B. Tech SEM I

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
			(Oovernineni M	AV 2021-22						
Course Information										
Progr	amme		B Tech (Informat	ion Technology)						
Class										
Cours		<u>0</u>	That Tear D. Tee							
Cours	o Nom		Data Mining							
Docire										
Desire	eu neg	uisites:	Statistics and Mat	nematics						
T	eachin	g Scheme		Examination Sc	heme (Marks)					
Lectu	re	3 Hrs/week	T1	T2	ESE	Total				
Tutor	ial	-	20	20	60	100				
Practi	ical	_		<u> </u>						
Intera	oction	_		Credi	ts: 3					
		1	1		-					
			Сол	rse Obiectives						
1	To ir	troduce basic c	concepts, principles	and techniques of dat	a mining.					
2	To co	ompare various	data mining tools.		B ·					
3	To ir	npart different	data mining techniq	ues to handle real wo	rld problems					
		Cou	irse Outcomes (CC)) with Bloom's Tax	onomy Level					
At the	end of	the course, the	students will be ab	le to,		1				
CO1	CO1 Summarize the basic concepts and techniques of data mining									
CO2 Apply data mining algorithms for solving real life problems Apply										
03	Eval	uate optimized	solution in data min	ling using complex a	nd nuge dataset	Evaluate				
Module Module Contents Hours										
Modu	ıle		Modu	le Contents		Hours				
Modu	ile I	ntroduction : I	Modu Basic Concepts in I	le Contents Data Mining		Hours				
Modu I	ile In E	ntroduction : I Data mining b	Modu Basic Concepts in I ackground, classifi	le Contents Data Mining ication of Data Mi	ning, Data Mining	Hours 7				
Modu	ile In C T	ntroduction : I Data mining b Dechniques. Dat	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap	le Contents Data Mining ication of Data Mi oplications	ning, Data Mining	Hours 7				
Modu I	ile In E T D	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives	le Contents Data Mining ication of Data Mi oplications	ning, Data Mining	Hours 7				
Modu I II	ile In E T D E	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit	le Contents Data Mining ication of Data Mi oplications tecture of Data M	ning, Data Mining /lining, Knowledge	Hours 7 6				
Modu I II	nle In E T D E re A	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, E	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization.	ning, Data Mining Aining, Knowledge	Hours 7 6				
Modu I II III	nle Lu D T D D r C R A F	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining Epresentation, I Association Rul Drequent items	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation., As	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization.	ning, Data Mining /lining, Knowledge neration, correlation	Hours 7 6 7				
Modu I II III	nle In D T D D C ra A F a	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul Prequent itemsonalysis, constra	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d le mining, et generation,, As int based Associatio	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining.	ning, Data Mining Aining, Knowledge neration, correlation	Hours 7 6 7 7 7				
Modu I II III	nle In D T D C F a C	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul Grequent itemsonalysis, constra Classification &	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Prediction	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining.	ning, Data Mining Aining, Knowledge neration, correlation	Hours 7 6 7				
Modu I II III IV	nle In D T D D D C F a C Is	ntroduction : I Data mining b Dechniques. Data Data Mining Pr Data Mining epresentation, I Association Rul Frequent items nalysis, constra Classification & Ssues, Decision	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association a Prediction	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining.	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification	Hours 7 6 7 7 7 7 7 7 7				
Modu I II III IV	ile In D D D D D D D D D D D D D D D D D D	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul requent items nalysis, constra Classification & Ssues, Decision methods, Predict	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Prediction Tree, Bayesian cla tion, ensemble class	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining. assifier, Back propag	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification	Hours 7 6 7 7 7 7 7 7 7				
Modu I II III IV	ile In E In	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul Grequent itemso nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to prediction Tree, Bayesian class inn, ensemble class S	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag iffication	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification	Hours 7 7 6 7 7 7 7 6 7				
Modu I II III IV V	ile In D T D D C F A F A F C Is n C S Si b	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, E Sociation Rul requent items nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap- imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Prediction Tree, Bayesian cla tion, ensemble class s cs, Clustering me ased, grid based).	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining. assifier, Back propag sification	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification based, hierarchical	Hours 7 7 6 7 7 7 7 6 7 6 7				
Modu I II III IV V	nle In In In In In In In In In In In In In I	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul Grequent itemsof nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag ification thods, (partitioning Data sets	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification based, hierarchical	Hours 7 6 7 7 6 7 6 6 7				
Modu I II III IV V VI	nle In D T D D C R A F a C Is n C S S b b	ntroduction : I Data mining b Dechniques. Data Data Mining Pr Data Mining epresentation, I Association Rul requent items nalysis, constra Classification & Ssues, Decision bethods, Predict Cluster analysis imilarity metri ased, density ban ntroduction to fining spatial d	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining. assifier, Back propag sification thods, (partitioning Data sets Mining time series, s	ning, Data Mining <i>A</i> ining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets,	Hours 7 7 6 7 7 7 7 6 6 6 6				
Modu I II III IV V VI	Ile In In <td>ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul requent items analysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d veb mining</td> <td>Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association to the prediction Tree, Bayesian class or, Clustering me ased, grid based), Mining Complex I lata, temporal data,</td> <td>le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag dification thods, (partitioning Data sets Mining time series, m</td> <td>ning, Data Mining Aining, Knowledge neration, correlation gation, Classification based, hierarchical mining text datasets,</td> <td>Hours 7 7 6 7 7 7 6 6 6 6 6</td>	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul requent items analysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d veb mining	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association to the prediction Tree, Bayesian class or, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag dification thods, (partitioning Data sets Mining time series, m	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification based, hierarchical mining text datasets,	Hours 7 7 6 7 7 7 6 6 6 6 6				
Modu I II III IV V VI	Ile In	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, E Sociation Rul Grequent itemson nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d yeb mining	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining. assifier, Back propag ification thods, (partitioning Data sets Mining time series, m	ning, Data Mining <i>A</i> ining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets,	Hours 7 6 7 6 7 6 6 6 6 6 6 6 6				
Modu I II III IV V VI	ile In Im Im Im	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul requent items inalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d zeb mining	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag dification thods, (partitioning Data sets Mining time series, m Text Books	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets,	Hours 7 6 7 6 6 6 6 6				
Modu I II III IV V VI	ile In Im Im Im	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I association Rul requent itemso nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d yeb mining ei Han and Mic	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to based Association a Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propage ification thods, (partitioning Data sets Mining time series, m Text Books Data Mining – Concep pagement Systems 200	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets, pts and Techniques",	Hours 7 6 7 6 7 6 6 3rd Edition, The				
Modu I II III IV V VI VI	Ile In E In	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I association Rul requent items nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d yeb mining ei Han and Mid gan Kaufmann S	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to based Association a Prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule ger on mining. assifier, Back propag- sification thods, (partitioning Data sets Mining time series, m Text Books Data Mining – Concel agement Systems, 201 atory and Advanced to	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification based, hierarchical mining text datasets, pts and Techniques", 11 anics" 2 nd Edition, D	Hours 7 6 7 6 7 6 6 3rd Edition, The arron 2002				
Modu I II III IV V VI VI 1 2	Ile In Control In Cont	ntroduction : I Data mining b Dechniques. Data Data Mining Pr Data Mining epresentation, I Association Rul requent itemso nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to Aining spatial d web mining ei Han and Mid gan Kaufmann & Dunham , "Da Witten Fibe Fr	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives Primitives, Archit Data generalization d le mining, et generation,, As int based Association to based Association Prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data,	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag- ification thods, (partitioning Data sets Mining time series, i Text Books Data Mining – Concel agement Systems, 201 ctory and Advanced t 11 "Data Mining – P	ning, Data Mining Aining, Knowledge neration, correlation gation, Classification based, hierarchical mining text datasets, pts and Techniques", 11 opics", 2 nd Edition, Perspective Lease	Hours 7 6 7 6 7 6 3 rd Edition, The earson, 2003 rning Tools and				
Modu I II III IV V VI VI 1 2 3	Ile In Control In Cont	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining Pr Data Mining epresentation, I Ssociation Rul Grequent itemson nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to Gining spatial d yeb mining ei Han and Mid gan Kaufmann S Dunham , "Da Witten, Eibe Fr niques", 3 rd Edi	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives Primitives, Archit Data generalization a le mining, et generation,, As int based Association a Prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data, Cheline Kamber, "D Series in Data Mana ta Mining: Introduc rank and Mark Ha ition, 2011	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag iffication thods, (partitioning Data sets Mining time series, s Text Books Data Mining – Conce agement Systems, 201 ctory and Advanced t Il, "Data Mining: Pr	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets, pts and Techniques", 11 opics", 2 nd Edition, Per- cractical Machine Lea	Hours 7 6 7 7 7 6 6 3 rd Edition, The earson, 2003 rning Tools and				
Modu I II III IV V VI VI 1 2 3	Ile In Control In Cont	ntroduction : I Data mining b Dechniques. Dat Data Mining Pr Data Mining epresentation, I Association Rul requent itemso nalysis, constra Classification & Ssues, Decision nethods, Predict Cluster analysis imilarity metri ased, density ba ntroduction to fining spatial d zeb mining ei Han and Mic gan Kaufmann & Dunham , "Da Witten, Eibe Fr niques", 3 rd Edi	Modu Basic Concepts in I ackground, classifi a Preprocessing, Ap imitives Primitives Primitives, Archit Data generalization a le mining, et generation, As int based Association a Prediction Tree, Bayesian cla tion, ensemble class cs, Clustering me ased, grid based), Mining Complex I lata, temporal data, Cheline Kamber, "D Series in Data Mana tta Mining: Introduc rank and Mark Ha ition, 2011	le Contents Data Mining ication of Data Mi oplications tecture of Data M & summarization. ssociation Rule gen on mining. assifier, Back propag dification thods, (partitioning Data sets Mining time series, m Text Books Data Mining – Conce agement Systems, 201 ctory and Advanced t Il, "Data Mining: Pr	ning, Data Mining Aining, Knowledge heration, correlation gation, Classification based, hierarchical mining text datasets, pts and Techniques", 11 opics", 2 nd Edition, Peractical Machine Lea	Hours 7 6 7 6 6 3 rd Edition, The earson, 2003 rning Tools and				

1	Rajan Chattamvelli, "Data Mining Methods : Concepts & Applications", Narosa Publishing House International Publisher, 2010						
2	Sushmita Mitra, Tinku Acharya, "Data Mining Multimedia, Soft Computing and Biometrics", WILEY Publication, 2003						
3							
Useful Links							
1	https://nptel.ac.in/courses/106/105/106105174/						
2	https://www.mugroatlearning.com/blog/date.mining.tutorial/						

2 https://www.mygreatlearning.com/blog/data-mining-tutorial/

3	https://www.coursera.org/specializations/data-mining

CO-PO Mapping														
	Programme Outcomes (PO)												P	SO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	2						1					2	
CO2	3										2	2		
CO3														1

Assessment

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember	Not	Not Allowed	Not Allowed	Not							
	Allowed			Allowed							
Understand	5	5	10	20							
Apply	10	5	15	30							
Analyze	5	5	15	25							
Evaluate		5	15	20							
Create			5	5							
Total	20	20	60	100							

