Hrs		
Course Out	tcomes : At the er	d of th	e cours	e the stu	ıdent will b	e able to				
CO1: Und	erstand the conce	pts and	l princi	ples of l	Network Se	curity.				
CO2: Ana	lyze various class	ical en	cryptio	n techni	ques and b	lock cipher structu	ıre.			
CO3: Ana	lyze advanced en	cryptio	n stand	lard.	*	1				
CO4: Und	erstand block cip	her mo	des of	operatio	n.					
CO5: Expl	lain various asym	metric	ciphers	5						
CO6: Und	erstand cryptogra	phic ha	ash fun	ctions a	nd digital si	ignatures				
Introductio	n to Security co	oncepts	s: Com	puter S	ecurity con	cepts, OSI Secur	ity Architec	ture, Security		
attacks, Sec	urity services, S	ecurity	mecha	inisms, 1	Fundament	al security design	principles,	A model for		
Network See	Network Security. Number Theory: Fuclidean Algorithm, Modular Arithmetic, Fermat's and Fuler's Theorem, Testing for									
primality										
Symmetric Ciphers: Classical Encryption Techniques: Symmetric Cipher model, Substitution										
techniques. Transposition techniques. Steganography.										
Block Ciph	ers and DES: T	radition	nal blo	ck ciphe	r structure,	Data Encryption	Standard, D	DES Example,		
Strength of I	DES, Block ciphe	er desig	gn princ	ciples.	,	71	,	1 /		
Advanced 1	Encryption Stan	dard:	AES S	tructure	, AES trans	sformation function	ons, AES Ke	ey Expansion,		
AES Examp	ole, AES Impleme	entatior	1.							
Block Ciph	er Operation M	Iodes:	Multip	le Encr	yption and	Triple DES, Ele	ctronic code	book, Cipher		
Block Chair	ing Mode, Ciphe	r feedb	back mo	ode, outp	put feedbac	k mode.	1.0.0.4			
Asymmetrie	c Ciphers and P	ublic k	ey cry	ptosyste	ems: Public	-Key Cryptograph	ny and RSA	: Principles of		
Public-Key	cryptosystems, F	ISA A	Igorith	m. Dall	ier Helima	n Key Exchange	, Elgamai (ryptographic		
Cryptogram	hic Hash Funct	ions: A	nnlicat	tions of	ervntogran	nic hash functions	Hash funct	tions based on		
cipher block	chaining SHA	1011.5. 7 1	ppnea		eryptograpi	ne nash functions	, mash funct	lions based on		
Message Au	ithentication cod	les: Re	auirem	ents. M	essage auth	entication functio	ns. security	of MACs.		
Digital Sig	natures: Digita	l Sign	ature	requiren	nents, Elga	amal Digital Sig	gnature, Sci	hnorr Digital		
Signature sc	heme.	e		1		0		C		
Text Books	•									
1. William	n Stallings, [7th E	dition]	, Crypt	ography	and Netwo	ork Security, Pears	son, 2017			
2. Behrouz	z A. Forouzan, D	Mukho	opadha	yay, [2n	d Edition],	Cryptography and	l Network S	ecurity,		
MC Gra	w Hill, 2010									
Reference I	300ks:		1 т	W. C	1) 1	1.0	1171 D 1	1: 1 2000		
I. Eric Co	ie, Dr. Konald Ki	$\frac{1}{2}$ $\frac{1}$	1 James	SW. Con	niey, Netwo	ork Security Bible	, Wiley Pub	lishers, 2009		
2. Bruce C. Berndt, Number Theory in the Spirit of Ramanujan, University Press, American Mathematical Society, 2006										
3 V K La	in Cryptography	and M	atwork	Security	Khanna F	ubliching House	2017			
J. V.N. Ja	hate Cryptography	allu ING	Netwo	rk Security	, Khaillia P rity TMU	A th Edition 2010	201/			
	maic, Cryptograp	iry and	INCLWO	IN SCUU	шу, пип,	- Dunion, 2019				

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

	Ν	ATUR	AL LA	NGUA	GE PROC	ESSING (NLP)					
I Semester	: M. Tech						S	cheme : 2022			
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks			
CS810	PE-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration :	$\frac{2 \text{ Hrs}}{1 \text{ Gul}}$		(1 (1 4 111		d Exam Du	ration: 3 Hrs			
Course Out CO1: Unde Cleansing at CO2: Deve	rstand the concep nd POS tagging. lop a NLP applic	ts of th	e cours atural	se the sti Languag e NLTK	ge Processir	ng and the importa	nce of Text	Wrangling,			
CO3: Imple	ement Text classi	fication	algori	thms us	ing scikit-le	arn and NLTK.					
CO4: Unde	rstand the basics	of Tok	enizing	g text an	d using Wo	rdNet.					
CO5: Unde	CO5: Understand the importance of Text feature extraction process to a classifier.										
and Cleansi word remove Text. NLP Applie Statistical metatraction, recognition. Text Classi Stochastic algorithm, Text Classi Stochastic Sto	ing, Sentence sp val, Spell correct cations: Building nachine translatio Question answe ification: Maching gradient descent Cext clustering – 1 Text and Wo nto words, Token op words in a tol d synonyms in tol	ilitter, T ion, PO g your f n, Infor ering s ne Lean t, Logi K-Mean rdNet nizing s cenized the Wo	Fokeniz Fokeniz Solve tagg First NI matior ystems ming, ' istic re- ns, Top Basics sentence senter ordNet, s feature	zation, S ging, Na LP appli n retrieva s, Dialo Text cla egression bic mode s: Introc ces usin nee, Loc Calcul	Stemming, amed Entity cation, Oth al, Speech r og systems, ssification, n, Support eling in text luction, To g regular e oking up Sy ating Word	Lemmatization, S V Recognition (NI er NLP applicatio recognition, Text o , Language dete Sampling – Naïv Vector Machine Using NLTK with kenizing text int xpressions, Trainity msets for a word Net Synset simit	o sentences ing a senter in WordNe basification o sentences ing a senter in WordNe barity, Disc	removal, Rare g Structure in ne translation, n, Information ical character Decision trees, andom forest hon Libraries s, Tokenizing nce tokenizer, t, Looking up overing word			
Feature Ex Decision tr Measuring p with voting, Text Books 1. Natural Harden 2. Practice	traction: Bag o ee classifier, Tr precision and rec Classifying with Language Proc iya by Packt 2010	at word raining call of a multip cessing: 6.	s featu a ma a classi ble bina	ire extra ximum fier, Cal ury class on and	entropy cl lculating hi ifiers, Train NLTK, D	ning a Naïve Bay lassifier, Training gh information we ing a classifier wi beepti Chopra, Ja	yes classific g scikit-lear ords, Comb th NLTK-T ncob Perkin	er, Training a rn classifiers, ing classifiers rainer. ns, and Nitin			
2. Practica Systems O'Reily	s, Bodhisattwa 1 Media, Inc, 202	Majum 0.	der, A	ng: A (nuj Guj	pta, Sowm	ya Vajjala, Harsl	hit Surana	published by			

Reference Books:

- 1. Daniel Jurafsky & James H. Martin, Speech and Language Processing, An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition, 2nd Edition, Pearson Education, 2009.
- 2. Tanvier Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford Higher Education, 2008.
- 3. Daniel M. Bikel & Imed Zitouni, Multilingual Natural Language Processing Applications: From Theory to Practice, Pearson Publication, 2012.
- 4. Christopher D. Manning, and Hinrich Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

- 1. <u>https://www.coursera.org/specializations/natural-language-processing</u>
- 2. https://www.udemy.com/course/speech-recognition-a-z-with-hands-onlearnkarts/
- 3. https://nptel.ac.in/courses/106105158

Question Paper Pattern:

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

INFORMATION RETRIEVAL SYSTEM (IRS)											
I Semester	M. Tech						S	cheme : 2022			
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks			
CS811	PE-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration :	2 Hrs	0.0011#	a tha at	idant will b	e abla ta	d Exam Du	ration: 3 Hrs			
Course Out	v to apply IR priv	nciples	$\frac{1}{10000000000000000000000000000000000$	se me su	ant informa	tion large collecti	ons of data				
CO2: Abilit	y to design differ	ent do	rument	clusteri	ng algorith	ms	ons of uata.				
CO3: Imple	ment retrieval sv	stems f	for web	search	tasks.						
CO4: Desig	n an Information	Retrie	val Sys	stem for	web search	tasks.					
CO5: To understand the concepts of multimedia information retrieval.											
Introductio	Introduction to Information Retrieval Systems: Definition of Information Retrieval System,										
Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database											
Management Systems, Digital Libraries and Data Warehouses											
Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous											
Cataloging and Indexing: History and Objectives of Indexing Indexing Process Automatic Indexing											
Information	Extraction	listory	anu Ot	Jeenves	of mucking	g, muexing Floce	ss, Automat	ic indexing,			
Data Struct	ure: Introduction	1 to Da	ta Stru	cture. St	emming Al	gorithms. Inverte	d File Struct	ure. N-Gram			
Data Structu	ires, PAT Data St	tructure	e, Signa	ature Fil	e Structure,	Hypertext and X	ML Data St	ructures,			
Hidden Mar	kov Models		, 0		,	51		,			
Automatic	Indexing: Classe	s of Aı	ıtomati	ic Indexi	ng, Statisti	cal Indexing, Natu	ıral Langua	ge, Concept			
Indexing, H	ypertext Linkage	S									
Document a	and Term Cluste	ering: 1	Introdu	ction to	Clustering,	Thesaurus Gener	ation, Item	Clustering,			
Hierarchy of	f Clusters	1.0				1	1.0.1.				
User Search	n Techniques: Se	earch S	tateme	nts and \downarrow	Binding, Si	milarity Measures	and Rankir	ng, Relevance			
Feedback, S	elective Dissemination	nation (of Info	rmation	Search, we	eighted Searches c	of Boolean S	systems,			
Information	n Visualization.	lu пур Introdu	iction t	o Inforn	nation Visu	alization Comiti	on and Perce	ention			
Information	Visualization Te	chnolo	gies	o mom				eption,			
Text Search	Algorithms: In	troduct	ion to '	Text Sea	arch Techni	ques, Software Te	ext Search A	lgorithms.			
Hardware T	ext Search Syster	ns				1 ,		8,			
Multimedia	Information Re	etrieva	I: Spok	ten Lang	guage Audio	o Retrieval, Non-S	Speech Aud	io Retrieval,			
Graph Retrie	eval, Imagery Re	trieval,	Video	Retriev	al						
Text Books	•										
1. Informati	1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J.										
Kowalski, N	1ark T. Maybury,	Spring	ger								
Keterence	500KS:	. D.	XZ 4	. I. C		1 Dete St.	1 . 1				
I. Frak	es, W.B., Kicardo) Baeza	i- y ates	s: inform	ation Ketri	evai Data Structui	res and Algo	oritnms,			
2 Infor	mation Storage &	Retri	eval D	Rohert	Korfhage	- John Wiley & S	0115				
2. IIII0I	mation Storage C			y KOUCH	- ixoi mage -	John whey & S	0115.				

