# DEPARTMENT OF SOFTWARE ENGINEERING

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FACULTY OF COMPUTING SCIENCES AND ENGINEERING

# **CURRICULUM & SYLLABUS**

# FOR

# **B.Sc. Artificial Intelligence**

# (Based on Outcome Based Education)

Learning Outcomes based Curriculum Framework (LOCF)

# (I - VI Semester)

# **REGULATIONS – 2022 Revision 1**

# CURRICULUM for B. Sc (Artificial Intelligence) REGULATIONS – 2022

**REGULATIONS – 2022** (Applicable to the students admitted from the Academic year 2022 - 2023)

Ι	SEMESTER
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	Course	Course Name		(	Crec	lits		Hours					
Category	Code		L	Т	Р	SS	To tal	L	Т	Р	SS	To tal	
LAN	XGT101 /XFT101	Tamil – I / Foundation Tamil-I	2	1	0	0	3	2	1	0	0	3	
AECC-1	XGE102	English – I	2	1	0	0	3	2	1	0	0	3	
CC-1A	XAI103	Programming Methodologies	4	1	0	0	5	4	1	0	0	5	
CC-1B	XAI104	Algebra, Calculus & Analytical Geometry	4	1	0	0	5	4	1	0	0	5	
CC-1C	XAI105	Principles of Statistics	3	0	0	0	3	3	0	0	0	3	
CC-1A- Lab	XAI106	Programming Methodologies Lab	0	0	1	0	1	0	0	3	0	3	
CC-1C- Lab	XAI107	Principles of Statistics Lab	0	0	1	0	1	0	0	3	0	3	
UMAN-1	XUMA00 1	Human Ethics, Values, Rights, and Gender Equality	1	0	0	0	1	1	0	0	0	1	
Extension A	ctivites											2	
NSS,NCC,N	NSO,RRC and	d Swatch Bharath)											
Mentor Hou	ır											1	
Library Hou	ır											1	
Total			18	4	2	0	22	18	4	4	0	30	

# **II SEMESTER**

Category	Course	Course Nome		(	Crec	lits		Hours						
	Code	Course Name	L T		Р	SS	To tal	L	Т	Р	SS	To tal		
AECC 3	XGT201/	Tamil – II/	2	1 0 0 <b>3</b>		2	1	0	0	3				
	XFT201	Foundational Tamil - II												
AECC 4	XGE202	English – II	2	1	0	0	3	2	1	0	0	3		
CC-2A	XAI203	Data Structures	4	1	0	0	5	4	1	0	0	5		
CC-2B	XAI204	Discrete Mathematics	4	1	0	0	5	4	1	0	0	5		
CC-2C	XAI205	Python Programming	3	1	0	0	4	3	1	0	0	4		
CC2A-P	XAI206	Data Structures Lab	0	0	1	0	1	0	0	3	0	3		
CC2C-P	XAI207	Python Programming Lab	0	0	1	0	1	0	0	2	0	2		
UMAN-2	XUMA002	Environmental Studies	1	0	0	0	1	1	0	0	0	1		
Extension A	Activites	Swatch Bharath)									2	2		
Montor Ho												1		
	, ui											1		
Library Ho		T ( )						0		1				
		lotal	16	5	2	U	23	13	4	8	2	30		

# III SEMESTER

Category	Course	Course Name		0	red	its			Hours				
	Code		L	Τ	P	SS	Tot	L	Τ	P	SS	Tot	
AECC 5	XGT301/	Tamil – III/	2	1	0	0	3	2	1	0	0	3	
	XFT301	Foundational Tamil – III											
AECC 6	XGE302	English – III	2	1	0	0	3	2	1	0	0	3	
SEC-1B	XAI 303	Algorithms	2	0	0	0	2	2	0	0	1	2	
CC-3A	XAI 304	Foundations of Artificial Intelligence With R	3	1	0	0	4	3	1	0	0	4	
		Programming											
CC-3B	XAI 305	Database Management Systems	3	0	0	0	3	3	0	0	0	3	
CC-3C	XAI 306	Auxillary Physics	3	0	0	0	3	3	0	0	0	3	
CC-3A-P	XAI 307	Artificial Intelligence Lab	0	0	1	0	1	0	0	2	0	2	
CC-3B-P	XAI308	Database Management Systems Lab	0	0	1	0	1	0	0	2	0	2	
CC-3C-P	XAI309	Allied Physics Lab	0	0	1	0	1	0	0	2	0	2	
GE-1		*Open Elective - To be chosen by student	3	0	0	0	3	3	0	0	0	3	
UMAN 3	XUMA003	Disaster Management	1	0	0	0	1	1	0	0	1	1	
Minor Course	XAI 310	Micro Processor (* Extra Credit)	1	0	0	0	1*	1	0	0	0	1	
Extension .	Activities										1	0	
NSS,NCC,	NSO,RRC and	d Swatch Bharath)											
Mentor Ho	our											1	
Library Ho	ur											0	
	,	Total	18	1	3	0	25+ 1*	18	1	7	1	30	

# **IV SEMESTER**

Category	Course	<b>Course Name</b>	Credits									
	Code		L	Т	Р	SS	Tot al	L	Τ	Р	SS	To tal
AECC 7	XGT401/ XFT401	Tamil – IV/ Foundational Tamil – IV	2	1	0	0	3	2	1	0	0	3
AECC 8	XGE402	English – IV	2	1	0	0	3	2	1	0	0	3
SEC-2B	XAI 403	Operating System	3	0	0	0	3	3	0	0	0	3
CC - 4A	XAI 404	Internet of things	2	0	0	0	2	2	0	0	0	2
CC – 4B	XAI 405	Machine Learning With Real time Applications	3	1	0	0	4	3	1	0	0	4
CC - 4C	XAI 406	Computer Networks	3	0	0	0	3	3	0	0	0	3
CC -4A-P	XAI 407	Internet of things Lab	0	0	1	1	2	0	0	2	0	2
CC -4B-P	XAI 408	Machine Learning With Real time Applications Lab	0	0	1	1	2	0	0	2	0	2
GE-2		*Open Elective - To be chosen by student	3	0	0	0	3	3	0	0	0	3
UMAN4	XUMA004	Introduction to Entrepreneurship Development	1	0	0	0	1	1	0	0	1	2
Minor Course	XAI409	Prolog (* Extra Credit)	1*	0	0	0	1*	1	0	0	0	1
Extension A NSS,NCC,I	Activities	d Swatch Bharath)									2	0
Mentor Ho	our											1
Library Hou	ur										1	
		Total	16	2	2	0	26+ 1*	17	2	6	3	30

# **V SEMESTER**

Category	Course	Course Name		(	Cred	its		Hours					
	Code		L	Τ	Р	SS	Tota	L	Т	Р	SS	Tot	
							1					al	
SEC-3A	XAI 501A	.NET Technologies											
	XAI 501B	Programming in Java	3	0	0	0	3	3	0	0	0	3	
	XAI 501C	Open source software											
DSE-1A	XAI502A	Neural Networks											
	XAI502B	Pattern Recognition	2	1	Δ	0	4	2	1	Δ	0	4	
	XAI502C	Image Processing	3	1	U	0	4	3	1	0	0	4	
	XAI502D	Fuzzy logic											
DSE-1B	XAI503A	Natural Language											
		Processing	2	1	0	0	3	2	1	0	0	3	
	XAI503B	Computer Vision Open CV	mputer Vision Open CV <sup>2</sup>				5	2	1	U	U	5	
	XAI503C	Sentiment Analytics	timent Analytics										
DSE-1C	XAI504A	System Security											
	XAI504B	Network Security	3	1	0	1	5	3	1	0	1	5	
	XAI504C	Ethics of AI											
DSE-1A-P	XAI505A	Natural Language											
Lab		Processing Lab											
	XAI505B	Computer Vision Open CV Lab	0	0	2	0	2	0	0	4	0	4	
	XAI505C	Semantic Analytics Lab											
DSE -1B-P	XAI 506A	.NET Technologies Lab											
Lab	XAI 506B	Programming in Java Lab	0	0	1	0	1	0	0	2	0	2	
	XAI 506C	Open source software Lab											
GE-3		*Open Elective - To be	3	0	Ο	0	3	3	Δ	0	Δ	3	
		chosen by student	5	0	U	0	3	5	0	0	0	3	
UMAN5	XUMA005	Cyber Security	1	0	0	0	1	1	0	0	1	2	
Extension Ac	tivities										2	2	
NSS,NCC,NS	SO,RRC and S	Swatch Bharath)										-	
Mentor Hour													
Library Hour	XA1507	IDT 21 Dave		0	0	0		0	0	0	0	1	
	AAIJU/	III 21 Days	15	2	3	1	2 24	14	2	0 0	2	U 30	
		10(8)	13	3	5	1	24	14	5	0	2	30	

# **V1 SEMESTER**

Category	Course	Course Name			Cr	edits				Hou	rs	
	Code		L	Τ	P	SS	Total	L	Τ	Р	SS	Total
SEC-4A	XAI601A	Web Technologies										
	XAI601B	Mobile Application		1	0	0	2	2	1	0	0	2
		Development		1	0	0	3		1	0	0	3
	XAI601C	Game Programming for AI										
DSE-2A	XAI602A	Human Computer Interface										
	XAI602B	Web Mining &										
		Recommender Systems	3	1	0	0	4	3	1	0	0	4
	XAI602C	AI and Expert Systems										
	XAI602D	AI With Robotic										
DSE-2B	XAI603A	Data Analytics										
	XAI603B	Edge Computing	2	1	0	0	3	2	1	0	0	3
	XAI603C	Cloud Computing										
DSE-2A-P	XAI604A	Human Computer Interface										
Lab		Lab										
	XAI604B	Web Mining &										
		Recommender Systems Lab	0	0	1	0	1	0	0	2	0	2
	XAI604C	AI and Expert Systems										
		Lab	_									
	XAI604D	AI With Robotic Lab										
SEC-4A-P	XAI605A	Web Technologies Lab										
Lab	XAI605B	Mobile Application	0	0	1	0	1	0	0	2	0	2
		Development Lab	Ŭ	Ŭ	1	Ŭ	-	Ŭ	Ŭ	_	Ŭ	_
	XAI605C	Game Design with AI Lab										
DSE-2C	XAI606	Project Work	0	0	6	4	10	0	0	12	0	12
Extension A	ctivities										2	2
(NSS,NCC,	NSO,RRC ar	nd Swachh Bharath)									2	2
Mentor Hou	ır											1
Library Hou	r											1
Total			7	3	10	0	22	7	3	16	2	30

Semester	Credits	Hours
I Sem	24	30
II Sem	23	30
III Sem	25+1*	30
IV Sem	25+1*	30
V Sem	24	30
VI Sem	22	30
Total	143+2*	

Cour	se Code					L	Т	Р	С				
Cour	se Name		தமி	ю́-I	· · · · · · · · · · · · · · · · · · ·	3	0	0	3				
Prer	equisite					L	Т	Р	Н				
C	:P:A	3:0:0				3	0	0	3				
			COURSE OUTCOMES		DOM	IAIN		LEVE	L				
			After the completion of the	ne course, students will b	e able to								
C01	Recogni பெருமக் கொள்ள	<i>ize</i> (அஎ களின் ( ல்.	டையாளம் காணுதல்) பல் தொண்டுகளைத் தமிழ்மெ	ல்வேறு அறிஞர் மாழி மூலம் அறிந்து	Cognit	ive	Re	memł	er				
CO2	Choose கவிதை	(தெரிவு களை இ	செய்தல்) பன்முகப் பரி லக்கியங்கள் மூலம் அ	மாணங்களின் நிந்து கொள்ளல்.	Cognit	tive	Re	memt	ber				
CO3	<i>Describ</i> செய்திக	e (ഖിണം ഞെ ഉ	க்குதல்) தமிழ் மகளிரின் ணர்தல்.	உரையாடல் சிறப்புச்	Cognit	ive	Un	derst	and				
C04	CO4       Apply (விளக்குதல்) பல்வேறு கலைத்துறைச் சார்ந்த பிரிவுகள், மண்ணின் பாடல்கள் குறித்துத் தெளிவு பெறல்.       Cognitive       Apply         CO5       Analyze (புகத்தல்) திறுகதைகளின் தோற்றும் வளர்க்கி       Cognitive       Analyze												
CO5 <i>Analyze</i> (பகுத்தல்) சிறுகதைகளின் தோற்றம் மற்றும் வளர்ச்சி Cognitive Analyze நிலை நாடகங்கள் - கவிதை குறித்துத் தெளிவு பெறுதல்.													
அல கு-1	தமிழ் த	ஸ்றிஞர்களு	ரும் தமிழ்த்தொண்டும்				9						
பாரதி தெ.ெ தொட	யார், பார பா.மீனாட் ாகள், சிர	திதாசன் சி சுந்தர 3ப்புப் வெ	, நாமக்கல் கவிஞர், சி.չ ம், கவிமணி தேசியவிநா பயர்கள்.	இலக்குவனார், உ.வே.சா ாயகம் பிள்ளை தொடர்ப	மிநாத அய ான செய்த	ப்யர், 5ிகள்,	சிறர்	த்த					
କାରଜ	5-2	கவிதை	கள் (மரபுக்கவிதை, புது	க்கவிதை)	9	)							
மரபுக் பட்டுக் புதுக்க ஞான	கவிதை 6கோட்டை கவிதை : க்கூத்தன்,	: முடியர கல்யா ந.பிச்சர ஆலந்த	சன், வாணிதாசன், சுரது ண சுந்தரம், மருதகாசி ழர்த்தி, சி.சு.செல்லப்பா, நூர் மோகனநங்கன் தொ	ா, கண்ணதாசன், உடுமல தொடர்பான செய்திகள். மு.மேத்தா, ஈரோடு தமி ட செய்திகள்.	லை நாராய ழன்பன், அ	பண ச டிப்துல்	கவி, ) ரகு	மான்,					
କାରନ	5-3	உரைய	ாடல்கள், தமிழ மகளிரில	जे मेळिपेप		)	0						
ஜ.யு.( அம்சே அன்ன வேலு	லாப மற பத்கர், க ரி பெசண் நாச்சியார்	றும வரா மராசர், ாட் அம்எ , வள்ளி	மாமுனவான தமழபபண் மா.பொ.சிவஞானம், காய மையார், மூவாலூர் ராமாட யம்மை, ராணி மங்கம்ம	, யாயாா, அண்ணா, டூ பிதே மில்லத் சமுதாயத் மிர்தம்மாள், டாக்டர் முத் ாள் சிறப்பு.	pததுராமல தொண்டு. துலட்சுமி	ஙகத ரெட்டி	ംதவ ,	τ,					
ച്ചരക	5-4	நாட்டுப்ப	றுப்பாடல்		9	)							
தாலா	ட்டுப்பாட	ல், தொழ	றில் பாடல், ஒப்பாரிப் பா	டல்.		_							
എലക	5-5	இலக்கி	ப வரலாறு		9	)							
ഉ_ത്വ	நடை, சி	நுகதை, –	நாடகம், கவிதைகள்.										
	LECTUR	E	TUTORIAL	PRACTICAL		TO	FAL						
	45					4	5						

#### பாட நூல்கள்:

- முனைவர் கா.செல்வகுமார் (தொ.ஆ.), பொதுத்தமிழ், மார்ச் 2022, துரைகோ பதிப்பகம், அரும்பாக்கம், சென்னை – 106. 9884159972.
- 2. முனைவர் மு.அருணாசலம் (ப.ஆ.) தமிழ் இலக்கிய வரலாறு 2012, அருண் பதிப்பகம், தரைத்தளம், பாலாஜி நகர், ளுடீஐ காலனி, கண்டோன்மெண்ட், திருச்சி 1. 9894440530
- சு.சக்திவேல் நாட்டுப்புற இயல் ஆய்வு, மணிவாசகர் பதிப்பகம் 12, மேலசன்னதி வீதி, சிதம்பரம் - 1.
- முனைவர் கோ.பெரியண்ணன் அடிப்படை எளிய தமிழ் இலக்கணம் 2003 வனிதா பதிப்பகம், 11- நானா தெரு, பாண்டி பஜார், தி.நகர், சென்னை - 17.

Cours	e Code				L	Т	Ρ	С						
Course	Name	அடிப்படைத் தமிழ்- I			3	0	0 0 3							
Prere	quisite				L	Т	Р	Н						
C:I	P:A	3:0:0			3	0	0	3						
		COURSE OUTCO	OMES		DO	MAIN		LEVEL						
After t	he comp	pletion of the course, stud	lents will be able to											
<b>CO1</b>	உயிர்	எழுத்துக்கள் - மெய்யெயு பலக்கி கினைவட்டல்	<u> ஒத்து</u> கள்		Cogni	tivo	Re	member						
	വതായവ	പര്യമ്മം ഉത്തങ്ങള്ല്ലംഗ.			cogni	live		member						
	உடல்	உறுப்புப் பெயர்கள் - எஎ	ரிய சொற்களை											
CO2	தொகுத்	துக் கூறுதல்			Cogni	tive	Re	member						
соз	ବ୍ରୁର୍ଶା ଓଡ	வறுபாடுளைப் புரிந்து கொ	Cognitive Understan											
CO4	தமிழில்	் உரையாடல் - இயற்சை	ரையாடல் - இயற்கையை வருணித்தல். Cognitive											
CO5	அறநெ	நிக் கருத்துக்களை வகை	ப்படுத்தும் திறன் டெ	பறல்.	Cogni	nitive Understan nitive Apply nitive Analyze எழுதுதல் - பொரு								
அலகு	- 1	<del>ດ</del> (L	ழத்துக்களின் வகைச	5 नां				9						
உயிர் விளக்ச	எழுத்த 6ம் அறி	க்கள் - மெய்யெழுத்துக தல்	ள் - பிரித்து எழுத	நுதல் - சே	ர்த்து	எழுது	தல் -	பொருள்						
அலகு	- 2	எளிய தமிழ்	ச் சொற்களை வகை	கப்படுத்துதல <u>்</u>	1			9						
உடல்	உறுப்பு	ப் பெயர்கள் - எளிய தமி	ழ்ச் சொற்கள் வசை	<u> ப்படுத்துத</u> ல்	i.									
அலகு	- 3	ଡ଼	லி வேறுபாட்டுத் திற	ळा				9						
ඉබ	வறுபாடுக	கள் - சொல் வகைகள்												
அலகு	- 4		உரையாடல்					9						
தமிழில்	் உரை	பாடல் - இயற்கையைப் ப	பற்றி அறிதல் - வரு	ணனை செu	ப்தல்									
அலகு	- 5	அறநெறிக்	கருத்துக்களைப் பி	ன்பற்றுதல்			j.	9						
விழாக்	கள் - உ	அறநெறிக் கதைகள் - பின	ழயின்றிப் படித்தல்,	எழுதுதல்										
U	ECTURE	TUTORIAL	PRACTICAL		т	DTAL								
	45					45								

#### பாடநூல்கள்:

- முனைவர் கோ.பெரியண்ணன் அடிப்படை எளிய தமிழ் இலக்கணம் -2003, வனிதா பதிப்பகம், 11, நானா தெரு, பாண்டி பஜார், தி.நகர், சென்னை - 17.
- முனைவர் ந.லெனின் பிழையின்றித் தமிழை எழுதுக (எளியமுறை) சூன்-2020, பிருந்தா பதிப்பகம், தஞ்சாவூர் - 05.

#### பார்வை நூல்கள்:

1. தமிழ்நாடு அரசு வெளியிட்டுள்ள தமிழ்ப் பாட நூல்கள், வகுப்பு - 6, 7, 8.

COU	RSE C	CODE	XGE102	L	Т	Р	SS	H	С			
COU	RSE N	IAME	English - I	3	0	0	0	3	3			
C:P:A	A - 3:0:	:0							<u> </u>			
COU	RSE O	DUTCOMI	ES:	Do	omai	n	Ι	Level				
CO1	Reca	II the basic	grammar and using it in proper context	Co	gniti	ve	Reme	ember	ring			
CO2	Expl	ain the pro	cess of listening and speaking	Co	gnitiv	ve	Unde	rstand	ding			
CO3	Adap	<i>ot</i> importat	nt methods of reading	Co	gnitiv	ve	Cr	eating	g			
CO4	Dem	onstrate th	e basic writing skills	Co	gnitiv	ve	Unde	rstand	<u>-</u> Jing			
					-							
SYLL	ABUS	8						HOU	RS			
UNIT	ľ	Grammar	,									
i. Major basic grammatical categories ii. Notion of correctness and attitude to error												
correction												
UNIT II Listening and Speaking												
iii. Importance of listening skills iv. Problems of listening to unfamiliar dialects v.												
Aspects of pronunciation and fluency in speaking vi. Intelligibility in speaking												
UNIT III Basics of Reading												
vii. Introduction to reading skills viii. Introducing different types of texts – narrative,												
descri	ptive, o	extrapolati	ve									
UNIT	IV	Basics of V	Writing									
ix. Int	roduct	ion to writi	ng skills x. Aspects of cohesion and coherence xi	. Exp	andi	ng a		9				
given	senten	ce without	affecting the structure xii. Reorganizing jumbled	sente	ences	into	o a					
cohere	ent par	agraph xiii	. Drafting different types of letters (personal notes	s, not	ices,							
compl	laints, a	appreciatio	n, conveying sympathies etc.)									
				Ί	otal	Ho	urs	36	)			
Text l	books											
	1. Ac	evedo and	Gower M (1999) Reading and Writing Skills. Lo	ondon	, Lo	ngm	an					
	2. De	euter, M et.	al. (2015). Oxford Advanced Learner's Dictionar	y of ]	Engl	ish						
	(Nint	th Edition).	New Delhi, OUP									
3. Eastwood, John (2008). Oxford Practice Grammar. Oxford, OUP												
4. Hadefield, Chris and J Hadefield (2008). Reading Games. London, Longman												
	5. He	edge, T (20	05). Writing. Oxford, OUP									
	6. Jo	IIy, David (	(1984). Writing Tasks: Stuidents' Book. Cambridg	ge, C	UP							
	7. Kl	ippel and S	wan (1984). Keep Talking. Oxford, OUP	<b>1</b>								
	8. Sa	raswati, V	(2005). Organized Writing I. Hyderabad, Orient I	Black	swa	n						
	9. Sw	van, Micha	ei. (1980). Practical English Usage. Oxford, OUP	)								
10. Walter and Swan (1997). How English Works. Oxford, OUP												

	PO1	PO	PO	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO11	PO12	PSO1	PSO2
		2	3							0				
CO1	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO2	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO3	1	0	0	0	0	0	1	0	1	0	0	0	0	0
CO4	2	0	0	0	0	0	1	0	1	0	0	0	0	0
Total	7	0	0	0	0	0	6	0	4	0	0	0	0	0
Scaled	2	0	0	0	0	0	2	0	1	0	0	0	0	0
Value														
	1	0	0	0	0	0	1	0	1	0	0	0	0	0

# Table 1: Mapping of Cos with POs:

1-5=1, 6-10 = 2, 11-15= 3

0-No Relation, 1- Low Relation, 2 – Medium Relation, 3- High Relation

Table 2:	Mapping	g of COs	with	GAs:
----------	---------	----------	------	------

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	0	0	0	0	0	0	0	1	1	2	0	0
CO2	0	0	0	0	0	0	0	0	0	2	0	0
CO3	0	0	0	0	0	0	0	0	0	1	0	0
<b>CO4</b>	0	0	0	0	0	0	0	0	0	0	1	0
Total	0	0	0	0	0	0	0	1	1	5	2	0
Scale	0	0	0	0	0	0	0	1	1	1	1	0

1-5=1, 6-10 = 2, 11-15= 3

0-No Relation, 1- Low Relation, 2 - Medium Relation, 3- High Relation

# **Performance Indicators**

# PI 8: 1 High Ethical Standards

**1.1.1** Practice ethical codes and standards endorsed by professional engineers.

# PI 9: 1 Leadership and team work

**1.1.1** Perform as an individual and as a leader in diverse teams and in multi-disciplinary scenarios.

# PI 10: 1Communication Skills

**1.1.1** Professional communication with the society to comprehend and formulate reports, documentation, effective delivery of presentation and responsible to clear instructions.

# PI 11:1. Life-long learners:

**1.1.1** Update the technical needs in a challenging world in equipping themselves to maintain their competence

# XAI103-PROGRAMMING METHODOLOGIES

Sub	Code			L	Т	SS	C	
540	Couc	PROGRAMMING METHODO	AMMING METHODOLOGIES		5			
XA	I 103			L	Т	SS	H	
			_	4	1	0	5	
COURS	E OUTCO	MES	DOMAIN		L	EVEL		
CO1	Recognize	the importance of developing	Cognitive	]	Reme	nber		
	problem.	forithms and now charts to solve a	Psychomotor	: ]]	Perce	otion		
CO2	<i>Identify</i> t	he needs problem solving skills	Cognitive	1	Under	stand		
coupled with top down design principles. Psychomotor Percept								
CO3	Demonstra	ate the strategies of array	Cognitive		Apply	, 		
	processing	g algorithms coupled with iterative	Psychomotor	: 1	Percep	otion		
CO4	methous.		Cognitive		Apply	/e		
0.04	Illustrate	the concept of Structures	Psychomotor	•	Mecha	nism		
application development. Affective Res								
CO5	Develop a	nd Establish searching techniques	Cognitive		Create	2		
	and use o	f pointers. recursive techniques in	Psychomotor	. (	Origin	ation		
programming regeneration construction of the second						10	L 2	
UNIT I	tion to Dro	gramming Brogram Concent Char	G	240.01	*****	127 ing Ci	-3	
in Proc		lenment Algerithms Notations	Dociment Elo	rugi	annin Arta	Turnov	ages	
III FIOE Drogram	ming Mot	hadalagias Introduction to C++	Design, Fio	wcn ~	Bacic	Type:	5 01	
Structur	a In C++ V	Variables and Assignments Input and	1 Output Solo	5 -	Dasic n and	Ropot	ition	
Stateme	nte	anabies and Assignments, input and	a Output, Sele	cuoi	n and	Repet	mon	
UNIT I	I FUN	ICTIONS				12-	+3	
Top-Dov	wn Design.	Predefined Functions, Programmer	-defined Func	tion	n. Loca	l Vari	able.	
Function	n Overload	ing, Functions with Default Argum	ents. Call -By	-Val	lue an	d Cal	1-Bv-	
Reference	e Paramete	ers, Recursion.					5	
UNIT II	I ARF	RAYS				12-	F3	
Introdu	ction to Arr	ays, Declaration and Referring Array	ys, Arrays in I	Men	nory,	Initiali	izing	
Arrays.	Arrays in F	unctions, Multi-Dimensional Arrays.						
UNIT I	V STR	UCTURES				12-	+3	
Structur	es - Membe	r Accessing, Pointers to Structures, S	tructures and	Fun	ctions	, Arra	ys of	
Structures, Unions								
UNIT V		ES AND SEARCHING ALGORITH	MS	<u> </u>			+3	
Declarat	ion and Ini	tialization, Reading and Writing Str	ings, Arrays o	f Str	rings,	String	and	
Function	n, Strings ai	nd Structure, Standard String Library	y Functions. Se	earc	hing I	Algori	thms	
- Linear	Search, Bir	hary Search. Use of files for data inp	out and output	t. m	erging	g and	сору	
files.								

LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
60	15	0	0	75
TEXT BOOKS				
1. Problem Se	olving and Progran	n Design in C, J. R.	Hanly and E. B. Ko	offman, Pearson,
2015.				
2. Programm	ing and problem so	olving with C++: b	rief edition, N. Dale	e and C. Weems,
Jones & Ba	rtlett Learning, 201	0.		
REFERENCES				
1. Brian W. I	Kernighan and De	ennis M. Ritchie,	"The C Programm	ning Language",
Pearson Ed	ucation Inc. (2005).			
2. Aho A.V.	J.E. Hopcroft and	J.D. Ullman., 20	01. "The Design	and Analysis of
Computer A	Algorithms", Pears	on Education Delhi	i. Second Edition.	
<b>E-REFERENCES</b>				
1. http://www.	comptechdoc.org/1	pasic/basictut/inde	ex.html	
2. http://cse02-i	iith.vlabs.ac.in/			
3. http://textofv	video.nptel.iitm.ac.i	n/video.php?cour	seId=106104128	
4. <u>http://www.npte</u>	el.ac.in			

5. <u>http://www.vlab.co.in</u>

Table 1: Mapping of Cos with POs.