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
		(007	AY 2	021-22						
			Course In	nformation						
Prog	ramn	ne	B.Tech. (Infor	mation Technol	ogy)					
Class	s, Sem	lester	Final Year B.	Tech., Sem. VII						
Cour	se Co	de								
Course Name Cryptography & Network Security										
Desi	red R	equisites:	Computer Net	works						
	Tea	ching Scheme		Examination	n Scheme (Marks)					
Lectu	ure	3 Hrs/week	T1	T2	ESE	Total				
Tuto	rial	-	20	20	60	100				
Prac	tical	-								
Inter	actio	n –		C	redits: 3					
			C	011 /						
1			Course	Objectives						
	10 To	elaborate the fundament	tal network secu	irity parameters						
	10 To	impart various encryptic	on techniques							
3	10	apprise security mechan	asmag (CO) wi	th Plaam 's Tax	ork infeats					
At th	o and	of the course the studer	comes (CO) wi	th Bloom's Lax	conomy Level					
		or the course, the studen	f information	.0,		Analyza				
$\frac{cor}{cor}$	Pra	ctice various encryption	algorithms by	examining crypt	-complexity	Analyze				
C02		mare access control me	chanisms and a	uthentication se	rvices	Analyze				
		inpare access control inc	chamsins and a	unentied for se		7 mary 20				
Moo	lule		Module (Contents		Hours				
		Security Overview:								
]]	[Services, Mechanism a Classical Encryption	and Attacks, Th Fechniques, Su	7						
		Techniques, Steganog Block Cipher:	raphy							
I	I	Block Cipher Design Cipher Model, Data	Principles, M Encryption Sta	6						
		AES	51							
		Public Key Encryptic	on:							
l	Ι	Principles of Public-K	ey Cryptosyster	n, RSA Algorith	ım,	7				
		Distribution of Public	Keys, Diffie-He	ellman Key Excl	nange					
		Authentication Function	tions and Servi	ces:						
	V	Hash Functions, Mess	age Authenticat	ion Codes, Digit	tal Signatures	7				
		Kerberos, X.509 Certi	ficates							
		IP & Web Security:	A .1 .*		1.4 0 4					
, x	7	IP Security Architecti	are, Authentica	tion Header, Er	capsulating Security	C				
` `	/	Payload, Combining S	ecurity Associa	tions	and Transport I area	6				
		Security Secure Flect	ronic Transactio	e Socket Layer	and Transport Layer					
		Perimeter Security:		лі —						
v v	Г	Intruders Intruder Det	ection Passwor	d Management	Malwares	6				
Firewall Configurations Trusted Systems Honeypots										
			,			1				
			Text	Books						
1	Willi	am Stallings, "Cryptog	raphy and Net	work Security,	Principles and Pract	ices", Pearson				
	Publi	cation, 8 th Edition 2020)	-		4				
2	Atul 2017	Kahate, "Cryptography	and Network S	<i>ecurity"</i> , McGra	aw Hill Education Inc	lia, 4 th Edition,				
			Refe	rences						

1	Menezes, A. J., P. C. Van Oarschot, and S. A. Vanstone, " <i>Handbook of Applied Cryptography</i> ", CRC Press, 2 nd Edition, 2018						
2	Schneier, Bruce, "Applied Cryptography: Protocols & Algorithms", Wiley Publication,2 nd						
	Edition, 2015						
Useful Links							
1	https://www.researchgate.net/publication/26585503_Network_Security_Policies_and_Guideline						
1	s_for_Effective_Network_Management						
2	https://www.tutorialspoint.com/information_security_cyber_law/network_security.htm						

3 https://cis-india.org/internet-governance/publications/it-act/short-note-on-amendment-act-2008

CO-PO Mapping															
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1		3					1							2	
CO2	2				3								1		
CO3			2	1											
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															
Each CO	of the	course	e must	map to	o at lea	st one	PO.					-			

Assessment

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed							
Understand	5	5	10	20							
Apply	10	5	15	30							
Analyze	5	5	15	25							
Evaluate		5	15	20							
Create			5	5							
Total	20	20	60	100							

Walchand College of Engineering. Sangli											
(Government Aided Autonomous Institute)											
	AY 2021-22										
Course Information											
Progr	amme	B.Tech. (Informat	tion Technology)								
Class.	Semester	Final Year B. Tec	h., Sem VII								
Cours	e Code		,								
Cours	e Name	Data Mining Lab									
Desire	d Requisites:	Basic computer pr	rogramming Statistic	28							
			<u>, , , , , , , , , , , , , , , , , , , </u>								
Т	eaching Scheme		Examination So	heme (Marks)							
Lectu	re -	LA1	LA2	ESE	Total						
Tutor	ial -	30	30	40	100						
Practi	ical 2 Hrs/Week	50	50	10	100						
Intera	ection -		Cred	ite• 1							
Intera			Citu	1.5. 1							
		Com	rse Objectives								
1	To demonstrate basi	concepts principle	es of data mining tecl	miques							
2	To develop program	ming skills of data n	nining tools	inques							
3	To introduce data mi	ning approaches to	handle real world da	tasets							
	Cou	rse Outcomes (CO) with Bloom's Tax	onomy Level							
At the	end of the course, the	students will be able	e to,	L. L							
CO1	Apply appropriate da	ata preprocessing an	d mining techniques		Apply						
CO2	Compare various dat	a mining algorithms	8		Analyze						
CO3	Develop a data minin	ng solution to solve	real word problems		Create						
		List of Europe	imonta / Lob Astivi	tion							
T ist of	f Exmanimanta.	List of Experi	iments / Lad Activi	lies							
Experi	iment 1. Perform data	smoothing									
Experi	iment 2: Perform data	transformation.									
Experi	iment 3: Perform data	normalization.									
Experi	iment 4: Finding sumn	nary for dataset.									
Experi	iment 5: Plotting vario	us types of graphs fi	rom dataset.								
Experi	iment 6: Data Preparat	ion and Exploration	Visualization Techn	iques							
Experi	iment 7: Performance	Metrics and Assessing Mathematics	nent Metrics for Prec	liction and Classifi	cation						
Experi	iment 9: Supervised Le	arning Methods Lo	gistic Regression								
Experi	iment 10. Unsupervise	d Learning Methods	s · Association Rules								
Experi	iment 11: Unsupervise	d Learning Methods	s : Cluster Analysis								
Experi	iment 12: Perform vari	ous data mining tasl	ks using WEKA and	KNIME OSS							
Experi	iment 13: Using some	sample data sets imp	plement and test data	mining techniques	5.						
	T, 1.11 (.)	T	Text Books	. 177 1 .	n and particle are						
1	Jiawei Han and Mic	heline Kamber, " <i>Da</i>	ata Mining – Concep	ots and Techniques	5", 3 rd Edition, The						
	Morgan Kaufmann S	peries in Data Manag	gement Systems, 201	1 actical Machine I	agming Tools and						
2	<i>Techniques</i> " 3 rd Edi	tion 2011	i, Dala Mining: Fr	actical machine L	earning Tools and						
	Lecturiques , 5 Lui										
		F	References								
	Chris Pal, Ian Witte	n, Eibe Frank, and	Mark Hall, "Data	Mining: Practical	Machine Learning						
1	Tools and Techniqu	es", Morgan Kaufr	nann Series in Data	Management Sy	stems, 4 th Edition,						
	2013										
2	Bostjan Kaluza, "Ins	stant Weka How-to"	, Packt Publishing Li	mited, June 2013							
		T I I	setul Links								

1	https://nptel.ac.in/courses/110/107/110107092/
2	https://nptel.ac.in/courses/110/107/110107095/
3	https://www.coursera.org/specializations/data-mining

CO-PO Mapping														
	Programme Outcomes (PO)												P	SO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2				1								2	
CO2		3									1	2		
CO3			3		2			2						1

Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ES	E is a separate head of	passing. LAI, LA	A2 together is treated as In-Semester Evaluation	ion.					
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks					
LA1	Lab activities,	Lab Course	During Week 1 to Week 6	20					
	attendance, journal	Faculty	Marks Submission at the end of Week 6	50					
1.4.2	Lab activities,	Lab Course	During Week 7 to Week 12	20					
LAZ	attendance, journal	Faculty	Marks Submission at the end of Week 12	50					
Lab ESE	Lab activities,	Lab Course	During Week 15 to Week 18	40					
	attendance, journal	Faculty	Marks Submission at the end of Week 18	40					
Wast 1 india	atag starting wash of a	compostor The tru	ical cabadula of lab accognizate is about						

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total					
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed					
Understand	5			05					
Apply	20	20	20	60					
Analyze	5	5	10	20					
Evaluate		5	5	10					
Create			5	5					
Total	30	30	40	100					

	Walchand College of Engineering, Sangli								
			Government	Arded Autonomous AY 2021-22					
			Co	urse Information					
Progra	amme	2	B.Tech. (Inform	ation Technology)					
Class,	Seme	ster	Final Year B. Te	ech., Sem VII					
Course Code									
Cours	e Nan	ne	Open Source So	ftware Lab					
Desire	ed Rec	quisites:	Unix Operating	Systems, Software	Engineering, Computer Ne	twork, Web			
			Technology						
Te	eachir	ng Scheme		Examination	n Scheme (Marks)				
Lectur	re - LA1 LA2 Lab ESE								
Tutori	ial	-	30	30	40	100			
Practi	cal	2 Hrs/week			· · · ·				
Intera	ction	1 Hr		Cı	redits: 2				
1	. .	. 1 .1	<u> </u>	ourse Objectives	•				
	101 To 7	ontribute or devi	en source software	e for software engin	mont				
2		ontribute of dev	elop soltware in c	ppen source environ	iment				
3	100		urse Outcomes (C	" O) with Bloom's [Favonomy I ovol				
At the	end o	f the course the	students will be a	ble to					
CO1	Prac	tice the open so	urce software tool	s in software devel	opment	Apply			
CO2 Analyze the economics of open source software									
CO3 Create open source software or contribute to existing open source software						Create			
Modu	le		Mo	odule Contents		Hours			
		ntroduction							
		ntroduction to	open sources- N	eed of Open Sour	ces- Advantages of Oper				
	r	novement Noti	on of Communi	ty Guidelines for	effectively working with				
I	H	FOSS communi	ity. Benefits of	3					
	H	Requirements for	or being open, f	r being open, free software, open source software, FOSS					
	I	Licensing Model	ls –GPL, AGPL,						
	I	Linux, Kernel Ve	ersions.						
		Open source de	velopment and F	OSS languages	C. 1 1				
II	ł	roprietary softw	vare development	model vs. Open So	ource software development	2			
	ľ	nodel, models IC	or FUSS- Cathedr	al model and Bazaa	ar model. Software package				
		ntroduction to	collaborative dev	velonment					
	I	Developer com	nunities, mailing	lists. IRC. wiki. v	ersion control (git/github)				
	ł	oug tracking,	handling non-te	echnical issues,	localization, accessibility	2			
	C	locumentation F	OSS code by dox	ygen.	•				
	(Open source Vi	rtualization and	FOSS					
IV	0	Containerization	technologies:	docker, Container	Images, alternative to	2			
		ritualization: ro	cket, etc, Contain	erization of FOSS t	ools				
V		Configuration 0	I Network servic	Ces Wah conver Etr	Somer Talnot Somer ata	2			
v		GUI configuration	n tools: webmin	or usermin	server, remet server, etc	2			
		Web Server To	ols and FOSS CN	AS					
	I	nstallation and	Administration	of Web Servers-	LAMP. XAMPP. Anache				
VI	r	nysql, etc. Insta	llation of Conten	t Management Svst	ems – WordPress, Joomla	2			
	I	Drupal, Moodle,	MaheraXoops, M	lagento, social netw	vorking.				
		,							
			List of Exp	eriments / Lab Ac	tivities				

- 1. Compare the various Linux Distributions and their usage
- 2. Comparison of various Open Source tools : Project management
- 3. Comparison of various Open Source tools: bug tracking
- 4. Comparison of various Open Source tools: version control system
- 5. Comparison of various Open Source tools: CMS
- 6. Compilation and installation of Linux Kernel
- 7. Creation Of RPM/DEB packages
- 8. Excise the development of Open Source Software:-Develop simple software for basic needs such as calculator, editor or any small noticeable contribution in existing FOSS.
- 9. Configuration of Server based services and their uses
- 10. Docker container : An open source software development platform

-	· · · · · · · · · · · · · · · · · · ·								
	Text Books								
1	Andrew M. St. Laurent, "Understanding Open Source and Free Software Licensing", First								
1	edition, O'Reilly Media, Inc, ISBN:9780596005818								
2	Paul Kavanagh, "Open Source Software: Implementation and Management", First edition, Digital								
2	Press, 2004, ISBN: 9780080492001.								
2	Stefan Koch, "Free/Open Source Software Development", First edition, Idea Group Publishing,								
3	2004.								
	References								
1	Zhao Jiong, "A Heavily Commented Linux Kernel Source Code", Third edition, Old Linux								
1	Publications, 2019								
2	Stefan Koch · "Free/Open Source Software Development", First edition, IGI Publishing, 2004,								
2	ISBN-13: 978-1591403692								