3. Modern Information Retrieval By Yates and Neto Pearson Education.

Web References:

1. https://en.wikipedia.org/wiki/Information_retrieval

2. https://www.geeksforgeeks.org/what-is-information-retrieval

Question Paper Pattern:

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

DISTRIBUTED DATABASES (DDB) I Semester : M. Tech **Scheme : 2022** Course Category **Hours/Week** Credits **Maximum Marks** Code **Continuous** End Т Р TOTAL L С Internal **CS812** PE-II Exam Assessment 3 0 3 40 60 100 0 **Sessional Exam Duration : 2 Hrs End Exam Duration: 3 Hrs Course Outcomes** :At the end of the course the student will be able to **CO1:** Understand Distributed data Processing and Distributed DBMS Architecture. **CO2:** Analyse query processing and decomposition. **CO3:** Understand various Transaction Management concepts. **CO4:** Understand Distributed reliability and Parallel database systems. **CO5:** Illustrate the concepts of Distributed object DBMS and Object oriented data models. Introduction: Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas. Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. Distributed Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation. **Ouery processing and decomposition:** Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data. **Distributed query Optimization**: Query optimization, centralized query optimization, distributed query optimization algorithms. **Transaction Management:** Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management. Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning. Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters. Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing. Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS **Text Books:** 1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia. 2001. 2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill. **Reference Books:** 1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition.

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

	W	IRELE	SS AN	D MOE	BILE NET	WORKS (WMN)		
I Semester	: M. Tech						S	cheme : 2022
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks
CS813	PE-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration :	2 Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	tcomes :At the e	nd of th	e cours	se the stu	udent will b	e able to		
CO1: To s	tudy the Channe	l planni	ng for	Wireles	s Systems.			
CO2: To s	tudy the Mobile	Radio I	Propag	ation La	rge-Scale P	ath loss.		
CO3: To s	tudy the Mobile	Radio I	Propag	ation Sn	nall-Scale F	ading and Multip	ath.	
CO4: To s	tudy the Equaliz	ation ar	nd Dive	ersity.				
CO5: To s	tudy the Wireles	s Netwo	orks.	-				

The Cellular Concept-System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference, Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring.

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering.

Mobile Radio Propagation: Small –Scale Fading and Multipath: Small Scale Multipath propagation Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time

Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading.

Equalization and Diversity: Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration-Selection Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

Wireless Networks: Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access

Control, Comparison of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper Lan, WLL.

Text Books :

1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI.

2. Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.

3. Mobile Cellular Communication – Gottapu Sasibhushana Rao, Pearson Education, 2012.

Reference Books :

1. Principles of Wireless Networks - Kaveh Pah Laven and P. Krishna Murthy, 2002, PE.

2. Wireless Digital Communications - Kamilo Feher, 1999, PHI.

3. Wireless Communication and Networking - William Stallings, 2003, PHI.

4. Wireless Communication – Upen Dalal, Oxford Univ. Press.

Question Paper Pattern:

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

				BI	G DATA (BD)						
II Semester	:: M. Tech						Scher	ne: 2022				
Course	Category	Ηοι	irs/W	eek	Credits	Maxi	mum Marks					
CS818	PE-III	L	Т	Р	С	Continuous Internal Assessment	ntinuous nternal End Exam TOT ssessment					
		3	0	0	3	40	60	100				
Sessional Ex	am Durati	on: 2	Hrs			End Exa	am Duration:3	Hrs				
Course Out	comes: At t	the er	nd of tl	ne cou	rse student	will be able to						
CO1: Work	CO1: Work with big data platform and explore the big data analytics techniques, business											
CO2: Design	CO2: Design efficient algorithms for mining the data from large volumes.											
CO3: Analy	CO3: Analyze the HADOOP and Map Reduce technologies associated with big data analytics.											
CO4: Understand the fundamentals of various big data analytics techniques.												
CO5: Build a complete business data analytics solution.												
	1				5							
Introduction Systems, Inte Reporting.	1 to big dat elligent data	a : In 1 anal	troduc ysis, N	ction to Vature	o Big Data l of Data, Ar	Platform, Challen alytic Processes	ges of Convent and Tools, Ana	tional lysis vs				
Reporting. Vining data streams : Introduction To Streams Concepts, Stream Data Model and Architecture, Stream Computing, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Estimating Moments, Counting Oneness in a Window, Decaying Window, Real time Analytics Platform(RTAP) Applications, Case Studies - Real Time Sentiment Analysis- Stock Market Predictions.												
Hadoop: His Analysing th interfaces to Anatomy of Map Reduce	story of Hac e Data with HDFS Basi a Map Redu Types and	loop, Hade cs, D ice Jc Form	the Ha pop, So evelop bb run- ats, M	adoop caling oing a Failur ap Re	Distributed Out, Hadoo Map Reduc es, Job Sch duce Featur	File System, Cor op Streaming, De e Application, Ho eduling-Shuffle a es, Hadoop envir	mponents of Ha sign of HDFS, s ow Map Reduce nd Sort, Task e conment.	adoop Java e Works, execution,				

Frameworks: Applications on Big Data Using Pig and Hive, Data processing operators in Pig, Hive services, HiveQL, Querying Data in Hive, fundamentals of HBase and ZooKeeper, IBM InfoSphere BigInsights and Streams.

Predictive Analytics: Simple linear regression, Multiple linear regression, Interpretation 5 of regression coefficients. Visualizations - Visual data analysis techniques, interaction techniques, Systems and applications.

Text Books :

- 1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- 2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
- 3. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.

Reference Books :

 Arshdeep Bahga, Vijay Madisetti, "Big Data Science & Analytics: A HandsOn Approach. ",VPT, 2016

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

			MAC	CHINE	LEARNING	G (ML)		
II Semester	·: M. Tech						Scl	neme : 2022
Course Code	Category	He	ours/W	eek	Credits	Maxi	mum Mark	(\$
CS819	PE-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration :	2 Hrs				End	Exam Dura	ation: 3 Hrs
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will	be able to		
CO1: Unde	rstand machine l	earning	g Syster	ms and	Data prepro	cessing technique	s	
CO2: Build	Simple and Mult	tiple Li	near R	egressio	on Models	1 775 75 7		
CO3: Unde	rstand Classificat	$\frac{10n}{5}$ Teo	chnique	es like L	Decision Tre	es and KNN		
CO4: Imple	ement SVM and I	Jecision	n Trees	5.	• • • • •	- 1		
COS: Apply	y the sentiment cl	assifica	ation te	chnique	es in text an	alytics.		
		T.	4	·	<u>()) ()</u>		C1 11	
Machine Lo	earning Landsca	ipe: Int	roduct	ion, Typ	es of Mach	ine Learning Syst	ems, Challe	nges,
I esting and Handling V	Validating Data	Preproc	cessing	, Ior Ma	chine Learn	ing: working wit	n Pandas an	a Numpy,
Linear Rea	arcesion: Simple	Lines	ua witi	ression	Stens in	Building a Regre	ession Mod	al Building
Simple Line	ear Regression M	odel N	lodel D)iagnost	ics Multinl	e Linear Regressi	on	ci, Building
Classificati	on Problems: C	lassific	ation ()verviev	v. Binary L	ogistic Regressio	n. Credit Cl	assification.
Gain Chart	and Lift Chart, D	ecision	Tree C	Classific	ation, K-N	earest Neighbor C	lassifier	
Support V	ector Machine	s: Lin	ear S	VM cla	ssification,	Nonlinear SVN	A classifica	tion, SVM
Regression	Decision Trees:	Trainir	ng and	visualiz	zing a Decis	sion tree, Making	predictions	, Estimating
class proba	bilities, Computa	tional	comple	exity, G	ini Impurit	y or Entropy, Re	gularization	n of Hyper
parameters.								
TEXT AN	ALYTICS: Ov	erview,	Senti	iment (Classificatio	n, Naïve-Bayes	Model for	Sentiment
Classificatio	on, Using TF-IDF	Vecto	rizer, C	Challeng	ges of Text A	Analytics		
Text Books		0 1	<u>ر</u> ۱۰	T	· · · · · · · · · · · · · · · · · · ·	·1 · . T 1 /		C t
I. Aurelia	n Geron, "Hand	s-On N	/lachin	e Learn	ing with S	cikit-Learn and	I ensor Flow	: Concepts,
1001S, a	and Techniques to	Duthor	mienig Ma	gent Sys	Dradhan I	Iny Publications,	VII EV nub	n, 2017
	e Learning using	r yuloi		llaralijai	i Fiauliali, C	Diffesti Kuillar,	willer put	lications
Reference I	Books:							
1. Ethem	Alpaydin," Introd	luction	to Mac	chine Le	arning", Th	e MIT Press, Thi	rd Edition, 2	2014.
2. Tom M	.Mitchell, "Mach	ine Lea	arning"	', Mc Gr	aw Hill Edu	ucation, Indian Ed	lition, 2013	
Web Refer	ences:	/ 11		1 .	1 '			
1. https://	www.coursera.or	g/colle	ctions/1	machine	e-learning			
Question Po	aper Pattern:							
Internal A	Assessment:							
The question	on paper for inter	nal exa	minatio	on shall	consist of §	Six questions and s	student has	to answer
any Four c	juestions.							
End Exan	1:		otion -1	hall and	aist of Fir-	t quastions and -1	udant has to	0000000
Five question	on paper for end t	ланий	ation SI	nan con	SISU OI EIGU	i questions and st	uutin nas to	answer any
Inter questi	.0115.							