B Sc AI				PO				PSO	
D.St AI	1	2	3	4	5	6	7	1	2
CO1	2	2	2	2				2	1
CO2	1			2				2	
CO3	1		2	1					
CO4	2	1	2	3				2	1
CO5	2		1	3				2	
Total	8	3	7	11				8	2
Scaled Value	2	1	2	3				2	1

 $1 - 5 \rightarrow 1, \qquad 6 - 10 \rightarrow 2, \qquad 11 - 15 \rightarrow 3$ 

0-No relation 1-Low relation 2-Medium relation 3-Strong relation

					L	Т	SS	С	
	ALGEBRA, CA	LCULUS AND ANA	ALYTICA		4	1	0	5	
		GEONIETKY			L	Т	SS	Н	
4 0 0					4	1	0	5	
PREREQUISITES	Basics of Mathe	matics					1		
COURSE OUTCOME	ES			DOI	MA	IN	LEV	'EL	
CO1 Evaluate th	ne derivatives of	f given functions		Cog	niti	ve	Unc	lerstand	
CO2 Calculate t	the definite and hniques.	l indefinite integrals	s using	Cog	niti	ve	Uno Ren	lerstand, nember	
CO3 Apply bas	Und	lerstand,							
inverse of a	inverse of a matrix								
CO4 Solve prol	blems using H	Binomial, exponenti	al and	Cog	niti	ve	Unc	lerstand	
logarithmic	c series expansio	ons.		0					
CO5 Calculate	the distance	between two poin	ts and	Cog	niti	ve	Unc	lerstand	
explain sec	ction formulae,	slope form and in	tercept	_					
form.									
UNIT I – DIFFERENT	TAL CALCULU	JS						12+3	
Derivative of a function	on – Various fo	rmulae – Product ar	nd quotie	ent r	ule	of d	iffere	entiation –	
Differentiation of fun	nction of funct	ion (chain rule) – '	Trigonon	netri	c f	uncti	ons	– Inverse	
trigonometric function	ns – Exponen	tial function – Log	arithmic	fur	nctio	ons	– Lo	garithmic	
differentiation - Highe	er derivatives – S	Successive differentia	ation – Le	eibni	tz t	heor	em.		
UNIT II – INTEGRAL	L CALCULUS							12+3	
Constant of integration	n – Indefinite in	tegral – Elementary i	integral f	orm	ulae	e – M	letho	ds of	
integration – Integration fractions – Concept of	on by substitution definite integra	on - Integration by pa l – Properties of defin	arts – Inte nite integ	egra gral.	tior	h thro	ough	partial	
UNIT III - MATRICE	ES AND DETER	RMINANTS	t	,				12+3	
Definition and types of	of matrices – M	atrix Operation – De	etermina	nts –	- So	lutio	n of	system of	
linear equations by Ma	atrix method.						1		
UNIT IV – SERIES								12+3	
Binomial theorem for a	a rational index	- Exponential and L	ogarithm	nic se	eries	5 – Si	ımm	ation of	
the above series.							1		
UNIT V – TWO-DIMI	ENSIONAL AN	NALYTICAL GEOM	ETRY		<u>.</u>			12+3	
Cartesian coordinate	system – Intro	duction to polar co	ordinates	s – I	Dist	ance	e bet	ween two	
points – Section formu	llae – Area of tri	angle – Locus and it	s equatio	ons –	Stra	aight	t line		
	llel to an axis –	slope form –normal	form – I	ntero	cept	t fori	n thr	ough two	
of a straight line paral	ncurrency of the	ce lines.			т	-	тс		
point -condition of cor		SELF SIUDY	PKACI	ICA	L	_	10	JIAL	
point -condition of cor LECTURE T		15	^					5115	
of a straight line paral     point -condition of cor     LECTURE     60	15	15	0				75	5+15	
of a straight line paral       point -condition of cor       LECTURE       60       TEXT BOOKS	15	15	0		1		75	5+15	
of a straight line paral     point -condition of cor     LECTURE     1     60     TEXT BOOKS     1.     T. K. Manicavac	15 chagomPillay, T	15 . Natarajan, K. S. Ga	0 napathy,	Alg	ebra	a, Vo	7: olume	5+15 eI,	
of a straight line paral point -condition of cor         LECTURE       1         60       1         TEXT BOOKS       1. T. K. Manicavac S.Vishvanathan	15 chagomPillay, T	15 <sup>7</sup> . Natarajan, K. S. Ga 1blishers Pvt., Ltd, C	0 napathy, hennai 2	Alge 004.	ebra	a, Vc	75 Jume	5+15 eI,	
of a straight line paral       point -condition of cor       LECTURE       60       TEXT BOOKS       1. T. K. Manicavac       S.Vishvanathan       2. S.Naravanan,	15 chagomPillay, T Printers and Pu T.K.Manicavach	15 . Natarajan, K. S. Ga ublishers Pvt., Ltd, C nagamPillay, S.Vish	0 napathy, hennai 2 vanathar	Algo 004. n, C	ebra	a, Vo ulus	75 olume volu	5+15 e I , ume I &	
of a straight line paral point -condition of cor         LECTURE       1         60       1         TEXT BOOKS       1         1.       T. K. Manicavac S.Vishvanathan         2.       S.Naravanan, T. IIPrinters and P	15 chagomPillay, T Printers and Pu T.K.Manicavach Publishers Pvt., 1	15 <sup>7</sup> . Natarajan, K. S. Ga ablishers Pvt., Ltd, C agamPillay, S.Vish Ltd, Chennai 1991.	0 napathy, hennai 2 vanathar	Algo 004. n, C	ebra Calcu	a, Vc ulus	75 olume volu	5+15 e I , ume I &	
of a straight line paral point -condition of cor         LECTURE       1         60         TEXT BOOKS         1. T. K. Manicavac S.Vishvanathan         2. S.Naravanan, T. IIPrinters and P	15 chagomPillay, T Printers and Pu T.K.Manicavach Publishers Pvt., 1	15 7. Natarajan, K. S. Ga ablishers Pvt., Ltd, C nagamPillay, S.Vish Ltd, Chennai 1991.	0 napathy, hennai 2 vanathar	Algo 004. n, C	ebra Calcu	a, Vo	75 Jume volt	5+15 e I , ume I &	

#### REFERENCES

1. P.Kandasamy&K.Thilagavathi, B.Sc Mathematics for branch I – Vol I &Vol II, S.Chand& Co, 2004.

# **E- REFERENCES**

# www.nptel.ac.in

Advanced Engineering Mathematics, Prof. PratimaPanigrahi, Department of Mathematics, Indian Institute of Technology, Kharagpur.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3						2		
CO2	3						2		
CO3	3						2		
CO4	3						2		
CO5	3						2		
Total	15						10		
Scaled	3						2		
Value									

#### Mapping of COs with POs:



0 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

X	XAI 10	5			L	Т	SS	C				
					3	1	0	4				
С	Р	Α	PRINCIPLES OF STATIST		L	Т	SS	Н				
3					3	4						
COUR	RSE O	UTCO	MES	DOMA	IN		LEV	EL				
CO1	Un	derstan	d the nature and types of data	Cognitive		Kno	wledg	ze				
				Comprehension								
CO2	Bui	i <i>ld</i> Data	a collection strategy using scraping	Cognitive		Und	erstar	nd				
				Psychomo	otor	Perc	eptior	<u>1</u>				
CO3	Buil	<i>Puild</i> Statistical Models using Knime and Jasp Cognitive Application										
				Psychomo	otor	Eval	uatio	n				
CO4	Des	sign Hy	pothesis and perform Hypothesis	Cognitive		App	licatio	m				
	test	ting	Psychomotor Synthesis									
	Evaluation											
CO5	CO5 Develop Estimation tools to model Uncertainty Psychomotor Comprehension											
				Affective Application								
TINIT	T	Evaluation										
What i	I is Statio	FUU stice F	Pole of Statistics in Modern Day Applic	no DATA	Iding I	Blocks	of Sta	9+3				
What i	s Data	analysis	s - Process of Data Analysis - Significant	re of Statistic	s in Da	ita ana	lvsis -	- Nature				
of Var	riability	v - What	at is Data – Types of Data – Data C	ollection Me	ethods	- Ob	servat	ion and				
Experi	mentat	ion – Se	craping Web data – Statistical Procedu	res in Data d	collection	on - Ii	ntrodu	uction to				
Knime	– Insta	allation	of Knime – Understanding Knime Envir	onment – Ex	tractin	g data	from	internet				
using I	Knime	– Explo	ratory Data analysis using Knime									
UNIT	II	DES	CRIPTIVE STATISTICS					9+3				
What	is Des	criptiv	e Statistics – Graphical Methods for	Describing	g Data	– Ba	r Cha	rts Pie				
Charts	s – Ste	em and	Leaf Display – Frequency Distribu	tion – Hist	ogram	- W	orking	g with				
Bivari	ate Nu	imerica	I Data – Numerical methods for des	scribing dat	a - Me	easuri	ing C	_entre –				
wiean	- Mea	lian - M	ariahlaa Quantila Quantila nlata	e – Stanuar Summaria	a Devi	datas	-Q	uantiles				
Into	rprotir	nzeu v	anabies - Quantile - Quantile plots -	- Summariz	nig a (		et – Do	ox piots				
= Intel Bivari	ato Da	ta – Co	variance - Correlation - Pearson Con	rrelation – k	Cendal	l Ran	k Cor	relation				
– Spea	rman	correla	tion - Linear Regression - Nonlinear	relationshi	in and	trans	forma	ation				
UNIT	III		CRENTIAL STATISTICS	relationshi	ip unu	tiuns		9+3				
What is Inferential Statistics - Terminology in inferential Statistics - Sample - Population -												
Statistic – Point Estimation – Interval Estimation – Normal distribution Theory – Checking												
for No	ormali	ty and	Normalizing transformation – Chi	-squared	Distrik	oution	i – st	udent t				
distrib	oution	- Classi	ical central limit theory – Bernoulli tr	rials – Sam	pling -	Wha	t is sa	mpling				
– Sigr	nifican	ce of S	ampling in statistics – Random	Sampling –	Mont	e Ca	rlo Sa	mpling				
techni	que –	one sa	mple t test - Test of significance	- Confiden	ce Inte	erval	Estim	ation –				
Interp	<u>reta</u> tio	n of Co	onfidence Interval – Bayesian Statisti	CS								
UNIT	IV	HYP	OTHESIS TESTING					9+3				

What is a Hypothesis – Terminology in Hypothesis Testing - Formation of Hypothesis – Test Procedures – Errors in Hypothesis testing – Neyman-Pearson Lemma – Hypothesis testing using a single sample – Hypothesis tests for a population mean – P value – Hypothesis testing using t test – One tailed and two tailed hypothesis test – Paired and Unpaired test – Test of Variance – Chi square test for univariate data – Test for Homogeneity and independence – Introduction to Analysis of Variance – One way Analysis of Variance – Kruskal Wallis Rank Sum Test – Two way ANOVA – ANOVA vs T Test – MANOVA – ANOVA Vs MANOVA

**UNIT V** Probability

9+3

Fundamentals of Probability – Axioms of Probability – Consequences of Axioms – Distribution Function – Prior and Posterior Distribution - Properties of Distributi Function -Joint Probability – Conditional Probability – independence – Bayes Theorem – Sampling using Gibbs sampling – Bayesian Networks – Stochastic Process – Simple Random Walk – Markov Chains – What is Markov chain – Applications of Markov chains – Computing Markov Chains – Markov Chain Monte Carlo sampling – Path forward

LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
45	15	0	0	60

# **TEXT BOOKS**

Applied Statistics And Probability For Engineers – By Douglas Montgomery

# REFERENCES

- 1. Introduction to Data Mining, Tan, Steinbach and Vipin Kumar, Pearson Education, 2016
- 2. Wasserman, L. (2004). All of Statistics: A concise course in statistical inference

# **E-REFERENCES**

1. Casella, G. and Berger, R. L. (2002). Statistical Inference, 2nd ed

# Table 1: Mapping of Cos with POs.

B.Sc AI				PSO					
	1	2	3	4	5	6	7	1	2
CO1	2	2	2	2	1			2	1
CO2	1	2	2	2	1			2	
CO3	1		2	1	2				
CO4	2	1	2	3	1			2	1
CO5	2		1	3				2	
Total	8	5	9	11	5			8	2
Scaled	2	1	2	3	1			2	1
Value									

 $1 - 5 \rightarrow 1, \qquad 6 - 10 \rightarrow 2, \qquad 11 - 15 \rightarrow 3$ 

0-No relation 1-Low relation 2-Medium relation 3-Strong relation

Course Code	XAI 106	L	Т	Р	C
Course Name	PROGRAMMING METHODOLOGIE LAB	0	0	1	2
C:P:A	0:1.5:0.5	L	Т	Р	Η
		0	0	3	3

- 1. Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code, execute and test it. Students should be given assignments on following:
  - **a.** To learn elementary techniques involving arithmetic operators and mathematical expressions, appropriate use of selection (if, switch, conditional operators) and control structures.
- 2. Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code, execute and test it. Students should be given assignments on following :
- 3. Learn how to use functions and parameter passing in functions, writing recursive programs.
- 4. Write Programs to learn the use of strings and string handling operations.
- 5. Problems which can effectively demonstrate use of Arrays. Structures and Union.
- 6. Write programs using pointers
- 7. .Write programs to use files for data input and output.
- **8.** .Write programs to implement search algorithms.

B.Sc AI				PSO					
	1	2	3	4	5	6	7	1	2
CO1	1	1	1	2	1			2	1
CO2	1	2	2	2	1			2	
CO3	1		1	1	2				
CO4	2	1	2	3	1			2	1
CO5	2		1	3				2	
Total	8	5	9	11	5			8	2
Scaled	2	1	2	3	1			2	1
Value									

 $1 - 5 \rightarrow 1, \qquad 6 - 10 \rightarrow 2, \qquad 11 - 15 \rightarrow 3$ 

0-No relation 1-Low relation 2-Medium relation 3-Strong relation

Course Code	XAI 107	L	Т	P	C
Course Name	Principles of Statistics Lab	0	0	1	2
C:P:A	0:1.5:0.5	L	Т	Р	Н
		0	0	2	2
				-	
				d.	
1 1 1 4 1	617 •				
1. Fundamentals 0 2 Web scraping in	i Knime Knime				
3. Exploratory Da	ta analysis in Knime				
4.Nuances of JAS	SP				
5. Building statis	tical models in JASP				
6. Descriptive Sta	atistics in JASP				
7. Data Visualiza	tion in Knime				
8. Building a Lin	ear Regression Model				
9. Identifying con	rrelation between data in knime				
10. Implementat	ion of Student t test				
11. Confidence In	nterval estimation				
12. Sampling in l	Knime				
13. Hypothesis T	est using student t test				
14. Implementati	ion of Paired Hypothesis test				
15. Contingency	Tables in JASP				
16. Implementati	ion of Chi square test for Independence				
17. Implementati	ion of Analysis of Variance in JASP				
I / I Impicine we	•/				
18. Implementati	ion of MANOVA in JASP				
18. Implementati 19. Implementati	ion of MANOVA in JASP ion of Bayesian Model in Knime				

COURSE CODEXUMA001LTPSS								C			
COUR	RSE NAME	HUMAN ETHICS, VALUES, RIC	GHTS	2	0	0	1	0			
		AND GENDER EQUALITY	!	2	U	U	L	0			
PRER	EQUISITES	-		L	Τ	Р	SS	Η			
C:P:A		1.5:0:0.5		2	0	0	1	3			
COUR	RSE OUTCOMES		Domain		Lev	/el					
CO1	<i>Relate</i> and <i>Inter</i> relationships	rpret the human ethics and human	Cognitive Re			Remember					
CO2	<i>Explain</i> and <i>Ap</i> violence against	<i>oply</i> gender issues, equality and women	Cognitiv	Un Ap	Understanding, Applying						
CO3	<i>Classify</i> and <i>De</i> and their violatio	<i>velop</i> the identify of human rights	Cognitiv	e	An Rec	alyz ceivi	ing ng				
			Affective		<b>T</b> T	1	. 1				
CO4	report on violatic	Cognitiv	e	Un An	ders alyz	tandii e	ng,				
COF	<i>List</i> and <b>respo</b> brotherhood, fig	Cognitiv	e	Rer Res	nem spon	ıber, d					
man and good governance. Affective											
UNIT I     HUMAN ETHICS AND VALUES     6+3											
Integr develo respec UNIT	ity and Compete opment - Valuing t, Self-Confidence, IIGENDER EQUA	Time, Co-operation, Commitment character building and Personality.	and Co , Sympatl	nıp: uraş ny a	rann ge, V and	WHC Emp	D's h bathy, $6+3$	olistic Self-			
Gende empor HDI, G Empor	er Equality - Ge werment. Status o GDI, GEM. Contr werment.	nder Vs Sex, Concepts, definition f Women in India Social, Economic, ibutions of Dr.B.R. Ambetkar, Than	, Gender Education haiPeriya	eq n, H r an	uity, ealth d Pl	equ n, Er nule	uality, nploy to W	, and ment, omen			
UNIT	IIIWOMEN ISSU	IES AND CHALLENGES					6+3	3			
Wome Dome Measu Medic	en Issues and Cha stic violence, Sexu ures – Acts related al Termination of I	llenges- Female Infanticide, Female H Ial Harassment, Trafficking, Access H to women: Political Right, Property Pregnancy Act, and Dowry Prohibitio	feticide, V to educati Rights, a n Act.	iolei on, nd I	nce a Mari Right	agaiı riage ts to	nst wo e. Ren Educ	omen, nedial ation,			
UNIT	IV HUMAN	RIGHTS					6+3	3			
Human Rights Movement in India – The preamble to the Constitution of India, Human Rights and Duties, Universal Declaration of Human Rights (UDHR), Civil, Political, Economic, Social and Cultural Rights, Rights against torture, Discrimination and forced Labor, Rights and protection of children and elderly. National Human Rights Commission and other statutory Commissions, Creation of Human Rights Literacy and Awareness Intellectual Property Rights											
UNIT	V GOOD GO	OVERNANCE AND ADDRESSING	SOCIAL I	SSU	JES		6+3	3			
Good	Governance - Den	nocracy, People's Participation, Trans	parency in	n go	vern	ance	e and	audit,			
. <u> </u>											

Corruption, Imp	act of corruption	on society, whom	n to make corru	ption complaints, fight
against corruptio	n and related issu	es, Fairness in crii	minal justice admi	inistration, Government
system of Redress	sal. Creation of Peo	ple friendly enviro	onment and unive	rsal brotherhood.
LECTURE	TUTORIAL	SELF STUDY	PRACTICAL	TOTAL
30	0	15	0	45
Textbook				
1. Aftab A,	(Ed.), Human Ri	ghts in India: Is	sues and Challer	nges, (New Delhi: Raj
Publication	ns, 2012).			
2. Mani. V. S	5., Human Rights i	n India: An Over	view (New Delhi:	Institute for the World
Congress of	on Human Rights, 1	1998).		
3. Singh, B. F	P. Sehgal, (ed) Hun	nan Rights in India	a: Problems and P	erspectives (New Delhi:
Deep and I	Deep, 1999).			
4. Veeraman	i, K. (ed) Periyar o	n Women Right, (C	Chennai: Emerald	Publishers, 1996)
5. Veeraman	i, K. (ed) Periy	ar Feminism, (l	PeriyarManiamma	i University, Vallam,
Thanjavur	: 2010).			
Reference Books			1. T 1	
I. Bajwa, G.S. an	nd Bajwa, D.K. Hu	iman Rights in Inc	dia: Implementatio	on and Violations (New
Delhi: D.K. Pt	1011cations, 1996).			· · · · · · · · · · · · · · · · · · ·
2. Chatrath, K.	J. S., (ed.), Educa	tion for Fluman .	Rights and Demo	cracy (Shimala: Indian
2 Lagadagan I	Ivanced Studies, 19	190). Cocial locialation	in Tomil Node	Channai, Elashianan
5. Jagaueesan. I	1000)	Social legislations	s in Tamin Naut	i, Chennai: Elachiapen
A Kaushal Rach	1990). Momon and H	uman Rights in In	dia (Now Dolhi: K	avari Booka 2000)
F-Roforonco			ula (New Dellii. K	aven Dooks, 2000)
1 http://planning	commission nic in/a	houtus/committee/	wrkgrn12/wg occu	n safety n
2 http://cvc.nic.iu	n/welcome.html	boutus, committee,		
3 https://www.tr	ansparency org/			
4. https://www	.hrw.org/world-re	port/2015/countr	v-chapters/india	
		<u>r,, countr</u>	j mana j mana	

II SEMEST	FER											
Category	Course	Course Name			Cr	edits				Ho	ours	
	Code		L	Τ	P	SS	Total	L	Τ	Р	SS	Total
AECC 3	XGT201/	Tamil – II / Foundation	2	1	0	0	3	2	1	0	0	3
	XFT201	Tamil - II										
AECC 4	XGE202	English – II	2	1	0	0	3	2	1	0	0	3
CC-2A	XAI203	Data Structures	3	1	0	0	4	3	1	0	0	4
DSC -2	XAI204	Discrete Mathematics	4	1	0	0	5	4	1	0	0	5
CC-2B	XAI205	Python Programming	3	1	0	0	4	3	1	0	0	4
CC-2C	XAI206	Data Structures Lab	0	0	1	0	1	0	0	3	0	3
CC-2D	XAI207	Python Programming	0	0	1	0	1	0	0	2	0	2
		Lab										
UMAN-2	XUMA002	Environmental Studies	2	0	0	0	2	2	0	0	0	2
EA		Extension Activities	0	0	0	0	0	2	0	0	0	2
		NSS,NCC,NSO,RRC										
		and Swatch Bharath)										
		Mentor Li	brary	y hou	urs						2	2
		Total	16	5	2	0	23	19	4	8	1	30

								L	T	P	SS	C
XGE2	02							2	1	0	0	3
					ENGLISH II							
C P	Α							L	Т	Р	SS	Η
1.5 0	0.5							2	1	0	0	4
PREREQ	UISITI	E: Ni	1								1	
COURSI	EOUTO	COM	ES					DO	MA	IN	LEV	'EL
On the s	uccessf	ul coi	mpleti	on of t	this course stuc	lents would b	e able t	to				
CO1	Recall	the b	asic gra	ammar	and using it in pr	oper context	0	Cogn	itive		Remen g	nberin
CO2	Expla	in the	proces	s of list	ening and speaki	ng	C	Cogn	itive		Unders ng	standi
CO3	Adapt	impo	ortant n	nethods	of reading		0	Cogn	itive		Creatin	ıg
CO4	Demo	nstrat	te the b	asic wr	iting skills		C	Cogn	itive		Unders ng	standi
UNIT I		Adv	vanced	Readi	ng							6
Reading and interpreting non-linguistic texts iv. Reading and understanding incomplete texts (Cloze of varying lengths and gaps; distorted texts.)         UNIT II       Advanced Writing         6												
v. Analysi vii. Re-dra of prose o	ng a top aft a piec r poetry	ce of t ix. U	text with the second seco	ay or a h a diff rases, i	Ferent perspective dioms and punct	(Manipulation ation appropria	ed at an exercise ately	a pr e) vi	epari ii. Sı	ng tr imm	arise a p	oratt
UNIT III		Prin	nciples	of com	imunication and	communicati	ve comp	oeter	ice			6
x. Introdu non-verba xiii. Comi	ction to l xii. Ide nunicati	comm entifyi ve co	nunicat ing and mpeter	ion – pi overco ice	rinciples and proc oming problems of	cess xi. Types o of communication	of comm on	unic	ation	1 – V6	erbal and	d
UNIT IV		Cro	oss Cul	tural C	communication							6
xiv. Cross	-cultura	l com	munica	tion	1							
LEC	TURE		TUT	ORIAL	SELF STUDY	PRACTIC	CAL		r	ГОТ	AL	
	30		(	)	30	0				60	0	
REFERE	NCES:					4.7	_					
1) Bailey,	Stepher	n (200	)3). Ac	ademic	Writing. London	and New Yorl	k, Routle	edge	•	11 ·		
2) Departi	nent of	Englis	sh, Del	hı Univ	ersity (2006). Fl	uency in Englis	sh Part I	I. Ne	w D	elhi,		
5) Grellet,	F (198) T (200	1). De		ig Read	iing Skills: A Pra	ctical Guide to	Keading	g Ski	IIIS. ſ	New	Y Ork, C	UΡ
4) Heage, 5) Kumar	1. (200) S and T	3). W	v riting.	Londol	1, UUP Communication (	Skille New Del	lhi OID	)				
5) Kuillar, 6) Lazar $4$	G (2010	ushp )) Tit	Laid (2 erature	and I a	nouage Teaching	Cambridge (	III, OUP TIP					
7) Nuttall	C(199)	,). LIU 6) Те	eaching	Readin	nguage reachills	j. Camonuge, C	London	Ma	cmil	lan		
8) Raman	Meenal	kshi a	and San	geeta S	harma (2011) T	echnical Comn	nunicatio	., 1916 on: F	rinci	ples	and Pra	ctice
New Delh	i, OUP		Sull	0 D				1		r		
	,											

# XAI 203- DATA STRUCTURES

				L	Т	SS	С		
XAI	203			3	1		4		
		DATA STRUCTURES							
C 1	P A			L	Т	SS	H		
3 1	1 0			3	1		4		
PRERI	EQUISI	TE: Computer Programming							
Course	e Outco	mes	Domai	in Level					
After t	he com	pletion of the course, students will be able to							
CO1	Explan the m best b descrip	Cogniti Psycho or	itive Iomot Understa Apply			nd			
CO2	Choose To have a knowledge of complexity of basic operations like insert, delete, search on these data structuresCognitiveRemember								
CO3	Ability model	ve mot	Apply Set						
CO4	Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc.CognitiveAnalyze								
CO5	Ability differe Impler algorit	y to assess efficiency tradeoffs among ent data structure implementations. ment and know the applications of thms for sorting, pattern matching etc.	Cogniti	ve	Crea	ate			
UNIT	Ι	INTRODUCTION					9+3		
Basic Abstra Linkec Circula dimen	concept action F l Lists arly lint sional a	ts- Algorithm Specification-Introduction, R Performance analysis, Linear and Non-Line -Operations, Concatenating, circularly lir ked lists, Doubly Linked Lists- Operations. Re rrays, sparse matrices-array and linked repres	ecursiv ear data nked l epresen sentatic	e alg a stru ists-C tatiou ns.	gorith ucture Opera n of s	ms, es, Si tions ingle,	Data ngly for two		
UNIT	II	LINEAR DATA STRUCTURES					9+3		
Stack- Conve Definit Inserti	Operat rsion, tion and on and	ions, Array and Linked Implementations, Ap Postfix Expression Evaluation, Recursion d Operations, Array and Linked Implemen Deletion Operations, Dequeue (Double Ended	pplicati Imple Itations Queue	ons- ement , Circ e).	Infix ation cular	to Pc , Qu Quei	ostfix ieue- ies -		
UNIT	III	TREES		,			9+3		
Trees, Repres Binary UNIT	Repressentation Trees, I	entation of Trees, Binary tree, Properties of ns- Array and Linked Representations, Binary Priority Queue- Implementation, Heap- Defin <b>GRAPHS</b>	Binary 7 Tree T ition, In	Tree Traven Travenserti	es, Bi rsals, on, D	nary Threa eletio	Tree aded n. <b>9+3</b>		
Graph Hashir	s, Grapl 1g- Intr	h ADT, Graph Representations, Graph Travers oduction, Hash tables, Hash functions, Ov	sals, Se verflow	archii Har	ng, St ndling	atic 5. So	rting		

Methods, Comparison of Sorting Methods.				
UNIT V	ALGORITHM DESIGN TECHNIQUES	9+3		

Search Trees- Binary Search Trees, AVL Trees- Definition and Examples.Red-Black and Splay Trees, Comparison of Search Trees, Pattern Matching, Algorithm- The Knuth-Morris-Pratt Algorithm, Tries (examples).

LECTURE	TUTORIAL	PRACTICAL	SELF-STUDY	TOTAL
45	15	45		60+45
DEEEDENICES.			•	

# **REFERENCES:**

1. Fundamentals of Data structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson-Freed, Universities Press.

2. Data structures and Algorithm Analysis in C, 2nd edition, M. A. Weiss, Pearson

3. Lipschutz: Schaum's outline series Data structures Tata McGraw-Hill

- 1. www.tutorialspoint.com
- 2. <u>www.nptel.com</u>
- 3. <u>www.virtuallab.ac.in</u>
- 4. Lecture Slides, Multiple Choice Questions, Animations Link: <u>http://highered.mheducation.com/sites/0072967757/student\_view0/index.html</u>
- 5. Lecture Slides : <u>http://www.mhhe.com/engcs/compsci/forouzan/</u>

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	3	2	2	2	1	2
CO 2	3	3	2	2	2	1	2
CO 3	3	2	2	2	2	1	2
CO 4	3	3	2	2	2	1	2
CO 5	3	2	2	2	2	1	2
Total	15	13	10	10	10	5	10
Course	3	3	2	2	2	1	1

0-No relation

3- Highly relation 2- Medium relation 1- Low relation

COU	JRSE CODE	Ξ	x	(BC204	L	Т	Р	SS	С	
COL	JRSE NAME	Ę	DISCRETE	MATHEMATICS	3	1	0	2	6	
PRE	EREQUISTE	l		NIL	L	Т	Р	SS	Η	
	C:P:A			3:0:0	3	1	0	2	6	
Course	Outcome				Doma	in	Le	vel	-	
CO1	Define the	prop	erties and laws	of sets, relations and	Cogni	tive	R,	Ар		
	functions a	ndA	<i>pply</i> the operat	ion of the sets using						
	venDiagrai	m.								
CO2	Applythe c	conce	pts of logic and	d to find the normal	Cogni	tive	U,	Ар		
	forms. Exp	lain †	the tautologies	and						
	Contradict	ion.								
CO3 Apply the counting principle permutation and Cognitive U, Ap										
combination and to <i>solve</i> the problem. <i>Explain</i> the										
<u> </u>	pigeonhole	e prir		1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	Comi	1	TT	•		
CO4 Explain the types of lattices and to show lattices as Cognitive U, Ap										
partially ordered sets.										
and Explain any set with binary operation as a										
semigroup and group with examples.										
UNIT	[	und	Broup milliona	impres.			1	12		
Set not	ations – Bas	ic de	finitions and se	et operations – Venn	diagram	1 - A	lgebi	aic la	aws of	
set the	ory – D Mo	organ	's law. Relation	ns: Properties of rela	ations –	Type	s of	relati	ions –	
Equiva	lence classe	es. Fi	unctions: Defin	ition – Domain – R	ange and	d typ	oes o	f fun	ction-	
Classif	ication of fu	nctio	n.		0					
UNIT	II							12		
Statem	ents - Norm	al foi	rms – CNF – DI	NF – PCNF - PDN – T	Tautologi	ies - C	Cont	cadict	ions.	
UNIT	III							12		
Counti	ng principl	es –	The Pigeonh	ole principle - Co	unting -	- Per	mut	ations	s and	
Combi	nations – Co	mbii	natorial argume	ents – Countable and	uncount	able	sets.			
UNIT	IV			41				12		
Lattice	s as partially	v ord	ered set – Type	s of lattices – Lattices	as algeb	raic s	syste	m.		
	V	C		T 1 1	1 ·			12		
Binary	operations -	- Sen	11 groups - Groi	ups – Examples and e	elementa	ry pr	oper	ties.	TAT	
	IUKE		TUTORIAL	PKACIICAL	SELF	$\mathbf{v}$		10	IAL	
	45		15	0	3	<u> </u>		60 ·	+ 30	
TEXT	BOOK									
<b>1.</b> F	Ralph. P. G	Grima	ldi, "Discrete	and Combinatorial	Mather	natic	s: A	n Aı	oplied	
I	ntroduction'	", Fo	urth Edition, Pe	earson Education Asi	a, Delhi,	2002.				
2. K	Kenneth Lev	assei	ur and Alan Do	err, "Applied Discre	ete Struct	tures,	Dep	oartm	ent of	
N	/lathematica	l Scie	ences, Universit	y of Massachusetts L	.owell, V	ersio	n 2.0	, <b>201</b> 3	3.	
REFER	REFERENCES									
1. K	enneth H.Ro	osen,	"Discrete Mat	hematics and its App	plication	", Fif	th eo	dition	, Tata	
M	cGraw-Hill	Publ	ishing company	y pvt.Ltd., New Delh	i, 2003.					
2. D	r.M.K.Venka	atara	man, Dr	.N.SridharanN.Chan	idrasekai	ran,		"Di	screte	
M	athematics"	, the	National Public	shing Company, 2003	3.					

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3. Veerajan T., Discrete Mathematics with Graph Theory and Combinatorics", 10th edition, Tata McGraw Hill Companies, 2010.

#### **E REFERENCES**

- 1. <u>www.nptel.ac.in</u>
- 2. Graph Theory A NPTEL Course S.A. Choudum.
- **3.** Graph Theory by Prof. L. Sunil Chandran Computer Science and Automation Indian Institute of Science, Bangalore.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7				
CO1	3	1				1					
CO2	3	1	1			1					
CO3	3		1			1					
CO4	3					1	1				
CO5	3					1	1				

#### Mapping of CO's with PO's:

3-Strong Correlation, 2-Medium Correlation, 1-Low Correlation, 0-No Correlation

# XAI205- PYTHON PROGRAMMING

XAI205							
		3	0	1		4	
	Python Programmin	g					
C P A			L	Т	P	SS	Η
3 1 0			3	0	3		6
PREREQUISITE: Computer	Programming						
Course Outcomes		Don	nain	Le	vel		
After the completion of the co	urse, students will be able	e to					
Understand Nuances	and paradigms of		Kno	owle	dge	ć	
CO1 Programming		Cognitive			_		
			Cor	npre	eher	nsion	
Understand Object Or	iented Programming	- · ·	Knowledge				
CO2 methods		Cognitive					
Duild Creation Horn	touland using Thinkow	<i>C</i> :::		npre	ener	151011	
<b>Build</b> Gruphical User Ir	iterfuce using Trinter	Cognitive	Ap	plica	tion	n	
03		Douchomoto	- Sun	thee	ic		
Puild and Darlou woh	appa using Elask	Comitivo		1.	1.5		
COM	apps using riask	Cognitive	Application				
		Psychomoto	r Svn	thes	is		
Develop 2-dimensiona	l Games using Pygame			tion	-		
CO5	in Guines using i yguine	coginave	Ap	JIICa	tioi	.1	
		Psychomoto	r Syn	thes	is		
UNIT I Fundamenta	als of Python	5					3
Introduction to Programming -	What is Computing? - Vario	ous Programm	ing Para	dign	ns -	What	t is a
Programming Language? - Com	pilers Vs Interpreters - Intro	oduction to Py	thon Pro	ograr	nmi	ing - V	Why
Python Programming language	- Applications of Python F	Programming 1	anguage	e - Es	ssen	tial T	ools
for Python Developer - Installat	ion of Anaconda Environn	nent - Handlir	g of Jup	oyter	No	oteboo	)ks -
Fundamentals of Python Progra	mming – Variables & Assig	nments - Mul	iple ass	ignm	ient	conce a Dat	ept - ta In
Python – I - Numerical Types -	Handling Arrays In python	- Array Manir	ut - Kep sulation	- Lis	ts ir	g Dai ו Pvth	1011 -
List Manipulation - Strings in Py	thonRepresenting Data in P	vthon – II – Tu	ples - Se	ets &	Fro	zen s	ets –
Dictionarie	1 0	5	1				
UNIT II Co	ontrol Structure and Func	ctional progra	mming	5		3	
Control Flow in Python - Cond	litional Statements - If sta	tements - Rul	es of In	dent	atic	n	
- If else statement - Elif S	tatement - Nested If state	ement - Rule	Based 1	Expe	ert S	System	ms -
Control Flow in Python – Lo	ops - When to use loops	- For loop -	While l	oop	- B	reak	and
continue statement - Function	ons and Functional Prog	gramming-l	- Unde	rstar	nd -	Func	tion
execution - Create simple fur	ictions in Python - Funct	ional Program	nming	tools	5 - I	unct	ions
and Functional Programming-	II - Lambda functions - N	ap and filters	h antre		D-	1	
- Iterators, generators - I	violulies and Packages -	vvorking wi	in exist	ing	rac	каде	s in
	Object Oriented D	noramming				2	
		ogramming				3	

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Object Oriented Approach - Terminology in Object Oriented Programming - Introduction to Classes and Objects - Working with Custom classes - Parent Class Vs Child Class - Attributes and Methods - Encapsulation - Inheritance and Polymorphism

Controlling Attribute access – Functors - Class Descriptors - Multiple Inheritance - Meta classes – Algorithms in Python - What is an Algorithm? - Algorithm Vs Problems

How to write an Algorithm - - Introduction to Search algorithms - Fundamentals of Graph theory - Representing Problems as a graph - Graph traversal

3

**UNIT IV Python Applications - Graphical User Interface** 

Introduction to Graphical User Interface – I - What is a Graphical User Interface? - Introduction to Tkinter - Fundamental operations in Tkinter - Creating simple interfaces in python using Tkinter – Build GUI using Tkinter - Building a Dialog style program - Building a Main window style interface - Advanced Functions in Tkinter - Create a student data management system -Developing a Forward Kinematic Model GUI in python

UNIT V	Game And Web Development in Python	3
Game Development in	n Python - Introduction to Game development - Game o	levelopment
Pipeline - Game frame	works and libraries in python - Fundamentals of Pygame	<ul> <li>Building</li> </ul>
Games with Pygame -	Event types, Information and queue - Pygame modules - V	Veb services
in Python - Introduc	tion to web development - Various python framewor	ks for web
development - RESTful	API services p Introduction to Flask - Implementing a Flask	Webservice
- Building a Flask Appl	ication - Handling JSON files - Encoding information in JSON	- Setting up
services - Build a perso	nal profile in flask	

LECTURE	TUTORIAL	PRACTICAL	Total hours
15	0		60

# **TEXT BOOKS:**

Campbell, Gries, Montojo, and Wilson, Practical Programming: An Introduction to Computer Science Using Python. The Pragmatic Bookshelf, 2009

### **REFERENCES:**

Mark Newmann: Computational Physics with Python, 2nd Ed. (2012)

J. M. Stewart: Python for Scientists, Cambridge Univ. Press (2014)

# **E-REFERENCES:**

Guttag, John. Introduction to Computation and Programming Using Python: With Application to Understanding Data Second Edition. MIT Press, 2016. ISBN:9780262529624

#### PO3 PO4 PO5 PO1 PO2 PO6 PO7 **CO1** 3 1 1 2 1 CO<sub>2</sub> 3 1 1 1 1 CO3 3 1 2 1 $CO\overline{4}$ 1 3 1 1 CO5 3 1 1 2 1 1 15 3 3 5 2 3 6

### Mapping of CO's with PO's:

3-Strong Correlation, 2-Medium Correlation, 1-Low Correlation, 0-No Correlation

# XAI 206- DATA STRUCTURES LAB

XA	AI 20	6														L	T	P 3	SS	C 3
				DA	IA SI	IRUC	ĽΓU	Uŀ	JRE	ESI	LA	В				-	T	Б	00	
	1 P	A														L	1	1' 2	<u>55</u> 7	1 2
PREREOUISITE: Computer Programming															3	L	3			
Course Outcomes Dom												mai	in	Le	vel					
UNI	TI	aico		DUCT	ION										/11101			· cı	9+3	+ 9
Lab																				
Writ	e pro	gran	n that uses f	unctic	ons to	perfor	rm	n tl	the	e fo	ollo	win	g:							
1	) Cr	eatio	n of list of e	lemen	ts wh	ere the	ne si	siz	ize (	of	the	e list	;, ele	eme	nts t	o be	insei	tec	l and	-
	de	leted	are dynam	ically	given	as inp	put.	ıt.												
2	) In	npler	nent the ope	eration	ns, inse	ertion	n, de	del	elet	tior	n af	t a g	give	n po	ositio	on in	the l	ist	and	
	sea	arch	for an eleme	ent in f	the list	t														
3	) To	o disj	play the eler	nents	in forv	ward ,	/ r	rev	eve	erse	e or	der								
4	) W1	rite a	program th	at der	nonsti	rates t	the	.e a	app	plio	cati	ion	of s	tack	ope	eratio	ns (I	Eg: :	infix	
	ex	press	ion to postf	ix con	versio	on)														
5	) W1	rite a	program to	o imple	ement	queue	ıe d	da	ata	a sti	ruc	ture	e an	id ba	asic (	opera	tion	S 01	n it	
	(In	serti	on, deletion	, find	length	n) and	d co	od	de a	at l	leas	st oi	ne a	ppli	icati	on us	ing	que	eues	
6	) W1	rite a	program th	at use	s well	l defin	ned	d f	fur	nct	tion	is to	Cr	eate	a bi	nary	tree	of		
_	ele	men	ts and Trave	erse a	Binary	y tree i	e in j	ı pı	pre	eoro	der	, inc	orde	er ar	nd p	ostor	der.			
	) Wi an	rite p elen	program that nent in a list	t impl	ement	ts linea	ear a	: ar	and	l bi	ina	ry s	earc	ch m	netho	ods o	t sea	rch	ing f	or
8	) W	rite a	and trace pr	ogran	is to u	nders	stan	ind	nd tl	the	va	riou	ıs p	hase	es of	sorti	ng e	lem	ents	
	us	ing tl	ne methods.																	
	a)	Inser	tion Sort	b) Q	uicksc	ort		С	c) I	Bu	ıbbl	le sc	ort							
9	) W1	rite a	nd trace pro	ogram	s to Cı	reate a	a B	Bir	inaı	ry	sea	rch	tree	e an	d in	sert a	nd d	lele	te fro	om
	the	e tree																		
1	0) Re	epres	ent suitably	a gra	ph dat	ta stru	uctı	tur	ıre	an	nd c	lem	ons	trate	e op	eratio	ons c	of		
	tra	vers	als on it.																	