Useful Links					
1	https://bitnami.com/				
2	https://labs.play-with-docker.com/				
3	https://github.com/mit-pdos/xv6-public				
4	https://www.gnu.org/software/fsfe/projects/ms-vs-eu/halloween1.html				

						CO-I	PO N	Aappir	g						
				P	rograr	nme C) utco	omes (l	PO)					P	SO
	1	2	3	4	5	6	7	8	9		10	11	12	1	2
CO1			1		3									2	
CO2									2			3			
CO3													2		
The streng	gth of	mappir	ıg is to	be wr	itten as	1,2,3;	Whe	ere, 1:L	.ow, 2	:Me	edium	, 3:Hig	gh		
Each CO	of the	course	must r	nap to	at leas	t one P	Ю.								
Assessme	nt														
There are	three	compoi	nents o	f lab a	issessm	ent, L	A1, I	LA2 an	d Lab	ES	E.				
IMP: Lab	ESE i	s a sep	arate h	ead of	passin	g. LA1	, LA	2 toget	her is	trea	ated a	s In-Se	emester	r Evaluat	ion.
Assessme	ent	Bas	sed on		Cond	ucted	by	Тур	ical S	che	dule ((for 26	-week	Sem)	Marks
ТАТ		Lab a	es,	Lab Course			During Week 1 to Week 6						20		
LAI	a	ttendar	nce, jou	ırnal	Faculty			Marks Submission at the end of Week 6						30	
ТЛЭ		Lab a	ctivitie	es,	Lab Course			During Week 7 to Week 12						20	
	a	ttendar	nce, jou	ırnal	Fa	aculty		Marks Submission at the end of Week 12						eek 12	50
Lob ESI	-	Lab a	ctivitie	es,	Lab Course			During Week 15 to Week 18					40		
	a	ttendar	nce, jou	ırnal	Fa	aculty		Marks	Subn	niss	ion at	the en	d of W	eek 18	40
Week 1 in	dicate	s starti	ng wee	k of a	semest	er. The	e typ	ical sch	edule	of	lab as	sessme	ents is	shown,	
considerin	1g a 26	6-week	semes	ter. Th	e actua	l schee	dule	shall be	e as pe	er ac	cadem	ic cale	endar. I	Lab activi	ties/Lab
performance shall include performing experiments, mini-project, presentations, drawings, programming															
and other suitable activities, as per the nature and requirement of the lab course. The experimental lab															
shall have	typica	ally 8-1	0 expe	erimen	ts.										

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total					
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed					
Understand	5			05					
Apply	20	20	20	60					
Analyze	5	5	10	20					
Evaluate		5	5	10					
Create			5	5					
Total	30	30	40	100					

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
				AY 2021-22	,						
			Cour	se Information							
Progr	amm	e	B.Tech. (Information	tion Techology)							
Class Semester Final Year B Tech Sem VIII											
Cours		do	4IT491								
Cours		me	Agile Software T	ools and Practices I a	h						
Deging	d Do	auicitos	Software Enginee	ring	0						
Desire	eu Ke	quisites:	Software Enginee								
T	eachi	ng Scheme		Examination So	cheme (Marks)						
Lectu	re	-	LA1	LA2	ESE	T	otal				
Tutor	ial	_	30	30	40		100				
Practi	cal										
Intera	ction	3 Hrs/week		Cred	its: 3						
			Cou	rse Objectives							
1	То	define basics of S	oftware Testing an	d techniques.							
2	То	discuss project m	anagement cycle fo	or software developm	ent.						
3	To	illustrate Agile de	evelopment techniq	ues for software deve	elopment.						
		Cou	rse Outcomes (CC)) with Bloom's Tax	onomy Level						
At the end of the course, the students will be able to,											
CO1 Demonstrate use of automation testing tools							Apply				
CO2	Imp	lement project m	anagement techniq	ues like planning, ris	k analysis, scheduli	ng.	Apply				
		iluate software de	evelopment me cyc.	ie using Agne tools a	na DevOps.		Evaluate				
Modu	ıle		Мо	dule Contents			Hours				
		Software Testing	g Introduction:								
		Introduction, Im	portance of Softwa	are testing, How to	conduct Software	ortance of Software testing, How to conduct Software testing,					
1		Basic terminology of Software testing, Manual Testing Process, Difference									
		Basic terminolo	gy of Software t	esting, Manual Tes	sting Process, Dif	ference	7				
		Basic terminolo between Manua	gy of Software t al and Automate V Model of Software	esting, Manual Tes ed Testing, Softw	ating Process, Dif are testing Role	ference es and	7				
		Basic terminolo between Manua Responsibilities,	gy of Software t al and Automate V Model of Softwa a Techniques	esting, Manual Tes ed Testing, Softw are Development	sting Process, Dif are testing Role	ference es and	7				
п		Basic terminolo between Manua Responsibilities, Test Case Desig Static Technique	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques	esting, Manual Tes ed Testing, Softw are Development	are testing Role	ference es and	7				
II		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based	esting, Manual Tes ed Testing, Softw ire Development ques, Black-box Test Test Techniques Ley	ting Process, Differences, Differences, Differences, Differences, Differences, White vels of Software Texture Textures, White vels of Software Textures, White vels o	-box	7				
II		Basic terminolo between Manua Responsibilities, Test Case Design Static Techniques, Test Techniques, Types of Softwa	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing:	esting, Manual Tes ed Testing, Softw are Development ques, Black-box Test Test Techniques, Lev	are testing Role Techniques, White rels of Software Test	-box sting	7				
Ш		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Test Techniques, Types of Softwa i) Functional Te	gy of Software t al and Automate V Model of Softwa n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing	esting, Manual Tes ed Testing, Softw are Development ques, Black-box Test Test Techniques, Lev , Integration Testing,	Sting Process, Differences, Differences, Differences, Role Techniques, White rels of Software Testing, U	-box sting	7 6				
Ш		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Test Techniques, Types of Softwa i) Functional Te Acceptance Testi	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke 7	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Festing, Regression T	Techniques, White vels of Software Tes System Testing, U Sesting.	-box sting	7 6 7				
П		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Test Techniques, Types of Softwa i) Functional Te Acceptance Testi ii) Non Function	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic <u>Experience-based</u> re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform	esting, Manual Tes ed Testing, Softw are Development ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Festing, Regression T nance Testing. (Load	sting Process, Dif are testing Role Techniques, White rels of Software Test System Testing, U Sesting. I, Stress, Spike and	-box sting	7 6 7				
Ш		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Test Techniques , Types of Softwa i) Functional Te Acceptance Testi ii) Non Function Endurance Testir	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes	Sting Process, Differences, Differences, Differences, Differences, White Techniques, White Yels of Software Test System Testing, U System Testing, U Systems, Spike and Sting, Reliability Test	-box sting ser	7 6 7				
Ш		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testi ii) Non Function Endurance Testir Security Testing	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic <u>Experience-based</u> re Testing: sting: Unit Testing ng, Sanity/Smoke al Testing: Perform ng), Usability Testin	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes	Techniques, White rechniques, White rels of Software Tes System Testing, U resting. I, Stress, Spike and sting, Reliability Te	-box sting ser sting,	7 6 7				
Ш		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testin Endurance Testin Security Testing Project Manage	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment	esting, Manual Tes ed Testing, Softw are Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes	Sting Process, Differences, Differences, Differences, Differences, Differences, White vels of Software Testing, Usesting, Usesting, Spike and Sting, Reliability Testing, Reliability Reliabilit	-box sting ser sting,	7 6 7				
II		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testi ii) Non Function Endurance Testir Security Testing Project Manage Software Product	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F pitoring Risk Ana	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis Project Leade	sting Process, Dif are testing Role Techniques, White <u>vels of Software Tes</u> System Testing, U System Testing, U Stress, Spike and sting, Reliability Te sis/Design, Plannin rship Teamwork	-box sting ser sting, ng and Project	7 6 7				
II III IV		Basic terminologic	gy of Software t al and Automate V Model of Softwa n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur	esting, Manual Tes ed Testing, Softw <u>are Development</u> ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade es, Resource Alloc	Techniques, Dif are testing Role Techniques, White rels of Software Tes System Testing, U System Testing, U System Testing, U System Testing, U sting, Reliability Te sis/Design, Plannin rship, Teamwork, cation. Software	-box sting ser sting, ng and Project Ouality	7 6 7 6				
II III IV		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testif ii) Non Function Endurance Testif Security Testing Project Manage Software Product Scheduling, Mon Organization an Management Soft	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stand	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade res, Resource Alloc dards	sting Process, Dif are testing Role Techniques, White rels of Software Test System Testing, U System T	sting, ng and Project Quality	7 6 7 6				
II III IV		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testi ii) Non Function Endurance Testir Security Testing Project Manage Software Product Scheduling, Mon Organization an Management Sof Agile testing	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stand	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade res, Resource Alloc dards	sting Process, Dif are testing Role Techniques, White yels of Software Test System Testing, U System Testing, U System Testing, U System Testing, U System Testing, U Sis/Design, Plannin rship, Teamwork, cation, Software	-box sting ser sting, ng and Project Quality	7 6 7 6				
II III IV		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testif ii) Non Function Endurance Testif Security Testing Project Manage Software Product Scheduling, Mon Organization an <u>Management Sof</u> Agile testing The Fundament	gy of Software t and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform g), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stame als of Agile Sof	esting, Manual Tes ed Testing, Softw ire Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Testing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade res, Resource Alloc dards tware Development,	sting Process, Dif are testing Role Techniques, White <u>vels of Software Tes</u> System Testing, U System	sting, ng and Project Quality mming,	7 6 7 6				
II III IV V		Basic terminolo between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testi ii) Non Function Endurance Testir Security Testing Project Manage Software Product Scheduling, Mon Organization an Management Sof Agile testing The Fundament Aspects of Agile	gy of Software t and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stand als of Agile Sof Approaches, The I	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade res, Resource Alloc dards	ting Process, Dif are testing Role Techniques, White <u>vels of Software Tes</u> System Testing, U System Testing in Tradition	sting -box sting ser sting, ng and Project Quality mming, nal and	7 6 7 6				
II III IV V		Basic terminologi between Manual Responsibilities, Test Case Design Static Techniques, Types of Softwa i) Functional Te Acceptance Testin Endurance Testin Security Testing Project Manage Software Product Scheduling, Mon Organization an Management Sof Agile testing The Fundament Aspects of Agile Agile Approache	gy of Software t al and Automate <u>V Model of Software</u> Techniques s, Dynamic Technic Experience-based Te Testing: sting: Unit Testing ng, Sanity/Smoke T re Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stand als of Agile Sof Approaches, The D s, Status of Testing	esting, Manual Tes ed Testing, Softw <u>are Development</u> ques, Black-box Test <u>Test Techniques, Lev</u> , Integration Testing, Testing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade es, Resource Alloc dards tware Development, Differences between g in Agile Projects, F	Techniques, Dif are testing Role Techniques, White vels of Software Test System Testing, U System Testing, U System Testing, U Stress, Spike and sting, Reliability Te sis/Design, Plannin rship, Teamwork, cation, Software , Extreme Program Testing in Traditio Role and Skills of a	-box sting -box sting ser sting, ng and Project Quality mming, nal and a Tester	7 6 7 6 6				
II III IV V		Basic terminologi between Manua Responsibilities, Test Case Desig Static Techniques, Types of Softwa i) Functional Te Acceptance Testif ii) Non Function Endurance Testif Security Testing Project Manage Software Product Scheduling, Mon Organization an Management Sof Agile testing The Fundament Aspects of Agile Agile Approached in an Agile Team	gy of Software t al and Automate <u>V Model of Softwa</u> n Techniques s, Dynamic Technic Experience-based re Testing: sting: Unit Testing ng, Sanity/Smoke T al Testing: Perform ng), Usability Testin ment ct Management, F nitoring, Risk Ana d Team Structur tware Testing Stand als of Agile Sof Approaches, The P s, Status of Testing h, Agile Testing Man piquos in Acido Par	esting, Manual Tes ed Testing, Softw re Development ques, Black-box Test Test Techniques, Lev , Integration Testing, Festing, Regression T nance Testing. (Load ng, Compatibility Tes Requirements Analy lysis, Project Leade es, Resource Alloc dards tware Development, Differences between g in Agile Projects, F ethods, Assessing Qu	sting Process, Dif are testing Role Techniques, White rels of Software Test System Testing, U System T	reference reference and -box sting ser sting, ng and Project Quality mming, nal and a Tester imating	7 6 7 6				