Tech Category PE-III Duration : 2 es : At the enstand the implication of the implication	Ho L 3 2 Hrs nd of th portance are the ining c tion ru ised clu between Describer ion, Da	T T 0 ne cour ce of da data n classifie le mini- istering ng, Min n Simp riptive ata Dis- ch to	Veek P 0 rse the s ata mini needed for cation to ing usin g mining otivatin ole Attril Data S ccretizati	Credits C 3 tudent will I ng and the p or data mini echniques. g Market ba g algorithms g Challeng butes and D Summarization and Con a classific	Max Continuous Internal Assessment 40 End be able to principles of busin ng using preproce asket analysis. End be able to principles of busin ng using preproce asket analysis. End be able to formin and the second asket analysis. End be able to principles of busin ng using preproce asket analysis. End be able to principles of busin asket analysis. End be able to preproce asket analysis. End be able to preproce asket analysis. End be able to preproce asket analysis. End asket asket analysis. End asket asket asket asket asket asket asket	S imum Mar End Exam 60 d Exam Du eess intellige sssing techni Tasks, Ty ng, Data In eneration.	cheme : 2022 ks TOTAL 100 ration: 3 Hrs ence. iques. 'pes of Data, .tegration and
PE-III Duration : 2 es : At the en- stand the implice and Prep- stand data ment associa ze unsupervition hat is Data issimilarity be- sing: s the Data? Data Reduct General A ission Tree, B logating the	Ho L 3 2 Hrs nd of th portance are the ining c tion ru ised chu setween Descr ion, Da	T T 0 ne cour ce of da data n classifie le mini- istering ng, M n Simp riptive ata Dis- ch to	Veek P 0 rse the s ata mini needed for cation ta ing usin g mining otivatin ole Attril Data S cretizati	Credits C 3 tudent will I ng and the p or data mini echniques. g Market ba g algorithms g Challeng butes and D Summarizati ion and Con	Max Continuous Internal Assessment 40 End be able to principles of busin ng using preproce asket analysis. End be able to principles of busin ng using preproce asket analysis. End be able to for a ble to for	imum Mar End Exam 60 d Exam Du ess intellige ssing techni Tasks, Ty ng, Data In eneration.	ks TOTAL 100 ration: 3 Hrs nce. iques. rpes of Data, tegration and
PE-III Duration : 2 es : At the enstand the implice and Prep stand data ment associa ze unsupervite hat is Data issimilarity be sing: s the Data? Data Reduct General A	L 3 2 Hrs nd of the portance are the ining c tion ru ised clu Minin between Descri- ion, Da approace	T 0 ne cour ce of da data n classifie le mini- istering ng, Min Simp riptive ata Dis- ch to	P o rse the s ata mini reeded for cation to ing usin g mining otivatin ole Attril Data S cretizati solving	C 3 tudent will ing and the p or data mini echniques. g Market ba g algorithms g Challeng butes and D Summarization and Con a classific	Continuous Internal Assessment 40 End be able to principles of busin ng using preproce sket analysis. s. es, Data Mining ata Objects.	End Exam 60 d Exam Du ess intellige ssing techni Tasks, Ty ng, Data In eneration.	TOTAL 100 ration: 3 Hrs ence. iques. rpes of Data, itegration and
Duration : 2 es : At the en stand the imp ize and Prep stand data m ment associa ze unsupervi hat is Data issimilarity b sing: s the Data? Data Reduct General A ission Tree, B	3 2 Hrs nd of th portance are the ining c ition ru ised chui between Descrition, Da pproace	0 ne cour ce of da data n classifie le mini istering ng, M n Simp riptive ata Dis	0 rse the s ata mini needed for cation te ing usin g mining otivatin ole Attril Data S cretizati	3 tudent will ing and the pordata mini echniques. g Market bag algorithms g Challeng butes and D Summarization and Con a classific	40 Encode able to principles of busin ng using preproce asket analysis. s. es, Data Mining ata Objects. fon, Data Cleanir cept Hierarchy Ge	60 d Exam Du ess intellige ssing techni Tasks, Ty ng, Data In eneration.	100 ration: 3 Hrs ence. iques. rpes of Data, .tegration and
Duration : 2 es : At the en stand the imp ize and Prep stand data m ment associa ze unsupervi hat is Data issimilarity b sing: s the Data? Data Reduct General A ission Tree, B	2 Hrs nd of the portance are the nining c tion ru ised clu between Describion, Da pproace	ne cour ce of da data n classifi le mini istering ng, M n Simp riptive ata Dis	rse the s ata mini leeded for cation to ing usin g mining otivatin ole Attril Data S ccretizati	tudent will ng and the p or data mini echniques. g Market ba g algorithms g Challeng butes and D Summarizati ion and Con	End be able to principles of busin ng using preproce asket analysis. es, Data Mining ata Objects. ton, Data Cleanin cept Hierarchy Ge	d Exam Du ess intellige ssing techni Tasks, Ty ng, Data In eneration.	ration: 3 Hrs
es : At the en stand the imp ize and Prep stand data m ment associa ze unsupervi hat is Data issimilarity b sing: s the Data? Data Reduct General A ission Tree, B	nd of the portance are the ining c ition ru ised clu ised clu Describion, Da pproace	ne cour ce of da data n classifie le mini- istering ng, M n Simp riptive ata Dis	rse the s ata mini heeded for cation te ing usin g mining otivatin ble Attril Data S cretizati	tudent will ing and the point of data miniper data miniper second generation of the second se	be able to principles of busin ng using preproce asket analysis. s. es, Data Mining ata Objects. fon, Data Cleanir cept Hierarchy Ge	Tasks, Tyng, Data In	rpes of Data, .tegration and
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ize and Prep stand data m ment associa ze unsupervi hat is Data issimilarity b sing: s the Data? Data Reduct General A ission Tree, B	A mining c tion ru ised clu Minin between Description, Da pproace Suilding	data n classifi le mini istering ng, M n Simp riptive ata Dis	eeded for cation te ing usin g mining otivatin ole Attril Data S cretizati	or data mini echniques. g Market ba g algorithms g Challeng butes and D Summarizati ion and Con a classific	ng using preproce sket analysis. s. es, Data Mining ata Objects. fon, Data Cleanir cept Hierarchy Ge	Tasks, Ty	rpes of Data, tegration and
stand data m ment associa ze unsupervi hat is Data issimilarity b sing: s the Data? Data Reduct General A ision Tree, B	Mining c tion ru ised clu Minin between Description, Da pproac Suilding	ng, M n Simp riptive ata Dis	cation te ing usin g mining otivatin ble Attril Data S cretizati	g Market bag g algorithms g Challeng butes and D Summarization and Con	es, Data Mining ata Objects. ion, Data Cleanir cept Hierarchy Ge	Tasks, Ty	pes of Data,
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hat is Data issimilarity b sing: s the Data? Data Reduct General A ision Tree, B	Descr Descr Descr Descr Descr Descr Descr	ng, M n Simp riptive ata Dis	otivatin ole Attri Data S cretizati solving	g Challeng butes and D Summarization and Con a classific	es, Data Mining ata Objects. ion, Data Cleanir cept Hierarchy Ge	Tasks, Ty ng, Data In eneration.	pes of Data, itegration and
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sing: s the Data? Data Reduct General A ision Tree, B	Desci ion, Da	riptive ata Dis	Data S cretizati	Summarization and Con	on, Data Cleanir cept Hierarchy Ge	ng, Data In eneration.	tegration and
General A ision Tree, B	Approac	ch to	solving	a classific	ation problem F	<u> </u>	
sifier, Bayes	best sp s Theo	g a dec plit, A orem,	lgorithn using	ee, methods n for Decis the Bayes	for expressing an sion Tree Inducti theorem for class	Decision Tr n attribute te on, Rule B ssification,	ee Induction: est conditions, Base, Nearest- Naive Bayes
llysis: and Algor didate Gene h an example	rithms: eration e, FP-C	Freq and F Growth	uent Ite Pruning, Algorit	em Set ge Rule Gen .hm.	neration, The Aj eration, Confiden	priori Princ nce-Based F	ciple, Apriori Pruning, Rule
s: r Analysis, ithm, Key Is	Types sues in	of C Hiera	lustering rchical (g, K-Mean Clustering, l	s Algorithm, Ag DBSCAN Algorith	glomerative hm	Hierarchical
to Data Mir	ing D	ng NL	ng Tan	Michael St.	ainhach Vinin V.	mar DE A	
Concepts an	ning, Pê nd Tech	uig-Mi	$\frac{11}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	awei Han N	Tichel Kamber El	mai, FEA	
		inques	s, <i>э/</i> с, JI	awei Häll, N	incher Kahlber, El	150 1 101,2000	
ousing Data	Mining	• & OI	AP Al	ex Berson S	Stephen Smith TM	ИH.	
Techniques	Arun	<u>K</u> Puiz	ari. Univ	versities Pre	SS.		
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7 •	el ac in	/noc1§	$\frac{1}{2} \cos(1/1)$				
ecolirees not		$\frac{110010}{1100/2}$	758/dat	ahases-data	-mining		
$\frac{1}{5}$	and Aigo idate Gene an exampl : Analysis, thm, Key Is to Data Min concepts an using Data Techniques	and Algorithms: idate Generation an example, FP-C : Analysis, Types thm, Key Issues in to Data Mining, Pa concepts and Tech : using Data Mining Techniques, Arun : courses.nptel.ac.in	and Algorithms: Freq idate Generation and I an example, FP-Growth Analysis, Types of C thm, Key Issues in Hiera to Data Mining, Pang-Ni concepts and Techniques using Data Mining & OI Techniques, Arun K Puja courses.nptel.ac.in/noc18 deolectures.com/course/3	and Algorithms: Frequent in idate Generation and Pruning, an example, FP-Growth Algorit an examp	and Algorithms: Frequent item Set ge idate Generation and Pruning, Rule Gen an example, FP-Growth Algorithm. Analysis, Types of Clustering, K-Means thm, Key Issues in Hierarchical Clustering, I to Data Mining, Pang-Ning Tan, Michael Sta concepts and Techniques, 3/e, Jiawei Han, N using Data Mining & OLAP, Alex Berson, S Techniques, Arun K Pujari, Universities Pre courses.nptel.ac.in/noc18_cs14/ deolectures.com/course/3758/databases-data-	and Algorithms: Frequent Item Set generation, The A idate Generation and Pruning, Rule Generation, Confider an example, FP-Growth Algorithm. Analysis, Types of Clustering, K-Means Algorithm, Ag thm, Key Issues in Hierarchical Clustering, DBSCAN Algorith to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Ku concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, El using Data Mining & OLAP, Alex Berson, Stephen Smith, TM Techniques, Arun K Pujari, Universities Press. courses.nptel.ac.in/noc18_cs14/ deolectures.com/course/3758/databases-data-mining	and Algorithms: Frequent Item Set generation, The Apriori Frind idate Generation and Pruning, Rule Generation, Confidence-Based H an example, FP-Growth Algorithm. Analysis, Types of Clustering, K-Means Algorithm, Agglomerative thm, Key Issues in Hierarchical Clustering, DBSCAN Algorithm to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, PEA concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier,2006 using Data Mining & OLAP, Alex Berson, Stephen Smith, TMH. Techniques, Arun K Pujari, Universities Press.

