

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE AUTONOMOUS SYLLABUS REGULATION 2024





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AND DATA SCIENCE AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM





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VISION AND MISSION OF THE INSTITUTION

VISION

Jeppiaar Institute of Technology aspires to provide technical education in futuristic technologies with the perspective of innovative, industrial, and social applications for the betterment of humanity.

MISSION

І ІГАЬІНЙК І

- To produce competent and disciplined high-quality professionals with the practical skills necessary to excel as innovative professionals and entrepreneurs for the benefit of society.
- To improve the quality of education through excellence in teaching and learning, research, leadership, and by promoting the principles of scientific analysis, and creative thinking.
- To provide excellent infrastructure, serene, and stimulating environment that is most conducive to learning.
- To strive for productive partnership between the Industry and the Institute for research and development in the emerging fields and creating opportunities for employability.
- To serve the global community by instilling ethics, values, and life skills among the students needed to enrich their lives.





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VISION AND MISSION OF THE DEPARTMENT

VISION

The department will serve as a centre of excellence in practicing, training and implementing AI and AI associated techniques that will enable /support innovative thoughts and ideas across industries and society



MISSION

- M1: To collaborate with industry and provide the state of the art infrastructural Facilities to meet the global requirements and societal needs for AI.
- M2: Promote learning and development of students in Artificial Intelligence thought leadership, by providing them a suitable infrastructure and Environment, enabling them to grow into successful entrepreneurs.
- ♦ M3: To encourage students to pursue higher education and research in the field of AI.
- ✤ M4: To impart moral and ethical values in their profession



PROGRAMME EDUCATIONAL OBJECTIVES

- PEO 1: Utilize their proficiencies in the fundamental knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build systems that require management and analysis of large volumes of data.
- PEO 2: Advance their technical skills to pursue pioneering research in the field of AI and Data Science and create disruptive and sustainable solutions for the welfare of ecosystems.
- PEO 3: Think logically, pursue lifelong learning and collaborate with an ethical attitude in a multidisciplinary team.
- PEO 4: Design and model AI based solutions to critical problem domains in the real world
- PEO 5: Exhibit innovative thoughts and creative ideas for effective contribution towards economy building

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. Engineering knowledge: (K3) Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** (K4) Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** (K4) Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** (K5) Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** (K3, K5, K6) Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** (A3) Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** (A2) Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** (A3) Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** (A3) Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** (A3) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** (A3) Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** (A2) Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO 1: To evolve AI based efficient domain specific processes for effective decision making in several domains such as business and governance domains.

PSO 2: To arrive at actionable Foresight, Insight, hindsight from data for solving business and engineering problems

PSO 3: To create, select and apply the theoretical knowledge of AI and Data Analytics along with practical industrial tools and techniques to manage and solve wicked societal problems

PSO 4: To develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.

PSO 5: To able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.





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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE Autonomous Curriculum AI&DS - 2024 - 2025 - Credits Summary

S No	Subject Area			Credits	per Se	meste	er			Total
5.110	Subject Area	Ι	Π	Ш	IV	V	VI	VII	VIII	Credits
1	Humanities and Social Sciences including Management Courses(HS)	1	1	0	0	0	0	0	0	2
2	Basic Science Courses(BS)	4	4	4	0	0	0	0	0	12
3	Engineering Science Courses(ES)	10	12	0	0	0	0	0	0	22
4	Professional Core Courses(PC)	3	4.0	11	13	11	5	5	0	52
5	Professional Elective Courses(PE)	0	0	0	3	3	6	3	6	21
6	Open Electives(OE)	0	0	0	0	3	0	3	0	6
7	Employment Enhancement Courses(EEC)		STI) .	2011	1	1	2	7	11	25
8	Mandatory Courses(MC) - No Credit	EE, PE&HV	IC & LE	EVEng	0	0	0	0	0	0
	Total	19	22	16	17	18	13	18	17	140

JEPPIAAR



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE AUTONOMOUS CURRICULUM R2024 (CBCS) CURRICULUM AND SYLLABI FOR SEMESTERS I TO VIII