	DevOps Testing	
	DevOps, Version control with Git, Git, Jenkins, Maven, Integration with Jenkins,	
VI	Continuous Integration and Continuous Delivery CI/CD: Jenkins Creating	7
	pipelines, Setting up runners Containers and container orchestration (Dockers and	,
	Kubernetes) or application development and deployment.	
	List of Experiments / Lab Activities	
list of	Experiments:	
	1. Demonstrate Debugging Tool.	
	2. Implement White Box Testing(Manual)	
	3.Implement Black Box Testing(Manual)	
	4.Implement Unit Testing(Automated): TestNG	
	5.Implement Performance Testing(Automated) using JMetre:	
	6. Demonstrate Test Management Tool:TestStuff	
	7. Demonstrate Test Management Tool:TestLink	
	8. Demonstrate Web-Test Automation Tool- Selenium IDE	
	9. Demonstrate Web-Test Automation Tool- Selenium Web-Driver	
	10.Demonstrate Project Management Tool:JIRA	
	11. Implement Test automation using DevOps.	
	12. Demonstrate project life cycle using Agile framework.	
	Text Books	
	Glenford I Myers Corey Sandler. Tom Badgett "The Art of Software Testing". This	d edition
1	Wiley, 2011, ISBN: 978-1-118-13315-6	u vuition,
2	Ron Patton, Corey Sandler, Tom Badgett, "Software Testing", Second edition, Sams, 200)5
2	Lisa Crispin and Janet Gregory, "Agile Testing: A Practical Guide for Testers and Agil	e Teams",
3	First edition, Addison-Wesley Signature Series, 2009.	
4	Teresa Luckey, Joseph Phillips, "Software Project Management For Dummies", First	st edition,
	Wiley, 2006, ISBN: 9780471749349.	
	References	h Uouso
1	2003 ISBN 13-078 1580537010	in nouse,
	Joakim Verona · "Practical DevOns" First edition Artech House 2016	ISBN-13.
2	9781785886522, 1785886525.	1501(15)
	Henry: "Software Project Management: A Real-World Guide To Success". First edition.	Pearson
3	Education, 2004, ISBN- 9788131717929, 8131717925.	
	Useful Links	
1	https://www.javatpoint.com/software-testing-tutorial	
2	https://www.guru99.com/software-testing.html	
3	https://www.getzephyr.com/insights/developing-devops-testing-strategy-benefits-best-pr	actices-
4	https://www.softwaretestinghelp.com/agile-scrum-methodology-for-development-and-te	sting/
·		B'
	CO.PO Manning	

CO-PO Mapping														
		Programme Outcomes (PO)								PS	0			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			1		3								2	
CO2									2		3			
CO3												2		
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High														
Each CO	of the	course	must r	nap to	at leas	t one P	0.							

The assessment is based on 2 in-semester evaluations (ISE) of 10 marks each, 1 mid-sem examination (MSE) of 30 marks and 1 end-sem examination (ESE) of 50 marks.

MSE is based on the modules taught till MSE (typically Module 1-3) and ESE is based on all modules with 30-40% weightage on modules before MSE and 60-70% weightage on modules after MSE.

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	LA1	LA2	ESE	Total					
Remember									
Understand	15	10		25					
Apply	10	10	10	30					
Analyze	5	10	10	25					
Evaluate			10	10					
Create			10	10					
Total	30	30	40	100					

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
AY 2021-22										
			Course Info	rmation						
Program	me		B.Tech. (Infor	rmation Techno	logy)					
Class, Se	mester		Final Year B. Tech., Sem VII							
Course C	Code			,						
Course N	lame		Project 1							
Desired H	Requisite	s:								
]	Feaching	Scheme		Examination	Scheme (Mar	ks)				
Lecture		-	LA1	LA2	Lab ESE		Total			
Tutorial		-	30	30	40		100			
Practical		6 Hrs/Week			1					
Interaction	on	-		Cr	edits: 3					
			Course Ob	jectives						
1	To iden	tify real life needs	and project requ	uirements						
2	To elab	orate technical solu	tions through la	atest design & c	levelopment too	ols				
3	To com	pare and analyze the	ne IT platforms	for efficient sol	utions					
At the end	d of the c	ourse the students	will be able to	DIOOIII'S TAXO	lomy Level					
CO1	Integrat	te project at every s	stage of the soft	ware developm	ent life cycle		Apply			
CO2	Recom	mend project plans	that address rea	al-world challer	iges		Evaluate			
CO3	Develo	p software projects	with strategic g	goals			Create			
		List	of Experiments	s / Lab Activiti	es					
P E fc P al m S	List of Experiments / Lab Activities List of Experiments: Project is to be carried out in a group of maximum 5 to 6 students. Each group will carry out a project by developing any application software based on the following areas. 1. Application can be based on any trending new technology. 2. Application can be extension to previous projects. 3. Project group should achieve all the proposed objectives of the problem statement. 4. The work should be completed in all aspects of design, implementation and testing and follow software engineering practices. 5. Project reports should be prepared and submitted in soft and hard form along with the code and other dependency documents. Preferable use online code repositories (github/bitbucket) 6. Project will be evaluated continuously by the guide/panel as per assessment plan. 7. Presentation and report should use standard templates provided by department. Project report (pre-defined template) should be prepared using Latex/Word and submitted along with soft copy on CD/DVD (with code, PPT, PDF, Text report document & reference material) or on an online repository									
			Text Bo	ooks						
1	Rajendu Univers	ra Kumbhar , " <i>How</i> sal Prakashan, 2015	to Write Proje	ct Reports, Ph.	D. Thesis and H	Resec	urch Articles",			
2	Marilyr & the B	n Deegan, " <i>Acader</i> British Library, 201	nic Book of the 7	Future Project	Report", A Rep	ort t	o the AHRC			
			Dŕ							
			Ketere	nces	TT 1 1		21.22			

1	https://www.youtube.com/watch?v=0oSDa2kf5I8 (report writing)							
2								
Useful Links								
1	https://pats.cs.cf.ac.uk/wiki/lib/exe/fetch.php?media=project-report.pdf							
2	http://users.iems.northwestern.edu/~hazen/Writing%20Project%20Reports%202004a.pdf							
3	https://www.upgrad.com/blog/java-project-ideas-topics-for-beginners/							
4	https://www.geeksforgeeks.org/computer-science-projects/							

CO-PO Mapping														
		Programme Outcomes (PO) PSO											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
C01		1	2		2							3		
CO2										2			2	
CO3							3				2			1
The strengt	h of m	annin	a is to	be w	ritten	2012	3. W	here	1.I ou	7. 2.M	edium	2.H	igh	

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.

Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.									
Assessment	Assessment Based on Conducted Typical Schedule (for 26-week								
		by	Sem)						
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30					
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30					
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40					

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level (Marks) (For lab Courses)											
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total							
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed							
Understand											
Apply	15	10	10	35							
Analyze	5	10	5	20							
Evaluate	5	5	10	20							
Create	5	5	15	25							
Total Marks	30	30	40	100							

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
	AY 2021-22										
			Cour	se Information							
Progra	amm	e	B.Tech. (Informati	ion Techology)							
Class,	Sem	ester	Final Year B. Tech	n., Sem VII							
Course Code											
Course Name Open Elective -3: Data Visualization and Interpretation											
Desire											
Т	Teaching Scheme (Marks)										
	Teaching Scheme Examination Scheme (Marks) acture 3 Hrs/wook T1 T2 ESE										
Tutor	iel	-	20	20	60	100					
Practi	ral		20	20	00	100					
Intera	ction	1 -		Cred	its: 3						
		-	I								
			Cou	rse Objectives							
1	То	visualize the data	into scientific form	for interpretation ar	nd processing						
2	То	demonstrate data	analysis using vario	ous libraries and tech	iniques						
3	То	compare a well-s	tructured typeset ar	ticles, books, reports	3						
		Cou	rse Outcomes (CO) with Bloom's Tax	onomy Level						
At the	end	of the course, the	students will be abl	e to,							
CO1	Ap	ply the key techn	iques to visualize da	ita models		Apply					
CO2	An	alyze dataset and	use appropriate visu	alization techniques		Analyze					
<u>CO3</u>	Cre	eate articles, repor	rts using Open sourc	e tool (LATEX)		Create					
	-										
Modu	ile	.	Mod	ule Contents		Hours					
		Introduction to	Data Science -	nno o o o Tinta du ot	ion to Data Saia						
I		technologies Int	reduction to Machin	process, introduct	ions Classification	5					
		Clustering Reco	mmendation System	ie Learning, Regress	ions, Classification,						
		Working with D	Data in R –								
П		Variables, Vecto	ors, Matrices, lists &	Data frames, Logic	al vectored operator	s 8					
		Image data type,	Image representatio	n, categorical data u	sing Factors in R						
		Data/Image Vis	ualization using lib	raries –							
ш		Using graphs to v	visualize data, Basic	plotting in R, Mani	pulating the plotting	6					
		window, Advanc	ed plotting using lat	tice library in R. Ima	age visualization in	0					
		using Image proc	cessing tools								
		Models in Mach	ine Learning –	(- 1-1- TT							
		Regression Mode	els, Classification M	lodels, Unsupervised	Learning Models,						
11		Logistic regress	in Models. Models	on regression: alm	C Survival analy	(-)					
		Surv() coxph() -	- Linear mixed mod	JII. $g_{\text{IIII}}()$ – POISSON regression: $g_{\text{IIII}}()$ – Survival analysis: Linear mixed models: lme()							
		Data Reporting	using LaTeX –								
v		LATEX Softwa	re installation. L	ATEX typesetting	basics, LATEX m	ath 6					
		typesetting, Tabl	es and matrices, Ma	thematics in Latex	,						
		Case Studies –									
VI		Titanic Survival	analysis, face det	ection, Housing pri	ce prediction analy	sis,					
		Customer segme	ntation analysis, Iris	data analysis		0					
1	P	Malo		ext Books	XX7 / A	M 2012					
	Dr.	Mark Gardner, E	seginning Ristatistic	ai Programming Lar	iguages, Wrox (Ama	zon),Mar2013					
2	Gri	iiitnas, Higham,	Learning LATEX,	Amazon,2014							
				Defenences							
	Ree	aio Data Analysia	Tutorial by Jacob	Vhitehill Department	at of Computer Saia						
1	Das Un	iversity of the Wa	stern Cape $\frac{24}{077}$	minienin, Departmento (2009 [I]WCData Ana	nt of Computer Scier						
2		TFL Edy Course	$\frac{1}{1} \frac{1}{1} \frac{1}$)	195151 ut011a1.pu1]						
<u> </u>	1 1 11	LL, Lux, Cours		1							

	Useful Links							
1	Module I							
	https://www.coursera.org/learn/what-is-datascience?specialization=introduction-data-							
	science#syllabus							
	Module II, III, IV and VI							
2	https://onlinecourses.nptel.ac.in/noc21_cs23/preview							
	https://www.coursera.org/learn/r-programming/home/welcome							
2	Module V							
3	https://www.overleaf.com/learn/latex/Free_online_introduction_to_LaTeX_(part_1)							

	CO-PO Mapping													
	Programme Outcomes (PO) PSO											0		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				2							2		1	
CO2		1												1
CO3											3	3		
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High														
Each CO	of the	course	must r	nap to	at leas	t one P	0.							