Internal Assessment: The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

	OBJE (CT OR	IENTI	ED ANA	LYSIS AN	ND DESIGN(OO	AD)		
II Semester	: M. Tech	•					S	cheme : 2022	
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks	
CS821	PE-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL	
Sessional F	vam Duration: 3	J) Hrs	U	U	3	40 Fn	00 d Evam Du	ration: 3 Hrs	
Course Out	tcomes : At the er	nd of th	e cours	se the stu	ıdent will b	be able to			
CO1: Unde	rstand the import	ance of	mode	I, UML a	and Class d	iagrams.			
CO2: Desci	ribe the structural	and be	havior	al mode	ling of a so	ftware system.			
CO3: Desig	gn an event driver	n syster	n with	dynamic	c dimensior	18.			
CO4: Desig	gn logical elemen	ts of a s	system	•					
CO5: Const	truct an architectu	ural ten	nplate f	for appli	cations and	deployment diagr	ams.		
Introduction conceptual 1	on to UML: Imp model of the UM	portanc IL, Arc	e of r hitectu	nodeling re, Softv	, principle ware Devel	s of modeling, c opment Life Cycl	bject orient e, Mechanis	ted modeling, sms, Artifacts,	
Hello World	d.								
Basic Struc	tural Modeling:	Classe	s, Rela	tionship	s, Commor	n mechanisms, Dia	agrams, Clas	ss diagrams.	
Advanced	Structural Mod	leling:	Advaı	nced cla	isses, adva	nced relationship	s, Interface	s, Types and	
Roles, Packages, Instances, Object diagrams, Components.									
Basic Benavioral Modeling: Interactions, Use cases, Use case diagrams, Interaction diagrams, Activity diagrams									
Advanced	Rehavioral Mod	elino	Events	and sim	nals_state_r	nachines process	es and Three	ads. Time and	
Space, State	e diagrams.	•••••		und sigi	iais, state i	nuennies, process		ads, Thire and	
Architectu	ral Modeling: An	rtifacts,	Deplo	yment, (Collaboratio	ons, Common mo	deling techn	iques.	
Architectu	ral Modeling: Pa	atterns	and Fr	amewor	ks, Artifact	diagrams, Deplo	yment diagr	ams, Systems	
and Models	5.								
Applying the	he UML: Case St	tudies(1	Library	' manage	ement syste	m, ATM system,	Online shop	ping system).	
Text Books									
1. Grady B	Booch, James Run	nbaugh	, Ivar J	acobson	, [2nd Edit	ion], The Unified	Modeling L	anguage User	
Guide, F	Pearson Education	n, 2013	•						
			. 1 D - 44		T				
1. Craig La	arman, Appling (UML a	na Patt	erns: An		on to Object Orier	ited Analysi	s and Design	
2 Hans-Er	ik Friksson Mag	mus Pe	nker F	acation,2 Brian I vu	one David	Fado LIMI 2 Too	Jikit WILE	V Dreamtech	
India Pv	rt. Ltd.2004.	silus I C	likel, L		Jiis, David			I Dicamicen	
Ouestion Pe	aper Pattern:								
~	1								
Internal A The question Four quest	Assessment: on paper for inter- tions.	nal exa	minati	on shall	consist of §	Six questions and	student has t	to answer any	
End Exan The question Five question	n: on paper for end e ions.	examin	ation s	hall cons	sist of Eigh	t questions and st	udent has to	answer any	

	AI	OVANC	CED CC)MPUT	ER ARCHI	FECTURE (ACA)					
II Semester	·: M. Tech						S	cheme : 2022			
Course Code	Category	He	ours/W	'eek	Credits	Max	imum Mar	ks			
CS822	PE-IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL			
Sessional E	xam Duration :	2 Hrs	U	U	5	En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes :At the er	nd of th	e cours	se the stu	udent will b	be able to					
CO1: Unde Flow mecha CO2:Identit	rstand Parallel co misms. fy tradeoffs betwo (RISC) Scalar an	een Co	model	ls, Paral Instructi	lelism, Prog on Set Con	gram partitioning, nputers (CISC), R	Scheduling educed Instr	and Program uction Set			
CO3: Expla	in Hierarchical b	us svst	em and	Backpl	ane bus spe	ecification.					
CO4: Und	erstand Cache	memor	y org	anizatio	n, Shared	memory organi	zation and	concepts in			
Hierarchica	l memory technol	logy.						-			
CO5: Class	CO5: Classify Pipeline Processors based on Processing levels, Configurations and Control Strategies.CO6: Understand Multiprocessor System Inter connects, Cache Coherence, Synchronization										
CO6: Unc	lerstand Multip	rocesso	r Sys Acchor	tem In	ter connec	cts, Cache Coh	erence, Sy	nchronization			
Wechanishi	s and Message Fa	issing r	viechal	1151115.							
Parallel Co vector and Sizes and La System Into Dynamic Co Super scalar Backplane H	SIMD computer SIMD computers atency, Grain Pac erconnect Archit onnection Networ Processors, VL Bus Specification	s: The s, Cond cking an tecture rks, Ad IW Arc	State ditions nd Scho : Netw vanced chitectu	of Com of Para eduling, ork prop Process ire, Buse	puting, Mu Illelism, Pr Program fl perties and I sor Technol es And Arb	Iltiprocessors and ogram Partitionin ow Mechanisms. Routing, Static Co logy, Superscalar a itration- Hierarchi	Multi com g and Sche onnection Ne and Vector I cal Bus Sys	puters, Multi duling- Grain etworks, Processor, tem,			
Memory H	ierarchy: Hierard	chical N	Memor	y Techn	ology, Inclu	usion, Coherence	and Locality	, Memory			
Capacity Pla Organizatio Schemes.	anning, Cache Mo ns- Interleaved M	emory lemory	Organi Organ	zation, (ization,	Cache Addr Bandwidth	essing Models, Sh and fault Toleran	nared Memo ce, Memory	ry Allocation			
Pipelining Instruction Arithmetic	And Superscalar Pipeline Design, A Pipeline, Multifu	r Techn Arithm nctiona	iques: etic Pip l Arith	Linear Deline D metic Pi	Pipeline Pr esign-Comj peline.	ocessors, Nonline puter Arithmetic F	ar Pipeline I Principles, S	Processors, tatic			
Multiproce Synchroniza Virtual Cha	ssors And Mult ation Mechanism nnels, Flow Cont	i-Com s, Mess rol Stra	puters: sage Pa itegy.	Multip ssing M	rocessor Sylechanisms	ystem Interconnec - Message Routing	ets, Cache C g Schemes,	oherence and Deadlock and			
Text Books		a =-				44 44		1.11			
1. Kai Hwa The Mc	ang (2000), Adva GraHill.	inced C	omput	er Archi	tecture- Par	rallelism, Scalabil	ity, Program	mability,			
Reference l	Books:										
1David Compu	E. Culler, J. P. Si ter Architecture,	ingh, A Elsevie	noop (er, India	dupta, H a.	arcourt Asi	am, Morgan Kauf	mann (1999), Parallel			
2. V. Raja Prentic	urarnan, C. Siva F e Hall of India. N	Ram Mi lew De	urthy (2 lhi.	2000), P	arallel Com	nputers - Architect	ure and Pro	gramming,			

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

		IMA	GE AN	ND VIDE	EO PROCES	SSING (IVP)		
II Semester	·: M. Tech					i	S	Scheme : 2022
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	•ks
CS823	PE-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration :	2 Hrs	1	.1 .	1	En	d Exam Du	iration: 3 Hrs
Course Out	tcomes : At the e	nd of the	ne cour	se the st	udent will	be able to	<u> </u>	
non-linear o	perstand the relations on nixe	tionsnij els in a	ps betv digital	image	tels in digi	tal images and pe	erform vari	ous linear and
CO2: Apply	v various image e	enhance	ement t	echnique	es both in s	natial and frequen	cv domain.	
CO3: Under	rstand image con	npressio	on mod	lels and	different ty	pes of compression	on technique	es.
CO4: Perfo	rm Image segme	ntation	on real	time in	nages.		1	
CO5: Under	rstand the princip	oles of `	Video i	maging	and Video	display.		
Image Enh Image Shar Frequency I Image Con Compressio plane Codir Transform c	ancement and I pening – Image Domain Filtering. npression: File n Models: Error ng, Lossless Pr coding - Digital V	Restor: Restor format Free C redictive Vaterma	(bmp, omprese arking	Histogra – Degra tiff, pc ssion: H ing; Lo	am Modific dation Mod ex, gif, jpe uffman Cod ssy Compr	ation Techniques del – Noise Moc g.) - Compressio ding, Arithmetic (ression: Lossy P	– Image S lels – Spat on fundame Coding, LZ predictive C	Smoothening – ial Filtering – ntals – Image W coding, Bit Coding, Block
Image Segr Segmentatio	nentation: Point on Using Morpho	t, Line ological	and Ec Water	lge Dete sheds - [ection - Thr The Use of	esholding – Regi Motion in Segme	on Based S ntation	egmentation –
Introductio Video Camo and Interlac Video.	on to Video Pro eras, Video Disp ced Scan, Charad	cessing lay, Co cterizat	g: Vide omposition of	eo Captu te versus a Vide	are and Dis s Compone o Raster; A	splay- Principles nt Video; Analog Analog Color Te	of Color V Video Ras levision Sy	ideo Imaging, sterProgressive stems; Digital
Text Books	•							
1. Rafael C 2012	Gonzalez & Richa	ard Woo	ods, Di	gital Ima	age Process	ing, 3rd Edition.	Pearson pub	olications,
2. Video F	Processing and Co	ommun	ication	s- Yao V	Wang, Jorn	Ostermann, Ya-Q	in Zhang	
Reference I	Books:							
1. Anil K.	Jain, Fundamenta	al of Di	gital Ir	nage Pro	ocessing, Pl	HI publication, 20	13.	