SEM	ESTER - I									
C N-	Course	Course Title	Catal	Pe	rio	ds		CIE	CEE	тотат
5. 1NO	Code	Course Title	Category	L	Т	Р	C	CIE	SEE	IUIAL
THE	ORY									
1	AIP001	Induction Program		0	0	0				
2	AMA101	Matrices and Calculus	BS	3	1	0	4	40	60	100
3	APH101	Computational Physics	ES	3	0	0	3	40	60	100
4	ACS101	Principles of programming	PC	3	0	0	3	40	60	100
5	ACS102	Python Programming	ES	3	0	0	3	40	60	100
6	AMC101	Employment Enhancement Skills	MC	2	0	0	-	-	-	100
7	AMC102	Professional Ethics and Human Values	МС	2	0	0	-	-	-	100
8	AHS101	Language Enhancement	HS	0	0	2	1	60	40	100
PRA	CTICALS		·	•	-					
9	APH301	Computational Physics Lab	ES	0	0	4	2	60	40	100
10	ACS301	Python Programming Lab	ES	0	0	4	2	60	40	100
11	AEEC301	Mini project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
		ESTD. 20	Total	16	1	12	19			
SEM	ESTER - I	L								
S.No	Course Code	Course Title	Category	Pe L	rio T	ds P	С	CIE	SEE	TOTAL

	Code			L	Т	P				
THE	ORY									
1	AMA102	Discrete Mathematics	BS	3	1	0	4	40	60	100
2	AECS103	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	40	60	100
3	AAI101	Introduction to Data Science	ES	3	0	0	3	40	60	100

4	ACS106	Data Structures and Algorithms	PC	3	1	0	3	40	60	100
5	ACS142	Fundamentals of Cloud Computing	ES	3	0	0	3	40	60	100
6	AHS301	Communication Skills and Technical Writing	HS	0	0	2	1	60	40	100
7	AMC103	Indian Constitution	MC	2	0	0	0	-	-	100
PRA	CTICALS									
8	AECS302	Basics of Electrical and Electronics Engineering Lab	ES	0	0	4	2	60	40	100
9	ACS304	Data Structures and Algorithms Lab	PC	0	0	4	1	60	40	100
10	ACS302	Cloud Computing Lab	ES	0	0	4	1	60	40	100
11	AMC301	Yoga and Happy Living	MC	0	0	3	0	-	-	100
12	AEEC302	Mini project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	19	2	17	22			

SEM	ESTER - I	П								
C N-	Course	Comment Title	Catal	P	eri	ods	C	CIE	CEE	тоты
5. NO	Code	Course Thie	Category	L	Т	Р	C	CIE	SEE	IUIAL
THE	ORY									
1	AAI102	Artificial Intelligence	PC	3	1	0	4	60	40	100
2	ACS108	Database Management Systems	PC	3	0	0	3	60	40	100
3	AMA105	Probability and Statistics	BS	3	1	0	4	40	60	100
4	AMC108	Environmental Engineering and Sustainability	MC	3	0	0	0	40	60	100
PRA	CTICALS			<u> </u>		·			•	
5	AHS302	Soft Skills I	HS	0	0	2	0	-	-	100
6	ACS306	Database Management Systems Lab	PC	0	0	4	2	60	40	100
7	AAI301	Artificial Intelligence Lab	PC	0	0	4	2	60	40	100
8	AEEC303	Mini Project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	13	2	12	16			
SEM	ESTER - I	V								
S No	Course	Course Title	Catagory	P	eri	ods	C	СІБ	SEE	τοτλι
3.1NO	Code	Course fille	Category	L	Т	P	C	CIE	SEE	TOTAL
THE	ORY									
1	AAI103	Data Mining and Warehousing	PC	3	0	0	3	40	60	100

2	ACS107	Operating System	PC	3	1	0	3	40	60	100
3		Professional Elective 1	PE	3	0	0	3	40	60	100
4	ACS109	Computer Networks	PC	3	0	0	3	40	60	100
PRA	CTICALS		1					1 1	I	
5	AHS303	Soft Skills II	MC	0	0	2	0			100
6	ACS305	Operating system Lab	PC	0	0	4	2	60	40	100
7	ACS307	Computers Networks Lab	PC	0	0	4	2	60	40	100
9	AEEC304	Mini Project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	12	1	12	17			
SEM	ESTER - V	7								
S.No	Course	Course Title	Category	Pe	rio	ds	С	CIE	SEE	TOTA L
	Couc			L	Τ	Р				
THE	ORY									
1	AAI104	Multi -modal Data Processing and Learning	PC	3	1	0	4	40	60	100
2	AAI105	Machine Learning	PC	3	0	0	3	40	60	100
3		Professional Elective 2	PE	3	0	0	3	40	60	100
4		Open Elective 1	OE	3	Z	-	3	40	60	100
PRA	CTICALS									
5	AAI302	Multi -modal Data Processing and Learning Lab	PC	0	0	4	2	60	40	100
6	AAI303	Machine Learning Lab	PC	0	0	4	2	60	40	100
7	AEEC305	Mini Project/Internship/Professional practices	EEC	0	0	2	1	60	40	100
		PUPERUMA	Total	12	0	10	18			
SEM	ESTER - V	71								
S.No	Course	Course Title	Category	Pe	erio	ds	С	CIF	SEF	TOT AL
	Code			L	1	P				
THE	ORY									
1		Professional Elective 3	PE	3	() 0	3	40	60	100
2		Professional Elective 4	PE	3	() 0	3	40	60	100
3	AAI106	Deep Learning	PC	3	1	0	3	40	60	100
PRA	CTICALS									
4		Seminar	PW	0	0) 2	1	-	10 0	100
5	AAI304	Deep Learning Lab	PC	0	() 4	2	60	40	100