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed							
Understand	5	5	10	20							
Apply	10	5	15	30							
Analyze	5	5	15	25							
Evaluate		5	15	20							
Create			5	5							
Total	20	20	60	100							

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
			A	Y 2021-22	<i>((((</i>)))							
	Course Information											
Progr	amme		B.Tech. (Informati	ion Technology)								
Class.												
Cours	Course Code											
Cours	e Nam	e	Professional Electi	ive 3. Software Defir	ned Network							
Desire	d Rea	uisites•	Computer Networ	Computer Networks, Cloud Computing								
Desire	uncq		computer retwork	ks, cloud computing	>							
Te	achin	Scheme		Examination Scheme (Marks)								
Lectu	re	3 Hrs/week	T1	T2	ESE	Total						
Tutor	iol		20	20	60	100						
Procti	col		20	20	00	100						
Intoro	ation	-		Cradi	ta. 2							
mera		-		Creal	113. J							
			Com	rea Objectives								
1	To al	aborata fundam	Cou Cou	software defined not	work							
		aporate rundam	Defined Network	soliware defined net								
		traduce the net	Defined Network of	through virtualization	e and onen flow							
- 3	10 m		work administration									
At the	end of	the course the	students will be abl) WITH BIOOM'S TAX le to	onomy Level							
CO1	Inter	oret the abstrac	tion of control plan	e in software defined	network	Understand						
	Analyze the implications of traditional network architectures to software defined Analyze											
CO2 network												
CO3	CO3 Develop a network function for data centre applications Create											
Modu	ıle		Modu	le Contents		Hours						
	B	asic Networki	ng Device and SDN	1								
т	B	asic Packet Sw	itching Terminology	tching Terminology, Historical Background, The Modern								
1	D	ata Center, Tra	ditional Switch Arc	7								
		orwarding Tabl	es in SDN									
		ntroduction to	SDN	and a Cost Indus	han Data Cantua							
II	S. In	DN Implication	S: Research and Inn	lovation, Cost, Indust	Try, Data Centre	6						
		irtualization. N	etwork Virtualizatio	on. Network Function	virtualization							
	0	pen Flow Prot	tocol and SDN									
1 11	0	penFlow: Flow	Table structure, Flo	owtable Actions, Flor	w messages, Legacy	7						
	M	lechanisms Evo	olve Toward SDN, S	SDN Applications, A	lternate SDN	7						
	<u> </u>	lethods.										
		DN in Data Ce	entre	- Domondo Turnoli	na Tashualasiaa faa							
W	D th	ala Centre Del	Path Technologies	in the Data Centre	Ethernet Fabrics in	7						
1 .	th	e Data Centre,	SDN Use Cases	in the Data Centre,	Open SDN versus	7						
	0	Overlays in the Data Centre, Real-World Data Centre Implementations										
	A	pplication of S	SDN									
	C	onsistent Poli	cy Configuration,	Global Network	View, Wide Area							
	Networks, Service Provider and Carrier Networks, Campus Networks,											
		ospitality Netw	vorks, Mobile Netwo	orks, In-Line Networ	k Functions, Optical	~						
		etworks, SDN	vs. P2P/Overlay Ne	tworks.								
VI		eiwork runcu xisting Netwo	ork Virtualization	Framework (VM	Ware and others)							
		irtualization an	d Data Plane I/O. S	ervices Engineered P	ath	6						
			,	U								

	Text Books							
1	Chuk Black, Timothy Culver "Software Defined Networks: A Comprehensive Approach", 2nd							
Edition, Wiley publication, 2016.								
2 Thomas Erl, Zaigham Mahmood and Ricardo Puttini," Cloud Computing: Concepts								
² & Architecture ", Pearson, 1st Edition, 2010								
	References							
1	Thomas D. Nadeau, "Software Defined Networks, An Authoritative Review of Network							
1	Programmability Technologies", Ken Gray Publisher, August 2013, ISBN: 978-1-4493-4230-2.							
	Useful Links							
1	https://www.katacoda.com/courses/kubernetes							
2	https://aws.amazon.com/							

	CO-PO Mapping													
	Programme Outcomes (PO) PSO												50	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1		2										2	
CO2			3											
CO3	2													3

Assessment Plan based on Bloom's Taxonomy Level											
Bloom's Taxonomy Level	T1	Τ2	ESE	Total							
Remember	Not Allowed	Not Allowed	Not Allowed	Not							
Understand	5	5	10	20							
Apply	10	5	15	30							
Analyze	5	5	15	25							
Evaluate		5	15	20							
Create			5	5							
Total	20	20	60	100							

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
AY 2021-22								
	Course Information							
Programme	B.Tech. (Information Technology)							
Class, Semester	Final Year B. Tech., Sem VIII							
Course Code								
Course Name	Professional Elective 3 :Visual Computing							
Desired Requisites:	C programming							

Teachin	g Scheme	Examination Scheme (Marks)							
Lecture	3 Hrs /week	T1	T2	ESE	Total				
Tutorial	-	20	20	60	100				
Practical	-		· · · · · · · · · · · · · · · · · · ·		·				
Interaction	-	Credits: 3							

	Course Objectives								
1	To elaborate need of developing graphics application in visual computing								
2	To introduce the algorithmic development of graphics primitives like: line, circle, polygon etc.								
3	To represent and transform the media data for application development								
	Course Outcomes (CO) with Bloom's Taxonomy Level								

	Course Outcomes (CO) with Bloom's Taxonomy Level							
At the	At the end of the course, the students will be able to,							
CO1	Draw Geometric primitives using OpenGL	Analyze						
CO2	Implement basic transformations on objects using OpenGL.	Apply						
CO3	Implement clipping algorithm on lines using OpenGL.	Apply						

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Module	Module Contents	Hours
Ι	Graphics Primitives: Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside- outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers.	7
Π	2D transformation : Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing	6
III	2D Viewing viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen- sutherland, liang- bersky, NLN), polygon clipping	7
IV	3D concepts and object representation: 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces	7
V	3D transformation3D scaling, rotation and translation, composite transformation	6

VI	3D viewing: viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations	6							
	Text Books								
1	Edward Angel: Interactive Computer Graphics- A Top Down approach with Open Pearson Education, 2008	GL, 5th edition.							
2	2 Shallini Govil-Pai, Principles of computer Graphics, Springer								
	References								
1	M MRaiker, Computer Graphics using OpenGL, Filip learning/Elsevier								
2	Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version, Pearson Education,2011	3rd/ 4thEdition,							
	Useful Links								
1	https://www.cs.uregina.ca/Links/class-info/405/WWW/Lab1/								
2	http://people.csail.mit.edu/hasinoff/320/								
3	http://www.cs.toronto.edu/~kyros/courses/320/								

CO-PO Mapping															
		Programme Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2											2		2	
CO2	1			1	2								1		
CO3	3	2													
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															
Each CO	of the d	course	must r	nan to	at leas	t one P	Ю.								

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	T2	ESE	Total						
Remember	Not	Not Allowed	Not Allowed	Not						
	Allowed			Allowed						
Understand	5	5	10	20						
Apply	10	5	15	30						
Analyze	5	5	15	25						
Evaluate		5	15	20						
Create			5	5						
Total	20	20	60	100						

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
	AY 2021-22									
Course Information										
Progra	Programme B.Tech. (Information Technology)									
Class, Semester Final Year B. Tech., Sem VII										
Course Code										
Cours	e Nam	e	Professional Electiv	ve 3 · High Perform	ance Computing					
Desired Requisites: Parallel Computing										
Desire	u neq			2						
Те	eachin	g Scheme		Examination Sc	heme (Marks)					
Lectur	re	3 Hrs/week	T1	T2	ESE 1	otal				
Tutori	ial	-	20	20	60	100				
Practi	cal	-								
Intera	ction	-		Credi	ts: 3					
			Cour	se Objectives						
1	To in	troduce process	communication in p	barallel programs						
2	To el	aborate the effe	ct of process commu	inication on the perf	ormance of parallel program	ns				
3	To de	efine algorithms	in parallel processir	ng for a given proble	em					
A 1	1 0	Cou	rse Outcomes (CO)	with Bloom's Taxe	onomy Level					
At the	end of	the course, the	students will be able	to,	alam	Apply				
C01	Analy	vse the algorith	m to optimize the co	mmunication and co	mputation costs	Appiy Analyze				
CO2	Desig	on the appropria	te algorithm for engl	ineering problems		Create				
	20012	si ure appropria		B Proceeding		create				
Modu	le		Mod	ule Contents		Hours				
	B	asic communic	cation operations			_				
		ne to all, All	to All, All Reduc	ce, Prefix Sum, Sc	atter Gather, All to All	/				
		nalytical Mode	elling of Parallel Pro	norams						
II		ources of overh	ead, performance ma	atrix, Effect of granu	larity on performance	6				
TIT	A	nalytical Mode	elling of Parallel Pro	ograms		7				
111	S	calability, Minin	mum execution time,	, cost optimal execut	tion time	/				
IV	D	ense matrix alg	gorithms			7				
		latrix Vector, M	latrix-Matrix multipl	lications, Solving lin	ear equations					
V		orting sorting pe	twork Rubble sort			6				
		raph Algorith	ms							
VI	M	IST, SSSP, APS	SP			6				
			T	ext Books						
1	Anat Seco	h Grama, Ansul nd Edition, Pear	Gupta, George Kary rson Education ,2003	ypis, Vipin Kumar, " 3	Introduction to parallel co	mputing",				
2	Char Publi	les Severancer cations,2021	n , Kevin Dowd,	"High Performa	nce Computing", OpenS	tax CNX				
			D	eferences						
	Horrowitz Sahni Rajasekaran "Computer Algorithms" Computer Science W H Freeman and									
1	comp	any Press, New	York,1996	ič B "Introduction	n to Parallel Computing"	Springer				
2	Publi	cations, 2018	. . ., . ., коо	, D. Introduction		, spinger				

	Useful Links
1	https://onlinecourses.nptel.ac.in/noc20_me61/preview
2	https://www.geeksforgeeks.org/introduction-to-parallel-computing/
3	https://hpc.llnl.gov/training/tutorials/introduction-parallel-computing-tutorial

CO-PO Mapping														
	Programme Outcomes (PO)										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1					3							1		
CO2		1			2								1	
CO3	1	2												2
The stren	The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High													

Each CO of the course must map to at least one PO.

Assessment

Assessment Plan based on Bloom's Taxonomy Level										
Bloom's Taxonomy Level	T1	T2	ESE	Total						
Remember	Not	Not Allowed	Not Allowed	Not						
	Allowed			Allowed						
Understand	5	5	10	20						
Apply	10	5	15	30						
Analyze	5	5	15	25						
Evaluate		5	15	20						
Create			5	5						
Total	20	20	60	100						