# XAI207- PYTHON PROGRAMMING LAB

Course Code	XAI207	L	Т	Р	C					
Course Name	PYTHON PROGRAMMING LAB	0	0	4	2					
C:P:A	0:1.5:0.5	L	Т	Р	Н					
		0	0	4	4					
					60					
1.Handling Jupy	ter notebooks									
2.Data types in Python – I										
3.Data Types in I	Python - II									
4.Executing Cond	litional Statements in Python									
5.Executing For 1	oop and its variants in Python									
6.Executing Whil	e loop in python									
7.Building an Exp	pert System in Python									
8.Functional Prog	gramming in Python									
9.Creating Modu	les in Python									
10.Handling XM	L files in Python									
11.Modelling an	Expert system with Classes									
12.Implementation	on of Binary Search in Python									
13.Implementation	on of Bubble sort in python									
14.Implementation	on of Breadth First Search									
15.Implementation	on of Depth First Search in Python									
16.Working with	Bellman-Ford Algorithm in Python									
17.Fundamentals	of Tkinter									
18.Building a sim	ple Calculator using Tkinter									
19.Building a stu	dent information system using Tkinter									
20.Fundamentals	of Pygame									
21.Build a simple	e snake game in python									
22.Creating a star	r ship meteors game in Pygame									
23.Fundamentals	of Flask									
24.Build a studer	t Digital Profile using FLASK									

x	IIMAO	02		L	Т	Р	SS	С			
	UNIAU	02	ENVIRONMENTAL STUDIES	0	0	0	0	0			
C	Р	А	ENVIRONMENTAL STODIES	L	Т	Р	SS	Η			
1.5	0	0.5		2	0	0	1	3			
PRER											
Cours	e Outco	omes		Domain		Level					
After	the com	pletio	n of the course, students will be able to	·							
CO1	Descri explai	<i>be</i> the <i>n</i> anth	significance of natural resources and ropogenic impacts.	Cognitiv	e	Remember Understand					
CO2	<i>Illustr</i> and na ecolog	e	Understand								
CO3	<i>Identij</i> of ma pheno	<i>fy</i> the f ajor p menor	acts, consequences, preventive measures ollutions and <i>recognize</i> the disaster	Cognitiv Affective	e e	Remer Receiv	nber <sup>v</sup> ing				
CO4	Explai andpro sustain	<i>in</i> the actice nable d	e socio-economic, policy dynamics the control measures of global issues for levelopment.	Cognitiv	e	Understand					
CO5	the im welfar toward	e	Understand Apply								
UNIT	I	INT AN	TRODUCTION TO ENVIRONMENTAL D ENERGY	STUDI	ES			6			
Defini over-e effects	Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface										

and ground water, flood, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT II EC

ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d)

6

Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III	ENVIRONMENTAL POLLUTION	6
		1

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

6

6

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Water (Prevention and control of Pollution) Act – Issues involved in enforcement of environmental legislation – Public awareness.

#### UNIT V

# HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education - HIV / AIDS – Women and Child welfare programme– Role of Information Technology in Environment and human health – Case studies.

Lecture	Tutorial	Self-Study	Practical	Total
30	0	15	0	45

# Text book

1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000.

2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science, UK, 2003

# **Reference Books**

- 1. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, India, 2003.
- 2. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006.
- 3. Introduction to International disaster management, Butterworth Heinemann, 2006.
- 4. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.
- 5. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009.
- 6. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
- 7. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012.
- 8. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003.

- 9. Sundar, Disaster Management, Sarup& Sons, New Delhi, 2007.
- 10. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.

# **E-references**

- 1. http://www.e-booksdirectory.com/details.php?ebook=10526
- 2. https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science
- 3. <u>https://www.free-ebooks.net/ebook/What-is-Biodiversity</u>
- 4. <u>https://www.learner.org/courses/envsci/unit/unit\_vis.php?unit=4</u>
- 5. <u>http://bookboon.com/en/pollution-prevention-and-control-ebook</u>
- 6. <u>http://www.e-booksdirectory.com/details.php?ebook=8557</u>
- 7. http://www.e-booksdirectory.com/details.php?ebook=6804

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10
CO1	2						2		2	2
CO2	1						2			2
CO3	2	1	2				3		2	3
CO4	2	2	2				2			3
CO5	2				3	3				2
	9	3	4		3	3	9		4	12
Scaled value	2	1	1		1	1	2		1	3

# **III SEMESTER**

Category	Course	Course Name		0	red	its			]	Hou	rs	
	Code		L	Τ	P	SS	Tot	L	Т	Р	SS	Tot
AECC 5	XGT301/	Tamil – III/	2	1	0	0	3	2	1	0	0	3
	XFT301	Foundational Tamil – III										
AECC 6	XGE302	English – III	2	1	0	0	3	2	1	0	0	3
SEC-1B	XAI 303	Algorithms	2	0	0	0	2	2	0	0	1	2
CC-3A	XAI 304	Foundations of Artificial	3	1	0	0	4	3	1	0	0	4
		Intelligence With R										
		Programming										
CC-3B	XAI 304	Database Management	3	0	0	0	3	3	0	0	0	3
		Systems										
CC-3C	XAI 305	Auxillary Physics	3	0	0	0	3	3	0	0	0	3
CC-3A-P	XAI 306	Artificial Intelligence Lab	0	0	1	0	1	0	0	2	0	2
CC-3B-P	XAI307	Database Management	0	0	1	0	1	0	0	2	0	2
		Systems Lab										
CC-3C-P	XAI308	Allied Physics Lab	0	0	1	0	1	0	0	2	0	2
GE-1		*Open Elective - To be	3	0	0	0	3	3	0	0	0	3
		chosen by student										
UMAN 3	XUMA003	Disaster Management	1	0	0	0	1	1	0	0	1	1
Minor	XAI 309	Micro Processor	1	0	0	0	1*	1	0	0	0	1
Course		(* Extra Credit)										
Extension A	Activities										1	0
NSS,NCC,	NSO,RRC and	d Swatch Bharath)										
Mentor Ho	our											1
Library Ho	Library Hour											0
	18	1	3	0	25+ 1*	18	1	7	1	30		

# XAI 303 - ALGORITHMS

						L	Τ	Р	SS	C				
XAI	303			_		2	0	0	0	2				
			ALGO	RITHMS		-	-	<b>D</b>	0.0					
C P	A						1	<u>Р</u>	55	H				
			E			2	0	0	1	2				
FRERE	QUISI				Domain	Lovol								
After th	ne comt	oletion of t	he course, stude	ents will be able	e to			LC	vei					
	Recog	nizeto le	earn good r	principles of	Cognitive		Rem	emt	er					
CO1	algori	thm design	n.		Psychomoto	or	Perc	epti	on					
	Identi	fy and A	Achieve to le	arn how to				-						
con	analys	ses algorith	nms and estima	te their worst	Cognitive		Und	ersta	and					
02	-case	and avera	age- case beha	vior (in easy	Psychomoto	or	Set							
	cases)	,												
	Illusti	rate and p	practice to bec	come familiar	Cognitive		App	ly						
CO3	with 1	fundament	tal data structu	res and with	Psychomoto	or	Guided							
	the m	anner in	which these da	ata structures	5		Resp	ons	e					
	can be	est be imple	emented;		Camilina		A	1						
COA	<i>Demo</i>	nstrate 10	vlodgo in pro	tice (via the	Peychomoto	74	App	IY hani	<b></b>					
04	.04 ineoretical knowledge in practice (via the respiration									wiechamsm				
	Devel	$on$ and $\Lambda$	<i>Jaintain</i> Advan	ced Analysis	Cognitive		Crea	te						
CO5 Technique							Com	n vitet	e Ove	ert				
UNIT I	IN	TRODUC	TION					1		9				
Introdu	ction: I	Basic Desig	n and Analysis	Techniques of	Algorithms,	Cor	rectn	ess (	of					
Algorit	hm. Al	gorithm D	esign Technique	es: Iterative Tec	hniques, Div	ide	and	Con	quer,					
Dynam	ic Prog	ramming,	Greedy Algorit	hms.	_									
UNIT I	I SC	ORTING A	ND SEARCHI	NG TECHNIÇ	QUES					9				
Elemen	tary S	orting tecl	nniques– Bubb	le Sort, Insert	ion Sort, M	erge	Sor	rt, A	dvan	iced				
Sorting	techni	ques- Hea	p Sort, Quick S	ort, Sorting in	Linear Time	e - B	ucke	et So	rt, Ra	ıdix				
Sort an	nd Cou	nt Sort, S	earching Techr	liques- Mediar	ns & Order	Stat	istics	, co	mple	xity				
	s. тт ∣ ст	рарис лі	CORITUME							0				
Graphs	Algori	thms Gra	oh Algorithms_	Breadth First 9	Search, Denth	) Fir	st Se	arch	and i	ts				
Applica	ations.	Minimum	Spanning Trees	. String Process	sing			AI ( I I	unu l					
UNIT I	V LC	OWER BO	UNDING TECI	HNIOUES						9				
Lower	Boundi	ng Technic	ques: Decision T	rees, Balanced	Trees, Red-B	Black	Tre	es						
UNIT V	V Al	DVANCEI	D ANALYSIS T	ECHNIQUE						9				
Advand	ced A	nalysis T	echnique: Rar	idomized Alg	orithm, Dis	strib	uted	A	lgorit	hm,				
Heurist	ics.Bin	ary Search	Tree Problem.											
I	LECTU	RE	TUTORIAL	PRACTICAL	SELF STUDY		ΤΟΤΑ							
	30		15	0	0			4	5					
TEXT E	SOOKS	<b>b:</b>												
- 1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein Introduction to Algorithms, PHI, 3rd Edition 2009.
- 2. Sara basse & A.V. Gelder Computer Algorithm Introduction to Design and Analysis, Publisher Pearson 3rd Edition 1999

#### **REFERENCES:**

- 1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2007.
- 2. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 2002
- 3. A.V. Aho, J.E. Hopcroft and J.D. Ullman "Data Structures and Algorithms" Pearson Education Delhi, 2002

### **E-REFERENCES:**

- 1. www.tutorialspoint.com
- 2. <u>www.nptel.com</u>
- 3. www.virtuallab.ac.inLecture Slides,
- Multiple Choice Questions, Animations Link: <u>http://highered.mheducation.com/sites/0072967757/student\_view0/index.html</u>
   Lecture Slides + http://www.mbhe.com/onges/compaci/forewyon/
- 5. Lecture Slides : <u>http://www.mhhe.com/engcs/compsci/forouzan/</u>

### Mapping of COs with Pos

R Sc AI				PO				PS	50
D.SC AI	1	2	3	4	5	6	7	1	2
CO1	3				1				
CO2	2	3							
CO3	1	3	3	2	2				
CO4	1	3	3	2	2	3	2		
CO5		3	3	3	2	3	2	2	3
Total	7	12	9	7	7	6	4	2	3
Scaled	2	3	2	2	2	2	1	1	1
Value									

 $1-5 \rightarrow 1, 6 -10 \rightarrow 2, 11 -15 \rightarrow 3$ 

# XAI 304- FOUNDATIONS OF ARTIFICIAL INTELLIGENCE & R PROGRAMMING

					L	Т	Р	SS	C	
X	AI 304	4	FOUNDATIONS OF ARTIFIC	TAL	3	1	0	0	4	
			INTELLIGENCE & R PROGRAM	MING		r				
C	P	A			L	T	P	SS	H	
2	0	1			3	1	0	0	4	
PRER	KEQU	ISIT	E: XBC105				-	1		
A. (1	11	1	COURSE OUTCOMES	Domain			Le	vel		
After	the co	$\frac{omple}{1}$	etion of the course, students will be able t			C		•		
CO1	51	tuaen	it can <i>define</i> and <i>describe</i> intelligence	Comiting		Con	ipre	nensio	m	
COI		na exj Iochi	plum now it can be imparted in	Cognitive		Ana	wiec	ige		
			and Demonstrate Intelligent agents	Cognitivo		Sunt	bosi	0		
CO2	$\begin{array}{c c} D \\ f_{c} \end{array}$	resign	tions onvironments in real world and	Psychomoto	14	Sym Evol	nesi	5 07		
	CO2 for various environments in real world and Psychomotor Evaluation									
	Si	tudor	t can describe search algorithms and	Allective						
CO3		mree	mt knowledge using expert systems	Psychomote	or	Comprehensior				
000	, n	nd sei	mantic networks	Affective	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	App	licat	ion	/11	
						Eval	uati	on		
	D	esign	and <i>compare</i> Probabilistic models to			App	licat	ion		
CO4	l re	eprese	ent uncertainty in sensor systems	Psychomoto	or	Eval	uati	on		
		1	<i>y</i>	5		Synt	hesi	s		
	u	Inders	stand and Develop Programs using R	Cognitive		Kno	wlea	lge		
CO5	5 la	nguag	ze	Psychomoto	or	Eval	uati	on		
				2		App	licat	ion		
UNI	ΤI		Fundamentals of Artificial Intell	igence			6	+3		
Intro	oducti	ion to	Artificial Intelligence - What is Artifici	al Intelligenc	e -	A.I.	Para	ıdigm	s -	
Hist	ory of	f AI -	Turing Test - Applications of AI - Ele	ements of Ai	rtific	ial I	ntell	igence	e -	
Wha	at is a	in Ag	ent - Different types of Agents - Ration	nal Agent - S	Struc	cture	of	Ratio	nal	
Age	nt - W	/hat i	s an Environment - Nature of the enviror	nments – Cra	sh C	Cours	se or	ı Pyth	on	
– I –	· Why	y pyth	ion – Data types in Python – Crash Cou	irse on Pytho	on –	II –	Cor	dition	nal	
State	ement	:s – Lo	oops – Functions -Algorithms in Python	- What is an	Alg	gorith	1m -	How	to	
write	e an A	Algori	thm – Building SimpleAlgorithms				-	_		
		C 1	Problem Solving by Search	<b>)</b>		TA71	6-	-3	1	
Prob	oform	501V1	ng - Problem solving agent - Types	of Problem	S - נדד⊷	vv n	at 1	s Sea 4 Sea	rcn	
	uorithr		Introduction to graph theory Hour	to roprosont		hlon	ine 20. 2	u sea	nha	
Linir	oform	.15 - 1 10 - 10	parch Algorithms - Implementation of	Uninformed	pro I Sa	arch	in in	s gra. Pytho	p115	
Intro	nducti	ion to	a Informed search algorithms - Unifor	med Search	Vs	Info	ші rme	d Sea	n -	
Hen	ristic	Infor	mation - Best First Search - Greedy se	arch algorit	hm .	- A*	Alc	orith	m -	
Itera	tive /	A* alg	porithm – Introduction to Local search a	algorithms -	Wha	at is	Loc	al Sea	rch	
Intro	oducti	ion to	Hill Climbing algorithms - Types of H	lill climbing	algo	rith	ns –	Intuit	tion	
of H	Hill C	limbi	ng algorithms – Simulated Annealing	- What is	sim	ulate	dan	nealir	1g -	
Simu	ulated	l Ann	ealing Vs Hill Climbing - Intuition of S	Simulated Ar	inea	ling	- Ad	lversa	rial	
searc	ch - (	Game	s - Optimal Decision in Games - Alpha	a Beta Search	n -M	linin	nax S	Search	L I	
UNI	T III	C	onstraint Satisfaction & Knowledge Re	presentation	l			6+3		

Constraint Satisfaction Problem - What is a Constraint - Constraint Satisfaction Problem in AI - Constraint Network - solving a Constraint Satisfaction Problem - Value and Variable Ordering - Constraint Propagation - Arc Consistency - Forward checking Applications of CSP - Knowledge Representation - Introduction to Knowledge based AI - Knowledge representation - Ontological Engineering - Techniques in Knowledge Representation - Introduction to Logic - What is Logic - Propositional Logic - Forward and Backward Chaining - Semantic Networks - What is Semantic Network - Intuition of Semantic Network - Expert Systems - What is an expert system - Components of an Expert system - Applications of an Expert systems

UNIT IV	Γ	Decision Makin	g Under Uncert	tainty	6+3			
What is dee	cision making	- Decision Ne	tworks - What :	is Uncertainty	- Introduction to			
Probability	- Probability	Notation - In	dependence an	d Conditional	Independence -			
Bayesian N	etworks - Ba	yes Theorem -	- What is a Ba	yesian Networ	k - Structure of			
Bayesian N	etwork - Bay	esian Network	in Python - B	uilding a Baye	sian Network in			
Python - In	Python - Inference in Bayesian Networks - Applications of Bayesian Networks - Markov							
Chains - 1	Chains - Introduction to Markov Chains - Understanding Markov Property -							
Applications of Markov Chains - Time and Uncertainty - Introduction to Hidden Markov								
Models – Intuition of Hidden Markov Model – Applications of Hidden Markov Model								
UNIT VNuances of R Programming6+3								
Introduction	n to R languag	ge –Working w	ith R language -	R Vs Python -	Installation of R			
and R studi	o - Understand	ding R studio E	nvironment - Int	roduction to R	language - Basics			
of R langua	ge (Datatypes	, Control Flow,	Functions) - Ha	ndling data in I	R - Working with			
Vectors and	d Matrices in	R language -	- Working with	n R packages -	· Linear Algebra			
Operations	in R Studio	- Web scrapin	ig in R languag	ge – Data Visu	alization in R -			
Handling te	ext data in R	- Text Processi	ing Fundamenta	als - R package	s for Text - Text			
Extraction -	Extraction - What are keywords - Characteristics of Keywords - Keywords extraction							
methods Te	methods Term Frequent - Inverse document frequency method - Text Rank - Rapid							
Keyword –	Keyword – Extraction - Benchmark Evaluation							
LECT	URE	TUTORIAL	PRACTICAL	SELF	TOTAL			

LECTURE	TUTORIAL	PRACTICAL	STUDY	TOTAL
30	15	0	15	60
TEXT BOOKS:				

# 1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein Introduction to Algorithms, PHI, 3rd Edition 2009.

2. Sara basse & A.V. Gelder Computer Algorithm – Introduction to Design and Analysis, Publisher – Pearson 3rd Edition 1999

### **REFERENCES:**

- 1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2007.
- 2. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 2002
- 3. A.V. Aho, J.E. Hopcroft and J.D. Ullman "Data Structures and Algorithms" Pearson Education Delhi, 2002

### **E-REFERENCES:**

- 1. www.tutorialspoint.com
- 2. <u>www.nptel.com</u>
- 3. www.virtuallab.ac.inLecture Slides,
- 4. Multiple Choice Questions, Animations Link:
- Pg. 39 B.Sc. Artificial Intelligence Curicullum and Syllabus Regulations 2022

<u>http://highered.mheducation.com/sites/0072967757/student\_view0/index.html</u>
Lecture Slides : <u>http://www.mhhe.com/engcs/compsci/forouzan/</u>

B Sc AI				PO				PS	50
D.SC AI	1	2	3	4	5	6	7	1	2
CO1	3		2		1	2			1
CO2	2	3	1	1	1	1		1	
CO3	1	3	2	2	2	1	1		1
CO4	1	3	2	2	2	2	1	1	
CO5		3	3	3	2	2	2	2	2
Total	7	12	10	8	8	8	4	4	4
Scaled	2	3	2	2	2	2	1	1	1
Value									

### Mapping of COs with Pos

 $1-5 \rightarrow 1, 6 -10 \rightarrow 2, 11 -15 \rightarrow 3$ 

# XAI 305- DATA BASE MANAGEMENT SYSTEM

					L	Т	Р	SS	C
XA	<b>AI30</b> 5	;			3	0	0	0	3
			DATA BASE MANAGEMENT SYSTE	EM					
С	Р	Α			L	Τ	Р	SS	Η
3	0	0			3	0	0	0	3
PRERE	QUI	SITE:	Computer Fundamentals						1
Course	Out	comes	*	Domair	۱	L	eve	1	
After th	ne co	mpleti	on of the course, students will be able to						
CO1	Bui	ld the	concept of DBMS programming and its	Cogniti	ve	R	lem	embe	er
	fun	damer	ntal	_		K	Inov	wledg	ge
CO2	Bui	<i>ld</i> an a	application program using concepts. Explain	Cogniti	ve	R	lem	embe	er
	and	impl	ement the normalization concept for a table			U	Inde	erstai	nd
	of d	lata							
CO3	Det	velop a	in application program using a data model	Cogniti	ve	K	Inov	vledg	ge
	Det	velop	the query technical processing in database						
	mai	nagem	ents						
CO4	Stu	dents	gain much needed knowledge pertaining to	Cogniti	ve	U	Inde	erstai	nd
	rela	tional	database management systems, data	Affectiv	/e	A	[pp]	ly	
	mo	dels, S	QL query processing,				- 1		-
CO5	To	under	stand the big data platform and its use cases	Cogniti	<b>Cognitive</b> Underst		erstai	nd	
	imp	leme	ntation techniques. Apply analytics on	Affectiv	7e	A	pp	ly	
	stru	ictured	and unstructured data.			0	TT		
		<u> </u>			1	9	Hr	5	
Basic L		ase $Cc$	ncepts, Terminology, and Architecture; Type	es of Data	abas	e M	ana	geme	ent
Bolotio	S, D	home	ces between Relational and other Database		$D_{\rm D}$			aenn	ng:
Entity 7	ns, 50 Turno	cnema	s, Constraints, Queries, and Opdates; Concep	otual vs.	Phys	sical	IVIC	Jaem	ng;
	rype: T	5, atti 1	RELATIONAL DATABASES			Q	Hr	2	
SOLD	ata D	efiniti	on: Specifying Tables Data Types Constraint	s Simple	SFI	FC	<u>тт</u>	» NSFI	۲
UPDA'	TF T	)FLFT	'F Statements' Complex SELECT Queries in	ncluding	Ioii	ns a	nd	Nest	ed.
Ouerie	s: Ac	tions a	and Triggers: Views: Altering Schemas Relat	ional Ale	vebra	a. D	efir	ition	of
Algebr	a: Re	elation	s as Sets: Operations: SELECT, PROJECT.	IOIN.	etc.	No	rma	lizati	ion
Theory	and	Funct	ional Dependencies, 2NF, 3NF, BCNF, 4NF, 5	NF.					
UNIT	II		DATABASE DESIGN			9	Hr	5	
Indexir	ng: Fi	les, Bl	ocks, and Records, Hashing; RAID; Replicati	on; Singl	e-Le	evel	and	l Mu	lti-
Level I	Index	es; B-	Trees and B+-Trees. Query Processing Trar	nslation o	of SC	QL	intc	Que	ery
Plans; I	Basic	s of Tr	ansactions, Concurrency and Recovery.						
UNIT I	[V		TRANSACTION MANAGEMENT			9	Hr	5	
DATA	BASE	E PRO	GRAMMING: Embedded SQL; Dynamic SQI	L, JDBC;	Avc	oidir	ng I	njecti	ion
Attacks	s; Sto	ored P	rocedures; Lightweight Data Access Layers	for Pyth	non	and	Jav	vaScr	ipt
Applica	ation	s; PHI	P and MySQL, Object Relational Modeling:	Hiberna	te fo	or Ja	ava,	Act	ive
Record	Record for Rails.								
UNIT	V A TE A		IMPLEMENTATION TECHNIQUES	16 5	1	9	Hr	5	
BIG D	ATA:	Moti	vations; OLAP vs. OLTP; Batch Processing;	MapRe	duce	an	dŀ		op;
Spark;	Othe	er Sys	tems: HBase. Working with POSIGRES, R	EDIS, M	ONC	υ,	and	a NE	LO:

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Setting up the san	ne Database on Fou	r Platforms; Basic	Queries and Repo	orting.
	1	1	_	
LECTURE	TUTORIAL	PRACTICAL	SELF- STUDY	TOTAL
45	0	0	0	45
<b>REFERENCES:</b>				
1. Abraham Sill	perschatz, Henry	F. Korth, S. S	udharshan, 2011'	'Database System
Concepts", Six	th Edition, Tata Mc	Graw Hill.		
2. RamezElmasri	, Shamkant B. Na	vathe., 2008. "Fu	undamentals of D	atabase Systems",
Fifth Edition, I	Pearson.			-
3. Raghu Ramak	rishnan., 2010. "Da	atabase Managen	nent Systems", Fo	urth Edition, Tata
McGraw Hill.		0	2	

**4.** G.K.Gupta, 2011."Database Management Systems", Tata McGraw Hill.

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

P Se AI	РО							PSO		
D.SC AI	1	2	3	4	5	6	7	1	2	
CO1	0	1	2	0	1	0	0	3	3	
CO2	0	1	1	1	0	0	0	1	1	
CO3	1	3	1	1	1	0	0	3	3	
CO4	1	3	2	1	1	1	1	3	3	
CO5	3	3	2	2	1	1	1	3	2	
Average	1	2	2	1	1	0	0	3	2	

# XAI 306 : ALLIED PHYSICS

CO1 F CO1 F CO2 F CO2 F CO2 F CO2 F CO2 F CO3 C CO3 C CO4 I a CO5 I k UNIT -I Ohms law in series a induction magnetic f	500 · Δ	ALLIED PH 15IC5	~							
C:P: $PRERE VI COURSE On the successor On the successor CO1  CO2  CO2  CO3  CO4  CO3  CO4  I a CO5  V NIT -I  Ohms law in series a induction magnetic magnetic r$	٠A		3	1	0	4				
PREREQU COURSE On the succession CO1 F CO2 F CO2 F CO3 C CO3 C CO4 I a CO5 I k UNIT -I Ohms law in series a induction magnetic m	•17	2.8:0.8:0.4	L	Т	Р	Η				
COURSEOn the successCO1CO1CO2CO2CO3CO3CO4CO5LCO5UNIT -IOhms lawin series ainductionmagnetic magnetic r	UISITE	Basic science Knowledge.	3	1	0	4				
On the success of the second	OUTCO	MES	Don	nain	Lev	vel				
CO1 CO2 CO2 CO3 CO3 CO4 CO5 UNIT -I Ohms law in series a induction magnetic magnetic r	ccessful c	ompletion of this course, students would be able t	to							
CO1 a F CO2 F CO3 C CO3 C CO4 I a CO5 L UNIT -I Ohms law in series a induction magnetic m	Recall O	nms law, <i>learn</i> about resistors and capacitors								
CO2 CO3 CO3 CO4 CO4 CO5 UNIT -I Ohms law in series a induction magnetic magnetic r	and <i>appl</i>	y knowledge to calibrate low voltmeter using	Cogr	nitive	Under	rstand				
CO2 CO3 CO3 CO4 CO4 CO5	potention	neter.								
CO3 CO3 CO4 CO4 I a CO5 L k UNIT -I Ohms law in series a induction magnetic magnetic r	CO2 Recall basic of semiconductor distinguish different types Cognitive Remember,									
$\begin{array}{c} & E \\ CO3 & C \\ CO4 & I \\ a \\ CO5 & k \\ \hline UNIT -I \\ Ohms law \\ in series a \\ induction \\ magnetic \\ magnetic \\ r \end{array}$	of diodes	and their applications.	0081		anal	lyze				
CO3 C CO4 I a CO5 I WNIT -I Ohms law in series a induction magnetic magnetic r	Examine	the structure of number systems, <i>perform</i> the	-		Under	stand				
CO4 I a CO5 L k UNIT -I Ohms law in series a induction magnetic magnetic r	conversio	n among different number systems and <i>discuss</i>	Cogr	nitive	apı	olv				
CO4 CO5 UNIT -I Ohms law in series a induction magnetic magnetic r	operation	of all the gates.			11					
CO5 L L L L L L L L L L L L L	llustrate	reduction of logical expressions <i>using</i> Boolean	Cogr	nitive	Under	stand				
CO5 k UNIT -I Ohms law in series a induction magnetic magnetic	algebra al	na k-map.	Ŭ		Ap	ply				
UNIT -I Ohms law in series a induction magnetic magnetic r	Unaerstai	<i>ia</i> the fundamental of logic design and <i>Acquire</i>	Cogr	nitive	Under	stand				
Ohms law in series a induction magnetic magnetic r					Ap	ріу 2 + 2				
in series a induction magnetic magnetic		f registance in series in parallel Specific registan		anacito	re: con	$2 \pm 3$				
induction magnetic magnetic r	and nara	lel – Electromagnetic induction: Laws of electr	omagr	apacito etic in	duction	_ self				
magnetic magnetic r	- Mutua	1 induction of coil Magnetic properties of ma	terials	· maon	etic int	ensity				
magnetic r	induction	, permeability, susceptibility – brief introducti	ion of	dia. p	ara and	l ferro				
	materials		.011 01	ulu, p	ara arro					
UNIT - II	SEM	ICONDUCTOR			(	6 +3				
Properties	s of ser	niconductors – Types of semiconductors– I	'N ju	nction	diode	-V I				
Characteri	istics– Ha	lf wave and full wave and Bridge rectifiers – Zer	ner dio	de– cha	aracteris	stics of				
Zener dioc	de -Zene	diode as voltage regulator- Photo Diode - photo	) transi	stor – I	ED.					
UNIT –III	I NUN	IBER SYSTEM AND LOGIC GATES				9+3				
. Number	r Systen	: Decimal - Binary - Octal - Hexadecimal	Numb	per Sys	tems –	· Inter				
Conversio	on – BCD	Codes –		-						
8-4-2-1 Co	odes, Exc	ess - 3 Code - Gray Code - Binary Arithmeti	c Ope	rations	- Add	ition –				
Subtraction	on – Multi	plication - Division - 1's Complement - 2's Comp	olemer	nt Binar	y Opera	ation.				
Logic Gate	es: Basic	Logic Gates AND, OR, NOT, NAND, NOR, X	OR, X	- NO	R – Un	iversal				
Building B	Blocks.									
UNIT -IV		LEAN ALGEBRA AND KARNAUGH MAPS				9+3				
Basic law	of Boole	an algebra – Demorgan's theorems – Duality Th	eorem	- Red	acing B	oolean				
expression	ns Using I	Boolean laws – Minterms – Maxterms – Sum of Pi	coducts	s - Proc	lucts of	Sums.				
3 Variable	е К – Мар	- 4 - Variable K - Map sum of product only -Sim		tion of	K-Maps	6. 0.2				
UNII -V	<b>SEQ</b>	osign: Elin Elong P/SE/E IV E/E Moster SI	AL AN	n Elon		9+3				
Synchrono	i Logic D	tors Mod 3 Mod 5 Counters	ave fil	ргюр	s – Regi	sters –				
	OKS	15 - 19100 J, 19100 J Counters.								
1 R N	Miiriioeel	an "Modern Physics" 3rd Edition S. Chand Put	olishin	j. New	Delhi 🤉	2004				
2 Elec	ctricity a	nd Magnetism, R. Murugesan, Revised Edition	5. Char	nd & Cu	)., New	Delhi.				
Rer	print (201	4)			.,	,				
Sequential Synchronc TEXT BOO 1. R M	l Logic D ous Coun OKS Murugesl	esign: Flip Flops – R/S F/F - JK F/F – Master Sla ters - Mod 3, Mod 5 Counters.	ave Fli	p Flops	<b>N</b>   5 – Regi Delhi, 2	sters – 2004.				