2. Pratt, Digital Image Processing, 4th Edition, Wiley Publication, 2007.

Web References:

1. <u>https://en.wikipedia.org/wiki/Digital_image_processing</u>

Internal Assessment: The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

			SOF	T CO	MPUTING	(SC)		
II Semester : M.	Tech						Sc	heme: 2022
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	
						Continuous		
	PE-IV	L	Τ	Р	С	Internal	End Exam	TOTAL
CS824						Assessment		
		3	0	0	3	40	60	100
Sessional Exam	Duration: 2 Hrs					End	Exam Duration	: 3 Hrs
Course Outcor	nes: At the end o	f the c	course	studen	ts will be ab	ole to		
CO1: Analyze	various neural ne	etwork	archit	ecture	s and learning	ng models.		
CO2: Design as	ssociative memor	y netv	vorks a	nd uns	supervised le	earning networl	KS.	
CO3: Define th	e fuzzy logic and	l sets.						
CO4: Study of	membership func	tions	and fu	zzy ari	thmetic ope	erations.		
CO5: Understa	nd genetic algorit	thm co	oncepts	and t	heir applicat	tions.		
Artificial Neura	l Networks: Intro	oducti	on, Ba	sic mo	dels of ANI	N, important tei	rminologies of A	ANNs.
Supervised Lea	rning Network	s: Pe	rceptro	on Ne	tworks, Ad	laptive Linear	Neuron, Back	propagation
Network.								
Associative Mer	nory Networks:	Trai	ning A	lgoritl	nms for pat	tern association	n Auto associat	tive Memory,
Bidirectional Ass	ociative Memory	(BAI	M), and	l Hopi	field Networ	rks.		
Unsupervised L	earning Networ	k: In	troduct	ion, F	ixed Weigh	t Competitive	Nets, Maxnet,	Mexican Hat
Net, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter								
Propagation Networks, Adaptive Resonance Theory Networks								
Introduction to	Fuzzy Logic, C	lassic	al Set	s and	Fuzzy Sets	S: Introduction	, Classical Sets	(Crisp Sets),
Fuzzy Sets, Class	sical Relations -a	ina Fl	izzy Ko	elation	is- Cardinal	ity, Operations	, Properties and	composition.
Momborshin fur	utions Features	115. F1177	ificatio	n ma	mborshin ve	lue assignment	te Defuzzificati	on
Fuzzy Arithmeti	ic and Fuzzy Me	, ruzz asure	s. Fuz	n, me zv arit	hmetic Exte	ension principle	E Fuzzy measur	
Genetic Algorit	hm . Introductio	n R	$\frac{5.1 \text{ uz}}{1}$	ermina	plogies in	Genetic Algor	ithm Operator	s in Genetic
Algorithm –Enco	ding, selection. (Trosso	ver and	d Mut	ation. Appli	cations.	iunii, opeiutor	5 m Genetic
Application of S	Soft computing:	Opti	mizatio	on of '	Traveling S	alesman Probl	em using Gene	tic Algorithm
Approach, Genet	ic Algorithm –Ba	used Ir	nternet	search	n Technique		8	6
Text Books •					1			
1 S N Siyan	andam SN Deer	na "Pr	icinles	of So	ft Computin	o" WILEY Sec	ond Edition 201	3
Poforonce Rool		<i>Ju</i> 11	leipies	01 00.	n computin	6 WILLI Dee		
1 S.P. Jan	C T Sun and F	Mizu	toni "	Jouro	Fuzzy and	Soft Computing	"DHI/Dearson	Education
1. S.K. Jang New Del	g, C. F.Sull and E. hi 2004	IVIIZU	iani, 1	veuro-	Tuzzy anu s	son Computing		
2 S Rajas	ekaran & G A V	iiaval	akshmi	i Pai I	DHI New D	elhi 2003		
2. S. Rajas	I Ross "Fuzzy I	IJayai Logic	with F	ngine	Pring Applic	enn 2005	aw-Hill 1997	
Web References	•	Logic	with L	nginev	anig Appire		aw-1111, 1997.	
1 https://pptel	• ac in/courses/106	1051	73					
Ouestion Paper	Pattorn ·	1031	<u> </u>					
Internal Assess	ment: The quest	ion na	per for	interr	nal examinat	tion shall consi	st of Six questio	ons and
student has to an	iswer anv Four a	uestio	ns.					
End Exam:								
The question par	per for end exami	nation	ı shall	consis	t of Eight a	uestions and st	udent has to ans	wer any Five
questions.					8 1			5
▲								

DIGITAL FORENSICS (DF)

II Semester	: M. Tech						S	cheme : 2022	
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks	
CS825	PE-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional E	xam Duration: 2	2Hrs				En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes :At the er	nd of th	e cours	se the stu	udent will b	be able to			
CO1: Under	rstand the fundan	nental c	concept	ts of dig	ital forensic	c, digital evidence	and the inc	ident	
response pro	ocess.	• •,•	. 1		1, 1 ,	1 • 1			
CO2:Apply	various data acq	uisition	techn	iques an	d tools on t	he evidences.			
CO4:Learn	of various foron	nicable	to an	erent lo	foront foror	sugations.			
CO4: Usage	knowledge on cl	oud for	s to alla	rocedur	es and chall	lisics uala.			
				1.1					
CO6: Unde	rstand the concep	ot of file	e systei	n and th	eir use in Io	orensic analysis.			
Digital fam	maina Intra du ati	on II:		Dulas of	f Commutor	/ Divital famonaia	Digital fa		
discipline	Definition of di	оп, пк aital fe	story, I	Kules of digital	forensic i	investigations G	, Digital 10	tal forensic	
investigation	n	gitai it		, uigitai		investigations, or	Jai OI uigi	lai iorensie	
Digital evid	lences: Introduct	tion. wł	nat is d	ligital ev	vidence. rul	les of digital evid	ence. chara	cteristics of	
digital evid	ence, types of e	evidenc	e, chal	llenges	in evidence	e handling, volat	ile evidence	e, evidence	
handling procedures. Incidence Response: Introduction, Goals of incident response, people involved									
in incident	response, incide	ent res	pond 1	Methodo	ology, Acti	vities in initial	response, P	hases after	
detection of	an incident.								
Data Colle	ction: Introduction	on, the	facts	in a c	riminal cas	se, people involv	ved in data	collection	
techniques,	Live data collect	ion, Liv	ve data	collectio	on example	s-Windows, Unix			
Forensic D	uplication:Introd	luction,	Rules	of forer	isic duplica	tion(Thumb Rule), Necessity	of forensic	
duplication,	Forensic dupli	cates a	s adm	Issible	evidence,	Important terms	in forensic	duplicate,	
Forensic du	plication 1001 re	equiren	ients, C rd Driv		a Forensic	c duplicate of a F	lard Drive,	Creating a	
Network F	orensics: Introdu	ction to		re. Intrusion	n Detection	System) Types (TIDS Adv	antages and	
disadvantag activities, P Password Investigatin	es, Understandir ort Scans, Addre cracking, Under g routers, Networ	ng Net ss Spoc standin rk Proto	work i ofing, A og Teo ocols.	ntrusion Attacking chnical	as and Atta g with Troj Exploits,	acks, recognizing ans, Viruses and Collecting Netw	g pre-intrusi Worms, Un vork based	ion/ Attack derstanding evidence,	
L-IVIAII FO	tion E mail some	uice 01	\mathbf{E} -IVI	an as e E Mail f	Forensia and	avoiking of E-M	all, Steps 1	m E- man	
Mobile For	rensics. Mobile	hackir	$1\sigma_{-}$ SN	IS and	Call Forg	ing mobile pho	ne forensie	s Forensic	
procedures	CIA Traid Sof	tware	and ha	ardware	mobile nh	one tricks And	roid forensi	cs Mobile	
forensic To	ols. Computer	Forens	ic Too	ls: Intro	duction. ev	valuating comput	er forensic	tool needs.	
types of co	mputer forensic	tools,	tasks 1	performe	ed by com	puter forensic to	ols, Tool co	omparisons,	
software too	ols, hardware tool	ls, Vari	ous coi	nputer/	Digital fore	ensic tools.)	1 ,	
Cloud For	ensics: Introduc	tion, T	hree c	limensic	ons of clou	ud forensics, usa	ge of clou	d forensic,	
challenges to cloud forensic. Impact of cloud computing on digital forensic, Cloud forensic Tools.									
File system	s: Various types	of file	system	ns, Intro	duction to s	storage layers, Ha	rd disk driv	ve, Forensic	
Analysis of	me systems.								

Text Books:

1. Dr.Neelakshijain and Dr.Dhanajay R. Kalbande, Digital Forensic: The Fascinating World of Digital Evidences, Wiley Publications, 2017.

Reference Books:

- 1. Kevin Mandia, Chris Prosise, Incident Response and computer forensics, Tata McGraw Hill, 2006.
- 2. Nelson, Phillips Enfinger, Steuart, Computer Forensics and Investigations, CENGAGE Learning.
- 3. John R. Vacca, Computer Forensics, Computer Crime Investigation, Firewall Media, New Delhi.
- 4. https://www.oreilly.com/library/view/digital-forensics-with/9781597495868/

Question Paper Pattern:

Internal Assessment:

The question paper for internal examination shall consist of **Six** questions and student has to answer any **Four** questions.