		Wa	Ichand College	e of Engineerin	g, Sangli								
			(Government All	Y 2021-22	uie)								
			Cours	e Information									
Progr	amm	e	B.Tech. (Informat	ion Technology)									
Class.	Sem	ester	Final Year B. Tec	h., Sem VII									
Cours	se Co	de		,									
Cours	se Na	me	Professional Elect	ive 3 : System Prog	ramming								
Desire	ed Re	quisites:	Data Structures an	d Operating System	IS								
		-	÷										
l	each	ing Scheme		Examination S	cheme (Marks)								
Lectu	$\begin{array}{c c c c c c c c c c c c c c c c c c c $												
Tutor	ial	1 - 20 20 60											
Pract	ical	al -											
Intera	action	<u> </u>		Cred	its: 3								
			Cour	se Objectives									
1	Toi	ntroduce basic cor	cepts in systems pr	ogramming.	11 1								
2	Toe	elaborate the struct	ure and design of as	ssemblers, linkers ai	nd loaders.								
3	To	lefine the concept	s of high level prog	ramming languages	* 1								
A (1) -		Cour	se Outcomes (CO)	with Bloom's Tax	onomy Level								
At the		of the course, the s	tudents will be able	: t0,			A						
	CO1 To apply the execution process of high level programming A CO2 To apply the working of commiler A												
C02	CO2 To analyze the working of compiler A CO2 To compress various compiler A												
	100	compare various co	Simpliers, linkers and	d loaders			Analyze						
Mod	مات		Mod	lula Contents			Hours						
WIUU	uie	Overview of Sy	vstem Software	Introduction Softw	are Software Hier	rarchy	110015						
		Systems Program	ming. Machine St	ructure. Interfaces.	Address Space, Co	mputer							
		Languages. Tool	s. Life Cycle of a	Source Program. Le	evels of System Sof	ftware.	_						
		Overview of L	anguage Processor	s Programming L	anguages and Lar	nguage							
		Processors, Lang	guage Processing Ad	ctivities, Program E	xecution, Fundame	ntal of							
		Language Proces	sing, Symbol Table	S									
		Assemblers: Ele	ements of Assemb	oly Language Prog	ramming, Design	of the							
		Assembler, Ass	embler Design C	Criteria, Types of	Assemblers, Tw	o-Pass							
II		Assemblers, On	e-Pass Assemblers	s, Single pass As	sembler for Intel	x86,	6						
		Algorithm of	Single Pass Asse	mbler, Multi-Pass	Assemblers, Adv	vanced							
		Assembly Proces	s, Variants of Assei	mblers Design of tw	o pass assembler,								
		Wacro and Mac	cro Processors: Int	roduction, Macro D	eminition and Call,	Macro							
		Expansion, Neste	eu macro Calls, Ad	Assembler Eurotic	nues, Design UI a	iviacro							
III		Basic Tasks of a	Macro Processor	Assembler, Functio	acro Processors Fe	atures	7						
		Macro Processor	Design Options T	WO-Pass Macro Pro	acto ritocessors, re accessors One-Pass	Macro							
		Processors	Design options, 1			101uero							
		Linkers and Lo	aders: Introduction	. Relocation of Linl	king Concept. Desig	n of a							
		Linker, Self-Rel	ocating Programs,	Linking in MSD	OS, Linking of O	verlay							
	IV Structured Programs, Dynamic Linking, Loaders, Different Loading Schemes,												
10	Sequential and Direct Loaders, Compile-and-Go Loaders, General Loader												
		Schemes, Absolu	ute Loaders, Reloca	ating Loaders, Prac	tical Relocating Lo	oaders,							
		Linking Loaders,	Relocating Linking	g Loaders, Linkers v	/s Loaders								
	7	Scanning and I	Parsing: Programm	ning Language Gra	mmars, Classificat	ion of							
		Grammar, Ambig	guity in Grammatic	ammatic Specification, Scanning, Parsing, Top Dow									
v v		Parsing, Bottom	up Parsing, Lang	up Parsing, Language Processor Development Tools, LEX,									
'	YACC, Compilers : Causes of Large Semantic Gap, Binding and Binding					Times,	, Č						
		Data Structure us	sed in Compiling, S	cope Rules, Memor	y Allocation, Comp	olation							
		ot Expression, C	ompilation of Contr	ol Structure, Code (Optimization								

V	Interpreters & Debuggers: Benefits of Interpretation, Overview of Interpretation, The Java Language Environment, Java Virtual Machine, Types of Errors, Debugging Procedures, Classification of Debuggers, Dynamic/Interactive Debugger
	Text Books
1	D M Dhamdhere, System Programming, McGraw Hill Publication, second revised edition, 2009
2	Srimanta Pal, System Programming, Oxford University Press, 2011
3	R.K. Maurya & A. Godbole, <i>System Programming and Compiler Construction</i> , Dreamtech Press, 2014
	References
1	Leland L. Beck, <i>System Software – An Introduction to Systems Programming</i> , Pearson Education Asia,3 rd edition, 2000
2	Santanu Chattopadhyay, System Software, Prentice-Hall India, 2007
3	R K Maurya and Anand A Godbole System Programming and Compiler Construction (Includes Labs), Dreamtech Press, 2014
	Useful Links
1	www.cs.jhu.edu/~scott/pl/lectures/parsing.html
2	www.en.wikipedia.org/wiki/System_programming
3	https://pptel.ac.in/courses/106/106/106106197/

	CO-PO Mapping													
		Programme Outcomes (PO) PSO												
	1	1 2 3 4 5 6 7 8 9 10 11 12 1 2												
CO1	CO1 3 1													
CO2		1			2								1	
CO3	CO3 1 2 2 2													
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High														
Each CO	Each CO of the course must map to at least one PO.													

AssessmentThe assessment is based on 2 in-semester evaluations (ISE) of 10 marks each, 1 mid-sem examination(MSE) of 30 marks and 1 end-sem examination (ESE) of 50 marks.MSE is based on the modules taught till MSE (typically Module 1-3) and ESE is based on all moduleswith 30-40% weightage on modules before MSE and 60-70% weightage on modules after MSE.

Assessme	Assessment Plan based on Bloom's Taxonomy Level													
Bloom's Taxonomy Level T1 T2 ESE														
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed										
Understand	5	5	10	20										
Apply	10	5	15	30										
Analyze	5	5	15	25										
Evaluate		5	15	20										
Create			5	5										
Total	20	20	60	100										

B. Tech SEM-II

			Walchand Coll	ege of Engineering	g, Sangli								
	AY 2021-22												
			Cou	rse Information									
Progr	Programme B.Tech. (Information Techology)												
Class,	Semes	ster	Final Year B. Teo	ch., Sem VIII									
Cours	e Code	e											
Cours	e Nam	e	Techno-Socio Ac	tivity									
Desire	ed Req	uisites:											
	Teaching Scheme (Marks)												
T	eachin	g Scheme		Examination	Scheme (Marks)								
Lecture - LA1 LA2 ESE Total													
Tutorial - 30 30 40 100													
Practical 2													
Interaction - Credits: 1													
Course Objectives													
1To propose a structured and rational solution to address the relevant skills2To motivate students towards the desirous need of industry economy and society													
 2 To motivate students towards the desirous need of industry, economy and society 3 To provide opportunity to integrate IT based solutions with various enterprises 													
Course Outcomes (CO) with Bloom's Taxonomy Level													
At the end of the course, the students will be able to,													
CO1	CO1Employ the programme for welfare of society and environmentApply												
CO2	Appr	aise pragmatic	skills for national a	ind international con	npetitions	Analyze							
<u> </u>	Reco	mmend and pro	pose engineering s	olution for industry	and community	Evaluate							
			List of Exne	riments / Lah Acti	vities								
Assess	sment i	is based on the	rubric decided by	v department	vines								
	Stude	ent can undertal	ke any techno-socio	o activity as listed b	elow but not limited	to:							
	1. E	Each student or	group of student	s may work for th	e welfare of the er	nvironment, society							
	2 E	hrough program	mes such as tree p	lantation, blood dor	ation campaigns etc). tion/exhibition							
	2. L 3. (Certification of	the MOOC courses	(beyond syllabus)	/ Programming com	petition/ interaction							
	v	vith industry			,	P•							
	4. I	Developing any	innovative gadget	/ solution / system a	and technology trans	fer in the interest of							
	Natio	on / Society / In	stitute (WCE)	(:		· · · · · · · · · · · · · · · · · · ·							
	5. F	ontributions	ers /articles in na	uonal / internation	nal conferences / j	journals or similar							
	6. 0	Coordinating stu	idents' clubs / servi	ices like SAIT/WLU	JG/Lab administrati	on or any other							
	7. 0	Organizing tech	no-socio activity f	for the students / c	community in rural	areas, unprivileged							
	a	reas											
1	Text Books												
References													
1													
	1		τ	Useful Links									
1	1												
				DO Manata									
			CO	-PO Mapping									

					CO-I	PO Ma	pping							
	Programme Outcomes (PO)												PSO	
1	2	3	4	5	6	7	8	9	10	11	12	1	2	

CO1			1		3								2	
CO2									2		3			
CO3												2		
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High														
Each CO of the course must map to at least one PO.														

	Assessment												
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.													
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks									
т. а.1	Lab activities,	Lab Course	During Week 1 to Week 6	20									
LAI	attendance, journal	Faculty	Marks Submission at the end of Week 6	50									
1.4.2	Lab activities,	Lab Course	During Week 7 to Week 12	20									
LAZ	attendance, journal	Faculty	Marks Submission at the end of Week 12	50									
Lab ESE	Lab activities,	Lab Course	During Week 15 to Week 18	40									
Lab ESE	attendance, journal	Faculty	Marks Submission at the end of Week 18	40									
XXX 1 4 1 11	1 1 0												

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessme	Assessment Plan based on Bloom's Taxonomy Level												
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total									
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed									
Understand				05									
Apply	20	20	20	60									
Analyze	10	5	10	20									
Evaluate		5	5	10									
Create			5	5									
Total	30	30	40	100									

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute) AY 2021-22												
	AY 2021-22 Course Information												
D			Course Ir	iformation									
Program	me		B.Tech. (Infor	mation Technolo	gy)								
Class, Ser	mester		Final Year B.	Tech., Sem VIII									
Course C	ode												
Course N	ame		Project - 2										
Desired R	kequisit	es:	Project - I										
Те	aching	Scheme		Examination	Scheme (Marks								
Lecture	0	_	LA1	LA2	Lab ESE	Total							
Tutorial		_	30	30	40	100							
Practical		16 Hrs/Week											
Interaction - Credits: 08													
- Credits; Vo													
Course Objectives													
1	To iden	tify real life need	s and project re	quirements									
2	To elab	orate technical so	olutions through	latest design & d	levelopment tool	8							
3 To compare and analyze the IT platforms for efficient solutions													
A t the and	1 of the	Course Out	comes (CO) wit	th Bloom's Taxo	nomy Level								
CO1	I of the	te project at each	stage of the soft	0, ware developme	nt life cycle	Apply							
CO1 CO2	Recom	mend project at each	s that address re	eal-world challen	ges	Evaluate							
CO2	Develo	p software projec	ts with strategic	goals		Create							
I			U	<u> </u>		I							
		Li	st of Experime	nts / Lab Activit	ies								
List of Ex	xperime	ents:	in a snown of m	wimum 5 to 6 at	Idanta Ducioatia	to be comind							
h h	ased res	earch paper from	iournals		idents. Floject is	to be carried							
Ea	ach grou ollowing	up will carry out a	project by deve	eloping any appli	cation software b	based on the							
	1. A	pplication can be	based on any tr	ending new tech	nology.								
	2. A	application can be	extension to pr	evious projects.									
	3. R	esults of the proj	ect is to be teste	d and validated a	gainst standard d	ata set.							
	4. P	roject group shou	ld achieve all th	e proposed objec	tives of the prob	lem statement.							
	5. 1	he work should b	e completed in a	all aspects of desi	ign, implementat	ion and testing							
	6 P	roject reports sh	ould be prepar	ed and submitte	d in soft and h	ard form along							
	0. I W	vith the code and	other depender	ncy documents. P	referable use onl	ine code							
	re	epositories (githu	o/bitbucket)	•									
	7. P	roject will be eva	luated continuo	usly by the guide.	/panel as per asse	essment plan.							
8. Presentation and report should use standard templates provided by department.													
9. Preferably student should present/publish article.													
Pr	Project report (pre-defined template) should be prepared using Latex/Word and submitted												
al	ong wit	n son copy on CI	עעע (with co	ae, PP1, PDF, To	ext report docum	ent & reference							
m	aterial	or on an online r	nository										
m St	aterial) tudents :	or on an online re should maintain a	pository.	k containing wee	kly progress of t	he project.							
m St	aterial) tudents	should maintain a	project log boo Text	k containing wee	kly progress of t	he project.							
m St 1	aterial) tudents Rajenda Univers	or on an online reshould maintain a ra Kumbhar , " <i>He</i> sal Prakashan, 20	project log boo Text w to Write Proj 15	k containing wee Books fect Reports, Ph	kly progress of t	he project. search Articles",							

	References										
1	https://www.youtube.com/watch?v=0oSDa2kf5I8 (report writing)										
	Useful Links										
1	https://pats.cs.cf.ac.uk/wiki/lib/exe/fetch.php?media=project-report.pdf										
2	http://users.iems.northwestern.edu/~hazen/Writing%20Project%20Reports%202004a.pdf										
3	https://www.upgrad.com/blog/java-project-ideas-topics-for-beginners/										
4	https://www.geeksforgeeks.org/computer-science-projects/										

	CO-PO Mapping													
	Programme Outcomes (PO) PSO													
	1 2 3 4 5 6 7 8 9 10 11 12 1 2													
CO1		1	2		2							3		
CO2										2			2	
CO3	CO3 3 2 1													
The stree	The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High													

Each CO of the course must map to at least one PO.