3. M. Morris Mano and Michael D. Ciletti, –Digital Design<sup>I</sup>, 5th Edition, Pearson, 2014.

4. Albert Paul Malvino; Donald P Leach; Goutam Saha, "Digital principles and applications", 8th Edition, McGraw Hill Education, New Delhi, 2015.

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1. Thomas L. Floyd, —Digital Fundamentals<sup>I</sup>, 10th Edition, Pearson Education Inc, 2011.

2. Jacob Millman, Christos Halkias, "Analog and Digital Circuit and Systems", 2nd

Edition, Tata McGraw-Hill Education, 2017.

### **E RESOURCES**

- Biswanath Banerjee and Amit Shaw, Department of Civil Engineering IIT Kharagpur, "THEORY OF ELASTICITY", National Programme on Technology Enhanced Learning (NPTEL),
- 2. https://nptel.ac.in/courses/105/105/105105177/
- 3. Prof. Goutam Saha, Department of Electronics & Communication Engineering IIT Kharagpur, "DIGITAL ELECTRONIC CIRCUITS", National Programme on Technology Enhanced Learning (NPTEL), <u>https://nptel.ac.in/courses/108/101/108101091/</u>
- 4. Prof. S. Srinivasan Department of Electrical Engineering, IIT Madras, "Digital Circuits and Systems", National Programme on Technology Enhanced Learning (NPTEL), https://nptel.ac.in/courses/117/106/117106086/

	LECTURE	TUTORIAL	PRACTICAL	TOTAL HOURS
Hours	45	15	-	60

# XAI 307- ARTIFICIAL INTELLIGENCE & R PROGRAMMING LAB

		ARTIFICIAL INTELLIGENCE &	INTELLIGENCE & L T P C								
XA	AI307	R PROGRAMMING LAB	0	0	1	1					
			U	U	1	1					
C:P:A		0:1.5:0.5	L	Т	Р	Н					
			0	0	1	2					
Cours	e Outcom	es Doma	in	Lev	vel						
CO1	Describe	key terminologies, concepts and Cogni	tive	Cor	nprehe	ension					
	techniqu	es employed in Statistical Analysis.		Kno	owledg	ge					
CO2	Build an	application program using Conditional Cogni	tive	Syr	Synthesis						
	Statemer	nts concepts Psych	omotor	Eva	luation	ı					
		Affect	ive	Ap	plicatic	n					
CO3	Develop	an application program using a Cogni	tive	Kno	owledg	ge					
	Modules	Psych	omotor	Coi	nprehe	ension					
	Develop	the query technical processing in Affect	ive	Ap	plicatio	m					
	database	managements		Eva	luation	1					
CO4	Explain	and <i>Implement</i> the Binary Search, Cogni	tive	Ap	plicatio	n					
	Breadth	First Search , Bubble sort concept in Psych	omotor	Eva	luation	n					
	Python .	Working with Bellman-Ford Algorithm		Syr	thesis						
	in Pytho	n									
CO5	Apply	the student Digital Profile using Cogni	Cognitive Knowledge								
	FLASK,	creating a star ship meteors game in Psych	omotor	Eva	luation	1					
	Pygame			Ap	plicatic	on 2					
10	1 0				6	U					
1.Cras	h Course	on Python – I									
2.Cras	h Course	on Python – II									
3.Impl	ementatio	on of Binary Search Algorithm in Python									
4.Impi	ementatio	on of Dubble Sort Algorithm in Python									
6 Impl	omontatio	on of A* Algorithm									
7 Impl	ementatio	on of Hill Climbing Algorithm									
8 Imp	lementati	on of Simulated Annealing in Python									
9 Build	ling Onto	logical graphs									
10.Bui	lding Sem	antic Network in Python									
11.Des	sign and E	Deployment of an Expert System									
12.Bui	lding Prol	pabilistic Models									
13.Bui	lding Bay	esian Networks in Python									
14.Bui	lding Mar	kov Chain Model									
15.Building a General Mixture Model in Python											
16.Bui	lding a Hi	dden Markov Model in Python									
17.Fur	ndamental	s of R language									
18.We	b scraping	g in R									
19.Bui	ld Data da	ashboard using Flex Dashboard									
20.Tex	t Extractio	on and Analysis in R									

# XAI 308- DATA BASE MANAGEMENT SYSTEM LAB

		DATA BASE MANAC	GEMENT S	SYSTEM	L	Τ	P	С	
XAI	[ 308	LAB	3		0	0	1	1	
C:P:A		0:1:1			L	Т	Р	Н	
					0	0	1	2	
		Course Outcomes:		Dom	ain	Ту	pe		
CO1	Analyz attribu Operat	te the organization and identities and relationships in it <i>Pr</i> ions	fy the entitie <i>actice the bas</i>	s, ic Cogni	tive	Ren Kn	Remember Knowledge		
CO2Understand and apply cardinalities for each relationship. Identify strong entities and weak entitiesRemen Under Apply						nember dersta ply	ind		
CO3	Installa Relatic	ntion of MySQL, <i>Analyze and</i> nal data base queries	Apply prope	er Cogni	tive	Kn Ap	owled ply	lge	
CO4Apply frequency charts for large data setsCognitiveUnd App							dersta ply	ind	
CO5 Apply statistical package to perform factor analysis Cognitive Understar								ind	
<ol> <li>E-r rela lika</li> <li>Co stra</li> <li>Rej</li> <li>Rej</li> <li>No dat</li> <li>Ins</li> <li>Ins</li> <li>Ins</li> <li>Ins</li> <li>Ins</li> <li>Arco</li> <li>Pra</li> <li>Co</li> <li>Pra</li> </ol>	ationshi e candic ncept de ong enti- lational present present ormaliza tabase de stallation stallation stallation detallation facticing /IL commandes: ta within actice qu nstraint	Analyze the organization and ps in it. Identify the primary l late keys, partial keys, if any. esign with E-R Model. Apply ties and weak entities (if any) Model : Represent all the enti relationships in a tabular fash tion : Apply the First, Second esigned for the organization of MySQL and practicing DI of MySQL and practicing DI of MySql. Creating database ables and databases if not req DML commands on the Datal mands are used to for managi retrieve data from a database on a table, deletes all records fr teries (along with sub queries) s etc.	cardinalities cardinalities ties (Strong, ion. l and Third N DL command s, how to cre uired. Try tr base created ng data with e, insert data om a table, th ) involving A	for each rela for each rela Weak) in tab Normalizatio Is ate tables, al uncate, renar for the exam in schema ol into a table he space for NY, ALL, IN , SUM, AVG	tions ular n leve tering me cc ple o pjects , upd the re N, and etc.,	y the hip. I fashic els or g the omma rgani . Som ates e cords d NO	dentif other on. the databa ands e zation e existin s rema T	keys fy ase, tc. a ain	
		F	LECTURE	PRACTICA			AL		
			U	00		00			

v	A 1300	ALLIED PHYSICS LABORATORY	L	Т	Р	С	
	A1307	ALLIED I III SICS LADORATORI	0	0	1	1	
	C:P:A	0.5:1:0.5	L	Т	Р	Н	
PRER	EQUISITE	Nil	0	0	2	2	
COURS On the s	SE OUTCOM	ES pletion of this course students would able to	Doma	ain	Lev	vel	
CO1	<i>Explain</i> gate with truth ta	es and <i>demonstrate</i> functions of various gate ble.	Psychon Affectiv	notor: e:	Analyze Mechar Respon	e, 1ism d	
CO2	<i>Construct</i> the voltage for ch	e regulator power supply and <i>Measure</i> the output anging input.	Cognitive Psychom	e otor	Evaluate		
CO3	<b>Recall</b> diode	es, explain circuits and its characteristics	Psychon Affectiv	notor: e:	Analyze, Mechanism		
CO4	<i>Construct</i> sin	nple circuits using logic gates.	Cognitive Psychom	e otor	Synthesis		
CO5	<i>Know</i> the corflipflops.	cepts of semiconductor storage and function of	Cognitive Psychom	e otor	Comprehension		

Ex. No	Experiments (Any Eight Experiments)							
1.	Basic Logic gates IC's verification.			CO1				
2.	Logic gates (AND, OR, NOT) – using di	screte componer	nts	CO1				
3.	Verification of De Morgan's theorem.			CO4				
4.	4. Diode characteristics							
5.	5. Voltage regulator power supply using full wave rectifier							
6.	Half adder & Half subtractor using basic	gate.		CO4				
7.	NAND & NOR as Universal Logic gates	5.		CO1				
8.	Full adder using basic gate.			CO3				
9.	RS – Flip Flop			CO5				
<b>10.</b> JK – Flip Flop								
		LECTURE	PRACTICAL	TOTAL				
	HOURS	0	30	30				

							L	Т	Р	SS	C
X	UMA002		DISAS	TER MANAGE	MENT	Г	0	0	0	0	0
С	Р	А					L	Т	P	SS	Η
2.75	0	0.25					3	0	0	0	3
PREREC	QUISTE: X	ES202									
Course	Outcomes					Don	nain		Leve	1	
CO1	Understa	<i>nd</i> and	l Recognize	the concepts of disa	aster	Cog	nitiv	'e	Unde Reme	erstar embe	nd r
CO2	<i>Recogniz</i> disaster	e and a	<i>lescribe</i> the	causes and effects o	of	Cog	nitiv	'e	Unde Reme	erstar embe	nd r
CO3	Describe	the va	rious approa	ches of risk reducti	ion	Cog	nitiv	'e	Rem	embe	r
CO4	Demonstr disaster a	<i>rate</i> th	e inter-relat	ionship between		Cog	nitiv	'e	Unde	erstar	nd
CO5	Discuss h	azard	and vulnera	bility profile of Ind	lia	Cog	nitiv	'e	Rem	embe	r
TINIT	and respo	ond to	drills related	a to relief		Affe	Ctive	5	Resp	onse	6
UNII -	I IN	TKOL	Disaster I	UDISASTEKS	tre Doo	:1:00	D	ialea			0
Concep			- Disaster, I		ity, Kes	meno					
UNIT -	$\frac{\Pi}{12}$ DI	ISAST	ERS: CLAS	SIFICATION, CAU	JSES, I	<u>MP</u>	<u>ACT</u>	<u>S</u> 1.	1 .1.1	Cl	12
Differer	itial impa	cts- in	terms of a	caste, class, gender	, age,	loca	tion,		abilit	y Gl	obal
		PPRO	CHES TO		REDIC		NI			ange	10
Disaster	ini Ai	$\frac{1 \text{ KO}}{\text{its}}$ and	alvsis Pha	ses Culture of sa	fety n	reve	ntio	n m	nitioal	tion	and
prepare	dness con	nmuni	tv based D	RR. Structural- no	onstruc	tural	me	asur	es. r	oles	and
respons	ibilities o	of- co	mmunity,	Panchavati Rai II	nstituti	ons/	Urb	an	Local	Bo	dies
(PRIs/U	JLBs), state	es, Cer	tre, and oth	er stake-holders.		,					
UNIT -	IV IN	TER-I	RELATION	SHIP BETWEEN D	DISAST	TERS	AN	D			6
Factors	affecting	Vulne	rabilities, di	fferential impacts.	impac	t of	Dev	elop	ment	proi	ects
such as	dams, er	nbank	ments, char	nges in Land-use	etc. Cli	imate	e Cł	ang	e Ad	aptat	ion.
Relevar	ce of indig	genous	knowledge	, appropriate techno	ology a	nd lo	ocal	reso	urces	- F	
UNIT -	V DI	SAST	ER RISK M	ANAGEMENT IN	INDIA	4					11
Hazard	and Vuln	erabili	ty profile of	f India Component	s of Di	isaste	er R	elief:	Wate	er, Fo	ood,
Sanitati	on, Shelter	r, Hea	lth, Waste I	Management <sup>®</sup> Institu	utional	arra	nge	ment	ts (M	itigat	ion,
Respons	se and P	repare	dness, DM	Act and Policy,	, Othe	r re	late	d po	olicies	s, pla	ans,
program	nmes and l	legisla	tion).								
The pro	ject / fielc	lwork	to understa	nd vulnerabilities v	work o	n rec	lucti	on c	of disa	aster	risk
and bui	ld a cultur	al safe	ty.		I						
LEC	TURE	TU	TORIAL	PRACTICAL	SEL	F-ST	UD	Y	T	DTA	Ĺ
	45 001/2		0	0		0			45		
TEXT B	OOKS:										
1. C	Coppola I	P Dar h-Hein	non, "Intro	oduction to Inter	nationa	al D	Disas	ter	Mana	agem	ent,
2 K	(N. Shast	ri, "Die	saster Mana	- gement in India″P	innacle	e Tec	hnol	00v	2012		
3 (	Gupta Ani	1 K. 9	Sreeja S. N	air, "Environment	al Kno	wlea	lge	for	Disas	ter I	Risk
	/anageme	nt, NII	DM, New De	elhi, 2011			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	101	- 1040	1	
L	Management, MiDW, New Denn, 2011										

- 4. Lee Allyn Davis, "Natural Disasters", Infobase Publishing, 2010
- 5. Andharia J, "Vulnerability in Disaster Discourse", JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008

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- 1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000
- 2. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

#### **E- RESOURCES:**

1. NIDM Publications at http://nidm.gov.in- Official Website of National Institute of Disaster Management (NIDM), Ministry of Home Affairs,

- 2. http://cwc.gov.in, http://ekdrm.net, http://www.emdat.be,
- 3. http://www.nws.noaa.gov, http://pubs.usgs.gov, http://nidm.gov.ini
- 4. <u>http://www.imd.gov.in</u>

### **IV SEMESTER**

Category	Course	Course Name	Credits								Hours					
	Code		L	Τ	P	SS	Tot	L	Τ	Р	SS	То				
							al					tal				
AECC 7	XGT401/	Tamil – IV/	2	1	0	0	3	2	1	0	0	3				
	XFT401	Foundational Tamil – IV	ndational Tamil – IV													
AECC 8	XGE402	English – IV	2	1	0	0	3	2	1	0	0	3				
SEC-2B	XAI 403	Operating System	3	0	0	0	3	3	0	0	0	3				
CC - 4A	XAI 404	Internet of things	2	0	0	0	2	2	0	0	0	2				
CC – 4B	XAI 405	Machine Learning With Real time Applications	3	1	0	0	4	3	1	0	0	4				
<b>CC – 4C</b>	XAI 406	Computer Networks	3	0	0	0	3	3	0	0	0	3				
CC -4A-P	XAI 407	Internet of things Lab	0	0	1	1	2	0	0	2	0	2				
CC -4B-P	XAI 408	Machine Learning With Real time Applications Lab	0	0	1	1	2	0	0	2	0	2				
GE-2		*Open Elective - To be chosen by student	3	0	0	0	3	3	0	0	0	3				
UMAN4	XUMA004	Introduction to Entrepreneurship Development	1	0	0	0	1	1	0	0	1	2				
Minor Course	XAI 409	Prolog (* Extra Credit)	1*	0	0	0	1*	1	0	0	0	1				
Extension A	Activities										2	0				
NSS,NCC,NSO,RRC and Swatch Bharath)																
Mentor Hour											1					
Library Ho	Library Hour											1				
	Total		16	2	2	0	25+ 1*	17	2	6	3	30				

## XAI403 - OPERATING SYSTEMS

x	XAI403			L	Т	Р	SS	С
	D		<b>OPERATING SYSTEMS</b>	3	0	0	0	3
C	P	A		L	1	P	SS	H
				3	0	0	U	3
PREKE	QUISI			Dor		Lorrol		
Course	After		nain		Level			
	Identi		he important computer system resources and	,				
CO1	Cogr ive	nit	Ren	nembo	er			
Ability to explain the process scheduling algorithms and Cognit Understand								
	Calcul	late scl	neduling problems	ive	e	Α	pply	
CO3	Ability	y to <i>ex</i>	press various process synchronization issues.	Cogr ive	nit	Und A	erstaı pply	nd
CO4	Indica impor	te th	e memory management techniques and of file system.	Cogr ive	nit	Und	erstaı	nd
CO5	<i>Classif</i> variou	fy fun 1s type	ctionality and have sound knowledge of s of operating system android.	Cogr ive	nit	Understand		
UNIT I	IN	VTRO	DUCTION TO OPERATING SYSTEM				1	2+3
What is	s Opera	ating	System? History and Evolution of OS, Basic	OS f	uncti	ons,	Resou	arce
Abstrac	tion, Ty	ypes o	f Operating Systems- Multiprogramming Syste	ems, B	atch	Syste	ms, T	ime
Sharing	, Systen	ns; Op	erating Systems for Personal Computers, Wor	kstatio	ons a	nd H	and-l	neld
Devices	, Proce	ss Con	trol & Real time Systems.					
UNIT I	I Pl	ROCE	SS CHARACTERIZATION				1	2+3
Process	or and	User N	Aodes, Kernels, System Calls and System Progr	rams,	Syste	em Vi	ew of	the
Process	and R	esourc	es, Process Abstraction, Process Hierarchy, Th	nreads	, Thr	readir	ng Iss	ues,
Thread	Librai	ries; I	Process Scheduling, Non-Pre-emptive and	Pre-er	nptiv	ve Sc	hedu	ling
Algorit	hms.							
UNIT I	II IN SY	TER I	PROCESS COMMUNICATION AND RONIZATION				1	2+3
Deadlo	ck, Dea	adlock	Characterization, Necessary and Sufficient C	Condit	ions	for I	Deadl	ock,
Deadlo	ck Han	dling	Approaches: Deadlock Prevention, Deadlock	Avoid	ance	and	Dead	lock
Detection	on and	Recov	ery. Concurrent and Dependent Processes, Crit	ical Se	ectior	n, Sen	napho	res,
Method	ls for	Inter-j	process Communication; Process Synchroniz	ation,	Cla	ssical	Pro	cess
Synchro	onizatio	on Prol	blems: Producer-Consumer, Reader-Writer.					
UNIT I	V M	IEMO	RY MANAGEMENT				1	2+3
Physica Partitio	al and ns, Pag	Virtua jing, Se	l Address Space; Memory Allocation Strateg egmentation, Virtual Memory. (File and I/O M	ies– F Ianage	ixed emen	and t, OS	-Varia secui	able rity)
Directo	ry Stru	cture,	File Operations, File Allocation Methods, De-	vice N	lana	geme	nt, Pi	pes,
Buffer,	Shared	Memo	ory, Security Policy Mechanism, Protection, Au	thenti	icatio	n and	l Inte	rnal

	_								
Access Aut	horizatio	n.							
LINIT V	INTRO	DUCTION TO ANI	OROID OPERATI	NG	17+3				
	SYSTE	Μ			1213				
Introductio	n to An	droid Operating Sys	stem, Android De	velopment Frame	ework, Android				
Applicatior	n Archite	cture, Android Proce	ess Management a	nd File System, Sr	mall Application				
Developme	ent using	Android Developme	nt Framework.						
ТЕСТІ	DE	TUTODIAI		SELF	ТОТАІ				
LECIU	JKE	TUTORIAL	PKACIICAL	STUDY	IOIAL				
60		15	0	15	75				
Т	ext book								
1. A Sil	berschat	z, P.B. Galvin, G. Gag	gne, Operating Sys	tems Concepts, 8t	h Edition, John				
Wile	y Publica	ations 2008.							
2. A.S.	Tanenba	um, Modern Operati	ing Systems, 3rd E	dition, Pearson Ed	ducation 2007.				
3. G.N	Jutt, Ope	rating Systems: A Mo	odern Perspective,	2nd Edition Pears	son Education				
,1997	7.								
4. W.S	Stallings,	Operating Systems, I	Internals & Design	Principles 2008 5	th Edition,				
Pren	tice Hall	of India.							
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992									
E-Referenc	es		_	_					
1 NETEL Exidence 2000 USe Bangalara [Opline] Available at:									

- 2. <u>http://nptel.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New\_index1.html</u>
- 3. <u>http://nptel.iitg.ernet.in/Comp\_Sci\_Engg/IISc%20Bangalore/Operating%20Systems.htm</u>

R Se AI	PO								0
D.SC AI	1	2	3	4	5	6	7	1	2
CO1	3	2	1						2
CO2	2	1	2	2			2		2
CO3	2	2	1				2		3
CO4	2	2	1						
CO5	2	1				1			1
Total	11	8	5	2		1	2		8
Scaled Value	3	2	1	1		1	1		2

# CO Versus PO mapping.

0-No relation 1- Low relation 2- Medium relation 3- Highly relation

# XAI 404 - INTERNET OF THINGS (IoT)

v	A T 4 0	4			L	T	P	SS	C
			INTERNET OF THINGS (Io1	Г)	2	0	0	U	2
C	$\begin{array}{c c c c c c c c c c c c c c c c c c c $							SS	Н
2	0	0			2	0	0	1	2
PRE	EREQ	UISI	TE: Students with fundamental Knowledg	ge of C &	: Py	thon	lar	nguag	е,
Sem	iconc	lucto	or and fundamentals Digital Electronics						
On the successful completion of the course, students will be able to									
Cou	rse O	utco	me	Domain			Le	evel	
Understand the definition and significance of the							wle	dge,	
CO1 Internet of Thing, Introduce the fundamental Cognitiv							lyze		
Discuss the architecture operation and including							wle	dae	
CO2	de	vices	for sensing, actuation, processing, and	Cognitive		Con	npre	hensi	on
	coi	nmu	nication	0			r -		_
	De	sign	a portable IoT using Arduino/ equivalent	~		Kno	wle	dge,	
CO3	<b>3</b>   bo	ards	and relevant protocols. Know the basics of	Cognitive,		Ana	lysis	s, Set	
	op	erati	onal Arduino IDE Installing and Setting up	Psychomoto	or				
		nlou	an IoT amplication and connect Working		Knowledge			doe	
CO4		th A	rduino for data acquisition	Cognitive		1010110080			
CO		nders	stand how to Implement application	Cognitive		Perception,			
	de de	velop	oment and tools.	coginave		Kno	wle	dge	
UN	<u>[] - ] </u>		INTRODUCTION INTERNET OF THING	u1	•	(	1	1	5
	Com	1011 2 mun	ication definitions Concepts Characteristics	ore the scene	ario	ior a	appi	licatio	n oi
Phy	sical I	Desig	n of IoT. Logical Design of IoT - IoT Function	al Blocks. Sec	ruri	tv		u 1550	105 -
UN	(T - II	:	TECHNOLOGIES BEHIND IoT			- )		1	5
Con	trol U	Jnits	Communication modules Bluetooth Zigbee	e Wifi GPS-	IO	[ Pro	otoc	ols (I	Pv6,
6Lo	WPA	N, RI	PL, CoAP etc), MQTT, , - RFID, Wireless Sensc	or Networks	We	b of [	Thin	igs ve	rsus
Inte	rnet o	f Thi	ings – Two Pillars of the Web – Architecture St	tandardizatio	on fe	or W	οТ	[	
UN	[T - II	I:	PROGRAMMING BASICS FOR IOT					1	5
Prog	gramr	ning	Fundamentals with C using Arduino IDE - U	Understandi	ng t	he A	ardu	ino I	DE -
Inst	alling	and	setting up the Arduino IDE - Connecting	the Arduino	o IL	JE W	vith	aevia	ces -
Con	dition	al S	tatements and Loops - Strings and I/O -Using	a lables / C	Lib	rarv	fun	ction	s for
Seria	al, de	lav	and other invoking functions - Working wi	ith LED and	l Sv	vitch	exa	ample	e on
Ard	uino	C Ĺił	prary functions					1	
UN	UNIT - IV :WORKING WITH ARDUINO FOR DATA ACQUISITION15								
Wor	Working with Arduino for data acquisition with IOT Devices - Understanding Sensors and								
Dev	ices -	Unc	lerstanding basic electronic components and	power elem	ents	5 - U	nde	rstan	ding
the	Input	s tro	om Sensors - Working with Temperature Se	nsors -Work	ung	W1t	h U	ltrasc	b ID
Sens	sor -V	vork	ing with humany sensor - working with M	notion Senso	- 10	vvor	KIII	g wit	

UNI	IT - V:SENSOR PROGRAMMING15										
Working with Proximity Sensor - Working with Photo Diode - Working with Accelerometer and vibration sensor - Measuring Voltage and Current Working with Arduino for data acquisition with IOT Devices - Understanding the Outputs - Activating LED Lights - Activating Relays - Activating Buzzer - Running DC Motors - Running - Stepper Motors and Servo Motors											
L	LECTURE TUTORIAL SELF - STUDY PRACTICAL TOTAL										
	45 45										
REFE	ERENCE BC	OKS:									
1	Michael M	argolis, "Arduino Coo	kbook" 2nd Editio	n, O'Reilly Medi	a, 2011						
2	Michael Co 978-0-7356	ollier, Robin Shahan, " -9722-5	Fundamentals of A	Azure", Microso	ft Press, 20	15, ISBN:					
3	Rick Raine 5093-0059- https://do	ey, "Azure Web Apps 4 4. Microsoft Azu ocs.microsoft.com/en-u	for Developers", are, "Introduction as/azure/storage/	Microsoft Press n to Microsof 'common/storag	, 2015, ISB t Azure ge-introduc	N: 978-1- Storage", tion					
4	4 . CharalamposDoukas , Building Internet of Things with the Arduino, Create space, April 2002										
5	5 Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011										
6	The Intern Olivier He	et of Things: Applicat rsent, Omar Elloumi ar	ions to the Smart nd David Boswartl	Grid and Buildi hick - Wiley -201	ng Automa 2	ation by -					

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI	РО								50
D.SC AI	1	2	3	4	5	6	7	1	2
CO1	1	2	2	1	1	0	0	1	2
CO2	1	3	1	2	2	0	1	2	2
CO3	0	3	1	2	2	1	1	2	2
CO4	0	3	0	2	2	0	1	2	2
CO5	0	3	2	1	3	1	1	3	2
Average	1	2	1	2	2	1	1	2	2

### XAI 405 - MACHINE LEARNING WITH REAL TIME APPLICATIONS

					L	Τ	Р	SS	C
X	AI40	5	MACHINE LEARNING WITH REAL	I TIMF	3	1	0	0	4
C     P     A   MACHINE LEARNING WITH REAL TIME APPLICATIONS							1		
C	P	A			L	T	P	SS	H
	$\frac{1}{1}$				3	1	0	0	4
PRE	KEQ	UISI	I.E. Foundations of Artificial Intelligence & R	programming					
On	ine su	cces	stul completion of the course, students will	be able to			т.	.1	
Cou	rse O	utco	me	Domain			Lev	el	
CO		ollect	and <i>scrap</i> data from various sources and	Cognitive	A A	Appli	icatio	on	
	0U	lla a	uataset	Psychomotor		valu		20	
<b>CO2</b> Define Data cleaning strategy and generate clean Psychomotor Knowledg						ge			
	da	ta			1	тррп	icatio	511	
CO	<b>u</b>	nder	stand data visualization techniques and	Cognitive	K	Know	vledg	ge	
	bu:	ild da	ata dashboards	Psychomotor	r A	Appli	icatio	on	
CO	l Ur	idersi	tand Machine Learning paradigms	Cognitive	0	Comp	oreh	ensio	n
CO	<b>,</b>   <sup>Bu</sup>	ild, 1	Deploy and Tune Machine Learning	Psychomotor	r   A	Appli	icatio	on	
TINI		sdels	Buthon Freentials for Mashing Learning	Affective	5	ynth	lesis.	Analy	VS1S
UN	1 - 1	ion to	Python Essentials for Machine Learning	ng? Difforman	hotu	loop "	Fradi	L: tional	<b>)</b>
Introduction to Machine Learning - What is of Machine Learning? - Difference between Traditional AI and Machine Learning - Types of Machine Learning - Tools for MachineLearning - Hypothesis search - Loss Functions - Classic Applications of Machine Learning – Essentials of Python for Machine Learning – NumPy - Crash course on Python fundamentals Working with Essentials Python libraries for Machine Learning - Introduction to NumPy - Working with N-dimensional Data in NumPy - Matrix Operations - Trace, Determinant, Inverse - Sparse Matrix - n-dimensional array - Essentials of Python for Machine Learning – Pandas - Introduction to Data frames, Data structures - Data sorting - Data Iteration - Handling Text data - Data Visualization I - Introduction to Data visualization - Significance of Data visualization - Introduction to Matplotlib - Working with Basic Plots in Matplotlib Data Visualization II - Information extraction from Graphs - Introduction to Seaborn - Density Plots - Relationship graphs - Distribution plots - Regression Plots – Introduction to Google Data studio -							h - ing ine is - ine n - ata II - io -		
UN	T - II	:	Data Preprocessing & Statistics in Machine Le	earning				15	5
Data	a Coll	ectic	on - Machine Learning Project Life cycle -	What is Data	- Tyj	pe of	Da	ta - D	)ata
Python - Data pre-processing - Is your data clean? - What is Data Preprocessing - Data cleaning techniques - Handling Missing data - Handling Categorical data - Feature scaling - Outlier Detection - Statistics for Machine Learning - Descriptive Statistics - Significance of Statistics in Machine Learning - Different Types of Statistical Methods - Measure of central tendency - Measure of Variation - Measure of Shapes - Correlation - Introduction to SciPy - Working with Descriptive Statistics using SciPy - Inferential Statistics - What is Inferential Statistics - Sampling Data - Working with Monte Carlo sampling Method - Confidence Intervals - Central Limit Theorem - Working with t distribution and Z distribution - Hypothesis Testing - Types of Errors - Performing Hypothesis Testing in Python - Probability For Machine Learning - Fundamentals of Probability Theorem - Framing Joint Distributions - Probability Estimation - Maximum A Posterior Fetimation								Data ure 3 - ls - n - tics ling d Z g in n - on -	
UN	T - II	I:	Supervised Learning					1	5

What is Supervised Learning - Various Algorithms in Supervised Learning - Applications of
Supervised Learning - Supervised Learning - Regression I - Introduction to Linear
Regression - Linear Regression - Mathematical Intuition - Data visualization - Simple Linear
Regression - Supervised Learning - Regression II - Introduction to Multiple Linear
Regression - Multiple Linear Regression - Mathematical Intuition -
Performance Measures and Model Tuning - Supervised Learning - Classification - Difference
between regression and classification - Various Algorithms in Classification - Fundamentals
of Logistic Regression - Logistic Function & Sigmoid Curve - Support Vector Machines -
Support Vector Machines Algorithm Implementation of SVM In Python - Various Kernels in
Support Vector Machines - Performance Metrics & Parameter Tuning - Confusion Matrix -
ROC Curve - Cross Validation in Machine Learning - K fold Cross Validation & Grid search -
Face Recognition using Principle Component Analysis and SVM - Ensemble Techniques -
Introduction to Decision Trees - Introduction to Random Forest - Bagging - Boosting-
Understanding Random Forest classification method - Naïve Baves Method

Introduction to Bayes Theorem - Intuition of Naïve Bayes theorem

UNIT - IV : **Recommender Systems & Unsupervised Learning** Recommender Systems - What is a recommender system? - Types of Recommender systems -