End Exam:

			CC	OMPUT	TER VISIO	N (CV)		
II Semester	: M. Tech						Se	cheme : 2022
Course Code	Category	Ho	ours/W	eek	Credits	Μ	aximum Ma	arks
CS826	PE-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
<u> </u>		3	0	0	3	40	60	100
Sessional E	xam Duration: 2	<u>2 Hrs</u>		41 4	1 4 111	11 /	End Exan	Duration: 3 Hrs
Course Out	comes : At the er	na of the	e cours	e the sti	ident will b	e able to		
CO2. Use t	ni the mage form	ing one	notora f	for imag		sing and conversi	ion	
CO2: Use li	the data interno	Ing ope	rators I	lor imag	e preproces	and optimization	1011. n	
CO3. Appr	rstand the Deep N	Venral N	Vetwor	$\frac{105}{101}$ m $\frac{101}{101}$	INNs for co	mputer vision rec	nonition and	l lower level
vision tasks	istand the Deep I	(curur r		K5 and C		mpater vision rec		
CO5: Unde	rstand object dete	ection a	nd sem	antic se	gmentation	methods.		
	5				<u> </u>			
Image for transformation: Compression Image proce equalization operators: N Model fitti underfitting variation,Bi Deep Lear normalization Convolution weights and Recognition recognition. Semantic se Video under Text Books	nation: Introductions, 3D transform Lighting, Reflect n. essing: Point operation on-linear filtering on-linear filtering ng and optimiz , Robust data fitti lateral solver, App ningDeep neuration on, Loss functions nal neural netw activations. 1: Instance reco Object detection gmentation: Instance standing, Vision	ction t mations ance a erators: g: Sep g, Bilat zation: ing, Va olication il netw s, Back orks: F gnition : Face ance se and lar	o com , 3D rc nd sha Pixel t arable eral filt Scatte riationa n:Intera orks: propag Pooling detecti gmenta nguage.	puter v otations, ding, O transform filterin tering, E ered dat al metho active co Weights gation, T g and un ge class on, Pedo ation, Pa	vision, Geo 3D to 2D p ptics, The ms, Color tr g, Band-pa Binary imag a interpola ods and regulation, ods and regulation of and laye fraining and spooling, N ification: estrian detection moptic segre	pmetric primitive projections, Lens digital camera: S ransforms, Compo- ass and steerable e processing. tion: Radial bas alarization: Discre- Markov random fi rrs, Activation f l optimization. Network architect Feature-based m ction,General obje- nentation, Pose es	es and trans distortions, I Sampling an ositing and n e filters, Me is functions ete energy m ields:Conditio functions, R ures, Model ethods Deep ect detection stimation.	sformations: 2D Photometric image d aliasing, Color, natting, Histogram ore neighborhood , Overfitting and inimization, Total onal random fields. egularization and zoos, Visualizing p networks, Face
1. Richard	Szeliski, Compu	ter Visi	on:Alg	orithms	and Applic	ations, Springer, 2	2nd Edition,	2022.
Reference I	Books:		10				~ 1	· · ·
1. WESLEY	' E. SNYDER, H	AIRON	IG QI,	Fundar	nentals of C	Computer Vision,	Cambridge U	University
Press, 2017. 2. Aditi Maj Graphics, ar	umder, M. Gopi, nd Image Process	Introdu ing, CR	uction t C Pres	to VISU ss, Taylo	AL COMP or & Francis	UTING Core Con Group, 2018.	acepts in Cor	nputer Vision,
Question Po	per Pattern:	•	<u> </u>				1 . 1	1
Four question	sessment: The quest	ion paper	r tor inte	rnal exan	nination shall	consist of Six questic	ons and student	has to answer any
End Exam: questions.	The question pape	er for end	examin	ation shal	l consist of E	ight questions and stu	udent has to an	swer any Five

	H	IIGH I	PERFC	ORMAN	ICE COMI	PUTING(HPC)		
II Semester	: M. Tech						S	cheme : 2022
Course Code	Category	Н	ours/W	eek	Credits	Max	ximum Mar	ks
CS827	PE-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration:	2 Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	tcomes :At the en	nd of th	e cour	se the st	udent will b	be able to	0 11 1	
CO1: Unde	erstand the limita	tions, c	ontrol	structur	e and comr	nunication model	s of parallel	computer
systems.	nonizo the decom	magitia	n taalan	ianaa a	ad manning	tachniques for no	<u>mallal alaami</u>	therea
CO2: Sum	rstand One to all	$\frac{positio}{a^{11}}$ to	n techn	iques ai	all commu	techniques for pa	rallel algori	lnms.
CO3: Unde	rstand One-to-all	, all-lo	one an	a all-to-		ncation operation	s for paralle	i computers.
CO5: Unde	rstand the thread	nrogra	mmino	for sha	red address	space platforms u	ising OpenM	ſP
Introductio	n : Implicit porol	Inliam	limitor	tions of		space platformanaa		intura of
narallel plat	forms communit	cation r	nodel (uons of of parall	el platforms	stelli perioritalice	x, control sur	rallel
computers	routing mechanis	ms for	interco	nnectio	n networks	s, message passing	g cosis ili pa	Tallel
Parallel alg	orithm design :	Decorr	nositic	on techn	iques, tasks	and interactions.	manning tec	hniques for
load balanci	ing, methods for	reducin	g inter	action o	verheads, p	arallel algorithm	models- the	data parallel
model, the t	ask graph model.	, the wo	ork poo	l model	, the master	-slave model, the	pipeline mo	del, hybrid
models.	01	,	1		,	,	1 1	, ,
Basic communication operations : One-to-All Broadcast and All-to-One Reduction, All-to-all								
Broadcast a	nd reduction, sca	tter and	l gathe	r, Impro	ving the spe	eed of some comm	nunication o	perations:
splitting and	l routing message	es in pa	rts, all	port cor	nmunication	n		
Programm	ing using messag	ge pass	ing pa	radigm	: Principles	of message passin	g programm	ing, The
building blo	cks, MPI: The me	essage p	assing	interfac	e, topologie	s and embedding,	overlapping	
communicat	tion with compute	ition: no	on-bloc	king coi	mmunication	n operations.	1	• •,•
Programm	ing shared addi	ess sp	ace pla	attorms	: Threads, I	OSIX threads, sy	ynchronizati	on primitives,
altributes o	retions to thread	lutex,	broniz	P - If	e program	a for directives r	citying con	current tasks:
assigning ite	erations to unread	is, sync	nromza		ross multipi	e for directives, in	lerging dire	cuves, nesting
Text Books	•							
1 Ananth	Grama Anshul (funta	George	Karvn	is Vinin K	umar Introductio	on to Paralle	el Computing
Second	Edition.Pearson l	Educati	on. 200)7.	is, • ipin i x	uniur, introductio		ir computing,
2. Benedic	t R Gaster. Lee	e Howe	es. Da	vid R I	KaeliPerhaa	d Mistry Dana S	Schaa. Hete	rogeneous
Comput	ing with OpenCL	., McG	raw-Hi	ll.Inc. N	lewyork, 20)11.		8
Reference 1	Books:	,						
1. Michael	J. Quinn, Paralle	el Prog	rammi	ng in C	with MPI	and OpenMP, M	IcGraw-Hill	International
Editions,	Computer Scien	ce Seri	es, 200	4.		_		
2. Jason Sa	nders, Edward K	androt	CUD	A by Ex	ample – An	n Introduction to	General-Pur	pose GPU
Program	ming, Addison W	/esley,	2011.					
Web Refer	ences:							
1. <u>https://ww</u>	w.tutorialspoint.	<u>com/pa</u>	<u>rallel</u>	algorith	m/parallel_a	algorithm_introdu	<u>iction.html</u>	
2. <u>https://co</u>	mputing.llnl.gov/	<u>/tutoria</u>	ls/oper	<u>MP</u>				
3. https://np	tel.ac.in/courses/	106108	3055					

			DEE	P LF	CARNING (DL)		
II Semester:	M. Tech							Scheme: 2022
Course Code	Category	Ηου	irs/W	'eek	Credits	Ma	ximum Mar	·ks
						Continuous		
	PE-V	L	Т	Р	С	Internal	End	TOTAL
CS828						Assessment	Exam	
		3	0	0	3	40	60	100
Sessional Exan	n Duration: 2	Hrs				End E	Exam Durati	on:3 Hrs
Course Outcor	nes: At the end	d of tl	ie coi	irse s	students wil	l be able to		
CO1: Understa	nd the historic	al trei	nds in	deep	learning a	nd use Tensor t	flow for perf	orming Linear
Regressio	on, Gradient D	escen	t, opti	mize	rs, graph vi	sualization and	l training cur	ves.
CO2: Summariz	ze the fundame	entals	of A	tifici	al Neural N	letworks.		
CO3: Understar	nd the training	of De	eep N	eural	Nets.			
CO4: Understan	nd the Convolu	ıtiona	1 Neu	ral N	letworks Aı	chitecture.		
CO5: Understa	nd the Recurre	nt Ne	ural	Jetw	orks and de	en RNN trainii	າອ	
		110 1 10	unun 1			op id it i danin	-8.	
Introduction to	o Deen Learn	ing :]	Introd	uctio	n. Historic	al trends in Dee	en Learning	
Up and Runni	ng with Tenso	orFloy	w: Ins	tallat	tion. Creatin	g Your First G	raph and Rur	ning It in a Session.
Managing Grar	ohs. Lifecvcle	ofa	Nod	e Va	alue. Linear	· Regression v	with TensorF	Flow. Implementing
Gradient Descer	nt. Feeding Dat	ta to t	he Tr	ainin	g Algorithm	Saving and R	estoring Mod	lels. Visualizing the
Graph and Train	ing Curves Us	ing Te	ensor	Board	l. Name Sco	opes. Modulari	tv. Sharing V	Variables.
Introduction	A rtificial No		Notry	orba	· Erom Diol	agioal to Artif	ioiol Nouron	Training on MLD
with TonsorFlor	W High I avol		Troin	urks ing o	DNN Llain	a Plain Tonsor	Flow Fine 7	S, Training an MLr
Notwork Hyper	w High-Level	AFI,	ITam	mg a	DININ USIII	g riam rensor	riow, rine-	i uning Neurai
Network Hyper parameters								
I raining Deep	Neural Nets:	Vanis	shing/	Exp	loding Grad	ients Problems	s, Reusing Pr	etrained Layers,
Faster Optimize	ers, Avoiding (Jveri	1000000000000000000000000000000000000		bugn Regula	arization		1 T
	CNDL A relite	rks:	I ne A	rcnit	ecture of th	e visual Corte	x, Convoluti	onal Layer,
Pooling Layer.,	CININ Archite	Deep		Net-J	, Alexinel,	GoogLeinei, K	ESINEL.	in a DNNa Daan
Recurrent Neu	rai networks:	Recu	rrent	Ineur	ons, basic		orriow, Irain	ling Kinns, Deep
KININS Toxt Doolyg (
1 Doon Loomi	ing Ion Good	Fallow	Vac		Donaio Aor	n Courvilla N	IIT Drage ha	alr
1. Deep Learn		enow		1ua E	Agent 2017	Einst Edition	111 Press boo	JK.
2. Hands-On M	lachine Learni	ng w	lin Sc	1K11-N	March 2017	First Edition		
Reference Bool	KS :	τ		1.1.	- 1 NT: - 1	_		
1. Neural Netw	orks and Deep	Lear	ning r	viicna	$\frac{1}{1}$ Cl		· · · 1 D	11.1.
2. Neural Netw	orks and Deep	Lear	ning A	Aggai	rwai, Charu	C.Springer In	ternational P	ublisning.
web Reference	es: (•	<u></u>	/ 1	1 .	0		
1. https://www	coursera.org/s	pecia	lizatic	ons/de	eep-learning	?		
2. https://www	coursera.org/le	earn/1	ntrodu	lct101	n-tensorflow	?		
Question Paper	Pattern:							
T (T)								
Internal Asses	ssment:	1.		. 1	- 11 - • •	£ 6!	1 . 1	
The question pa	aper for interna	l exar	nınatı	on sh	all consist o	of Six questions	and student	has to answer any
Four questions	•							
Ena Exam:			4.	1 11		-1.4		
The question pa	aper for end exa	amina	uion s	nall	consist of El	gnt questions a	ind student ha	as to answer any
rive questions.								