		Asses	sment									
There are thre IMP: Lab ES	There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.											
Assessment	Based on	Conducted	Typical Schedule (for 26-week Sem)	Marks								
		by										
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30								
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30								
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40								

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based	l on Bloom's Tax	xonomy Level (M	arks) (For lab C	ourses)
Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember				
Understand				
Apply	15	10	10	35
Analyze	5	10	5	20
Evaluate	5	5	10	20
Create	5	5	15	25
Total Marks	30	30	40	100

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
		(Covernational)	AY 2021-22	(410)							
		Cou	irse Information								
Progra	mme	B.Tech. (Informa	ation Technology)								
Class	Semester	Final Year B Tec	ch Sem VIII								
Course	e Code										
Course	e Name	Professional Elec	ctive 4 ·Wireless Netw	vorks							
Desire	d Requisites.	Computer Netwo	orks	UIK5							
Desire	u Kequisites.	Computer Pretwo									
Te	aching Scheme		Examination Scheme (Marks)								
Lectur	e 3 Hrs/wee	k T1	T1 T2 ESE								
Tutori	al -	20	20	60	100						
Practic	cal -										
Interac	ction -		Cred	its: 3							
	I										
		Co	ourse Objective								
1	To introduce win	reless network standar	ds, technologies, and o	operations							
2	To elaborate the	concepts of wireless	network	1							
3	To compare phy	sical layer protocols ir	n wireless network								
		Course Outcomes (C	O) with Bloom's Tax	onomy Level							
At the	end of the course,	, the students will be a	ble to,								
CO1	Understand basi	cs of wireless network	systems	, 1	Understand						
CO2	Compare the trai	nsmission of voice and	d data through various	networks	Analyze						
	Distinguisii illuit	upani propaganon and	auvanceu wireless ne	IWOIKS	Allalyze						
Modu	le	Mo	dule Contents		Hours						
Modu	le WLAN Intr	Mo oduction and Basics	dule Contents		Hours						
Modul	le WLAN Intr 802.11 proto	Mo oduction and Basics col stack basics, RF sp	dule Contents	unlicensed band usag	Hours						
Modul	le WLAN Intr 802.11 proto Types of net	Mo oduction and Basics col stack basics, RF sj works and their usage	dule Contents pectrum of operations, , Role of Wi-Fi alliand	unlicensed band usag ce. Exercises: Survey o	Hours P, 7						
Modul	le WLAN Intr 802.11 proto Types of net WLAN prod	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances.	unlicensed band usag ce. Exercises: Survey o	Hours e, 7 of 7						
Modul I	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L	Mo oduction and Basics col stack basics, RF sp works and their usage ucts in consumer appli ayer services	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances.	unlicensed band usag ce. Exercises: Survey o	Hours P., 7 f						
Modul I II	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP Mu	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. vitches, ARP, Data link	unlicensed band usag ce. Exercises: Survey of control: HDLC	Hours P, 7 of 7						
Modul I II	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN	Mo oduction and Basics col stack basics, RF sp works and their usage ucts in consumer appli ayer services Circuit and Packet sw altiple access protoco	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. vitches, ARP, Data link ols, Wireless LAN, o	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an	Hours P. 7 d 6						
Modul I II	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N.	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, o	unlicensed band usag ce. Exercises: Survey o control: HDLC Comparison wired an	Hours P, 7 d 6						
Modul I II	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. vitches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of 2	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium	Hours Provide The second secon						
Modul I II III	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a	Mo oduction and Basics col stack basics, RF sp works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, Ma	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of I AC Frame Aggregatio	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN	Hours P. 7 f 7 d 6 n 7						
Modul I II III	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, Ma proughput calculation.	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of I AC Frame Aggregatio	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN	Hours P, 7 of 7 d 6 n, 7 T, 7 T						
Modul I II III	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La	Mo oduction and Basics col stack basics, RF sp works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, Ma roughput calculation. yer	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. vitches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of I AC Frame Aggregation	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN	Hours						
Modul I II III IV	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. principles used for WL and hidden nodes, Ma roughput calculation. yer try Process in WLAN and performance of W	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of 1 AC Frame Aggregation N, Security Evolution	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept	Hours Property of the second secon						
Modul I II III IV	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network En Throughput a	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, Ma aroughput calculation. yer try Process in WLAN and performance of W	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. vitches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of I AC Frame Aggregation N, Security Evolution LAN, Network trackin	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations.	Hours e, of 7 d 6 n, J, S, 7 7						
Modul I II III IV	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a Sniffing WI	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw altiple access protoco N. orinciples used for WL and hidden nodes, Ma roughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, o AN MAC, Details of I AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations.	Hours Property 7 Property 7 Property 6 Property 7						
Modul I II III IV V	Ie WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI capabilities of Item State	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. Orinciples used for WL and hidden nodes, MA proughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, O AN MAC, Details of I AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open analysing network ent	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debuggin	Hours P, 7 f 7 f 6 7 f 8, 7 g g g 6 6						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a Sniffing WI capabilities of connection p	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, Ma roughput calculation. yer try Process in WLAN and performance of W a transmission LAN Frames and an of APs and clients, A problems, Analysing D	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, of AN MAC, Details of I AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open malysing network ent Data transmission and	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debugging	Hours e_{r} 7 f 7 d 6 n_{t} 7 s_{s} 7 g_{e} 6						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a Sniffing WI capabilities of connection p issues, Analy	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, MA roughput calculation. yer try Process in WLAN and performance of W a transmission LAN Frames and an of APs and clients, A problems, Analysing D ysis of Roaming perfor	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, of AN MAC, Details of 1 AC Frame Aggregation IAN, Network trackin nalysis using open analysing network ent Data transmission and rmance.	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debuggin debugging performance	Hours Prime 7 of 7 d 6 n 7 ss, 7 g 6 e 6						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI capabilities of connection p issues, Analy 4G AND Be	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. Orinciples used for WL and hidden nodes, MA aroughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A problems, Analysing D visis of Roaming perfor yond	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. Pitches, ARP, Data link ols, Wireless LAN, O AN MAC, Details of E AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open malysing network ent Data transmission and rmance.	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debugging debugging performance	Hours Provide Ho						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI connection p issues, Analy 4G AND Bey Introduction	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw altiple access protoco N. orinciples used for WL and hidden nodes, Ma roughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A problems, Analysing D ysis of Roaming perfor yond – 4G vision – 4G featu	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, O AN MAC, Details of 1 AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open analysing network ent Data transmission and rmance.	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debugging debugging performance Applications of 4G – 4	Hours e, f 7 d 6 n, f 7 s, f 7 $g e e$ 6 $G e e$ 6						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI capabilities of connection p issues, Analy 4G AND Be Introduction Technologies Architecture Architecture	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. Orinciples used for WL and hidden nodes, MA proughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A problems, Analysing D ysis of Roaming perfor yond – 4G vision – 4G featu s: Multicarrier Mod , LTE, Advanced F	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. An MAC, Data link ols, Wireless LAN, O AN MAC, Details of I AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open analysing network ent Data transmission and trance. ures and challenges - A lulation, Smart ante Broadband Wireless	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debugging debugging performance Applications of 4G – 4 enna techniques, IM Access and Service	Hours Prime 7 Prime 7 Prime 6 Prime 7 Prim 7						
Modul I II III IV V	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI capabilities of connection p issues, Analy 4G AND Be Introduction Technologies Architecture, MVNO.	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw altiple access protoco N. orinciples used for WL and hidden nodes, Ma roughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A problems, Analysing D ysis of Roaming perfor yond – 4G vision – 4G featu s: Multicarrier Mod , LTE, Advanced F	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. Pitches, ARP, Data link ols, Wireless LAN, O AN MAC, Details of E AC Frame Aggregation AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open nalysing network ent Data transmission and rmance. ures and challenges - A hulation, Smart ante Broadband Wireless	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debuggin debugging performance Applications of 4G – 4 enna techniques, IM Access and Service	Hours Prime 7 Prime 7 Prime 6 Prime 7 Prime 7 Prime 7 Prime 7 Prime 7 Prime 6						
Modul I II III IV V VI	le WLAN Intr 802.11 proto Types of net WLAN prod Data Link L Overview of & PPP, Mu wireless LAN MAC Layer CSMA/CA p reservation a Roaming, Th Network La Network Em Throughput a WLAN data Sniffing WI capabilities of connection p issues, Analy 4G AND Be Introduction Technologies Architecture, MVNO.	Mo oduction and Basics col stack basics, RF sj works and their usage ucts in consumer appli ayer services Circuit and Packet sw iltiple access protoco N. orinciples used for WL and hidden nodes, MA roughput calculation. yer try Process in WLAN and performance of W transmission LAN Frames and an of APs and clients, A problems, Analysing D ysis of Roaming perfor yond – 4G vision – 4G featu s: Multicarrier Mod , LTE, Advanced H	dule Contents pectrum of operations, , Role of Wi-Fi alliand iances. ritches, ARP, Data link ols, Wireless LAN, O AN MAC, Details of 1 AC Frame Aggregation AC Frame Aggregation N, Security Evolution LAN, Network trackin nalysis using open analysing network ent Data transmission and rmance. ures and challenges - A fulation, Smart ante Broadband Wireless	unlicensed band usag ce. Exercises: Survey of control: HDLC Comparison wired an MAC protocol, Medium on and QoS in WLAN , Power save concept ng operations. source tools, Inferrin ry steps and debugging debugging performance Applications of 4G – 4 enna techniques, IM Access and Service	Hours Provide Ho						

Text Books

1	Eldad Perahia and Robert Stacey,"Next Generation wireless LANS 802.11n and 802.11ac", 2nd										
1	edition, Cambridge University Press, 2013										
2	Mathew Gast, 802.11 'Wireless Networks: The Definitive Guide', 2nd Edition, OReily, 2009										
	References										
1	Mathew Gast, "802.11n: A Survival Guide: Wi-Fi Above 100 Mbps", OReilly, 2012										
2	Mathew Gast, "802.11ac: A Survival Guide: Wi-Fi at Gigabit and Beyond", OReilly, 2012										
	Useful Links										
1	https://onlinecourses.nptel.ac.in/noc19_ee48/preview										
2	https://onlinecourses.swayam2.ac.in/ugc19_cs10/preview										

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1		2											1		
CO2					3										
CO3		1												2	

Assessme	Assessment Plan based on Bloom's Taxonomy Level												
Bloom's Taxonomy Level	T1	T2	ESE	Total									
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed									
Understand	5	5	10	20									
Apply	10	5	15	30									
Analyze	5	5	15	25									
Evaluate		5	15	20									
Create			5	5									
Total	20	20	60	100									

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
			A	Y 2021-22							
			Cour	se Information							
Progra	amme		B.Tech. (Informati	on Technology)							
Class,	Semes	ster	Final Year B. Tech	n., Sem VIII							
Course	e Code	e									
Course	e Nam	e	Professional Electi	ve 4: Advanced Data	a Structures						
Desire	d Req	uisites:	Computer Program	ming, Data Structur	es.						
Ta		- Cabarra		Enomination C	hama (Manlaa)						
Loctur	acning	2 Urg/wool		Total							
Tutori	<u>ะ</u> งไ	5 HIS/WEEK	20	10tai							
Practic	ai rol		20	20	00	100					
Interac	ction			Credi	ts: 3						
liiteru											
			Cou	rse Objectives							
1	To in	troduce time c	omplexity issue & b	alanced search trees							
2	To in	npart advanced	knowledge of Grap	h and Heap data stru	ctures						
3	To co	ompare data str	uctures and algorith	ms in real application	18						
		Co	urse Outcomes (CO) with Bloom's Tax	onomy Level						
At the	end of	the course, the	e students will be abl	le to,							
CO1	Solve	e real world pro	oblems using advanc	ed data structures		Apply					
CO2	Com	pare different c	lata structures			Analyse					
CO3	Evalı	late time comp	lexity of different al	gorithms		Evaluate					
					·						
Modu	le		Module	Contents		Hours					
	D	ata Structure	and Time Complex	kity:							
	R	eview of Bas	ic Concepts: Abstra	<i>,</i>							
1		mall Oh, Omeg	ga and Theta notation	ns, Solving recurrent	e equations, Data	6					
		$ructures \propto ns$	sis	lexity, iterative vs.	Recursive couning,						
		dvance Tree S	Structures:								
п	B	inary Trees R	inary search trees. T	hreaded Binary trees	Height balanced	7					
11		VI trees Spla	x trees: Δ self- Δ divis	ating_Data Structure	, meight bulanced	/					
		ans.	y nees. A sen-Aujus								
		elaps.	h Trans og Haara	Amore Deced Hoor	un Unan Ondanad						
Ш		rees and Half	Ordered Trees Le	Allay-Daseu Hear	Heaps Binomial	7					
	H	eaps. Changin	g Keys in Heaps. F	ibonacci Heaps, Do	uble-Ended Heap	,					
	S	tructures and N	Iultidimensional He	aps							
	T	ree Data Stru	cture Applications:	•							
	N	Iultiway Trees	, Lexicographical Se	arch Trees: Tries, E	ternal Searching:	7					
1 V	B	& B+ Trees, F	Redblack trees, Tree	Structured Programs	: Look – Ahead in	/					
	G	ames.									
	H	ashing:									
v	B	asic Hash Tab	les and Collision Re	esolution, Universal	Families of Hash	-					
		unctions, Perf	ect Hash Functions	s, Hash Trees, Ext	endible Hashing,	6					
		lembership Tes	sters and Bloom Filt	ers.							
X7	S	elected Proble									
VI	G D	raph Problem	is – Network flow thods – Markow's in	ws: Max Ilow – equality Dynamic C	mincut theorem,	7					
	1	iouaumsuc me	ulous – Iviaikov s In	equancy, Dynamic C							
			r	Fext Books							