Algorithms for Recommender systems - Applications of Recommender systems - Building a Recommender system - Performance metrics in Recommender Systems - Introduction to unsupervised learning - Unsupervised Learning - Types of Unsupervised Learning applications of Unsupervised Learning - Unsupervised Learning Clustering - Introduction to Clustering Algorithms - Types of Clustering Algorithms - What is K-Means Clustering? -Improving Models - Introduction to Hierarchical Clustering - Understanding a Dendrogram - Working with Hierarchical clustering - Performance Metrics in Unsupervised Learning -Building Unsupervised Models for Image segmentation

#### UNIT - V : **Reinforcement Learning**

15

15

Introduction to Reinforcement Learning - What is Reinforcement Learning - Characteristics of Reinforcement Learning - Difference between Reinforcement Learning and Other Learning Paradigms - Sequential Decision Making - Components of Reinforcement Learning Problem - Categories in Reinforcement Learning - Applications of Reinforcement Learning -Fundamentals of - Reinforcement Learning- Markov Property - State Transition Matrix -Markov Process - Markov Reward Process - Bellman Expectation Equation - Markov Decision Process Parameters - Optimal Value Function - Optimal policy - Partially Observable Markov Decision Process - Q learning

LECTURE	TUTORIAL	SELF - STUDY	PRACTICAL	TOTAL
45	-	-	-	45

### **REFERENCE BOOKS:**

1	Machine Learning, Tom Mitchell

2 Guttag, John. Introduction to Computation and Programming Using Python: With Application to Understanding Data. 2nd ed. MIT Press, 2016. ISBN: 9780262529624

**E-REFERENCES:** 

The Elements of Statistical Learning: Data Mining, Inference and Prediction, Trevor Hastie, Robert Tibshirani, Jerome Friedman

B Sc AI		РО								
D.SC AI	1	2	3	4	5	6	7	1	2	
CO1	1	2	2	1	1	0	0	1	2	
CO2	1 3		1	2	2	0	1	2	2	
CO3	0	0 3	1	2	2	1	1	2	2	
CO4	0	3	0	2	2	0	1	2	2	
CO5	0	3	2	1	3	1	1	3	2	
Average	1	2	1	2	2	1	1	2	2	

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

## XAI 406- COMPUTER NETWORKS

					L	Τ	Р	C		
XA	AI 406				3	1	0	4		
		COMPU	TER NETWORK	S		1				
C	P A				L	Т	Р	Η		
2.8	0 0.2				3	1	0	4		
COUR	RSE OUTO	COMES		DOMAI	N		LEV	EL		
After t	the comple	etion of the course, st	udents will be able t	.0		1				
CO1	Recogniz	<i>e</i> the importance of c	omputer networks	Cognitive		Rer	neml	ber		
	and <i>explu</i>	<i>in</i> the network mode	els, media, layering.	Psychomot	or	Gu	ided			
CO2	Describe	the functionalities of	layer and <i>indicate</i>	Cognitive		Un	derst	and		
the various network connecting devices.										
CO3	Demonst	<i>rate</i> the unicast and r	nulticast routing.	Cognitive		Un	derst	and		
<u>CO1</u>	Matalian	d Charu the mustered	for real times	Psychomot	or	Res	pons	se		
CO4	Mutch ar	a <i>Show</i> the protocol	for real time	Cognitive	0.1	Ker Sot	nem	ber		
COF	application	ons.	antion laws and	Cognitivo	01	Set	1			
05	Anutyze Dociow o	simple poteors of appli	cation layer and	Psychomot	or	An Ori	aiyze	tion		
TINIT	Design a	Simple network.	MENITALS AND D			D	gilla	1011 12±2		
Introd	I I	Data Communication	Notworka Note	n I SICAL LA	Into	N		1273		
Stand	ards and	Administration N	5 - Metwork Models	Protocol I a	me	na	ти Т	$r_{\rm D}/r_{\rm D}$		
Drotoc	al Suito	The OSI Model Tra	nemission Modia	Switching	yen	ng	- 10	_1 / 11		
LINIT	II I	DATA I INK I AVFR		Switching.				12+3		
Introd	uction to	Data Link Laver - L	ink Laver Addressi	ng - Error D	otoc	tion	and	Error		
Correc	rtion - Dat	a Link Control - MA	~ – Wired LANs <sup>.</sup> Et	hernet - Wire	less	LAN	Vs –	Other		
Wirele	ess Netwo	rks - Connecting Dev	ices and Virtual LA	Ns	1000			e thei		
UNIT	III	NETWORK LAYER						12+3		
Introd	uction to	Network Laver -	Network Laver P	rotocols – U	Inica	ast ]	Rout	ing –		
Multic	ast Routin	ng.	J					0		
UNIT	IV	<b>FRANSPORT LAYE</b>	R					12+3		
Introd	uction to	Transport Layer – Tr	ansport Layer Proto	ocols – User I	Data	grar	n Pr	otocol		
– Tran	smission	Control Protocol - SC	TP.			0				
UNIT	V	APPLICATION LAY	ER AND SECURIT	Y				12+3		
Introd	uction to	Application Layer -	Standard Client Se	erver Protoco	ls –	Mu	ltime	edia –		
WWW	/ and HTT	P – FTP – Electronic	Mail – TELNET – D	NS.						
LEC	CTURE	TUTORIAL	PRACTICAL	SELF STUD	Y	Τ	OT	AL		
	60	30	0	0			90			
TEXT	<b>BOOKS:</b>									
1.	BehrouzA	A.Forouzan, "Data Co	ommunications and	Networking'	', Fif	fth E	ditic	on,		
	McGraw	Hill Education, 2013.								
REFERENCES:										
1.	Achyut S	Godbole, Atul Hahat	te, "Data Communio	cations and N	letw	orks	5″, Se	econd		
	Edition, N	New Delhi: Tata McG	raw-Hill Education,	2011.			_			
2.	Andrew S	5. Tanenbaum, David	J. Wetherall "Comp	outer Networ	'ks",	Fift	h Ed	ition,		
_	Pearson I	Education Inc., 2013.		–						
3.	William S	stallings, "Data and C	computer Communi	cations", Ten	th E	diti	on,			
	Pearson Education, 2014.									

### **E-REFERENCES**

- 1. Video Lecture Link: <u>http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e\_videonotes/tanenba</u> <u>um\_video</u>Notes.html
- 2. Lecture Slides, Multiple Choice Questions, Animations Link: <u>http://highered.mheducation.com/sites/0072967757/student\_view0/index.html</u>
- 3. Lecture Slides: <u>http://www.mhhe.com/engcs/compsci/forouzan/</u>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc		PS	PSO						
D.5C.	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	0	1	0	1	1
CO2	0	1	3 2		0	2	0	2	2
CO3	1	2	3	0	0	2	0	2	2
CO4	1 2		3	1	0	2	0	1	2
CO5	0	3	0	1	0	2	0	1	2
Average	1	2	2	1	0	2	0	1	2

# XAI 407- INTERNET OF THINGS (IoT) LAB

XAI 407	INTERNET OF THINGS (IoT	() LAB	L	T	P	C				
C.D.A	0.1 5:0 5		U	0 T	1 D	1				
C:P:A	0:1.5:0.5			1	Г 1	н э				
Course Outeon		Domain	U	0	1	2				
Course Outcom	and functionalities of various single	Domain	Dot	/el	horing					
board Describe user def	embedded platforms fundamentals. e fundamentals of IoT board, system & ined functions and arrays	Cognitive	Co	mpre	chensio	on				
CO2 Build a element interrup	Cognitive Psychomotor	Syr Eva Ap	nthes aluat plica	is ion tion						
CO3 Describi develop Arduing function hat pins	CO3 Describing the use or pin connections in Cognitive developer boards (such as Raspberry Pi and Psychomotor Arduino UNO), and identifying the pin functions, serial interface pins, power pins and bat pins									
CO4 Develop digital c	an application program using analog & ommunication with arduino and UART.	Cognitive	Ap Eva Syr	plica aluat athes	tion ion is					
CO5 Design be able received	oT applications in different domain and to analyze and evaluate the data through sensors in IoT.	Cognitive	Remembering Evaluation Application							
<ol> <li>Write a Internet of Things with Arduino program using LED &amp; resistor Blinking LED.</li> <li>Know the functioning Program detect vibration, vibration or tilt of any object give output.</li> <li>Design and Develop the Arduino program find the working of a touch sensor is simila to that of a simple switch.</li> <li>Design the system using Arduino Board respectively to generate the ultrasound usin Ultrasonic Sensor find duration and distance.</li> <li>Apply the Arduino program using smoke sensor has a built-in potentiometer that allow you to adjust the sensor sensitivity according to how accurate you want to detect gas.</li> <li>Measure the temperature using sensor, which is designed specifically to measure th hotness or coldness of an object.</li> <li>Measure the soil moisture using sensor to find Measure the Volumetric content of water.</li> <li>Develop the Arduino program using IR sensor remote, measure the heat of an object a well as detects the motion.</li> <li>Create an Arduino program using PIR sensor detects a human being moving around.</li> <li>Develop a system to control the Arduino program using DC motor, the rotor is permanent magnet.</li> </ol>										

### Table 1: Mapping COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2
CO 1	2	2	1	1	1	1	1	2	2
CO 2	2	2	1	1	1	1	1	2	2
CO 3	2	1	2	1	2	1	2	2	2
CO 4	2	2	1	2	1	2	1	2	2
CO 5	1	2	1	1	2	1	1	2	2
Total	09	09	06	06	07	06	06	10	10
Course	3	3	2	1	2	2	2	3	3

0-No relation 3- Highly relation 2- Medium relation 1- Low relation

### $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$

# XAI 408 - MACHINE LEARNING WITH REAL TIME APPLICATIONS LAB

		МА	CHINEI	EADNIN		БАТ	L	Т	Р	С	
	AI 408	IVIA		EAL	0	0	1	1			
C:P:A		0:1.5:0.	5		L	Т	Р	Н			
							0	0	1	2	
Cours	e Outcomes	s				Doma	in	Lev	vel		
CO1	Collect an	nd scrap o	Cognit	ive	Ap	plicat	tion				
	<i>uild</i> a dat	aset	Psycho	motor	Ev	aluate	ۯ				
CO2	Define Dat	ta clean	Psycho	omotor	Re	memł	pering				
	data							Ap	plicat	tion	
CO3	Understar	nd data	vienalizat	ion tochnic	has and	Cognit	ive	Re	memł	pering	
	build data	nu uala 2 dashba	visualizat		ques anu	Psycho	motor	Ap	plicat	tion	
CO4	4 Understand Machine Learning paradigms Cog							Co	mpre	hension	
	Understand Machine Learning paradigms										
CO5	Build Den	nou and	Tune Ma	chine Lear	nino	Psycho	omotor	Ap	plicat	tion	
	Models Affe							Sy	nthesi	IS	
	modelb							Ar	alysis	3	
										60	
1.	Crash Cou	rse on P	ython								
2.	Working w	vith Nun	nPy in Pyt	thon							
3.	Working w	vith Pano	das in Pyt	hon							
4.	Data Visua	alization	using Ma	tplotlib and	l Seaborn						
5.	Building a	Data da	shboard u	ising Googl	e Data studi	0					
6.	Data Prepr	cocessing	g in Pytho	n							
7.	Feature Sca	aling in I	Python		G . ID						
8.	Working w	vith Desc	criptive St	atistics usir	ig SciPy						
9. 10	Working w	vith Infe	rential Sta	tistics using	g SciPy						
10.	Hypotnesis	s Testing		• • • •	11	•1 •7 т					
11.	Building a	Simple I	Linear Keg	gression MC	Jadel using 50	Cikit Lea	irn				
12.	Building a	Logistic	Pogrania	egression N		SCIKIT L	earn				
13.	Building a	Building on Image recognition model using SVM and DCA									
14.	Emoii Class	athad									
15. 16	Snam Doto	emou									
17	Gender Ba	sed Voic	e Recomi	tion using	insimervice	d learni	nσ				
17.	Building ar	n Uneun	ervised I a	earning mo	del usino Hi	erarchi	чв ral Clue	tering			
10. 19	Building a	Recomm	ender Sw	stems in Pv	act using Th thon			, cring			
20	Implement	tation of	Dynamic	Programm	ing in Pytho	n					
21.	Implement	tation of	O learnin	g in Python							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO	PSO 2
								1	
CO 1	2	2	2	2	1	2	1	2	2
CO 2	3	3	1	3	2	1	1	2	2
CO 3	2	2	2	3	2	3	2	2	2
CO 4	3	2	1	2	2	2	1	3	2
CO 5	1	3	2	1	2	1	1	2	3
Total	11	12	08	11	09	09	06	11	11
Course	3	3	2	3	2	2	2	3	3

Table 1: Mapping COs with POs:

0-No relation 3- Highly relation 2- Medium relation 1- Low relation

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$ 

### **V SEMESTER**

Category	Course	Course Name		Credits Hours								
	Code		L	Τ	Р	SS	Total	L	Τ	Р	SS	Total
SEC-3B	XAI 501A	.NET Technologies	3	0	0	0	3	3	0	0	0	3
	XAI 501B	Programming in Java	3	0	0	0	3	3	0	0	0	3
	XAI 501C	Open source software	3	0	0	0	3	3	0	0	0	3
DSE-5A	XAI502A	Neural Networks	3	1	0	0	4	3	1	0	0	4
	XAI502B	Pattern Recognition	3	1	0	0	4	3	1	0	0	4
	XAI502C	Image Processing	3	1	0	0	4	3	1	0	0	4
	XAI502D	Fuzzy logic	3	1	0	0	4	3	1	0	0	4
DSE-5B	XAI503A	Natural Language Processing	2	1	0	0	3	2	1	0	0	3
	XAI503B	Computer Vision Open CV	2	1	0	0	3	2	1	0	0	3
	XAI503C	Sentiment Analytics	2	1	0	0	3	2	1	0	0	3
DSE-5C	XAI504A	System Security	3	1	0	0	4	3	1	0	0	4
	XAI504B	Network Security	3	1	0	0	4	3	1	0	0	4
	XAI504C	Ethics of AI	3	1	0	0	4	3	1	0	0	4
DSE-5A	XAI505A	Natural Language Processing Lab	0	0	2	0	2	0	0	4	0	4
Lab	XAI505B	Computer Vision Open CV Lab	0	0	2	0	2	0	0	4	0	4
	XAI505C	Semantic Analytics Lab	0	0	2	0	2	0	0	4	0	4
SEC-3B	XAI 506A	.NET Technologies Lab	0	0	1	0	1	0	0	2	0	2
	XAI 506B	Programming in Java Lab	0	0	1	0	1	0	0	2	0	2
Lab	XAI 506C	Open source software Lab	0	0	1	0	1	0	0	2	0	2
GE-3		*Open Elective - To be chosen by student	3	0	0	0	3	3	0	0	0	3
UMAN5	XUMA005	Cyber Security	2	0	0	0	2	2	0	0	0	2
		mentor libra	ry ho	ours	1	1	1	1	1		2	2
	XAI508	IPT 21 Days	0	0	0	0	2	0	0	0	0	0
		Total	14	3	4	0	24	14	3	8	2	30

## XAI 501A .NET TECHNOLOGIES

				CILC					
Ň		~ .			L	Т	Р	S S	C
Х	BC50	3A			3	0	0	0	3
		[	DOT NET TECHNOLOGIES						
С	Р	Α			L	Т	Р	S S	н
2.8	1	0.2			3	2	0	0	8
PRE	REQU	JISITE	: Nil						
COL	JRSE	OUTC	OMES:			1			
	.1		Course Outcomes	Domai	n		Lev	vel	
After	r the c	comple	tion of the course, students will be able to						
COI	Re	ecogniz	e the basics of .net frame work	Cognitive Psychomoto	or 1	Rem Perc	em epti	ber ion	
CO2	Ex	press a	and <i>relate</i> decision and iteration control	Cognitive	1	Und	erst	and	d
	stı	ructure	s to implement programs	Psychomoto	r 1	Perc	epti	ion	
CO3	Pr	<i>edict</i> a	nd <i>Create</i> database connection and	Cognitive	1	Und	erst	and	d
	m	anipuli	ate the data source	Psychomoto	r 1	Resp	ons	se	
CO4		<i>100se</i> a	nd <i>Apply</i> controls and <i>reproduce</i> well-	Cognitive		Rem	em	ber	
<u> </u>	stı	ucture	d .NET applications	Psychomoto	r.	Resp	ons	se	
CO5	Ca	nstruc	t and <i>demonstrate</i> various real-world	Cognitive		Create			
TINT	ap	plicati	ONS IN ASP.NET WITH C#	Psychomoto	otor Mechanism				
UNI	11		ACDUCTION TO .NET FRAMEWORK	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1		9	1		
Man	aged	Code	and the CLK- Intermediate Language, Meta-	ata and JII	l C(	ompi		on. 1T	-
Eron		k Class	Jibrary NET objects ASP NET NET web	g the INEL	rran ndo	lew(	JIK-	• 11 nc	le
I INII'	T II		CODUCTION TO C# NET	sei vices – vvi	nuo	0 0	011	115	
Varia	ables	and c	constants $-$ data types $-$ declaration Opera	itors - type	s _	nre	red	enc	ρ
Expr	essio	is. Pro	gram flow – Decision statements – Loop state	ements – Va	lue (	data	tvi	pes	-
Struc	tures	, Enur	nerations. Reference data types- Single dime	nsional – M	lulti-	dim	ens	ion	al
array	∕s – ja	gged a	rrays – dynamic arrays Windows programming	g– creating w	vind	ows	For	ms	5 —
wind	lows	control	s -Events. Menus and Dialog Boxes- Creating r	nenus – men	u ite	ms -	- co	nte	xt
ment	u – Us	sing dia	alog boxes - showDialog () method.						
UNI	ΓIII	APP	LICATION DEVELOPMENT USING ADO .N	ET		9			
Arch	itectu	re of A	ADO.NET - ADO.NET providers - Connection -	- Command ·	- Da	ta A	dap	oter	: –
Data	set. 4	Accessi	ng Data with ADO.NET - Connecting to Data	Source, Acco	essir	ıg D	ata	wi	th
Data	set a	nd Dat	a Reader - Create an ADO.NET application - Us	ing Stored Pr	oceo	lure	<b>S</b> .		
			RODUCTION TO ASP.NET	V' 1 D'		9	110	<u> </u>	
ASP.	NEI	Featur	es: Change the Home Directory in IIS - Add a	Virtual Dire	ctory	/ 1N	IIS	Set	a 1
Defa	ult D	ocume	nt for IIS - Change Log File Properties for IIS	- Stop, Start,	or I		e a	VV e	ed
Site.	role	Conti	ng Controls for Applications Adding web	controls to	npu	τνά Pogra	ina S	anc	m
Cont	rols -	Types	of Server Controls - Adding ASP NET Code to	Page	aı	age	. 0	erv	eı
UNI	T V		LICATIONS OF ASP.NET WITH C#	1 1 USC.		9			
Wind	lows	Applic	cation: Creation of Media Player. Web Applica	tions: Iob Pa	ortal	, E-r	nai	l ar	nd
SMS	Serve	er, Onli	ne food ordering System.			_			

LECTURE	TUTORIAL	PRA	CTI	CA	L			S ST	ELI TUI	F- DY	TOTAL	
45	0		0					0			45	
TEXTBOOKS												
1. David Cha	ppell, "Understandi	ing .N	ЕΤ",	2n	d Ec	litio	n, /	\dd	iso	n-V	Vesley Professiona	
2006.												
2. Andrew Tre	2. Andrew Troelsen, PhilJapikse , "Pro C# 7 With .NET and .NET Core", Apress, 2017.											
3. Matthew Macdonald, "ASP.NET: The Complete Reference", McGraw Hill Education,												
2017.	2017.											
1. REFERENC	CES											
1. Herbert Sch	uildt, "C# 4.0 The Co	omplete	e Ref	ere	nce"	, Mc	Gra	w-l	Hill	l Ed	lucation, 2010.	
1. Marino Pos	adas, "Mastering C#	# and .	NET	Fra	amev	vork	:", I	Pack	t P	ubl	ishing, 2016.	
2. 3. Paul	Deitel and Harvey	<sup>7</sup> Deite	el, "N	Visu	ial C	С# Н	low	to	Pr	ogr	am", Prentice Hal	
Pearson Ed	ucation Limited; 6th	editio	n (20	)17)	•							
3. E-REFEREN	NCES											
1. www.tutor	ialspoint.com											
2. www.micro	osoft.com/net											
3. WWW.W3SC	hools.com/aspnet					•						
	C	.Os vei	sus	PO	s ma	ppu	ng					
	R Se AI				PO				PS	<b>50</b>		
	D.5C AI	1	2	3	4	5	6	7	1	2		
	CO1	3				1		1				
	CO2	2	2	1	2	3	0	2	1			
	CO3	2	3	2	2	3	1	2	2			
	CO4	2	3	2	2	3	0	2	2	3		
	CO5	1	3	3	2	3	1	2	3	2		
	Total	10	11	8	10	13	2	9	8	5		
	Scaled Valu	ie 2	3	2	2	3	1	2	2	1		
		153	16	10	àD	11 1	5à	3				

# XAI 501B- PROGRAMMING IN JAVA

XAI 501B			PROGRAMMING IN JAVA		L 3	Т 0	P 0	S S 0	C 3	
С	Р	Α		L	T	Р	S S	н		
3.5	0.5	0			3	0	0	0	3	
PREI										
Cour	n	Leve	el							
After										
CO1	Re Ma	cogi anag	<i>uize</i> and <i>Express</i> the fundamentals of Data Base gement System and Relational database system	Cognitive	2	Rem Und	emt erst	oer and		
CO2	<i>Re</i> an	cogn d Ste	<i>uize</i> and <i>Explain</i> the Transaction Management orage implementation techniques	Cognitive	2	Rem Und	eml erst	oer and		
CO3	<b>Sketch and show</b> the Relational data base design for the real time application.Cognitive Psychomoto r									
CO4	An qu	<i>aly:</i> erie	2	Analyze Apply						
CO5	De for	oto	Origination							
UNI	ГΙ		INTRODUCTION					Ģ	9+6	
Fund Lang	lamer uage	ntals - C	of Object-Oriented Programming – Java Ev Constants, Variables and Data Types – Operator ranching Decision Making and Leoning	olution – s and Exp	Ove press	ervie ions	w c - D	of Ja Jecis	ava ion	
UNI	<u>пе а</u> Г II	iu D	CLASSES OBJECTS AND METHODS					(	9+6	
Intro	ducti	on -	Defining a Class - Adding Variables - Adding	Methods	– Cre	eatin	σO	biect	s –	
Acces	ssing	Cla	ss Members - Constructors - Method Overloadin	ng – Static	Men	nber	5 – I	, Vest	ing	
of M	letho	ds –	Inheritance - Overriding Methods - Final Va	ariables ar	nd M	[ethc	ds -	- Fi	nal	
Class	ses – l	Final	lizer Methods - Abstract Methods and Classes - `	Visibility (	Contr	ol				
UNI	ΓIII		ARRAYS, INTERFACE AND PACKAGES					ç	9+6	
Array	ys - (	Dne-	Dimensional Array – Creating an array – Two-I	Dimension	al A	rray	– St	ring	;s –	
Vecto	$\frac{\text{ors} - 1}{1}$	Wra	pper Classes – Interfaces: Multiple Inheritance –	Packages						
Croat	L IV	Thro	ada Extending the Thread Class Stopping	and Black	ing	Th	road	S T	ifo	
Creat Cycle Syncl - Ty Thro	e of a hroni pes o wing	a Th zatio of Ei our	ads – Extending the Thread Class – Stopping a read – Using Thread Methods – Thread Ex on – Implementing the 'Runnable' Interface – Ma rrors – Exceptions – Multiple Catch Statement own Exceptions	ceptions - anaging Er s - Using	ing a Th rors Fina	read and lly S	Pri Exce	orit orit eptio mer	y – ons nt –	
UNI	ГΥ		APPLET PROGRAMMING					Ģ	9+6	
Intro Appl Appl	Introduction – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML File – Running the Applet – Passing Parameters to Applets – Getting Input from the User - Abstract Windowing Toolkit									

LECTURE	TUTORIAL	PRACTICAL	SSSS SELF- STUDY	TOTAL								
45	-	30 -		75								
REFERENCES	REFERENCES:											
1. Bruce H	Eckel, Thinking i	n Java (4 <sup>th</sup> edition) He	rbert Schildt,									
2. Java: T	he Complete Ref	erence (9 <sup>th</sup> edition)										
3. Y. Dani	iel Liang, Introdu	uction to Java Program	nming (10 <sup>th</sup> edition)									
4. Paul De	eitel, Harvey Dei	itel, Java: How To Pro	gram (10 <sup>th</sup> edition)									
5. Cay S. 1	Horsttnann, Core	e Java Volume I –Fund	5. Cay S. Horsttnann, Core Java Volume I –Fundamentals (10 <sup>th</sup> edition)									

# XAI 501C- OPEN SOURCE SOFTWARE

					L	Т	Р	С									
XAI 501C			OPEN SOURCE SOFTWARE	3	0	0	3										
	<u>, , , , , , , , , , , , , , , , , , , </u>		(PHP/MySOL))			1											
C	$\frac{1}{2} P A \qquad \qquad$																
2.8																	
PRE	EREQ		: Operating Systems, Programming in C														
OB	ECI.	IVE:	sime arter as of logening Orace Course Coffee														
	Kealize the importance of learning Open Source Software																
	Understand the concepts in USS																
Apply the knowledge in real time applications     COURSE OUTCOMES     DOMAIN     LEVEL																	
Afte	r tho	complo	tion of the course students will be able to	DOMAI	.1N			CL									
Alte		comple	the terminologies and licensing factors of														
CO		pen Sou	rce Software	Cognitive	<u>)</u>	Rei	mem	ber									
CO2	2 Ex	<i>press</i> th	e significance of Open Source Software	Cognitive	j	Un	ders	tand									
	En	<i>nploy</i> th	ne understanding of Open Source Software	<u> </u>		•	1										
CO	3 an	nd active	ely <i>participate</i> in teams for the	Cognitive	<u>j</u>	Ap	ply	1									
	de	evelopm	ent of open source software projects	Affective		Res	spon	d									
CO4	<b>Utilize</b> the open source tools effectively in the real						Apply										
CO	world applications.																
	<b><u>205</u></b> Design the Open Source Web applications Cognitive																
<b>T</b>				1			9 C										
Dev com mov	elopr merc vemer	ment M cial soft nt - Cer	Iodel Licences and Patents, FOSS, BSD, I ware vs. Open Source software Commercia tification courses issues -global and Indian.	Free Softw I aspects Copyrights	vare of ( s ar	Mc Oper d co	vem Sou py l	ent, urce efts,									
Арр	mcati	ion of O	pen Sources. Problems with traditional comm	ercial softw	vare	2 											
U	nit I	I	Open source scripting Language				9										
Wha Elem Usin	t is PH ients · g Fun	HP? - Bas - Using V ctions.	ic Syntax of PHP – programming in web environme ariables - Constants – Data types - Operators ; State	nt - Commoi ments – Wo	n PH rkin	P Scr g Wit	ipt h Arr	ays -									
U	NITI	III P	HP File Handling			9											
Crea	ating	Functio	ns - Reading Data in Web Pages - PHP Brows	er - Handl	ing	Pow	er, C	OOP									
- Str	ing N	Aanipul	ation and Regular Expression , File and Direc	tory Hand	ling	, W0	orkir	ng									
Wit	h For	ms, Intr	oduction to advanced PHP concepts Object-C	Priented Pr	ogr	amm	ning	-									
Adv	vance	d Objec	t-Oriented Programming .														
U	NIT	IV C	CSS and Ajax				9										
Ajay	< - A(	dvanced	l Ajax – Drawing Images on the Server.														
U	NIT	<b>V</b> 0	pen source database management System: MySQL				9										
Intr	oduct	tion-Se	tting up an account - Starting, Terminating ar	nd writing	you	r ow	n M	ySQL									
Prog	gram	s - Reco	rd Selection Technology - Working with Strin	gs - Date a	nd	Time	e – So	orting									
Que	ery R	Results	module - Generating Summary - Workin	g with M	leta	data	_	Query Results module - Generating Summary - Working with Metadata - Using									

Pg. 69 B.Sc. Artificial Intelligence - Curicullum and Syllabus -Regulations 2022

Sequences – MySQL and Web PHP and SQL database: PHP and LDAP ; PHP Connectivity ; Sending and receiving emails , PHP Database Connectivity: Retrieving data from MySQL - Manipulating data in MySQL using PHP

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

#### **TEXT BOOKS:**

1 "Understanding Open Source and Free Software Licensing" By Andrew M. St. Laurent - O'Reilly Media Publications

2. The PHP Complete Reference, Steven Holzner, McGraw Hill Education, 2007

**REFERENCES:** 

1."Open Source Licensing" By Lawrence Rosen, Prentice Hall Publications

2."Linux System Programming" By Robert Love, O'Reilly Media Publications

**E-REFERENCES:** 

1.http://git-scm.com/

2.http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/

3.http://www.gnu.org/philosophy/

4.https://www.gnu.org/software/gawk/manual/

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

DCa	РО								0
D.3C.	1	2	3	4	5	6	7	1	2
C01	3	2	1	1	0	1	0	1	1
CO2	0	1	3	2	0	2	0	2	2
CO3	1	2	3	0	0	2	0	2	2
CO4	1	2	3	1	0	2	0	1	2
CO5	0	3	0	1	0	2	0	1	2
Average	1	2	2	1	0	2	0	1	2

# XAI 502A- NEURAL NETWORKS

						-	-	<b>D</b>	66				
XAI502A							T	P	55	C			
C P A		- NEU	NEURAL NETWORKS						3 11				
	r 0	A 05	_			L 2	1	P 0	55	<b>H</b>			
2.3 Dro Do		0.5	Lincor algohno			3	U	U	0	3			
COURSE OUTCOMES DOMAIN LEY													
COUR	COURSE OUTCOMES DOMAIN L												
CO1	CO1 <i>Recognize</i> the importance of Neural Network         Cognitive         Remember           CO2         Identifies the mode of Artificial Neural         Neural												
02	CO2 <i>Identify</i> the needs of Artificial Neural Cognitive Understand												
CO3	Den	nonstr	ate the Perceptro	n Models.	Cognitive		Арр	oly					
CO4	Illu Alg	<i>strate</i> orithn	the concept	Back propagation	Cognitive		Арр	oly					
CO5	Der	velop	and Establish	the Radial basis	G		0						
	net	works			Cognitive		Cre	ate					
UNIT	I	INT	<b>RODUCTION T</b>	O NEURAL NETW	ORKS				12+3	3+3			
Introdu	iction	, Hu	mans and Co	mputers, Organiz	ation of t	the	Brair	1, I	Biolog	ical			
Neuror	n, Bi	iologic	al and Artific	cial Neuron Mo	dels, Char	acter	istics	of	: AN	JN,			
McCull	loch-F	itts M	odel, Historical D	evelopments, Poter	ntial Applica	tions	of A	NN.					
UNIT	II	ESS	ENTIALS OF AF	<b>TIFICIAL NEURA</b>	L NETWOR	RKS			12+3	3+3			
Artifici	Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron												
Activat	Activation Function, ANN Architectures. Classification Taxonomy of ANN –												
Connec	ctivity	, Le	arning Strateg	y (Supervised,	Unsupervi	sed,	Re	info	rceme	nt),			
Learnir	ng Ru	les.	0 0		-					,			
UNIT I	II	SIN	GLE LAYER FEE	D FORWARD NE	<b>FWORKS</b>				12+3	\$+3			
Introdu	uction	, Pe	rceptron Mode	ls: Discrete, Co	ontinuous	and	Мı	alti-C	Catego	ory,			
Trainin	g Al	lgorith	ms: Discrete a	nd Continuous P	erceptron 1	Netw	orks,	Li	mitati	ons			
of the F	Percep	tron N	lodel.										
UNIT	IV	MU	LTI- LAYER FEE	D FORWARD NET	<b>WORKS</b>				12+3	\$+3			
Credit	As	ssignm	ent Problem,	Generalized	Delta Ru	ıle,	Der	ivat	ion	of			
Backpr	opaga	ation	(BP) Training	g, Summary o	f Backpro	paga	tion	A	lgoritł	nm,			
Kolmog	gorov	Theor	em, Learning Dif	ficulties and Impro	vements.				_				
UNIT	V	RAI	DIAL BASIS NET	WORKS					12+3	\$+3			
Radial	basis	netwo	rks: Radial basis	network - training	RBF networ	ks - g	rossł	berg	netwo	ork:			
Basic r	onlin	ear m	odel - two layer	competitive netw	vork - Adap	otive	resor	nanc	e theo	ory:			
Overvi	ew of	adapt	ive resonance-La	yer 1-Layer 2 -Learr	ning Law:L1	-L2 ar	nd L2	2-L1-	Hopfi	eld			
networ	k.												
LEC	TURI	E	TUTORIAL	PRACTICAL	S SEI STU	LF JDY		ТО	TAL				
60         15         0         15         75+15													
TEXT I	BOOF	<b>KS</b>											
]	Martin T. Hagan, Howard B. Demuth, Mark H. Beale, Orlando De Jesus, "Neural												
Network Design "(2nd Edition), ISBN-10: 0- 9717321-1-6,ISBN-13: 978-0-9717321-1-7													
Tariq Rashid, "Make Your Own Neural Network", 2016													
9	Simon Haykin, "Neural networks and Learning Machines" (3rd Edition), ISBN-13:												
9	978-01	131471	399, ISBN-10: 013	1471392, Prentice H	[all, 2008.								