DESIGN PATTERNS (DP)

Γ

II Semester	r: M. Tech							Scheme: 2022
Course Code	Category	Hour	s/Weel	K	Credits	Maximum Ma	rks	
CS829	PE-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration: 2	2 Hrs					End Exa	m Duration: 3 Hrs
Course Ou	tcomes:At the en	d of the	e cours	e the stu	ident will b	e able to		
CO1: Unde	rstand the usage	of desig	gn patte	erns for	solving obj	ect-oriented desig	gn problems	5
CO2:Descr	ibe the creational	patterr	is abstr	act facto	ory, factory	method, builder,	prototype,	and singleton.
CO3:Under	stand structural p	oatterns	: adapt	er, bridg	ge, composi	te, decorator, fac	ade, fly wei	ight, proxy.
CO4:Expla	in behavioral patt	terns ch	ain of	responsi	ibility, com	mand, interpreter	, iterator, m	nediator,
men	nento, observer, s	tate, str	ategy,	templat	e method, a	nd visitor.		
CO5:Expla	in the patterns us	ed in so	olving c	lesign p	roblems of	Lexi Document I	Editor	
Design Pat	tern Introductio	n: Wha	at Is a l	Design l	Pattern, De	scribing Design F	Patterns, the	e Catalog of Design
Patterns, Or	ganizing the Cata	alog, H	ow to S	Select a	Design Pat	tern, How to Use	a Design P	attern, How Design
Patterns Sol	ve Design Proble	ems?					1.5	
Creational	Patterns: Abstra	act Fac	tory Pa	ttern, B	uilder Patte	ern, Factory Meth	nod Pattern	, Prototype Pattern,
Singleton F	attern.Structura	I Patte	erns :	Adapte	r Pattern,	Bridge Pattern, (Composite	Pattern, Decorator
Pattern, Facade Pattern, Flyweight Pattern, Proxy Pattern.								
Behavioral patterns: Chain of responsibility Pattern, Command Pattern, Interpreter Pattern, Iterator Pattern,								
Mediator Pattern, Memento Pattern, Observer Pattern, State Pattern, Strategy Pattern, Template method								
Pattern, Vis	tior Pattern.	- D		4 E.I.4.	n Desian	Duchlance Deer		Estra Estra tina
A Case S	udy: Designing	g a DC	Summe	ll Eallo	fr, Design	Problems, Doci	ument Stri	icture, Formatting,
Window Sv	ig the User Oner	errace,	Suppe Snellin	a Check	ving and Hy	unhenation	inuarus, su	upporting multiple
What to Ex-	nect from Design	Dottor	$rac{}{}$	g Cheek riaf His	tory Datter	n Community An	Invitation	Parting Thought
Toxt Books	peet nom Design	1 atteri	15, A D		101 y, 1 aller	ii Community An	mvnauon,	
1 Erich Ga	- mma [2008] Des	ion Pat	terns el	ements	of reusable	object oriented s	oftware De	earson Education
2 Frank B	llilla [2000], Des	noMou	nior E	Jone R	hport Dot	er Sommerlad	Michael St	al PatternOriented
2. Flank D	rchitecture: A Sv	stem of	Dotter	alls IX	Wiley & Sc	1006	viicitaet St	
Boforonco l	Rooks.	Stelli OI	1 atten	i, joiii		JIIS, 1770.		
1 Mark G	rand Pattern's in	ΙΔΥΔ	Vol-I	Wiley I	TeamTech			
1. Mark G	rand Pattern's in		Vol-II	Wiley	DreamTech	.		
2. Mark G	rand $[2006]$ IAV	$\frac{J \Lambda V \Lambda}{V \Lambda Ente}$	rprise	, whey Design 1	Dicalification Patterns Vo	1 1-III Wiley Dream	mTech	
J. Wark O.	eman_Oreilly_sno	A Line	First I	Design P	atterns	1-III, WIICy Died		
5 Alan Sh	alloway Design I	a, 110au	Fypla	ined De	arcon Educ	ation		
Vob Pofor	anoway,Design I	atterns	Expla	incu, i c		auon.		
1 https://so	urcomoking com	design	nottor	na				
2 https://ww	urv oodesign com	ucsign_	_patter	115				
2. <u>intps://w</u>	anar Dattarre	1/						
Internal A	uper rullern:	estion -	aner for	rinternal	examinatio	n shall consist of S	in anestions	and student has to
answer any	Four questions	iesuon p	aper 10		chammatio	n shan consist of S	ix questions	and student has to
End Exam	The question n	aper for	end exa	aminatio	n shall consi	st of Eight auestio	ns and stude	ent has to answer anv
Five question	ons.	1				8 1		y

ENGLISH FOR RESEARCH PAPER WRITING

						-		
I Semester : AMT	1					Scl	neme : 2022	
Course Code	Hours/	Week	1	Credits	Max	imum Marks		
	•		P	C	Continuous			
AU 101	L	Т	P	C	Internal	End Exam	TOTAL	
				0	Assessment			
	2	-	-	U	-	-	-	
Course Outcomes : As	t the and	oftha	011700	the studer	t will be able to			
Course Outcomes . A			ourse			1. :1:4		
CO2: Learn about what t	ow to imp	brove yo	our wi	riting skills	s and level of reada	biiity		
CO2: Learn about what	$\frac{10}{11}$ write 1	$\frac{1}{1}$		n Tid I		1:	<u> </u>	
CO3: Understand the ski	lls neede	d when	writi	ng a Title	Ensure the good qu	ality of paper at	very first-	
time submission								
			-	• •				
Paragraph Basics, Logi	<u>cal Orde</u>	er and '	<u>Frans</u>	sitions	1		1 1	
Planning and Preparation	on, Word	1 Orden	; Bre	eaking up	long sentences, S	Structuring Para	agraphs and	
Sentences, Being Concis	e and Re	moving	Redu	indancy, A	voiding Ambiguity	and Vagueness	5	
Paraphrasing Plagiaris	m and B	asic of	Pape	r Writing	H 1 ' 1 O	··· · · · · · · · · · · · · · · · · ·	1 · 1	
Clarifying Who Did Wi	nat, High	lighting	g You	ar Finding	s, Hedging and Cr	iticizing, Parap	hrasing and	
Plagiarism, Sections of a	Paper, A	bstracts	s. Intr	oduction				
Structure of Research raper Deview of the Literature Methods Desults Discussion Conclusions The Final Check								
Review of the Literature,	Method	s, Resul	ts, Di	scussion, C	conclusions, The Fi	inal Check.		
Essential Key Skills Red	<u>quirea-i</u>	a a Tit	1. 1.		a needed when we	ting on Alectro	t trave alrilla	
are needed when writing	on Introd	lg a Th		y skills ar	hon writing a Povic	ung an Abstrac	turo	
Essential Koy Skills Do	an muod	ruction,	SKIIIS	s needed w	nen writing a Kevi	w of the Litera	ture,	
Skills are needed when y	vriting th	ı ve Meth	ode	skills need	ed when writing th	e Results skills	are needed	
when writing the Discus	sion and	skills a	are ne	eded wher	writing the Concl	usions useful r	hrases how	
to ensure paper is as good	d as it co	uld nos	sibly]	be the first	- time submission	usions. userui p	111 does, 110 w	
te ensure paper is as good	<i>a a b i c c c</i>	ara pob	Jiery					
Text Books :								
1. Goldbort R (2006) Writing	g for Sc	ience	, Yale Univ	versity Press (availa	able on Google	Books)	
2. Dav R (2006) Ho	w to Wri	te and I	Publis	h a Scienti	fic Paper, Cambrid	ge University P	ress	
					1	6 5		
Reference Books :								
1. Highman N (199	8), Hand	lbook c	of Wr	iting for th	ne Mathematical So	ciences, SIAM.	Highman's	
book.	<i>,,,</i>			U			C	
2. Adrian Wallwor	k, Engli	sh for	Writ	ing Resea	rch Papers, Spring	ger New York	C Dordrecht	
Heidelberg Londo	on, <u>201</u> 1							
Question Paper Pattern:								
Internal Assessment: 7	The quest	ion pap	er fo	r internal e	examination shall c	onsist of Six q	uestions and	
has to answer any Four of	questions	•						