1	Robert 2007	obert Kruse, C L Tando, Bruce Leung, " <i>Data Structure and Program Design in C</i> ", Pearson, 2 nd , 007													
	References														
1	https://c	https://onlinecourses.swayam2.ac.in/cec21_cs02/													
Useful Links															
1	1 http://www.dave-reed.com/csc427.F04/														
2	http://w	ww.cs	e.unt.e	du/~ra	nda/CS	CE31	10/								
						CO	-PO N	Aappi	ng						
				P	Progra	mme	Outco	mes (I	PO)				P	SO	
	1 .	-	-	4	1	6		0							
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	<u> </u>	2	3	4	5	6	7	8	9	10	11	12	1 2	2	
CO1 CO2	1 1 2	2	3	4 2	5	6	7	8	9	10		12	1 2	2	
CO1 CO2 CO3	1 1 2	2	3	4 2 2 2	5	6	7	8	9	10			<u>1</u> 2	2	

Assessme	nt Plan based	on Bloom's Taxo	onomy Level	
Bloom's Taxonomy Level	T1	Τ2	ESE	Total
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Understand	5	5	10	20
Apply	10	5	15	30
Analyze	5	5	15	25
Evaluate		5	15	20
Create			5	5
Total	20	20	60	100

			Walchand Col	lege of Engineering	g, Sangli	
			(Government F	AV 2021_22	nstitute)	
			Cou	A 1 2021-22		
Drogr	ommo		B Tech (Informat	tion Technology)		
Class	Somo	tor	Final Vear B Tec	h Sem VIII		
Cours	e Code					
Cours	e Cour	<u> </u>	Professional Flect	tive 4 ·Soft Comput	inσ	
Desire	d Rea	uisites:	Artificial Intellige	ence Programming	I anguages and tool	like Matlah/Scilah
Desire	u neq	uisites.	7 in thirden interinge		Lunguuges und toor	
Te	eaching	Scheme		Examination	Scheme (Marks)	
Lectu	re	3hr/Week	T1	T2	Total	
Tutor	ial		20	20	60	100
Practi	cal			100		
Intera	ction			Cre	dits: 3	
			Co	urse Objectives		
1	To in	troduce variou	is component of sof	t computing		
2	To in	npart soft com	puting concepts to s	olve engineering an	d optimization prob	lems.
3	To el	aborate swarm	intelligence metho	ds 2	1 1	
	1	Co	urse Outcomes (C	O) with Bloom's T	axonomy Level	
At the	end of	the course, the	e students will be al	ole to,	<i>v</i>	
CO1	Class	ify hard and so	oft computing conc	epts		Apply
CO2	Com	pare the working	ng of swarm intellig	gence methods		Analyze
CO3	Justif	y the soft com	puting technique fo	r given problem		Evaluate
		2				
Modu	ıle		Modu	le Contents		Hours
	Ir	ntroduction				
Т	H	istory, Scope of	of Soft Computing,	components of Sof	t Computing- Neura	1 5
1	N	etworks, App	lication scope of A	ANN, Fuzzy Logic	, Genetic algorithm	, 3
	S	warm Intellige	nce, Hybrid System	n, Hard vs. Soft Con	nputing.	
	A	rtificial neura	al network (ANN)			
	Fi	undamental C	oncept, Evolution	of Neural networ	k, Basic models o	f
П	A	NN, importan	t terminologies of	ANN, Mc-Culloch	Pitts Neuron, Linea	r 7
	se	eparability, Al	ND,OR, EXOR p	roblem solving by	ANN, Supervise	
		earning, Unsu	ipervised Learning	, Application to A	ANN to real worl	1
	pi	oblem.				
	G	enetic algorit	nms (GA)	Commingle give in C	Constin amountain	
		Selection or	sic operators and I	tion and mutation	fitness function	8
III	- tr	aditional vs. G	Senetic algorithm s	imple genetic algorithm	ithm general geneti	. 7
	al	gorithm the	schema theore			
		ogramming A	Application to GA to	real world problen	n on one one	
	Ir	ntroduction to	classical set and f	uzzv sets		
	In	troduction, Cl	assical set (crisp se	t) Fuzzy sets and th	eir properties, Fuzz	
IV	m	odels, Membe	rship function, Def	uzzification. Applic	cation to Fuzzy logi	6
	to	real world pro	oblem.	11	2 6	
	S	warm intellige	ence (SI)			
	A	nt colony of	ptimization (ACO). Swarm as a	multi-agent system	,
	D	istributed cod	ordination and gr	oup communication	on, Particle Swarr	1
v	0	ptimization (P	PSO), Differential	Evolution (DE), Ha	armony search (HS)	, e
V	B	acteria Foragi	ng Optimization (H	BFO), Artificial Be	ee Colony algorithm	1 ð
	(A	ABC), Biogeo	graphy-Based Opt	imization (BBO),	Gravitational Searc	n
	A	lgorithm (GSA	A), Grenade Explos	sion Method (GEM) Teaching Learnin	g
	B	ased Optimiza	tion Algorithm (TL	BO).		

VI	Applications of soft computingHybrid System, Applications in image processing, optimization of TSPusing GA/ANN, GA based Internet search technique, soft computing basedhybrid fuzzy controller, Application of soft computing in multipledisciplines. Top research article in soft computing from high reputedjournals.	6
	Text Books	
1	Jyh-Shing Roger Jang, Chuen-Tsai Sun, and EijiMizutani "Neuro Fuzzy and S Computational Approach to Learning and Machine Intelligence", Prentice Hall,	Soft computing: A New Delhi, 1986.
2	Goldberg, David E, "Genetic Algorithms in Search, Optimization and Ma Addison Wesley, New Delhi, 1989.	chine Learning",
3	Sivanandam S N and Deepa S N, "Principles of Soft computing", Wiley India Ed	lition., 2008.
	References	
1	Timothy J. Ross, "Fuzzy Logic with Engineering Application", Tata McGraw 2004.	Hill, New Delhi,
2	Robert J Schalkff, "Artificial Neural Networks", McGraw Hill, New Delhi, 1997	•
3	Sivanandam S N and Deepa S N, "Introduction to Genetic algorithms", Heidelberg, 2008.	Springer Verlag,
	Useful Links	
1	https://onlinecourses.nptel.ac.in/noc20_cs17/preview	
2	http://www.soft-computing.de/linkC.html	

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2														
CO2		2		2											
CO3					3							1			
The stren	gth of a	mappir	ng is to	be wr	itten as	; 1,2,3;	Where	e, 1:Lo	w, 2:M	ledium	, 3:Hig	gh			
Each CO	of the	course	must 1	map to	at leas	t one P	Ю.								

Assessment Plan based on Bloom's Taxonomy Level									
Bloom's Taxonomy Level	T1	Τ2	ESE	Total					
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed					
Understand	5	5	10	20					
Apply	10	5	15	30					
Analyze	5	5	15	25					
Evaluate		5	15	20					
Create			5	5					
Total	20	20	60	100					

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
AY 2021-22											
Course Information											
Programme B.Tech. (Information Technology)											
Class, Semester Final Year B. Tech., Sem VIII											
Course Name Professional Elective 4: Deep Learning											
Course N	gorithma										
Desired	xequisi	les:	Computer Program	inning, Data Struc	tures, Computer Al	gonums					
Tes	Teaching Scheme Examination Scheme (Marks)										
Lecture		3 Hrs/week	T1	Total							
Tutorial		-	20	20	60	100					
Practical		_									
Interacti	on	-		Cred	lits: 3						
		1									
			Course	Objectives							
1	To int	roduce the para	adigm shift techniq	ue, deep learning i	nto students						
2	To ela	borate the deep	b learning methods	in real world appli	cations						
3	To exp	olain deep lear	ning concepts								
		Course	Outcomes (CO) v	vith Bloom's Taxo	nomy Level						
At the en	d of the	course, the stu	dents will be able t	0,							
<u>CO1</u>	Comp	are the deep le	Analyze								
<u>CO2</u>	Identii	ty the optimiza	tion techniques in o	leep learning		Analyze					
CO3	compu	iter vision.	rning techniques fo	or natural languag	e processing and	Арргу					
Modul	e		Module	Contents		Hours					
	F	undamentals									
		IcCulloch Pitts									
I		earning Algor	7								
		ower of MLP									
		eural Networks Back	ropagation algorit	h Power of Fee	aforward ineural						
		ntimizations i	in Gradient Desce	nt•							
	G	radient Descer									
II	G	D. Stochastic	6								
	A	dam.									
	R	egularization	:								
	R	egularization:									
Ш	st	opping, Data	7								
	Ir	jecting noise	,								
	W	rise Pre-train									
	111 D	intialization me	thods, Batch Norm	alization.	D •						
		icon voluos on									
IV	21	nd its interpr	7								
1.4		ectorial Repre	,								
	S	VD for learnin									
		onvolutional									
	C	onvolutional N									
V	G	oogLeNet, Re	6								
	G	uided Backp	0								
	<u> </u>	onvolutional N	leural Networks								
	R	ecurrent Neu	ral Networks:	.							
I VI	R	ecurrent Neur									
	Vanishing and Exploding Gradients, Truncated BPTT, GRU, LSTM.										

Text Books															
1	Aurelien Geron, "Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow:														
1	¹ Concepts, Tools and Techniques to Build Intelligent Systems", Second Edition, O'Reilly, 2019									,2019					
2	Eugene Charniak, "Introduction to Deep Learning", The MIT Press Cambridge, 1st Edition, 2019														
2019															
References															
Ian Goodfellow Voshua Bengio and Aoron Courville "Deen Learning" The MIT Press															
1	Con	nhrida	$\sim M_{\odot}$, IU.	nootta l	Londo	n En	aland	2017				anning	, Inc wi	11 11035
	Call	ποπαξ	ge, Ma	ssacin	isetts I	Londo	n, Eng	gianu,	2017						
Useful Links															
1 https://www.classcentral.com/course/swayam-deep-learning-iitropar-43579															
CO-PO Mapping															
					Pro	ogram	me O	utcon	nes (P	0)				PS	0
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
001		1		2										2	
COI		1		2										2	
CO2				3											
CO3		2													3
The strength of mapping is to be written as 1.2.3: Where, 1:Low, 2:Medium, 3:High															
Each CO of the course must map to at least one PO															
Luch cos of the course must map to at least one 10.															

Assessment Plan based on Bloom's Taxonomy Level								
Bloom's Taxonomy Level	T1	Τ2	ESE	Total				
Remember	Not Allowed	Not Allowed	Not Allowed	Not Allowed				
Understand	5	5	10	20				
Apply	10	5	15	30				
Analyze	5	5	15	25				
Evaluate		5	15	20				
Create			5	5				
Total	20	20	60	100				