REFERENCES
Satish Kumar, "Neural Networks: A Classroom Approach", Tata McGraw-Hill
Publishing Company Limited, New Delhi, 2004.
James A. Freeman and David M. Skapura, "Neural Networks Algorithms,
Applications, and Programming Techniques, Pearson Education (Singapore) Private
Limited, Delhi, 2003.
Christopher M. Bishop, "Neural Networks for Pattern Recognition", Springer, 2006
Kevin Gurney, "An introduction to neural networks", UCL Press Limited is an
imprint of the Taylor & Francis Group, ISBN 0-203-45151-1 Master e-book ISBN,
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E-REFERENCES
https://www.simplilearn.com/tutorials/deep-learning-tutorial/what-is-neural-
network
http://neuralnetworksanddeeplearning.com/
https://cs.stanford.edu/people/eroberts/courses/soco/projects/neural-
networks/Sources/index.html

DCAL			Р	0				PS	50
D.5C AI	1	2	3	4	5	6	7	1	2
CO1	2	2	2	2	2	2	1	2	1
CO2	2	3		2	2		3	2	
CO3	3		2	1		2	2		
CO4	2	1	2	3	1			2	1
CO5	2	1	1	3		3	1	2	
Total	11	7	7	11	5	5	7	8	2
Scaled	3	2	2	3	1	1	2	2	1
Value	5	2	2	5	1	1		2	1

Table 1: Mapping of Cos with POs.

 $1 - 5 \rightarrow 1, \qquad 6 - 10 \rightarrow 2, \qquad 11 - 15 \rightarrow 3$ 

0-No relation 1-Low relation 2-Medium relation 3-Strong relation
# XAI 502B- PATTERN RECOGNITION

					L	T	P	C
x	XAI 502	2B	<b>ΒΑΤΤΕΡΝΙ ΒΕΛΟΛΝΙΤΙΟΝΙ</b>		3	0	0	3
C	D		PATTERN RECOGNITION		т	T	р	тт
20	r A	<u> </u>			2	0	r 0	<u>п</u> 2
Z.O PREI		0.2 ISITE	• Operating Systems Programming in C		3	U	U	3
ORIE	ALQU FCTIV	E.	Operating Systems, 110gramming in C					
•	1 To	L. unde	rstand Fuzzy Pattern Classifiers and Percenti	on				
	2 To	) enab	le students to critically analyze design and c	eate innos	zati	vo nr	odu	rte
•	and	soluti	ons for the real life problems		au	ve pi	ouu	213
•	3 To	explo	ore different classification models					
•	4 To	study	v about feature extraction and structural patte	ern recoon	itio	n		
	1, 10	Jour	COURSE OUTCOMES	DOMAI	N		EVI	EL
After	the co	mplet	tion of the course, students will be able to		-	1		
	Criti	cally	analyze a problem, identify, formulate and					
CO1	solve	e pro	blems in the field of AI Engineering	Cognitive	2	Rer	nem	her
	cons	iderin	g current and future trends.	cognitiv	-		110111	<i>U</i> CI
	App	ly :	mathematical foundations, algorithmic					
CO2	prine	ciples	and AI with computer science theory in the	Cognitive	c	Un	ders	tand
00-	mod	eling	and design of computer based systems of	00811111				i i i i i i i i i i i i i i i i i i i
	vary	ing co	mplexity					
CO2	Expl	ain	and compare a variety of pattern	Cognitive	ۆ	Ap	plv	
COS	class	sificat	ion, structural pattern	Affective		Res	pon	d
	11+;1;	ize the	open source tools effectively in the real				1	
CO4	worl	ld ann	lications	Cognitive	Ş	Ap	ply	
	Desi	gn to	the Apply pattern recognition techniques to					
CO5	real-	world	problems such as document analysis and	Cognitive	ć	Ap	ply	
	reco	gnitio	n	0			. ,	
U	NIT I	I	NTRODUCTION				9	
Over	view	of Pa	ttern recognition - Discriminant functions	- Superv	vise	d lea	rnin	g -
Parar	metric	estin	nation – Maximum Likelihood Estimatio	n – Baye	esia	n pa	iram	eter
Estim	nation	- P1	roblems with Bayes approach– Pattern	classificati	on	by	dista	nce
funct	ions –	Minir	num distance pattern classifier.					
UN	II TIN	C	LUSTERING				9	
Clustering for unsupervised learning and classification - Clustering concept - C Means							/leans	
algorithm - Hierarchical clustering - Graph theoretic approach to pattern Clustering -								
Valid	lity of	Cluste	ers.					
UN	JIT III	S	<b>FRUCTURAL PATTERN RECOGNITION</b>				9	
Elem	nents c	of form	nal grammars – String generation as pattern	descriptio	on -	- Rec	ogni	tion
of syn	ntactic	descr	ription – Parsing – Stochastic grammars and a	applicatior	ns –	Grap	oh ba	ased
struc	tural r	eprese	entation.			1		
UN	IT IV	N	IARKOV MODELS				9	

State Machines – Hidden Markov Models – Training-classification-support vector machine-Feature selection.

**UNIT V** RECENT ADVANCES

Fuzzy logic – Fuzzy Pattern Classifiers – Pattern Classification using Genetic Algorithms – Case Study Using Fuzzy Pattern Classifiers and Perception.

9

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

**TEXT BOOKS:** 

1.Robert J.Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley & Sons Inc., New York, 1992.

**2**. Tou and Gonzales, " Pattern Recognition Principles", Wesley Publication Company, London,

**REFERENCES:** 

M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011.
 S.Theodoridis and K.Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press, 2009.

3. Robert J.Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley & Sons Inc., New York, 1992.

4. C.M.Bishop, "Pattern Recognition and Machine Learning", Springer, 2006. 5. R.O.Duda, P.E.Hart and D.G.Stork, "Pattern Classification", John Wiley, 2001

6. Andrew Webb, "Stastical Pattern Recognition", Arnold publishers, London, 1999.

			·		0				· /		
DCa	РО								PSO		
D.3C.	1	2	3	4	5	6	7	1	2		
CO1	2	2	1	2	2	1	3	1	1		
CO2	2	2	1	2	2	2	3	2	2		
CO3	2	2	2	1	2	2	2	2	2		
CO4	2	2	1	1	3	2	2	1	2		
CO5	2	3	2	2	1	2	3	1	2		
Average	2	2	2	2	2	2	2	1	2		

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

## XAI 502C- IMAGE PROCESSING

х	AI502	2C	-	L 3	T 0	P 0	S S 0	C 3		
C	Р	Α		-	L	Т	Р	S S	н	
2.5	0.5	0	-	-	3	0	0	0	3	
PRE	REQU	JISIT		DOM			<b>T T</b>			
A fto	u tha		COURSE OUTCOMES	DOMA	IN		LE	VEL		
CO1		ompi	a the significance image fundamentals and							
COI	ma	Cognitive		R	eme	mbe	r			
CO2	Exp tecl	oress t nnique	he knowledge on image enhancement	Cognitive	1	U	nde	star	nd	
CO3	Em rec	<i>ploy</i> a onstru	nd understand the image restoration and ction procedures	Cognitive		А	pply	T		
CO4	Uti pro	<i>lize</i> ar cedur	d exploit the image segmentation es.	Cognitive		A	pply	τ		
CO5	Rea	cogniz	<i>e</i> thecolor models.	Cognitive		Create				
UNI	ТІ	]	DIGITAL IMAGE FUNDAMENTALS						9	
and Pixe Geoi	Discr ls, Sc netry	imina ome l , Persj	tion, Image Sensing and Acquisition, Image S Basic Relationships between Pixels, Coordin pective Projection, Linear and Nonlinear Operat	Sampling ate Con ions.	and	l Qu tion	iant s, Ii	izati mag	on, ing	
UNI	ΤIΙ	]	MAGE ENHANCEMENT						9	
Imag Histo Smo	ge Enl ogran	hancer n Equ z Filte	nent in the Spatial Domain: Intensity transform alization, Correlation and Convolution, B rs. Sharpening Filters, Gradient and Laplacian	mations, asics of	Cor Sp	tras atia	tStre Fi	etchi lteri	ng, ng,	
UNI	T III		FILTERING IN THE FREQUENCY DOMAIN						9	
Filte	ring	in th	e Frequency domain: Hotelling Transform,	, Fourier	: T	rans	forn	ns a	ind	
prop	erties	, FFI	(Decimation in Frequency and Decimati	ion in 7	Tim	e T	echr	niqu	es),	
Conv	voluti	on, C	orrelation, 2 -D sampling, Discrete Cosine Tra	ansform,	Free	quer	acy o	lom	ain	
filter	ing.									
UNIT IVIMAGE RESTORATION AND RECONSTRUCTION9							9			
Image Restoration and Reconstruction: Basic Framework, Interactive Restoration, Image							age			
deto	deformation and geometric transformations, imagemorphing, Restoration techniques,									
NO1S	e cna	racter	zation, Noise restoration filters, Adaptive filter	rs, Linear	, PO	S1t10	n in	varı	ant	
uegr T	AUATION	7 E	COLOR IMACE PROCESSINC	nom proj	ecti				9	
Colo	r Im	<u>а се</u>	Processing Color Fundamentals Color Mod	dels. Per	hue		lor	Im		
Proc Shar Oper ofDi	Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation. Morphological Image Processing, Dilation and Erosion, Opening and Closing., Extensions to Gray -Scale Images.Image Segmentation: Detection ofDiscontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based									

Segmentation, Segmentation by Morphological Watersheds.

LECTURE	TUTORIAL	PRACTICAL	SELF- STUDY	TOTAL
60	30	0	0	90

### **TEXT BOOKS:**

1. Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods, 4th Edition, Prentice Hall.

### **REFERENCES:**

1. Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Hall.

2. Stan Birchfield, Image Processing and Analysis, Cengage Learning.

### **E-REFERENCES:**

1. <u>https://www.tutorialspoint.com/image</u> processing/

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B.Sc.				PO				PS	60
(AI)	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	0	1	0	1	1
CO2	0	1	3	2	0	2	0	2	2
CO3	1	2	3	0	0	2	0	2	2
CO4	1	2	3	1	0	2	0	1	2
CO5	0	3	0	1	0	2	0	1	2
Average	1	2	2	1	0	2	0	1	2