DISASTER MANAGEMENT

DISASTER MANAGEMENT										
I Semester : AMT				Scheme : 2022						
Course Code	Hours/	Week		Credits	Max	Maximum Marks				
AU 102	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
	2	-	-	0	-	-	-			
Course Outcomes : At the end of the course the student will be able to										
CO1: Learn to demonstr	CO1: Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and									
humanitarian respo	onse.	• • •		1.1	•. •	1. 1				
CO2: Critically evaluate	disaster	risk red	uctioi	n and hum	anitarian response p	olicy and pract	ice from			
CO2 Develop on under	tonding	ofstand	anda	fhumonit	arian racmanage and	prostigal relation	naa in			
specific types of d		ond con	flict s	ituations	arian response and	practical televal				
CO4 • Critically understa	nd the st	renoths	and v	veaknesses	of disaster manage	ment annroach	25			
CO5: Planning and prog	rammino	in diffe	erent (countries 1	particularly their ho	me country or t	he countries			
they work in	ranning			countries, j	particularly then no	file country of t				
Introduction:										
Disaster: Definition Fac	tors and	Signific	ance	Differenc	e Between Hazard	and Disaster [.] N	latural and			
Manmade Disasters: Diff	ference]	Vature	Type	and Mag	nitude					
Disaster Prone Areas in I	ndia:	tature,	I ype.	, and widgi	intude.					
Study of Seismic Zones	; Areas	Prone t	o Flo	ods and D	Proughts, Landslide	s and Avalancl	nes; Areas			
Prone to Cyclonic and C	Coastal H	Iazards	with	Special R	eference to Tsunam	ni; Post-Disaste	r Diseases			
and Epidemics				-						
Repercussions of Disast	ers and	Hazard	ls:							
Economic Damage, Los	s of Hun	nan and	Anir	nal Life, I	Destruction of Ecos	ystem. Natural	Disasters:			
Earthquakes, Volcanism	is, Cyclo	ones, T	sunan	nis, Flood	s, Droughts and I	- Famines, Lands	slides and			
Avalanches, Man-made	disaster:	Nuclea	r Rea	actor Melt	down, Industrial A	ccidents, Oil	Slicks and			
Spills, Outbreaks of Dise	ase and]	Epidem	ics, W	ar and Co	nflicts.					
Disaster Preparedness a	and Man	ageme	nt:							
Preparedness: Monitoring of Phenomena Triggering A Disaster or Hazard: Evaluation of Risk:										
Application of Remote	Sensing,	Data 1	from	Meteorolo	gical and Other A	gencies, Media	a Reports:			
Governmental and Community Preparedness.										
Risk Assessment Disaster Risk:										
Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation.										
Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's										
Participation in Risk Assessment. Strategies for Survival.										
Disaster Mitigation:										
Meaning, Concept and	Strategies	s of Dis	saster	Mitigatio	n, Emerging Trend	s In Mitigation	n. Structural			
Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.										
Text Books :										

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies

"NewRoyal book Company.

Reference Books :

- 1. Sahni, Pardeep Et. Al. (Eds.)," Disaster Mitigation Experiences and Reflections", Prentice Hall ofIndia, New Delhi.
- 2. Goel S. L., Disaster Administration and Management Text and Case Studies", Deep &DeepPublication Pvt. Ltd.,Delhi.

Question Paper Pattern:

Internal Assessment: The question paper for internal examination shall consist of **Six** questions and has to answer any **Four** questions.

SANSKRIT FOR TECHNICAL KNOWLEDGE										
I Semester : AMT				Scheme : 2022						
Course Code	Hours/	Week		Credits	ts Maximum Marks					
AU 103	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
	2	-	-	0	-	-	-			
Course Outcomes : At	t the end	of the c	ourse	the studen	it will be able to					
CO1: Understanding bas	ic Sansk	rit lang	lage							
CO2: Ancient Sanskrit li	terature	about so	cience	e & technol	logy can be underst	tood				
CO3: Being a logical lan	guage w	ill help	to dev	velop logic	in students					
Alphabets										
Alphabets in Sanskrit,										
Tenses	<u> </u>	<u> </u>								
Past/Present/Future Tense, Simple Sentences										
Roots	Roots									
Order, Introduction of ro	ots,									
Sanskrit Literature										
Technical information ab	out Sans	krit Lite	eratur	e						
Technical Concepts of B	Engineer	ing			1 . 1					
Technical concepts of En	gineerin	g-Electi	rical,	Mechanica	l, Architecture, Ma	thematics				
Text Books :		~								
1. "Abhyaspustakam" – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi										
Reference Books :										
1. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit										
Sansthanam, New Delhi	Publicati	on								
2. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.										
Question Paper Pattern:										
Internal Assessment: T	Internal Assessment: The question paper for internal examination shall consist of Six questions and									
has to answer any Four c	questions	•								

STRESS MANAGEMENT BY YOGA (SMY)									
II Semester : AMT				Scheme : 2022					
Course Code	Hours/	ours/Week C			Max	imum Marks			
					Continuous				
AU 201	L	Т	Р	С	Internal	End Exam	TOTAL		
110 201					Assessment				
	2	-	-	0	-	-	-		
	1 1	0.1		.1 . 1					
Course Outcomes : At	t the end	of the c	ourse	the studen	it will be able to	_			
CO1: Develop healthy m	ind in a l	nealthy	body	thus impro	oving social health a	also			
CO2: Improve efficiency	/								
 Definitions of Eig 	ght parts o	of Yog.	(Ash	tanga)					
• Yam and Niyam.									
• Do's and Don't's	in life.		_						
1) Ahinsa, satya,	astheya,	bramha	chary	a and apar	Igraha				
11) Shaucha, santo	osh, tapa,	swadh	yay, 1s	shwarprani	dhan				
Asan and Pranaya	am								
i) Various yog po	oses and	their be	enefits	for mind &	& body				
ii) Regularization of breathing techniques and its effects-Types of pranayam									
Text Books :									
1. Yogic Asanas for Group Tarining-Part-I': Janardan Swami Yogabhyasi Mandal, Nagpur									
Reference Books :									
1. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama									
(Publication Department), Kolkata									
Question Paner Pattern.	•								

Question Paper Pattern: Internal Assessment: The question paper for internal examination shall consist of **Six** questions and has to answer any **Four** questions.

PEDAGOGY STUDIES (PS)											
II Semester : AMT					\$ *		Scheme : 2022				
Course Code	Hours/Week			Credits	N	Maximum Marks					
AU 202	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
	2	-	-	0	-	-	-				
Course Outcomes : At the end of the course the student will be able to											
CO1: What pedagogical practices are being used by teachers in formal and informal classrooms in											
developing countries?											
CO2: What is the evidence	on the et	ffectiven	ess of	these peda	gogical practices, in	what conditions,					
and with what population	n of learn	ers?									
CO3: How can teacher edu	cation (c	urriculu	m and	practicum)	and the school curri	culum and					
guidance materials be	est suppor	rt effecti	ve pec	lagogy?							
Introduction and Metho	odology										
Aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching											
Thematic Overview											
Pedagogical practices are	Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.										
Curriculum, Teacher edu	cation.										
Pedagogical Practices a	nd Meth	nodolog	y								
Evidence on the effect	iveness	of ped	agogi	cal practio	es, Methodology	for the in dep	oth stage: quality				
assessment of included	studies.	How o	ean te	acher edu	cation (curriculum	and practicum) and the school				
curriculum and guidance	material	s best s	uppor	t effective	pedagogy? Theory	of change. Stren	ngth and nature of				
the body of evidence for	or effect	ive ped	agogi	cal practic	es. Pedagogic the	ory and pedago	gical approaches.				
Teachers' attitudes and b	eliefs an	d Pedag	ogic s	strategies.							
Professional Developme	ent										
Alignment with classroom	m practi	ces and	follo	w-up supp	ort, Peer support, S	support from the	head teacher and				
the community. Curriculu	um and a	issessm	ent, B	arriers to 1	earning: limited res	sources and large	e class sizes				
Research Gaps and Fut	ure Dire	ections	- 1		~	1 5					
Research design, Contex	kts, Peda	igogy,	l'each	er educati	on, Curriculum an	d assessment, L	Dissemination and				
research impact.											
1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31(2): 245-261.											
2. Agrawal M (2004) curricular reform in schools: The importance of evaluation, Journal of											
Curriculum Studies, 36 (3): 361-379.											
Reference Books :											
1. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.											
 Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic 											

maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.

Question Paper Pattern:

Internal Assessment: The question paper for internal examination shall consist of **Six** questions and has to answer any **Four** questions.

PERSONALITY DEV	/ELOPM	ENT T	HRO	UGH LIFE	ENLIGHTENMEN	T SKILLS (PD	TLES)			
II Semester : AMT						S	cheme : 2022			
Course Code	Hours/Week			Credits	Max	ximum Marks				
AU 203	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
	2	-	-	0	-	_	_			
				-						
Course Outcomes : At	t the end	of the c	ourse	the studer	nt will be able to					
CO1: Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and										
achieve the highest goal in life										
CO2: The person who has studied Geeta will lead the nation and mankind to peace and prosperity										
CO3: Study of Neetishat	akam wi	ll help i	n dev	eloping ve	rsatile personality o	of students	1 2			
		1		10	1 2					
Neetisatakam-Holistic de	velopme	ent of pe	rsona	ılity						
• Verses- 19,20,2	21,22 (wi	sdom)								
• Verses- 29,31,3	32 (pride	& hero	ism)							
• Verses- 26,28,6	63,65 (vii	rtue)								
Nactigatellam Halistia da		ntofus		1:4						
Verses 52 53 5	(dont)	sht of pe	ISOIIa	uiity						
 Verses- 71 73 7 	75 78 (do	s) 2s)								
• • • • • • • • • • • • • • • • • • • •	<i>5,70</i> (uo	3)								
Approach to day to day w	vork and	duties.								
Shrimad Bhagy	vad Geet	a: Chap	ter 2-	Verses 41,	47,48,					
Chapter 3-Vers	es 13, 21	, 27, 35	, Cha	pter 6-Ver	ses 5,13,17, 23, 35,					
• Chapter 18-Verses 45, 46, 48.										
Statements of basic know	ledge.									
• Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68										
• Chapter 12 - Ve	rses 13,	14, 15, 1-1, Chui	16,17	, 18 D1 1 <i>C</i>	N 4					
Personality of F Charter? Verse	$\frac{17}{17}$ Ch	iel. Shri	Magal	Bhagwad C	jeeta:					
Chapter 4 Vorse	as 17, Ch	apter 5- 20	verse	28 30,37,42	,					
 Chapter 18 – Vers 	 Chapter 4- v erses 16, 36,39 Chapter 18 Verses 27 28 63 									
Text Books :	1303 57,	50,05								
1 "Srimad Bhagayad Gita" by Swami Swarupananda Advaita Ashram (Publication										
Department) Kolkata										
Reference Books ·										
1. Bhartrihari's T	hree Sata	kam (N	iti-sri	ingar-vaira	gva) by P.Gopinath	. Rashtriva San	skrit			
Sansthanam, New Delhi.										
Ouestion Paper Pattern:										
Internal Assessment: The question paper for internal examination shall consist of Six questions and has										
to answer any Four ques	tions.	1 1				1				