## XAI 502D- FUZZY LOGIC

										S S	С		
Х	(AI50)	2D					3	0	0	<u> </u>	3		
				FUZZY LOGIC			U	Ū	Ū	Ū			
С	Р	А					L	Т	Р	S S	Н		
2.5	0.5	0					3	0	0	0	3		
PRE	REQI	JISITE											
Te in	4		COURSE OUTCO	MES		DOMA	IN		LE	VEL	1		
To explain the basic mathematical elements of the theory of fuzzy sets													
CO1		ognize 1	the fuzzy fundamental	s and Explain the ba	$\frac{1}{1}$	<u>s.</u> Cognitive		R	emer	nber			
concepts of fuzzy sets and fuzzy logic													
<b>CO2</b> Understanding of the basic mathematical elements of the theory of fuzzy sets Cognitive								U	nder	stand	ł		
CO3	Em	<i>ploy</i> and	understand the image	restoration and	(	Cognitive		A	pply				
~~~	reco	onstructi	ion procedures			~		<u> </u>					
CO4	4		a annling tions of furre	Logio for uniona	(	Cognitive		A	pply				
05		liyze ine lication	e applications of juzzy s	logic jor various	(	Cognitive		C	reate				
UNI	JNIT I Fuzzy Set							9					
Intro	ductio	n – cris	p sets an overview –	the notion of fuzzy	sets – I	Basic con	cept	s of	fuzz	y set	ίs —		
class	ical lo	gic an	overview – Fuzzy lo	gic. Operations on fu	uzzy set	s - fuzzy	com	plen	nent	– fu	zzy		
unior	1 – fuz	zy inter	section – combination	is of operations – gene	eral aggi	regation o	pera	tions					
UNI	ΓII	Fu	uzzy Logic Control								9		
Fuzz	y logi	c contro	ol Fuzzification –D	efuzzificatiuon- Kno	wledge	base- De	cisic	n m	akin	g log	gic-		
Mem	bershi	p functi	ons –Rule base										
	<u>r III</u>		elations	lationa hinamy ralat	tions on	a sinala	aat		vala		<u>9</u>		
. CII simil	sp and arity i	i luzzy relations	relations - binary relations - Compatibility or	tolerance relations-	orderin	$a single  \sigma s = Mei$	set– nher	shin	fund	rtion			
meth	ods of	generat	tion – defuzzification	methods	oraerin			Ship	Turr		5		
UNI	ΓIV	A	daptive Fuzzy Syster	ns							9		
Perfc	ormanc	e inde	ex- Modification of	rule base0- Mod	lificatior	n of me	mbe	rship	fu	nctic	ons-		
Simu	ltaneo	us mod	ification of rule base	and membership fu	inctions-	- classifi	catio	n an	d re	gress	sion		
trees	decis	10n tress	s, Cart algorithm – Da	ta clustering algorithr	ms: K m	eans clust	ering	g, Fu	zzy (	) me	ans		
U	UNIT V     Tree Learning     9												
Annl	ication	n of fuz	zy logic and neural r	networks to Measurer	ment- C	ontrol	lions	1 Pr	Cess	ing	and		
Imag	Image Processing. Neuro fuzzy control: Feedback Control Systems, Expert Control, Inverse												
Lean	Learning, Specialized Learning, Back propagation through Real –Time Recurrent Learning.												
L	ΕСΤΙ	JRE	TUTORIAL	PRACTICAL		SELF- STUDY		1	TOT.	AL			
	60		30	0		0			90				
	T D C	OVC											
1 EX	I BO	UKS:	d Soft computing La	ng ISR Sun C T and	1 Mizuto	ni F _ Por	arcor	edu	ratio	$n \gamma$	)04		
2. Fi	2. Fundamentals of Neural Networks <sup>II</sup> , LaureneFauseett, Prentice Hall India, New Delhi, 1994.												

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#### **REFERENCES:**

1. Fuzzy Logic Engineering Applications<sup>II</sup>, Timothy J.Ross, McGrawHill, NewYork, 1997.

2. Neural networks, Fuzzy logics, and Genetic algorithms, S.Rajasekaran and

G.A. VijayalakshmiPai Prentice Hall of India, 2003

3 Fuzzy Sets and Fuzzy Logicl, George J.Klir and Bo Yuan, Prentice Hall Inc., New Jersey, 1995

4 Principles of Soft Computing S.N.Sivanandam, S.N.Deepa Wiley India Pvt Ltd

#### **E-REFERENCES:**

1 https://onlinecourses.swayam2.ac.in/aic20\_sp06/preview 2 https://onlinecourses.swayam2.ac.in/arp19\_ap79/preview

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B.Sc.			PO PSO			<b>50</b>			
(AI)	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	1	3	1	1	1
CO2	3	3	2	2	2	3	1	2	2
CO3	2	2	3	2	2	2	1	2	2
CO4	2	3	2	1	2	3	2	1	2
CO5	3	3	2	2	2	2	2	1	2
Average	3	3	2	2	2	3	1	1	2

# XAI 503A- NATURAL LANGUAGE PROCESSING

X A 1502 A									S S	C				
X	AI503	3A				2	1	0	0	3				
			Natural	Natural Language Processing										
С	Р	Α				L	Т	Р	S S	Η				
2.5	0.5	0												
PRE	PREREQUISITE:													
COURSE OUTCOMES DOMAI									LEVEL					
To ir (NLI	ntrodu <u>P)</u>	ice the	fundamental concep	ots and techniques of na	tural langua	age p	proce	essir	ıg					
CO1	Un	derstar	nd the fundamental	concepts and	Cognitive	ç	R	eme	mbe	r				
	tech	nnique	s of natural languag	e processing (NLP)										
CO2	Uno	derstar d of NI	iding of the models	and algorithms in the	Cognitive	ę	U	nde	rstar	nd				
CO3	Der	nonstr	ate the computation	al properties of natural	Comitiv	<b>.</b>	Λ	nnlı	7					
	lan	guages	and the commonly	used algorithms for	Cognitive	2	A	рріу	/					
604	pro	cessing	g linguistic informat	tion.										
CO4	lan	derstan guages	iding semantics and for processing	pragmatics of	Cognitive	ę	А	pply	7					
CO5	And	alyze ti	he applications of N	LP	Cognitive	5	Create							
UNI	ΤI	N	LP Introduction						(	5+3				
Intro	ducti	on: ap	plication of NLP	techniques and key is	sues- MT	grar	nme	r ch	lecke	ers-				
dicta	tion -	- docu	ment generation- N	L interfaces- Natural la	nguage pro	ocess	sing	key	issu	les-				
the o	differe	ent ana	alysis level used f	or NLP: morpho-lexica	l-syntactic-s	sema	intic	pra	gma	tic-				
marl	xup(T	EI, UN	NICODE)-finite st	ate automata- Recursi	ve and au	gme	nted	tra	nsit	ion				
netw	orks-	open p	problems				-							
UNI	TII	H	IMMS and Speech I	Recognition					(	5+3				
Lexi	cal L	evel :	HMMS and Speed	h Recognition: Speech	n Recogniti	ion	Arc	hited	ture	e –				
Over	view	of HN	MM – Advanced M	ethods for decoding –	raining a s	peed	ch R	ecog	niz€	er –				
Hun	$\frac{1}{T}$	beech K	a second the second sec				-			C 1 2				
DINI	$\frac{1}{0}$ $\frac{111}{5}$	eech Ta	agging agging: Rule Based	Stochastic Part-ofSneech	Tagging _ ]	Franc	form	atio	n Ra	9+3 sed				
Tagg	ing-Co	ontext 1	Free Grammars for F	English – Context Free R	ules and Tre	ees -	- Ser	tenc	e Le	evel				
Cons	tructic	onsCoor	dination – Agreement	– Grammars and Human	Processing									
UNI	T IV	P	ARSING						(	5+3				
arsir	ıg wit	h Cont	text Free Grammars	- Top down Parser - I	roblems wi	ith E	Basic	Тор	Do	wn				
Pars	er – F	inite S	tate Parsing Method	ds - Representing Mean	ing: Compu	ıtati	onal	Des	sider	ata				
for R	lepres	entatic	ons – Meaning Struct	ture of Language – First	Order Pred	icate	e Cal	culu	IS					
UNIT V Machine Translation 6+3														
Ana	ysis –	• Attack	hed for a Fragment of	or English- Integrating S	emantic Ana Acabina Tar	alysi	is int	0 ית:	<u>ala -</u>					
the E		Parser	, Robust Semantic A	nalysis : Dialogue and r	of Dialogue		tion	- Di	alog	ue				
ACIS	- Au	onan		ue baseu mierpretation		ACL	3							
L	ECTU	JRE	TUTORIAL	PRACTICAL	SELF- STUDY	,	T	OT	AL					
Pg.	Pg. 79 B.Sc. Artificial Intelligence - Curicullum and Syllabus -Regulations 2022													

30	15	0	0	45						
TEXT BOOKS:										
3. Neuro Fuzzy a	nd Soft computing	, Jang J.S.R.,Sun C.	T and Mizutani E -	- Pearson						
education, 2004	4									
4. Fundamentals	of Neural Network	sI, LaureneFauseet	t, Prentice Hall Ind	lia, New						
Delhi,1994.										
<b>REFERENCES:</b>										
1. Fuzzy Logic En	gineering Applicat	ions", Timothy J.Rc	ss, McGrawHill,N	ewYork,1997.						
2. Neural network	ks,Fuzzy logics,and	Genetic algorithm	sl, S.Rajasekaran a	nd						
G.A.Vijayalakshr	niPai Prentice Hall	of India,2003								
3 Fuzzy Sets and	d Fuzzy Logicl, C	George J.Klir and	Bo Yuan, Prentic	e Hall Inc., New						
Jersey,1995		-								
4 Principles of Soft Computing S.N.Sivanandam, S.N.Deepa Wiley India Pvt Ltd										
<b>E-REFERENCES:</b>										
1 https://onlin	ecourses.swayam2	.ac.in/aic20_sp06/p	preview							
2 https://onlin	ecourses.swayam2	.ac.in/arp19_ap79/	preview							

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B.Sc.				PO				PS	50
(AI)	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	1	3	1	1	1
CO2	3	3	2	2	2	3	1	2	2
CO3	2	2	3	2	2	2	1	2	2
CO4	2	3	2	1	2	3	2	1	2
CO5	3	3	2	2	2	2	2	1	2
Average	3	3	2	2	2	3	1	1	2

# XAI 503B- Computer Vision Open CV

x	AI50	)3A	Computer Vision Open CV	L 2	T         P         SS         C           1         0         0         3				
С	Р	Α	1 1	L	T P SS H				
2.5	0.5	0		2	1 0 0 3				
PRE	REQ	UISITE		DOM					
001	<b>. . .</b>	1 .	COURSE OUTCOMES	DOMAIN					
	an	iderstar d its pro	ocessing	Cognitive	ion				
CO2	Bu im	ild and age pro	Integrate Vision pipelines with Digital cessing techniques	Cognitive Psychomotor Affective	Application Synthesis				
CO3	Un an	ıderstaı d its ch	id and demonstrate Image recognition allenges	Cognitive Psychomotor Affective	Application Comprehens ion				
CO4	Ex an	tract ar d comp	nd Detect Features from Images, Videos are feature extraction methods	Cognitive Psychomotor Affective	Application Evaluation				
CO5	Synthesis Application								
UNI	ΤI	F	undamentals of Computer Vision		6+3				
Com Intro is ar Dept form sense imag Imag	pute oduct 1 Ima th of atior ors - ging - ges -F	r vision ion to I age forr Field r - Can Charac - funda Reading	<ul> <li>Difference between computer vision and mage formation - Introduction to vision sense ned? - Image formation using Lens - Pinho - Image parameters - Primitives and Transf nera Model -Image sensing - Image sensir teristics of an Image sensor - Sensing Color mentals of OpenCV - Image Processing - Ins Videos - Changing Color spaces</li> </ul>	ad Digital Image ors - What is an 2 ole & Perspectiv formations - Geo og Pipeline - Ty - Camera respon tallation of Open	Processing - Image? – How ve projection - ometric Image vpes of Image nse and stereo nCV - Reading				
UNI	T II	F	undamentals Operations on Images		6+3				
Fund Blur: Rota Filte Prog Adaj Filte Wor UNI	Blurring Image - Blending - Subtraction - Geometric Operation - Image Translation - ImageRotation - Affine Transformation - Perspective Transformation - Image Thresholding &Filtering - Working and Types of Thresholding - Introduction to Simple Thresholding -Programming Simple Thresholding - Color - What is Adaptive Thresholding - Types ofAdaptive Thresholding - Adaptive Thresholding - Gaussian & Mean - What is an ImageFilter - Noise in Images - Working with Gaussian Filter -Working with Sobel Filter -Working with Prewitt FilterUNIT IIIMorphological Operations & Image Segmentation6+3What is Morphological Transformation - Different Morphological Transformations -								
Mor Tran Segn	Morphological Transformation - Different Morphological Transformations - Morphological Transformations - Understanding Erosion and Dilation - Morphological Transformations - Opening and closing - Top Hat - Bottom Hat transformation - Image Segmentation - What is Image segmentation - Applications of Image segmentation - Region								

		-	-									
of Interest - Vari	ous algorithr	ns for	r Ima	ge se	gmer	itatio	n					
UNIT IV	Feature Extra	iction	1 & N	lotio	n Del	ectio	n				6+3	
Introduction to	Feature Extr	action	n - V	Vhat	is Fe	ature	Extr	actio	n – S	Signif	icance of Feature	
Extraction - Vari	ious Feature	Extra	ction	Tech	miqu	es - V	Vhat	is Ed	lge d	etecti	on? Various Edge	
detection technic	ques - Bound	lary I	Detect	tion -	- Skel	etoni	zatio	n - Ir	ntrod	uctio	n to Histogram of	
Gradients - Ur	derstanding	Feat	ture	Mate	ching	Usi	ng H	łOG	- V	Vorki	ng with Feature	
Detectors - Intro	duction to SI	FT de	etecto	or – N	lathe	matic	al In	tuitic	on of	Scale	Invariant Feature	
Transform – Hough transform - Working with Features from Accelerated Segment Test –												
Understanding Speeded - Up Robust Features - Working with Binary Robust Independent												
Elementary Features - Image Stitching - Motion Detection - What is Motion Detection? -												
Motion field - Introduction to Optical Flow - Optical Flow constraint equation -												
Introduction to Dense Optical Flow - Applications of Optical Flow												
UNIT VFace Recognition & Object tracking6+3												
What is Face recognition – Challenges in Face Recognition Technology – Introduction to												
Haar Cascade Method – Case Study – Various Face recognition algorithms –Developing												
Face recognition method using haar cascade method – Working with Gesture Recognition –												
Object Tracking	- What is C	Object	t trac	king	- De	tectio	on ch	ange	-Int	rodu	ction to Gaussian	
Mixture Model -	Working wi	th ter	nplat	e ma	tchin	g - Ol	biect	track	ing u	ising	Feature Detection	
- Introduction	to Streamlit	- W	orkin	o wi	ith w	ebap	ps fo	or Co	mpu	iter V	Vision – Machine	
- Introduction to Streamlit - working with webapps for Computer Vision - Machine learning for Computer Vision												
LECTURE		IAL		PRA	CTIC	AL	5	SELF-	-STU	DY	TOTAL	
30	15				0				0		45	
<b>TEXT BOOKS:</b>												
1. Computer Vis	ion: Algorith	ms ai	nd A	pplica	ation	s, by	Richa	ard Sz	zelisk	ki		
<b>REFERENCES:</b>	0			rr -		- / - )				-		
1 Multiple V	iew Geomet	rv in	Co	mput	er V	ision.	. bv	Rich	ard	Hart	lev and Andrew	
Zisserman.		- ,				,	~ )	1401				
2 Computer V	vision <sup>.</sup> A Mod	lern /	Appr	oach.	bv Γ	)avid	Fors	vth a	nd Ie	an Po	nce	
3 Digital Imag	e Processino	by F	Rafae	l Gon	izalez	and	Rich	ard V	Vood	s		
F-REFERENCES	<u>.</u>	<i>, c y</i> 1	urue	1 001	izuicz	una	Iticit	ara v	1000	.0.		
Computer V	sion· Algori	thms	and	Annl	icati	nns h	v Ri	chard	1 Sze	liski		
Computer vision: Algorithms and Applications, by Kichard Szeliski												
Manning of Course Outcomes (CO) with Programme Outcomes (PO).												
wiapp			icom	es (C		iui P	rogra	1111116			es (r0):	
	B.Sc.				P()				PS PS	5()		
			r		10	r						
	(AI)	1	2	3	4	5	6	7	1	2		

CO2	3	3	2	2	2	3	2	2	2
CO3	2	2	3	2	2	2	3	2	2
CO4	2	3	3	1	2	3	2	2	2
CO5	3	3	3	2	2	2	2	2	2
Average	3	3	3	2	2	3	2	2	2

### XAI 503C- SENTIMENT ANALYTICS

							Т	Р	C			
XA	AI 503C	•					2	1	0	3		
		-		SENTIMENT ANA	LYTIC	S	_	-	Ŭ			
C	Р	Α				0	I.	Т	Р	н		
2.5	0.5	0					2	1	0	3		
PRER	EOUI	SITF	•						Ũ			
	<u> </u>		Co	ourse Outcomes		Domai	n	J	Leve	1		
After	the cor	nple	tion of t	he course, students will be a	able to							
CO1	Iden	tify 1	the sent	ment analytics application	(	Cognitive	Re	men	nber			
		55				0	Understand					
CO2	Expl	ain	the obie	ctive and problem of sen	timent		Re	men	nber			
	anal	vtics	· · <b>)</b> -	I		Cognitive	Ur	nder	stand	t		
CO3	Disc	uss t	he class	ification of sentiment analyt	tics	Cognitive	Re	men	nber			
		0	Ur	nder	stand	ł						
CO4 Discuss the subjective classification of sentiment Cognitiv									nber			
analytics									stand	1		
CO5 Explain the rules of sentiment analytics Cognitive									her			
	r					00811110	Ur	nder	stand	1		
U	NITI			INTRODUCTIC	)N				9			
Introd	luction	– Se	entimen	t analysis applications - Se	ntiment a	nalvsis rese	arch	– L	- Diffei	ent		
levels	of ana	lvsis	– sentir	nent lexicon and its issues –	sentiment	analytics a	is mi	ni N	ILP			
UNIT II The Problem of sentiment analysis 9												
The P	The Problem of sentiment analysis - definition of opinion - sentiment target - sentiment											
of tar	get – re	easo	n and g	ualifier for opinion - object	tive and ta	sk of senti	ment	t ana	alvti	cs –		
differ	ent tvi	oes (	of opin	ion – regular and compar	ative opir	nion – sub	jectiv	ve a	nd	fact		
implie	es opin	ion	1	0 1	1		,					
UN			Docum	ent sentiment classification					9			
Docui	ment s	entir	nent cla	ssification – supervised se	ntiment cl	assificatior	1 – C	lassi	ficat	ion		
using	mach	ine	learning	g algorithm - classificat	ion using	custom o	ore	fun	ctio	ι –		
unsur	pervise	d se	entimen	t classification - classifi	cation usi	ng sentim	enta	l le	xico	n -		
sentin	nent ra	ting	predicti	on		0						
UN	JIT IV	Ĭ	Sentime	ent subjective classification					9			
Subje	ctivity	– se	entimen	t subjective classification -	- sentence	sentiment	clas	ssific	catio	n –		
classif	ficatior	n met	thod – e	motion classification of sent	ence							
U	VIT V		Supervi	sed learning					9			
Super	vised 1	learn	ing – le	exicon based approach – pr	os and con	ns of the tw	vo a	ppro	bach	es -		
rules	of sent	imer	nt comp	osition- sentiment composi	tion rules ·	- negation	and	sent	ime	nt –		
rule re	epresei	ntatio	on									
	LECT	URE	1	TUTORIAL	PRACT	ΓICAL		TO	ΓAL			
	<b>4</b> 5	5		0	(	)		4	5			
TEXT	BOOK	S										
Sentir	nent ar	nalys	sis – Mir	ning , sentiment , Opinion a	nd Emotio	ns <i>-</i> Bing –	Liu ·	- Un	iver	sity		
of Illiı	nois at	Chic	ago									
E-RE	FEREN	ICES	5									
https:	<u>//ww</u>	w.nł	ip.gov.ii	<u>n/blood-donation_pg</u>								

B Sc AI				PO				PSO		
<b>D</b> .St. M	1	2	3	4	5	6	7	1	2	
CO1	1	2	2	1	1	0	0	1	2	
CO2	1	3	1	2	2	0	1	2	2	
CO3	0	3	1	2	2	1	1	2	2	
CO4	0	3	0	2	2	0	1	2	2	
CO5	0	3	2	1	3	1	1	3	2	
Average	1	2	1	2	2	1	1	2	2	

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

3-High Relation, 2-Medium Relation, 1-Low Relation, 0-No Relation

### XAI504A- SYSTEM SECURITY

XA	A1504	4A		L 4	T 2	P 0	S S 0	C 6			
	n		SYSTEM SECURITY	-	-		S				
C	Р	A		L	T	Р	S	Н			
3	0	0		4	2	0	0	6			
PK	EKE	QUIS	SITE:			т					
Λft	or th	o cor	course Outcomes Do	main		I	lever				
	1	IInda IInda	retandcomputer operating systems								
distributed systems, networks and Cognitive Remember representative applications.											
CO2       Identify the distributed system attacks, defenses against them, and forensics to investigate the cognitive aftermath       Remember											
CO	3	<i>Anal</i> evolv used	<i>yze</i> the basics of cryptography, how it has red, and some key encryption techniques cog today.	nitive	А	naly	ze				
CO	4	Reco	<i>gnize</i> the security policies. Cog	nitive	R	eme	mber				
CO	5	Anal attac	<i>yze</i> the malicious software and DOS Cog	nitive	А	naly	ze				
UNIT I CRYTOGRAHIC TOOLS 9+6											
Cry Aut Mat of S	ptoş then nage tore	graph ticati emen d Da	uic Tools- Confidentiality with Symmetric on and Hash Functions, Public-Key Encryption, D t, Random and Pseudorandom Numbers, Practica ta	Enc igital S Appl	rypti Signa icatio	on, ture on: E	Me s and incry	ssage l Key ption			
τ	JNI	ГΠ	USER AUTHENTICATION				9+6				
Use	er	A	Authentication- Means of Authent	ication	n, Pa	ISSW	ord-I	Based			
Au	then	ticati	on, Token-Based Authentication, Biometric Aut	hentic	ation	, Re	emote	eUser			
Au	then	ticati	on, Security Issues for User Authentication, Prac	ical A	pplie	catio	n: A	n Iris			
DIO		пс Бу 1111	ACCESS CONTROL	ems			0+6				
Acc		Con	trol- Access Control Principles Subjects Obje	rts ar	nd A	Acces	$\frac{910}{8}$ R <sup>2</sup>	iohts			
Dis	creti	onar	v Access Control. Example: UNIX File Access Cor	trol. F	Role -	Bas	ed A	ccess			
Cor	ntrol	, Cas	e Study: RBAC System for a Bank								
U	NIT	ĪV	DATABASE SECURITY				9+6				
Dat	abas	se Se	curity-The Need for Database Security, Databas	e Mar	nager	nent	Sys	tems,			
Rel	atior	nal I	Databases, Database Access Control, Inference	e, Sta	atisti	cal I	Datał	bases,			
Dat	abas	se En	cryption, Cloud Security								
τ	JNI	Г٧	MALICIOUS SOFTWARE				9+6				
Malicious Software-Types of Malicious Software (Malware), Propagation- Infected											
	ntent	t–Vir	uses, Propagation-Vulnerability Exploit-Wor	ns,	Prop	agat	ion-S	ocial			
Eng	ginee	ring. Zami	-SPAIN E-Mail, Irojans, Payload-System Cor	uption	1, Pa	aylo	ad-A Sorr	ttack			
Pay	load	l-Stea	althing-Backdoors, Rootkits,, Countermeasures,D	enial-o	of-Sei	vice	Att	acks-			
ruy	ioue		and the buckdoors, Rootkits,, Countermeasures,D		1 001	vice	110	ucito			

Denial-of-Service	e Attacks, Floo	ding Attacks, Di	stributed Denia	al-of-Service Attacks,
Application-Base	ed Bandwidth At	tacks, Reflector	and Amplifier	r Attacks, Defenses
Against Denial	-of-Service Attack	ks, Responding to	a Denial-of-Ser	vice Attack.
LECTURE	TUTORIAL	PRACTICAL	SELF STUD	Y TOTAL
30	15	0	0	45
<b>TEXTBOOKS:</b>				
1. M. Stamp, "I	nformation Securi	ty: Principles and	Practice," 2 st	Edition, Wiley, ISBN:
0470626399, 2	2011.			-
2. M. E. Whitm	an and H. J. Matte	ord, "Principles of	f Information S	ecurity," 4 st Edition,
Course Tech	hology, ISBN: 111	1138214, 2011.		2
3. M. Bishop, "	Computer Securi	ty: Art and Scien	ce," Addison	Wesley, ISBN: 0 -201-
44099-7, 2002				
4. G. McGraw,	"Software Secur	rity: Building Sec	curity In," Add	dison Wesley, ISBN:
0321356705, 2	2006			
<b>REFERENCES:</b>				
1. David J. Krug	glinski, Inside Vis	ual C++, Microsof	t Press 1992.	
2. Boar, B.H.,	Implementing Cl	ient / Server Co	mputing ; A	Strategic Perspectre,
Mcraw Hill, 1	1993.			
3. Bouce Elbert,	Client / Server C	Computing, Artech	n. Press, 1994.	
4. Alex Berson,	Client / Server A	rchitecture, McGr	aw Hill, 1996.	
E-REFERENCES	5:			
1. fivedots.coe.	psu.ac.th/~suthor	n/csw/01%20-20C	Client%20Serve	r%20Computing.pdf
	/D 1		(C1)	

2. www.bcanotes.com/Download/DBMS/Rdbms/Client\_Server%20Computing.pdf

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI				PO				PSO		
D.SC AI	1	2	3	4	5	6	7	1	2	
CO1	1	1	2	1	1	1	1	2	1	
CO2	1	2	1	1	1	1	1	2	1	
CO3	1	1	2	1	1	1	1	2	1	
CO4	1	2	1	1	1	1	1	1	1	
CO5	1	1	3	2	1	1	2	1	1	
Average	1	1	2	1	1	1	1	2	1	

# XAI504B- NETWORK SECURITY

XAI504B										P	S S	C		
				NETWO	ORK SECURITY			3	I	U	U	4		
С	Р	Α						L	Т	Р	S S	Н		
3	0	0						3	1	0	0	4		
PRI	ERE	QUIS	SITI	E <b>:</b>										
				Course Outcon	nes		Dom	ain		Ι	level			
То	und	ersta	nd r	necessary Approa	ches and Techniqu	es to	build p	rotec	ction	mec	chani	sms		
in o	rder	to se	ecur	e computer netwo	orks.				-		• .			
Toi	I o impart knowledge related to the various concepts, methods of Network Security using cryptography basics, program security, database security, and security in													
net	using cryptography basics, program security, database security, and security in networks.													
CO	CO1 Understand computer networks security and representative applications. Cognitive										mber			
CO	CO2       Apply the different cryptographic operations of symmetric cryptographic algorithms       Cogni								Re A	emei pply	mber '			
CO	CO3 Apply the different cryptographic operations of public key cryptography Cognitive									naly	ze, A	pply		
CO4 Apply the various Authentication schemes to Cognitive										Remember				
CO	5	5111u Unde	areta	unterent applicat	ourity practicos	and			A	ppiy	·			
	5	Svete	ersic em e	ecurity standards	curity practices	anu	Cogni	tive	A	naly	ze			
1	JNI	<u>уузк</u> Г I	1113		N						9+3			
Sec	urity	r tren	nds -	- Legal, Ethical ar	nd Professional Asi	pects	of Secu	ıritv.	Nee	ed fo	r Sec	curity		
at I	Mult	iple	leve	els, Security Polic	ies – Model of ne	etwor	k secu	rity -	- See	curit	y at	tacks,		
serv	vices	and	me	chanisms – OSI se	ecurity architecture	e – Cl	lassical	encr	yptio	on te	echni	ques:		
sub	stitu	tion	tec	hniques, transpo	sition techniques,	steg	ganogra	aphy	- Fo	ound	latior	ns of		
mo	dern	cry	pto	graphy: perfect	security - infor	mati	on the	ory	-cry	pto	syste	- m		
cry	otan	alysi	s.											
L	JNI	T II	S	ymmetric Cipher	S				_		9+3			
Ove	ervie	ew-Sy	/mn	etric Ciphers: Cl	assical Encryption	Tech	iniques,	Blo	ck ci	pher	s an	d the		
Dat	a Ei	ncryp	otior	1 Standards Publ	ic key Encryption	and	Hash	Fun	ctior	ns: P	ublic	z-Key		
Cry	ptog	graph	iy ai	nd RSA	1						0.0			
		<u> </u>		ublic key cryptog	graphy			<u>р</u> .	1.		9+3			
	then	natics	s of	Asymmetric K	ey Cryptography	: Pri	1 + 1 = 1	Pr1	mali	ty	l esti	ng –		
Fac KE	toriz Y Cl	PHE	n – 1 RS:	RSA cryptosyste	em – Key distribu	ition	– Key	neore mai	em <i>P</i> nage	men	t – 1	Diffie		
Hel	lmai	n key	exc	hange.										
U	UNIT IV Network Security Practices 9+3													
Aut	hen	ticati	on a	pplications-Electi	onic Mail Security	- IP S	ecurity	-Web	Sec	urity	/			
	J <b>NI</b> ]	ľ V	<u> </u>	etwork System S	becurity	11	•	• •		1 5	<u>9+3</u>	11		
Sys	tem	Secu	rity:	Intruders-Malicio	ous Sottware-Firew	alls -	viruses	-N	etwo	rk F	irew	alls.		
L	LECTURE TUTORIAL PRACTICAL SELF STUDY TO									TC	TAI	-		

45	15	0	0	60
<b>TEXTBOOKS:</b>				
1. William Stall	ings, Cryptograp	hy and Network	K Security-Princip	oles and Practices,
Prentice-Hall, Th	ird edition, 2003	ISBN: 8178089025		
<b>REFERENCES:</b>				
1. By Joseph Mig	ga Kizza, Guide t	o Computer Netw	vork Security, Spri	inger 2015.
2. Johannes A. Bi	uchaman, Introdu	ction to cryptogra	phy, Springer-Ve	rlag 2000.
3. AtulKahate, C	ryptography and	Network Security	, Tata McGraw H	ill. 2007

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI				PO				PSO		
D.SC AI	1	2	3	4	5	6	7	1	2	
CO1	1	2	1	2	2	2	1	2	1	
CO2	1	2	1	2	2	1	1	2	1	
CO3	2	1	1	2	1	1	1	2	1	
CO4	1	2	1	1	1	1	1	1	1	
CO5	1	2	2	2	2	2	2	1	1	
Average	1	2	1	2	2	1	1	2	1	

## AI504C- ETHICS OF AI

							L	T	P	С	
AI50	)4C	, ,					3	0	0	3	
	<b>D</b>	•		ETHICS OF A	[		-		n		
	<u>P</u>	A						1	P	<u>H</u>	
				• • • •			3	0	U	3	
PKEF	KEÇ	ĮŪIS	SITE: The	re are no prerequisites for	the course.			_			
Cour	se (	Dutc	omes			Domai	n	Lev	vel		
After	' the	con	npletion	of the course, students wil	l be able to			1			
CO1		[nde f AT	<i>rstand</i> th	e ethical issues in the de	evelopment	Cogniti	ve	Rem Und	emb ersta	er Ind	
$CO^{2}$	R	0110	mhor an	d Understand the AL c	oncents to	Cogniti	VA	Rom	omh	or	
02		nciet	al proble	ems by adapting the leg	al concents	Coginti	vc	Und	ersta	er ind	
by securing fundamental rights.											
Understand the ethical policies in AI based Cognitive Remember											
CO3	a	ppli	cations a	nd Robot development				Und	ersta	ind	
CO4	L	earr	n and <b>Un</b>	lerstand the ethical consid	lerations of	Cogniti	ve	Rem	emb	er	
	A	I wi	ith perspe	ectives on ethical values				Und	ersta	ind	
CO5	Т	his s	study wil	l help to <b>Understand</b> and	l overcome	Cogniti	ve	Rem	emb	er	
the evil genesis in the concepts of AI.										ind	
UNI	ГΙ		INTRO	DUCTION TO ETHICS	OF AI				<b>9</b> +(	3	
Role	of A	rtifi	icial Intel	ligence in Human Life, Ur	nderstanding	g Ethics,	Why	Ethic	cs in	AI?	
Ethic	al C	Cons	ideration	s of AI, Current Initiatives	s in AI and E	thics, Etl	nical l	lssue	s wi	th	
our re	elat	ions	hip with	artificial Entities.				1			
UNI	ΓII		FRAM	EWORK AND MODELS					9+;	3	
AIC	Gov	erna	ince by	Human-right centered	design, No	ormative	mo	dels,	Ro	ole of	
profe		nal	norms, I	eaching Machines to be M	loral.			1	0.1		
	<u> </u>	L 1 •1•		EPIS AND ISSUES	D	.1 .1.1	1		9+;	5	
Acco	unta	abili A T a	ty in Co	mputer Systems, Transpa	rency, Resp	onsibility	y and	I AI.	Kac	e and	
	$\frac{1}{\Gamma}$	$\frac{AIa}{7}$		ECTIVES AND ADDOA	CHES				<u>О</u> т,	2	
Doror		1700	on Ethic	of AL Integrating othical	values and	oconomi	- 11-		9 <b>-</b> ,	) nating	
origin	nati	on	$\Delta I_{2}$ Bina	ry approach Machine lear	values and e	Artificia	1 Mo	rol A	aon	te	
LINI	Γ	011, 1	CASES	SAND APPI ICATION	inig values,	<sup>1</sup> IIIIIII	11 1010		9+	3	
Ethic	<u>s o</u>	fΑ	rtificial	Intelligence in Transpor	t Ethical A	I in M	ilitarı	ı 7 Bi	iome	, dical	
resea	rch.	Pat	tient Car	e. Public Health. Robot '	Feaching, Pe	dagogy.	Poli	cv a	nd S	Smart	
City I	Ethi	cs.			- cuciling, 1 (	aug08),	1 011	cy a		, iiidii t	
	LE	CTL	JRE	TUTORIAL	PRACTI	CAL		TO	TA		
		4	45	15	-	-			60	)	
REFE	ERE	NCI	ES								
1.	Pau	ıla	Bodding	ton, "Towards a Code	of Ethics	for Arti	ficial	Int	ellig	ence",	
2	Opiniger, 2017. 2 Martine D. Dubbor Errole Descuele Supit Des "The Outerd Hardback of Entries										
۷.	ivia	117KU 117	S D. Dub	ber, Frank Pasquale, Suni	$a^{1}$ $2020$	Oxford	riand	DOOL	s of	LULICS	
2		nı, √a++	Oxford U	"Ethics of Artificial Intal	UK, 2020. ligence" Ov	ford Uni	vorci	hy D⊮		Editod	
э.	J. ľ	viall		, Eulics of Artificial filler	ingence, Ox		versi	iy r f	C33	Juneu	

99 Book, 2020.

- 4. N. Bostrom and E. Yudkowsky. "The ethics of artificial intelligence". In W. M. Ramsey and K. Frankish, editors, The Cambridge Handbook of Artificial Intelligence, pages 316-334. Cambridge University Press, Cambridge, 2014.
  5. Wellack, W. & Allen, C. "Marel machines: Teaching relate right form summer,"
- Wallach, W., & Allen, C, "Moral machines: Teaching robots right from wrong", Oxford University Press, 2008.

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI				PO				PSO		
D.St AI	1	2	3	4	5	6	7	1	2	
CO1	1	1	2	2	2	2	1	2	1	
CO2	1	1	2	2	2	1	1	2	2	
CO3	2	1	1	2	1	1	1	2	1	
CO4	1	2	2	1	1	1	1	1	1	
CO5	1	2	2	2	2	2	2	1	1	
Average	1	1	2	2	2	1	1	2	1	

# XAI 505A - Natural Language Processing Lab

X A I 505 A	Natural Language Processi	ng Lab	L	Τ	Р	C
AAI JUJA		0	0	0	2	2
C:P:A	0:1.5:0.5		L	Τ	Р	Η
			0	0	4	4
<b>Course Outcom</b>	ies	Domain	Lev	vel		
To introduce the fu	undamental concepts and techniques of natural la	anguage processing	(NLP)		60	
1. Preprocessir	ng of text (Tokenization, Filtration, Scri	pt Validation, S	top \	Nord	l Rem	oval,
Stemming)		-	-			
2. Implementin	ng word similarity					
3. Implementin	ng simple problems related to word disan	nbiguation				
4. Simple dem	onstration of part of speech tagging.	-				
5. Lexical analy	yzer.					
6. Semantic Ar	nalyzer.					
7. Sentiment A	nalysis.					

# XAI 505B - Computer Vision Open CV Lab

InclusionConservation of pairs	XAL505B	Computer Vision Open C	V Lab	L	Т	Р	C
$\begin{array}{c c c c c c } \hline C:P:A & 0:1.5:0.5 & I & T & P & H \\ \hline 0 & 0 & 4 & 4 \\ \hline Course Outcomes & Domain & Level & & & & & & & & & & & & & & & & & & &$				0	0	2	2
O044Course OutcomesDomainLevelCourse OutcomesDomainLevel1. Installation and Software Control602. Fundamentals of OpenCV3. Fundamental Image Operations4. Pixel Manipulation5. Geometric Operations6. Thresholding7. Image Filters8. Morphological Operations9. Image segmentation using Watershed Algorithm10. Image segmentation using Clustering11. Image segmentation using Clustering12. Image segmentation using Mean shift segmentation13. Implementation of Image segmentation using Clustering14. Implementation of Edge detection using OpenCV15. Feature Extraction using Histogram of Oriented Gradients16. Implementation of Scale invariant Fourier Transform in OpenCV17. Implementation of Features from Accelerated Segment Test in OpenCV18. Build a sparse optical flow model in OpenCV19. Build a Dense Optical flow model in OpenCV20. Face Recognition using Haar Cascade method21. Perform template matching in Open CV22. Perform template matching in Open CV23. Deuralon a Vision based Wabarm using Streamlit	C:P:A	0:1.5:0.5		L	Т	Р	Η
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22. Perform template matching in Open CV 23. Develop a Vision based Webapp using Streamlit	21. Perform Obj	ect Tracking in Open CV					
23 Develop a Vision based Webann using Streamlit	22. Perform tem	plate matching in Open CV					
25. Develop a vision based webapp using siteanin	23. Develop a V	ision based Webapp using Streamlit					

# XAI 506A - DOT NET TECHNOLOGIES LAB

XAI 506A	DOT NET TECHNOLOGI	ES LAB	L	Τ	Р	C
			0	0	2	2
C:P:A	0:1.5:0.5		L	Т	Р	Η
		-	0	0	4	4
Course Outcom	165	Domain	Lev	vel		
					60	
1.Familiarizing	with .NET Environment.					
2. Work with Co	onsole					
3. Looping and	Conditional Statements					
4. Working with	n various Controls such as timer, calendar	:, etc.,				
5. Create basic t	ext editor					
6. Insert, Delete	, Update and Modify Operations					
7. Store and ret	rieve data using Data Grids					
8. Working with	n various Controls					
9. Using stored	Procedures					
10.Form Creation	on with HTML					
11.Real Time Pr	oject					

# XAI 506B - PROGRAMMING IN JAVA LAB

XAI 506B	PROGRAMMING IN JAV	A LAB	L	Τ	Р	C
X11 500D	· · · · · · · · · · · · · · · · · · ·		0	0	2	2
C:P:A	0:1.5:0.5		L	Т	Р	Η
			0	0	4	4
Course Outcom	ies	Domain	Lev	vel		
					60	
1. Simple Java F	Programs					
2. Decision Mak	king, Branching and Looping					
3. Constructors	and Method Overloading					
4. Inheritance a	nd Method Overriding					
5.Arrays and St	rings					
6. Interfaces and	l Packages					
7.Multi Threadi	ng					
8. Exception Ha	ndling					
9. Applet Progr	camming					
10. Event Hand	ling					

### XAI 506C - OPEN SOURCE SOFTWARE LAB

X A I 506C	OPEN SOURCE SOFTWARI	E LAB	L	Т	Р	C
AII SOUC			0	0	2	2
C:P:A	0:1.5:0.5		L	Т	Р	Η
			0	0	4	4
<b>Course Outcom</b>	es	Domain	Lev	vel		
					60	

1. Write a program to find the factorial of a number.

2. Write a program using Conditional Statements.

3. Write a program to find the maximum value in a given multi dimensional array.

4. Write a program to find the GCD of two numbers using user-defined functions.

5. Design a simple web page to generate multiplication table for a given number.

6. Design a web page that should compute one's age on a given date.

7. Write a program to download a file from the server.

8. Write a program to store the current date and time in a COOKIE and display the 'Last Visited' date and time on the web page.

9. Write a program to store page views count in SESSION, to increment the count on each refresh and to show the count on web page.

10. Design an authentication web page in PHP with MySQL to check username and password.

11 Write a PHP program to access the data stored in a mysql table.

12. Write a PHP program interface to create a database and to insert a table into it.

i). Write a PHP program using classes to create a table.

ii). Write a PHP program to upload a file to the server.

### **V1 SEMESTER**

Category	Course	Course Name			Cre	edits				Hou	rs	
	Code			Τ	P	SS	Total	L	Τ	P	SS	Total
SEC-4A	XAI601A	Web Technologies	2	1	0	0	3	2	1	0	0	3
	XAI601B	Mobile Application	2	1	0	0	3	2	1	0	0	3
		Development										
	XAI601C	Game Programming for		1	0	0	3	2	1	0	0	3
		AI										
DSE-6A	XAI602A	Human Computer Interface	3	1	0	0	4	3	1	0	0	4
	XAI602B	Web Mining &	3	1	0	0	4	3	1	0	0	4
		Recommender Systems										
	XAI602C	AI and Expert Systems		1	0	0	4	3	1	0	0	4
	XAI602D	AI With Robotic 3		1	0	0	4	3	1	0	0	4
DSE-6B	XAI603A	Data Analytics 2		1	0	0	3	2	1	0	0	3
	XAI603B	Edge Computing		1	0	0	3	2	1	0	0	3
	XAI603C	Cloud Computing 2		1	0	0	3	2	1	0	0	3
DSE-6B	XAI604A	Human Computer Interface Lab	0	0	2	0	2	0	0	4	0	4
Lab	XAI604B	Web Mining &	0	0	2	0	2	0	0	4	0	4
		Recommender Systems Lab										
	XAI604C	AI and Expert Systems	0	0	2	0	2	0	0	4	0	4
		Lab										
	XAI604D	AI With Robotic Lab	0	0	2	0	2	0	0	4	0	4
SEC-4B	XAI605A	Web Technologies Lab	0	0	2	0	2	0	0	4	0	4
	XAI605B	Mobile Application	0	0	2	0	2	0	0	4	0	4
Lab		Development Lab										
	XAI605C	Game Design with AI Lab		0	2	0	2	0	0	4	0	4
DSE-6C	XAI606	Project Work		0	6	0	6	0	0	12	0	
												12
		Total		3	10	0	20	7	3	12	0	30

# XAI601A-WEB TECHNOLOGIES

XAI 601A         L         T         P         SS           3         0         1         0											<b>SS</b> 0		C 4	
C     P     A														
C         P         A           2         1         0         3         0														Η
2	1	0							3	0	2	0		5
PRE	ERE	QUIS	SITE	: Software Engi	neering									
				Course Ou	tcomes			Doma	in			Lev	el	
Afte	er th	le con	nple	tion of the cour	se, students will	l be al	ole to	1			1			
CO	1	Reco	gniz	e the significand	ce of Web Techn	nology		Cognitive Psychom	e otor		Re Pe	emem rcepti	ber Ion	
CO2	2	Expro JavaS	<i>ess</i> Scrip	the knowledg t and PHP in W	ge on HTML, Veb Design.	CSS	5 and	Cognitive	<u>)</u>		Ur	nderst	anc	1
CO3Employ the understanding of the Client and Server- side scripts and actively participate in teams for the creation of static and dynamic web pages.Cognitive AffectiveApply Respond														
CO4	4	<b>Utili</b> real v	<i>ze</i> tl worl	ne web design d applications.	ing tools effecti	ively	in the	Cognitive	ç		Ap	oply		
CO5	5	Desig Softw	gn a vare.	nd <i>Establish</i> t	he Website or	Web	based	Cognitive Psychom	e otor		Cr Se	reate t		
UN	IT ]	[	II	NTRODUCTIC	N TO WEB TE	CHN	OLOGY	K & HTMI	_					9+6
Intro Web form	odu o Pa ns a	ction ges – nd In	to V HT	Veb Technology ML Basics – H1 tags.	<ul> <li>Concept of Ti</li> <li>TML CSS – Links</li> </ul>	ier – V s – Im	Veb Pag ages – T	ges – Static Fables – Li	We sts -	b P Fra	ages ame	s – Dy s - HT	mar MI	nic
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UN	IT 1	IV IS	P	HP ADVANCE		.10115								9+6
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2	2. Elizabeth Castro, Bruce Hyslop, "HTML 5 and CSS 3", Eight Edition, Peachpit Press, 2015.													

- 3. Thomas A. Powell, Fritz Schneider, "JavaScript: The Complete Reference", Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2008.
- 4. Kevin Tatroe, Peter MacIntyre and RasmusLerdorf, "Programming PHP", Third Edition, O'Reilly Media, Inc., 2015.

### **REFERENCES:**

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- 2. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010.

#### **E-REFERENCES:**

1.<u>www.php.net/manual/en/intro-whatis.php</u>

2.<u>www.w3schools.com</u>

3.www.tutorialspoint.com

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI	РО								PSO		
D.St AI	1	2	3	4	5	6	7	1	2		
CO1	2	1	1	1	1	1	3	1	0		
CO2	2	1	1	1	1	1	1	1	0		
CO3	2	2	1	1	2	2	2	1	0		
CO4	2	1	1	1	0	1	1	1	0		
CO5	1	1	1	1	1	1	2	1	0		
Average	2	1	1	1	1	1	3	1	2		

 $1-5 \rightarrow 1, 6-10 \rightarrow 2, 11-15 \rightarrow 3$ 

### **XAI601B - MOBILE APPLICATION AND DEVELOPMENT**

				L	Т	Р	SS	C			
XAI601B			_	3	0	0	0	3			
	1	MOBILE APPLICATION AND DEVELOPM	MENT				1	-			
C P	A		_	L	T	<u>P</u>	SS	H			
3 0	0			3	0	0	0	3			
PREREQ	UISII	TE: Fundamentals of Computer	•		-	1					
Course O	utcor		omain		Lev	vel					
After the	comp	letion of the course, students will be able to									
	plat	form and its architecture	ognitive		Ren	nembe	r				
CO2 Summarize the knowledge on java, xml with Cognitive Understand											
android and <i>detect</i> about the android Psychomotor Perception											
development.											
CO3	Mai	<i>upulate</i> and utilize the layout, resources Co	ognitive		Ap	plicatio	on				
	and	user interface. Af	ffective		Rec	eiving					
CO4	Tok	<i>now</i> about the database in android Co	ognitive		Un	dersta	nd				
CO5	Dest	ign and test the android environment	• . •		0						
	usin	g exception handling, accessing the Co	ognitive		Cre	eate					
IINIT I	ciou						9				
(Introduc	tion)	What is Android Android Versions and i	ite Foatu	110	Sat	Vario	y us Andr	bio			
Devices	an f	be Market Android Market Application	n Store	пе А	ndra	vario Did Die	evelonm	ent			
Environm	ent S	system Requirements, Android SDK, Installing	ισ Iava. a	and	AD	F bund	lle - Ecli	nse			
Integrated	l Dev	elopment Environment (IDE), Creating Andro	oid Virtu	al D	evic	es (AV	Ds).	poe			
		ANDROID ARCHITECTURE OVERVIEW	AND				9				
UNITII		APPLICATION	-				-				
Android	Softw	vare Stack, The Linux Kernel, Android Ru	ntime -	Da	lvik	Virtua	al Mach	ine,			
Android	Runt	ime - Core Libraries, Dalvik VM Specific	c Librar	ies,	Jav	a Inte	roperabi	lity			
Libraries,	And	lroid Libraries, Application Framework, C	Creating	a l	New	Andr	oid Pro	ject			
,Defining	the F	Project Name and SDK Settings, Project Config	guration	Set	ting	s, Con	figuring	the			
Launcher	Icon,	Creating an Activity, Running the Application	n in the	AVI	D, St	opping	g a Runn	ing			
Applicati	on, M	odifying the Example Application, Reviewing	g the Lay	out	and	Resou	rce Files.	•			
UNIT III		ANDROID SOFTWARE DEVELOPMENT					9				
I In densio		PLAIFORM AND FRAMEWORK	<u>а тња т</u>		at a m	- Chara	aturna of				
Understa An droid	Duaia	g Java SE and the Dalvik virtual Machine	e, The T	Jire	ctory	/ Stru	cture of	an			
	Proje	Ci, Common Delauit Resources Folders, The v	values ro	Jide	r, Le	veragi	ng Andr				
Applicati	ion C	omponents Android Activities: Defining the		Iroja	$\frac{1}{1}$ Sol		Procoss	ing			
in the Ba	in the Background Broadcast Receivers: Announcements and Netifications Content Providers:										
Data Ma	nagei	ment Android Intent Objects: Messaging for	r Comp	onei	nte	Andro	id Mani	fost			
XML: De	clarin	or Your Components	i comp	onei		maio		1051			
Juil. De	ciuiii	UNDERSTANDING ANDROID USER					9				
UNIT IV		INTERFACES, VIEWS AND LAYOUTS	<b>T T I</b>								
Designin	Designing for Different Android Devices, Views and View Groups, Android Layout										
Manager	Managers, The View Hierarchy, Designing an Android User Interface using the Graphical										

Layout Tool Displaying Text with TextView, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with Seek Bar, Working with Menus using views, Gallery, Image Switcher, Grid View, and Image View views to display images, Creating Animation.

	DATABASES, INTENTS, LOCATION-BASED	9
UNIT	SERVICES	

Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers Intents and Intent Filters: Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers. Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location -Based Services, Geocoding and Map-Based Activities Multimedia: Audio, Video, Camera: Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures.

LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
45	0	0	-	45

### **TEXT BOOK**

Android Programming Unleashed (1st Edition) by Harwani.

Beginning Mobile Application Development in the Cloud (2011), Richard Rodger

#### **REFERENCES:**

- 1. Professional Android 4 Application Development, 3<sup>rd</sup> edition, reto meier, wiley publication 2012.
- 2. **Programming Android,** 1st Edition, <u>Zigurd Mednieks</u>, <u>Laird Dornin</u>, <u>G. Blake</u> <u>Meike</u>, <u>Masumi Nakamura</u>, Oreilly publications, 2011.

P So AI	РО								PSO		
<b>D.SC.</b> AI	1	2	3	4	5	6	7	1	2		
CO1	2	1	1	1	1	2	1	1	1		
CO2	3	2	2	2	2	2	2	2	1		
CO3	2	2	2	2	3	2	2	2	1		
CO4	3	2	2	2	2	2	2	3	1		
CO5	3	3	3	3	3	3	3	3	1		
Average	3	2	2	2	2	2	2	2	1		

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

# XAI601C-GAME PROGRAMMING FOR AI

XA	I601	С					L 3	T 0	P 0	<b>SS</b> 0	C 3	
			Game P	rogramming for	r AI		-	-	-		_	
С	Р	Α		0 0			L	Т	Р	SS	Н	
3	0	0					3	0	0	0	3	
PRER	REQU	UISIT	E: Fundamentals o	f Computer								
Cours	se O	utcom	ies			Domain		Lev	vel			
After	the o	compl	etion of the course,	students will be ab	le to	)		-				
CO1		To u and	nderstand the cond development	cepts of Game des	ign	Cognitive		Ren	nem	ber		
CO2		To le	earn the processes,	mechanics and iss	ues	Comitivo		Π'n	dore	stand		
		in C arch	Game Design, be o itectures of Game P	exposed to the C Programming	ore	Psychomo	otor	Per	cep	tion		
CO3		Gam	e programming pl	atforms, frame wo	rks	Cognitive		Ар	plic	ation		
		and	engines and Learn t	to develop games.		Affective		Rec	eivi	ing		
CO4		Use worl	Game programmi s and engines.	ing platforms, fra	me	Cognitive		Un	ders	stand		
CO5		Crea	te interactive Game	2S		Cognitive		Cre	eate			
UNIT	ΓΙ		INTRODUCTION	I		0				9		
Game - Definition - Genres of Games, Basics of 2D and 3D Graphics, Game Objects Design -												
2D ar	nd 3I	) Trar	nsformations – Proje	ections - Colour M	odel	s – Illumin	atio	n and	d Sh	ader	Models -	
Anim	atio	n – Co	ntroller based Anir	nation.								
UNIT	UNIT IIGAME ENGINE DESIGN9											
Rend	ering	g Con	cept – Software Rer	ndering – Hardwar	e Re	endering – S	Spat	ial S	orti	ng Al	gorithms	
– Alg	orith	ıms fo	r Game Engine – Co	ollision Detection -	Gar	ne Logic – 🤇	Gam	ne Al	[ – P	ath F	inding.	
UNIT	T III		GAME PROGRAM	MMING						9		
App	licati	on lay	yer, Game logic, G	ame views, manag	ging	memory, o	cont	rolli	ng t	he m	ain loop,	
loadi	ing a	nd ca	ching game data, U	ser Interface manag	geme	ent, Game e	even	t ma	nag	emer	nt.	
UNIT			GAMING PLATE	ORMS AND FRAM	MEN	VORKS				9		
2D a Unit	nd 31 y. D)	D Gar X Stud	ne development us lio,	ing Flash, DirectX,	Java	, Python, G	ame	e eng	ines	5 -		
UNIT	ΓV		GAME DEVELOP	MENT						9		
Deve	lopir	ng 2D	and 3D interactive	games using Direct	Xor	Python – I	som	etric	and	d Tile		
Dased		nes, P	UZZIE gaines, Single	<b>PRACTICAT</b>	utt P CT	iayer game	es. V		- -	ГОТ	λ.T	
	45	KE			51		L			<u>101</u> 45	<b>AL</b>	
	40		0	0		-				40		
REEE	REN	ICEC.										
1 M	KEFEKEINLES:											
Ceng	1. WIKE WIC SHATTING AND DAVID GRANAM, "Game Coding Complete", Fourth Edition,											
2.Saniay Madhay, "Game Programming Algorithms and Techniques: A Platform Agnostic												
Approach", Addison-Wesley Professional, 2013.												
3. Jason Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.												
4. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to												
Real-	Real-Time Computer Graphics" 2 nd Editions, Morgan Kaufmann, 2006.											

- 1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", 2 nd Edition Prentice Hall / New Riders, 2009.
- 2. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", 3 rd Edition, Course Technology PTR, 2011.
- 3. Jesse Schell, The Art of Game Design: A book of lenses, 1 st Edition, CRC Press, 2008.

R So AI	РО								PSO		
D.St AI	1	2	3	4	5	6	7	1	2		
CO1	2	1	1	1	1	2	1	1	1		
CO2	2	2	2	2	2	2	2	2	1		
CO3	2	2	2	2	3	2	2	2	1		
CO4	2	2	2	2	2	2	2	3	1		
CO5	2	3	3	3	3	3	3	3	1		
Average	2	2	2	2	2	2	2	2	1		

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

### XBC602A - HUMAN COMPUTER INTERFACE

									L	Т	Р	SS	C
XB	C60	2A							4	0	0	2	6
	1			Н	UMAN CON	MPUTER INTERFA	ACE			1			
C	P	A						-	L	T	P	SS	H
3			OTTE		1 ( 1 (	<i>c i</i>			4	0	0	2	6
PR	ERF		SITE:	: Func	lamentals of	Computer		Б	•		-	1	
	urse	Out		$\frac{1}{1}$	1	· 1 · ·111 11		Do	omaii	1	Lev	vel	
Aft	er ti	ne coi	mplet	tion of	the course, s	students will be able	e to						
CO	-	Anai	<i>yze</i> ti	ne cor	cepts relatin	ig to the design of	numan -	C	~:1:		<b>A</b>	-1	
	1	comp	mag	interi	hongiyo friq	ys making compu	ter-based	Cognitive Analy			aiyze		
		Ind	arctan	ompre	theoretical d	limonsions of hums	n factore						
CO	2	invol	lyod i	in the		f computer interfac		Co	gniti	ve	Eva	luate	
		Chor	neo th	$\frac{11}{10}$ $\frac{11}{10}$	nortant asp	ects of implement	tation of				•	1	
CO	3	hum	an-co	mpute	er interfaces	ects of implement		Co	gniti	ve	Ap	ply	
СО	4	Iden	tify th	he vai	rious tools a	nd techniques for	interface	e Cognitive Apply					
		Iden	tify th	he imn	act of usable	interfaces in the ac	centance						
CO5 and performance utilization of information systems						Analyze							
UN	UNIT I INTRODUCTION 12												
Inti	Introduction: Historical Evolution of HCL Interactive System Design: Concept of Usability-												
Def	finit	ion a	nd El	labora	tion, HCI a	nd Software Engin	eering, Gl	UII	Desig	n ar	nd A	esthe	tics,
Pro	toty	ping	Tech	nique	S	0	0,		0				,
UN		Í	MO	DÊL-I	BASED DES	IGN							12
Mo	del-	Base	d Des	sign ar	nd Evaluation	n: Basic Idea, Introc	luction to	Diff	ferent	: Typ	oes o	f Moc	lels,
GO	MS	Fam	ily of	Mode	ls (KLM And	d CMN -GOMS), Fi	tts' Law ar	nd H	lickh	yma	n's I	Law.	
TIN	TT	тт	CEN			MENT							12
Cot	ora	$\frac{1}{1}$ Do	velon	mont	Guidelines	and Principles S	hnoidorma	an'e	Fig	ht (	Colde	n Ri	100
No	rma	$n' \leq S$	even	Princi	nles Norma	n's Model of Inter	action Nie	an s olcor	n's Te	n H	Pilli	stice x	with
Exa	mn	le of	its 1156	e. Con	textual Indu	irv		.1501	.1.5 10	.11 1 1	curi	stics v	VILII
UN		IV	DIA	LOG	DESIGN								12
Dia	log	Desi	on: In	ntrodu	ction to Forn	nalism in Dialog De	sign, Desi	gn 1	using	FSN	/ / (Fi	nite St	tate
Ma	chir	res), S	State C	Charts	and (Classic	cal) Petri Nets in Di	alog Desig	о m. ]	Fask I	Mod	eling	and	
An	alvs	is: Hi	ierarc	chical T	Fask Analysi	s (HTA), Engineeri	ng Task	)			- 0		
Mo	dels	and	Conc	cur Tas	sk Tree (CTT	·).	0						
UN	IT Y	V	OBJ	ECT (	DRIENTED	MODELLING							12
Ob	ject	Oriei	nted N	Model	ling: Object	Oriented Principles	, Definitio	on o	f Cla	ss ai	nd C	bject	and
the	ir Ir	nterac	tions,	, Obje	ct Oriented N	Modelling for User	Interface I	Desi	gn, C	lase S	Stud	y Rela	ated
to N	to Mobile Application Development												
	LEC	TUR	E	ТТ	JTORIAL	PRACTICAL	SELF S	TU	DY		TC	TAL	
		60			0	0	30	)			60	+30	
L				1		-				1		-	

#### **TEXT BOOK**

- 1. Dix A., Finlay J., Abowd G. D. and Beale R. Human Computer Interaction, 3 rd edition, Pearson Education, 2005.
- 2. Preece J., Rogers Y., Sharp H., Baniyon D., Holland S. and Carey T. Human Computer
- 3. Interaction, Addison-Wesley, 1994.
- 4. B.Shneiderman; Designing the User Interface, Addison Wesley 2000 (Indian Reprint).

Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

R So AI		РО								
D.SC AI	1	2	3	4	5	6	7	1	2	
C01	2	1	1	1	1	2	1	1	1	
CO2	3	1	1	1	2	2	2	2	1	
CO3	2	2	2	2	2	1	1	2	2	
CO4	1	2	2	2	2	2	2	3	1	
CO5	1	1	2	2	3	3	3	3	1	
Average	2	2	2	2	2	2	2	2	1	

### XAI602B - WEB MINING & RECOMMENDER SYSTEMS

XA1602B				L 3	T 0	P 0	SS 0	C 3		
70110020		WEB MINING & RECOMMENDER SYS	ΓΕΜS	0	U	0	U			
C P	Α			L	Τ	Р	SS	Η		
3 0	0			3	0	0	0	3		
PREREQ	UISIT	<b>TE:</b> Web Technology								
Course O	utcon	nes	Domain		Lev	vel				
To give a	deep	sense of knowledge in understanding the resea	rch perspe	ctive	es us	ed i	n We	b		
mining and their direct usage in recommender Systems. Become Familiar with the process of										
how data is extracted in Recommender Systems in day to day life.										
CO1	Reco	<i>ognize</i> the significance of learn various								
	tech	niques to mine the Web and other information	Cognitive		Rer	nem	ber			
	netv	vorks,								
CO2	Sum and	<i>marize</i> the knowledge mine Social networks Social media	ks Cognitive Understand							
CO3	Man	<i>upulate</i> and utilize the layout, resources and	Cognitive		Ap	plica	ation			
	user	interface.	Affective		Ree	eivi	ng			
CO4	То	apply the appropriate technique for data								
	anal	ysis and Understand emerging areas in the	Cognitive		Un	ders	tand			
	ever	evolving Web								
CO5	Acq	uire statistical techniques to analyze complex								
	info	rmation and social networks and develop	develop Cognitive							
	state	e-of-the-art recommender systems that	cognitive cicu							
	auto	mate a variety of choice-making strategies								
UNIT I		INTRODUCTION					9			
Need, Im	porta	ince, Applications of Web Data mining. Captur	ring-users	web	acti	vitie	s, Cli	ent		
side, mid	dlewa	are vs server side-data and usage logging. W	eb Mining	and	1 its	typ	es, V	veb		
Usage Mi	ning,	Web Structure Mining, Web Content Mining					0			
UNII II	frame	WEB USAGE MINING	coto mottor		anti	Gent	9			
roproconti	ing n	attorns in form of relations (Cranks, Understand	ling woh ar	n lu mlic	ation	ncai	un,	ito		
Heare H	ing pa leat r	name Using statistical tools for usage analy	ulig web ap	pic	ano ino	leari	ving	for		
prospectiv	ve im	nrovements	SIS and II	lacii	пс	icari	шığ	101		
UNIT III		WEB STRUCTURE MINING					9			
Understa	nding	g link structure of the web, Static $v/s$ dvnami	c linking,	repr	esen	ting	the 1	ink		
structure	as gi	raphs, identifying most / least used links, path	hs, Categoi	izin	g lir	nks l	based	on		
required	attrib	utes, Clustering links based on required attribu	ites. Web as	sag	rapł	ı, ide	entify	ing		
nodes, ed	lges, i	n-degree, outdegree, HITS Algorithm Page Ran	k algorithn	n. 0	1		5	0		
UNIT IV	0	WEB CONTENT MINING					9			
Storing v	veb co	ontent as text, database, various document type	es, generati	ng r	neta	-info	rmat	ion		
of web d	ocum	ents, labelling,-tagging, identifying feature sets	. Represen	ting	web	o doc	cume	nts,		
Vector Space Model.TF-IDF, web-page summarization, tokenization, n-gram analysis,										
Categorizing web pages based on required attributes, Clustering web pages based on										
required	attrib	utes.			1					
UNIT V	UNIT VCONTENT-BASED RECOMMENDATION9									

Pg. 105 B.Sc. Artificial Intelligence - Curicullum and Syllabus -Regulations 2022

High level architecture of content-based systems, Advantages and drawbacks of content based filtering, Item profiles, Discovering features of documents, Obtaining item features from tags, Representing item profiles, Methods for learning user profiles, Similarity based retrieval, Classification algorithms.

LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
45	0	0	-	45

#### **REFERENCES BOOK**

1.Bing Liu, Web Data Mining: Exploring Hyperlinks, Content, and Usage Data, 2<sup>nd</sup> Edition, Springer, 2011

2. SoumenChakrabarti, Mining the Web, Morgan-Kaufmann, first edition, 2002

3.Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1sted

#### Web References:

https://www.kdnuggets.com/2014/09/most-viewed-web-mining-lectures-videolectures.html

https://www.cs.uic.edu/~liub/WebContentMining.html

#### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B So AI	РО								PSO	
D.St. AI	1	2	3	4	5	6	7	1	2	
C01	2	1	1	1	1	2	1	1	1	
CO2	3	2	2	2	2	2	2	2	1	
CO3	2	2	2	2	3	2	2	2	1	
CO4	3	2	2	2	2	2	2	3	1	
CO5	3	3	3	3	3	3	3	3	1	
Average	3	2	2	2	2	2	2	2	1	

# XAI602C - APPLIED DEEP LEARNING

						Р	SS	C			
XAI602C				3	0	0	0	3			
		Applied Deep Learning					1				
C P	Α			L	Τ	Р	SS	Η			
3 0	0			3	0	0	0	3			
PKEKEQUISITE: Web Technology											
Course O	utcon	nes	Domain		Lev	vel	<b>T</b> 4 T	1			
To give a deep sense of knowledge in understanding the research perspectives used in Web											
mining an	mining and their direct usage in recommender Systems. Become Familiar with the process of										
how data	how data is extracted in Recommender Systems in day to day life.										
COI	Una Nota	erstana the structure of Artificial Neural	Cognitive		now	leag	je Je si se	-			
<u> </u>	Inet	works			omp now	rene	ensioi	.1			
02	and	Deen Learning	Comitivo		now	roh	ze	n			
	ипи	Deep Learning	Cognitive		ualu	atio	ensio.	11			
CO3	Hnd	erstand the Nuances of Deen Learning	Cognitivo		au0. 10da						
05	или	erstand the Nuances of Deep Learning	Affective		omr	roh	e peio	n			
CO4	Dev	elon Deen learning Based Robot Applications	Psychomo	Paychomo			211510				
01	Dev	clop Deep learning based Robot Applications	tor	'   A	Application						
			Affective	Sy	Synthesis						
CO5	Buil	d Deep Learning applications using	Psychomo	) .							
	Tens	sorFlow	tor Application								
			Affective	ynth	esis						
UNIT I	UNIT I Fundamentals of Deep Learning 9										
Introducti	on to	Deep Learning - Revisit Machine learning - Cha	allenges in [	Macl	nine	Lea	rning	5 -			
What is I	Repre	sentation Learning - What is Deep Learning	- Deep L	earn	ing	Vs	Mach	ine			
Learning	- App	blications of Deep Learning - Fundamentals of	Neural Ne	two	rks -	- Int	uitior	ı of			
Neural A	ctivity	<i>v</i> - Structure of a biological Neuron - What is	an Artifici	al N	eura	al No	etwo	rk -			
Elements	of an	Artificial Neural Network - Decision making in	n an Artific	ial N	leur	al N	etwo	rk -			
Fundame	ntals	of Artificial Neural Networks - McCulloch Pit	ts Neuron	- We	eigh	ts ar	nd Bia	as -			
Universal	App	proximation Rule - Perceptron Learning R	ule - Act	ivati	on	Fun	ction	s -			
Optimizat	$rac{100}{100}$	Vhat is Optimization? - Gradient Descent - Bas	ic Intuitior	1 Of 1	Баск	[pro]	pagat	:10n			
Algorithm	1 - C.	hallenges in Backpropagation Algorithm - O	ptimizers a	ana	Keg ACT	ulari	Izatio	n -			
	a 1055	Fundamentals of Tensorflow	orking with	AD	AGr	AD	0				
	rninc	Project Cycle Deep Learning Tools	Introductio	$\frac{1}{1}$	<u>,</u> Т	01000	y rFlou	A.T.			
Introducti	on t	o PyCharm - Installation of PyCharm -	Installation	n u Dof	ј Тс	meor	rElow	v -			
Understar	ndino	TensorFlow Environment – What is a Ter	nsor – Var		Di	men	sions	of			
TensorFlo	w - 7	Two Dimensional Tensors – Tensor Handling a	nd Manipi	ilatio	on –	Ter	sorFl	low			
developm	ent e	ecosystem – Mathematical Computations in	TensorFl	ow	- S	bingl	e La	ver			
perceptron	n in '	TensorFlow – Machine Learning in TensorFlo	ow – Work	ing	witł	ים TF	lear	n –			
Distribute	d Co	mputing in TensorFlow - Exporting with Te	nsorFlow -	- Fo	rmir	ng C	Graph	is –			
Optimizer	rs in T	TensorFlow – Working with Keras				0	1				
UNIT III		Deep Neural Networks - Convolutional Neu	ral Networ	:ks			9				
Deep Fee	ed For	rward Neural Networks - What is a Deep Neu	ural Netwo	rk -	Intr	odu	ction	to			
Deep Fee	ed Foi	rward Neural Networks - What is a Deep Nei	iral Netwo	rk -	Intr	odu	ction	to			

Hidden Units - Fundamentals of Multi-Layer Perceptron - Develop a Multi-Layer Perceptron Model using TensorFlow - Deep Learning in Computer Visio - Challenges in Artificial Vision - Shift Invariance Systems - Understanding Convolutions -Fundamentals of Convolutional Neural Network - Components of Convolutional Neural Network - Convolutional Neural Network Architecture - Challenges with Convolutional Neural Network - Working with AlexNet, VGG Net, GoogLeNet -Applications of Convolutional Neural Networks in Vision -Build an Image classification Deep Learning Model using CNN - Hyper parameter tuning -Introduction to Transfer learning - What is Transfer Learning - Working with Pre trained models - Fine Tuning - Transfer learning using T-HUB - Data - Recurrent Neural Networks -What is Sequential Data? - Sequence Modelling - Problem with Vanishing and Exploding gradients - Back-propagation through time - Recurrent Neural Networks Architectures -Applications of Recurrent Neural Networks -Bidirectional - Working with Long Short-Term Memory - The Long Short - Term Memory Networks - Working with Time series data -Image Captioning

UNIT IVUnsupervised Deep Learning9IntroductiontoUnsupervisedDeepLearning- PrinciplesofUnsupervisedLearningRevisited-DifferencebetweenSupervisedandUnsupervisedLearning- UnsupervisedLearningLearningAlgorithms - Basics ofDeepUnsupervisedLearning - DeepUnsupervisedLearningmethods-IntroductiontoAutoencoder - Fundamentals ofPrincipleComponentAnalysis -EigenValuesandEigenVectors - RepresentationofPCA - SingularValueDecomposition -BasicsofAutoencoders - PCA andAutoencoders - DenoisingAutoencoders - SparseAutoencoders-DeepGenerativeModels - ClassificationofDeepGenerativeModels -ApplicationsofDeepGenerativeModels - VariationalAutoencoders variousperspectives -VAEFormulization-VariationalBound - Reparameterizationtrick - ComputingtheGradients - WeightedAutoencoders-SupervisedSupervisedSupervised

LINIT V	Generative Adversarial Network & Restricted Boltzmann	9						
UNII V	Machine							
Generative Adversarial Networks - Introduction to Generative Adversarial Networks - GAN								
Architecture - Generator Network - Discriminator Network - Minimax Formulation -								
DCGAN - Cyc	ele GAN - Restricted Boltzmann Machines - What is Restricted	icted Boltzmann						
Machine - Ma	rkov Chains - Markov Random Fields - Gibbs Samplin	g - Contrastive						
Divergence -	RBM's in Collaborative Filtering - Deep Boltzmann M	achines - DBM						
Formulation and Approximation - Build a Recommender System using RBM								

	11		<u> </u>	
LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
45	0	0	-	45

### **TEXT BOOK**

Deep Learning, An MIT Press book, Ian Goodfellow and Yoshua Bengio and Aaron Courville http://www.deeplearningbook.org

### References

Pattern Recognition and Machine Learning, Bishop

Neural Networks and Deep Learning, By Michael Nielsen, Online book, 2016

E-REFERENCES

Dive Into Deep Learning, By Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola, PDF, 2020
R So AI	РО								0
D.SC AI	1	2	3	4	5	6	7	1	2
CO1	3	2	1	3	3	2	3	2	1
CO2	3	3	2	2	2	2	3	3	2
CO3	2	3	3	2	3	2	2	2	1
CO4	3	3	2	2	3	2	3	3	2
CO5	3	3	3	3	3	3	3	3	2
Average	3	3	2	2	3	2	3	3	2

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

# XAI603A-DATA ANALYTICS

				L	Т	Р	SS	C	
XAI60	)3A			4	0	0	2	6	
		DATA ANALYTICS							
C P	A			L	T	P	SS	H	
3 0	0			4	0	0	2	6	
PRER	EQUI	SITE: Data Mining	Б	•		T 1			
Cours	e Out	comes	D	omaii	1	Lev	rel		
After	the col	mpletion of the course, students will be able to							
CO1	Anal	yze what constitutes "Artificial Intelligence and	Сс	ognitiv	<i>'e</i>	Ana	alyze		
	now	to identify systems with Artificial Intelligence							
CO2	Eour	uuteAI methods, and which	C	oonitiv	7e	Eva	luate		
002	AI m	ethods may be suited to solving a given problem.	C	991111	C	2.14	iuute		
~~~	Unde	erstand a given problem in the	6	•.•			1.	1	
CO3	langı	age/framework of different AI methods.	Co	ognitiv	<i>'e</i>	Unc	lerstar	ıd	
	Choc	an algorithm on a problem formalization and	Сс	ognitiv	ve	Арр	oly		
CO4	stato	the conclusions that the evaluation supports							
	state	the conclusions that the evaluation supports.							
0.05	Reco	gnize the limitations of current Artificial	Cognitive		<i>'e</i>	Analyze			
C05	Intel	igence techniques							
UNIT	T	INTRODUCTION						12	
Data	- Defi	nitions and Analysis Techniques: Elements,	V	Variał	oles,	ar	id I	Data	
Catego	orizati	on,Levels of Measurement, Data Management and Ir	nde	xing.	,				
UNIT	II	DESCRIPTIVE STATISTICS		0				12	
Descri	iptive	Statistics: Measures of Central Tendency, Measures	of I	Locati	on o	f Dis	persi	ons,	
Error	Estin	nation and Presentation (Standard Deviation, V	aria	ance),	Int	rodu	iction	to	
Proba	bility								
TINIT	TTT	BACIC ANALVCIC TECHNIQUES						10	
DNII	III Analw	BASIC ANALYSIS TECHNIQUES	<u>1 т</u>	actina	Ch	: Car	1040 7		
T Too	Analys	lysis of Variance, Correlation Analysis, Maximum Li	L L koli	ibood	, Cn Tori	1-5q1	lare I	est,	
I -IES	IV	DATA ANALYSIS TECHNIOLIES-I	NCI.	nioou	165			12	
Data	Analy	sis Techniques-I: Regression Analysis Classification	m	Techr	iane		luste	ring	
Techn	ianes	(K-Means K-Nearest Neighborhood) Data	A	nalvs	is '	Tech	nique	s-II·	
Assoc	iation	Rules Analysis. Decision Tree.		liniyo		i een	inque	5 11.	
UNIT	V	INTRODUCTION TO R PROGRAMMING						12	
Introd	Introduction to R Programming: Introduction to R Software Tool, Statistical Computations								
using	R (Me	ean, Standard Deviation, Variance, Regression, Cor	rela	ation	etc.)	Pra	ctice	and	
Analy	sis wit	h R and Python Programming, Sensitivity							
Analy	sis.								

LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL					
60	0	0	30	60+30					
TEXT BOOK			•						
1. Probability a	1. Probability and statistics for Engineers and Scientists (9 Edn.), Ronald E Walppole, Raymond H								
Myres, Shar	on L. Myres and Levi	ing Ye, Prentice Hall	Inc						
2. The Elements	of Statistical Learning, I	Data Mining, Inference, a	nd Prediction (2nd Edn.)	Travor Hastie Robert					
Tibshirani Jer	ome Friedman, Springer,	, 2014							
<b>REFERENCES:</b>									
1. Software fo	r Data Analysis: Pro	gramming with R (St	tatistics and Computin	ng), John M.					
Chambers, S	Springer								

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B.Sc. AI	РО								<b>50</b>
<b>D.SC.</b> AI	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	1	1	2	1	1
CO2	0	1	3	2	3	2	1	2	2
CO3	1	2	3	0	3	2	2	2	2
CO4	1	2	3	1	3	2	2	1	2
CO5	0	3	0	1	0	2	3	1	2
Average	1	2	2	1	2	2	2	1	2

# XAI603B-EDGE COMPUTING

XA	1603	BB					L	T	P 0	SS 2	C 6
				EDGE	COMPUTING		Ŧ	U	U	2	0
С	Р	Α					L	Т	Р	SS	Н
3	0	0					4	0	0	2	6
PR	ERF	QUI	SITE:	ІоТ				1			
Cot	urse	Out	come	5			Domai	n	Lev	vel	
Aft	er tł	ne co	mplet	ion of the course, s	tudents will be able	e to					
СО	1	<i>Anal</i> how	<i>lyze</i> v to ide	what constitutes " entify systems with	Artificial" Intellige Artificial Intellige	ence and nce	Cogniti	ive	Ana	alyze	
CO	2	<i>Eval</i> AI m	<i>uate</i> A ethoc	I methods, and wh ls may be suited to	iich solving a given pr	oblem.	Cogniti	ive	Eva	luate	
CO	O3 <i>Understand</i> a given problem in the language/framework of different AI methods. Cognitive Understand										
CO	4	<i>Choc</i> state	ose an the co	algorithm on a production of the product of the pro	problem formalizate evaluation suppor	tion, and ts.	Cogniti	ive	Ap	ply	
со	CO5 <i>Recognize</i> the limitations of current Artificial Cognitive Analyze Intelligence techniques										
UN		[	Intro	duction							12
Intr	odu	uctior	n to Ec	dge Computing Sce	enario's and Use ca	ses - Edge o	comput	ing r	ourpo	ose an	ıd
def	initi	on, ]	Edge	computing use c	ases, Edge compu	iting hard	ware a	rchit	ectu	es, E	dge
pla	tfor	ms,Eo	dge vs	s Fog Computing, (	Communication Mo	odels - Edg	e, Fog a	ind N	И2M	•	_
UN	IT I	I	Arch	nitecture							12
IoT	Ar	chite	cture	and Core IoT Mc	dules-A connected	l ecosyster	n,IoT v	rersu	s ma	achine	e-to-
ma	chin	le ver	rsus, S	SCADA, The value	of a network and 1	Metcalfe's a	and Bec	kstro	om's	laws,	IoT
and	l eq	dge	archit	ecture, Role of	an architect, Und	derstanding	g Impl	emei	ntatio	ons v	vith
exa	mpl	les-E>	xampl	le use case and de	eployment, Case st	udy – Tele	emedici	ne p	oallia	tive c	are,
Rec	luire	emen	its, Im	plementation, Use	case retrospective.						
UN	IT I	II	Rasr	oberrvPi							12
Intr	odu	ictior	to R	aspberrvPi, About	the RaspberryPi Bo	oard: Hard	ware La	avou	t and	l Pino	uts.
Op	erat	ing S	System	ns on RaspberryPi,	Configuring Rasp	berrvPi, Pı	rogram	ming	g Ras	pberr	vPi,
Con	nnec	ting	Raspl	perry Pi via SSH, R	lemote access tools	, Interfacin	ig DHT	Sens	, sor v	vith P	i, Pi
as V	Neb	serve	er, Pi (	Camera, Image & V	video Processing us	sing Pi.	0				
UN	IT I	[V	Imp	lementation of Mi	crocomputer						12
Imp	olen	nenta	tion o	of Microcomputer	RaspberryPi and	device Inf	terfacin	g, E	dge	to Cl	oud
Pro	toco	olsPro	otocol	s,MQTT, MQTT j	oublish-subscribe,	MQTT are	chitectu	re d	letail	s, MQ	QTT
stat	state transitions, MQTT packet structure, MQTT data types, MQTT communication										
formats, MQTT 3.1.1 working example.											
UN	IT V	V	Case	Study							12
Edg	ge o	comp	uting	with RaspberryF	i, Industrial and	Commerce	ial IoT	and	l Ed	ge, E	dge
con	npu	ting a	and sc	olutions.			TT TT > * /		<b>—</b> ——		
	LEC	$\frac{10R}{60}$	Ŀ		PKACTICAL	SELF ST	UDY				
TT	VT 1		V	U	U	30			61	+30	
IE	<b>AII</b>		I <b>N</b>								

- 1. IoT and Edge Computing for Architects Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020, ISBN: 9781839214806
- 2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019, ISBN: 978149204322.

#### **REFERENCES:**

- 1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984.
- 2. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc		PO							50
D.5C.	1	2	3	4	5	6	7	1	2
CO1	3	2	1	1	1	1	1	1	1
CO2	2	1	3	2	1	2	1	2	2
CO3	1	2	3	2	1	2	1	2	2
CO4	2	2	3	2	2	2	0	1	2
CO5	2	3	0	1	1	2	1	1	2
Average	2	2	2	2	1	2	1	1	2

# XAI 603C- CLOUD COMPUTING

YAL CO2	C			L	T	P 1	SS	C
XAI 603	0	I	U	4				
C P	Α			L	Т	Р	SS	H
3 0	0			3	0	2	0	5
PREREÇ	QUISIT	<b>'E:</b> Fundamentals of Computer						
Course	Outcon	nes	Domain		L	evel		
After the	e comp	letion of the course, students will be able to			-			
601	Recog	<i>mize</i> the importance of cloud computing	Cognitiv	е	R	eme	mber	
COI	behin activi	d all communications and day to day life ties.	Psychom	otor	Pe	ercep	otion	
	Expre	ss the functionalities of each cloud	Cognitiv	е	U	ndei	rstand	t
CO2	CO2 services and aware of the various cloud service							
	provi	ders						
CON	Empl	by the understanding of the various	Cognitiv	e	А	pply	7	
CO3 scheduling activities and actively <i>participate</i> in Cognitive								
	terms	tor the creation of various cloud services.	Cognitiv	Δ	Δ	nnlu	7	
CO4	Utiliz	the cloud services tools effectively in	Cogilitiv	L	11	PPIy		
	the re	al world applications.						
CO5	Desig	n and <i>Establish</i> the cloud services and	Cognitiv	е	C	reate	Ę	
	cloud	storage	Psychom	otor	S	et		
UNIT I		INTRODUCTION TO CLOUD COMPUT	ΓING					9+6
Definitio	on, cha	racteristics, components, Cloud service pro	vider, the	e rol	e of	net	work	s in
Cloud c	omputi	ing, Cloud deployment models- privat	te, public		hy	brid	, Clo	oud
service	model	s, multitenancy, Cloud economics and	benefits,		oua ro s	00 200	mpui	ing
	15 - 1aac	VIRTUALIZATION	VIICIOSOIT	nzu	10, 0	aaJ.		9+6
Virtualiz	zation	concepts , Server virtualization, Stor	age virt	uali	zatio	on,	Stor	age
services	Netw	ork virtualization, Service virtualization,	Virtualiza	atior	n n	nana	ngem	ent,
Virtualiz	zation	technologies and architectures, virtual	machine,	Me	easu	rem	ent a	and
profiling	g of vir	tualized applications. Hypervisors: KVM, >	Ken, VMw	vare	hyp	ervi	sors a	and
their fea	tures.				-			
UNIT II	$\frac{I}{11}$	DATA IN CLOUD COMPUTING	D' T 11			1 т		9+6
Kelation	al data	bases, Cloud file systems: GFS and HDFS, I	Biglable,	нва	se a	nd I	Jyna	mo. dal
Parallel	efficier	and extensions. Faraner computing,	ule III Ising Mar	ap-1 2-Ro	duc	ıce □ Fı	ntern	rico
batch pr	ocessin	g using MapReduce.		<i>j</i> -nc	uuc	с, ш	ncip	1150
UNIT IN	/	CLOUD SECURITY						9+6
Cloud s	ecurity	fundamentals, Vulnerability assessment	tool for	clou	ıd,	Priv	acy a	and
Security	in clou	d. Cloud computing security architecture:	General Is	ssue	s, Tr	uste	d Clo	oud
computi	ng, Se	cure Execution Environments and	Commun	icati	ons,	, N	/licro	-
architect	ures;	Identity Management and Access control,	Autonom	nic s	ecui	ity,	Secu	rity
challeng	es : V	irtualization security management - vi	rtual th	reats	, ' т	VM	Secu	rity
Recomm	nendati	ons, VM - Specific Security techniques, Se	ecure Exec	cutic	n E	nvır	onme	ents
and Con	ununic	auons in cioud.						

UNIT V ISSUES IN CLOUD COMPUTING	9+6								
Implementing real time application over cloud platform	Issues in Inter-cloud								
environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud.									
Quality of Service (QoS) monitoringin a Cloud computing environment. Cloud									
Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky									
computing, load balancing, resource optimization, resource dynamic reconfiguration,									
Monitoring									
LECTURE TUTORIAL PRACTICAL SELF ST	JDY TOTAL								
45 0 -	45								
TEXT BOOK									
1. System Analysis and Design – Awadh									

2. Analysis & Design of Information system – James A. Senn – McGraw Hill

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

B Sc AI	PO								PSO		
D.St AI	1	2	3	4	5	6	7	1	2		
CO1	1	1	2	1	1	2	1	2	1		
CO2	2	2	1	1	1	2	1	2	1		
CO3	2	1	2	1	1	2	1	2	1		
CO4	2	2	2	1	1	2	1	1	1		
CO5	2	1	3	2	1	1	2	1	1		
Average	2	1	2	1	1	2	1	2	1		

### XAI 604A HUMAN COMPUTER INTERACTION LAB

XAI604A HUMAN COMPUTER INTERACTION LAB		L	Τ	Р	C	
		0	0	2	2	
C:P:A	0:1.5:0.5		L	Т	Р	Η
			0	0	4	4
<b>Course Outcom</b>	es	Domain	Lev	vel		
					60	

1.Design a drop-down list or a menu in a GUI keeping in view the serial position effect

2. Design of a Mobile Keypad focusing on size, layout and devilling( a minimum of two different layouts)

3. Design of different icons in Graphical user Interface ( a minimum of four different icons)

4. Design UI screens for the elderly people with unsteady hands keeping in view the mouse sensitivity

5. Design a menu structure for ordering house- hold items from a mall directly to your home through a mobile

phone interface. Categorize the items into menus and submenus. (make use of Hick's Law)

6. Design a prototype of a TV remote Control Panel

7. Design a Mobile Interface for a Mall Map

8. Design a Mobile Interface screens for railway enquiry system

9. To Developed a Web Interface for Online banking system

10.To Design a Web Interface for a University website

# XAI 605AWEB TECHNOLOGIES LAB

X A 1605 A	WEB TECHNOLOGI	ESLAB	L	Т	Р	C
AT1100571		0	0	2	2	
C:P:A	0:1.5:0.5		L	Τ	P	Η
			0	0	4	4
Course Outcom	les	Domain	Lev	/el		
					60	
1. Formatting ta	gs, ordered list and unordered list.					
2.Tables, frame,	image map and hyperlink.					
3.Font, color and	d style					
4. Background a	and Links					
5.Form Validati	on					
6.Looping and (	Conditional Statements					
7. Strings and O	perators					
8.Flow of contro	ols and Arrays					
9.PHP Forms						
10.PHP Function	ns					
11.File Handling						
12.Exception Ha	andling					
13. PHP Session	s and Cookies					
14. PHP MySQI	- Connection					

### XAI601B MOBILE APPLICATION AND DEVELOPMENT LAB

VALOED	MOBILE APPLICATION	AND	L	Т	P	C
XA1605B	DEVELOPMENT LA	В	0	0	2	2
C:P:A	0:1.5:0.5		L	Т	Р	Η
			0	0	4	4
Course Outcom	es	Domain	Lev	vel	-	
					60	
1. Formatting ta	gs, ordered list and unordered list.					
2.Tables, frame,	image map and hyperlink.					
3.Font, color and	d style					
4. Background a	ind Links					
5.Form Validati	on					
6.Looping and (	Conditional Statements					
7. Strings and O	perators					
8.Flow of contro	ols and Arrays					
9.PHP Forms						
10.PHP Function	ns					
11.File Handling						
12.Exception Handling						
13. PHP Session						
14. PHP MySQI	Connection					