6	AEEC306	Miniproject/Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	9	1	8	13			

SEM	ESTER - VI	I								
S No	Course	Course Title	Cotogory	I	Period	ls	C	CIF	SEE	TOTAL
9.INU	Code	Course Thie	Category	L	Т	Р	C	CIE	SEL	IUIAL
THE	ORY									
1	AAI107	Cyber Security	PC	3	0	0	3	40	60	100
2		Professional Elective5	PE	3	0	0	3	40	60	100
3		Open Elective 2	OE	3	0	0	3	40	60	100
PRA	CTICALS	·								
4	AAI306	Project Phase I	PW	0	0	12	6	40	60	100
5	AAI305	Cyber Security Lab	PC	0	0	4	2	60	40	100
6	AEEC307	Internship/Professional practices	EEC	0	0	2	1	60	40	100
			Total	9	0	18	18			
SEM	ESTER - VI	II								
S No	Course	Course Title	Catagory	I	Period	ls	C	СШ	SEE	тотат
9.INU	Code	Course Thie	Category	L	Т	Р	C		SEE	IUIAL
THE	ORY									
1		Professional Elective 6	PE	3	0	0	3	40	60	100
2		Professional Elective 7	PE	3	0	0	3	40	60	100
PRA	CTICALS									
3	AAI307	Project Phase II	PW	0	0	20	10	40	60	100
4	AEEC308	Internship/Professional practices	EEC	0	0	2	1	60	40	100
		EST	Total	6	0	22	17			



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE AUTONOMOUS SYLLABUS R2024 (CBCS) PROFESSIONAL ELECTIVE

VER	FICAL - I	- Data Science					
	Course			Period	5	Total	
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AAI701	Data Visualization	3	0	0	3	3
2	AAI702	Data Analytics for Finance	3	0	0	3	3
3	AAI703	Internet of Things	3	0	0	3	3
4	AAI704	Network Security	3	0	0	3	3
5	AAI705	Brain Computer Interface	3	0	0	3	3

VERT	TICAL - II	- Data Retrieval Techniques					
	Course			Period	5	Total	
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AAI706	Data Augmentation and Disc	pl3 ^{1e}	0	0	3	3
2	AAI707	Multivariate Calculus And Forecasting	3	0	0	3	3
3	AAI708	Block Chain Technology	3	0	0	3	3
4	AAI709	Cryptography	231	0	0	3	3
5	AAI710	Computational Neuroscience	3	0	0	3	3

VERT	FICAL - II	I- Cyber Security and Data Pr	rivacy					
	Course			Period	S	Total		
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits	
1	AAI711	Dependable Artificial Intelligence	3	0	0	3	3	
2	AAI712	Computer Vision	3	0	0	3	3	
3	AAI713	Quantum Computing	3	0	0	3	3	
5	AAI714	Cognitive And Behavior Science	3	0	0	3	3	

VERT	FICAL - IV	V- Data Centric Computation					
	Course		Peri		S	Total	
S.No	Code	Course Title	L	T P		Contact Periods	Credits
1	AAI715	Resource constraint AI	3	0	0	3	3
2	AAI716	Data Engineering	3	0	0	3	3
3	AAI717	Data centers management	3	0	0	3	3

VERTICAL - V Data Security

	Course			Period	5	Total	Credits	
S.No	Code	Course Title	L	Т	Р	Contact Periods		
1	AAI718	Reinforcement Learning	3	0	0	3	3	
2	AAI719	Time Series Data Analysis	3	0	0	3	3	
4	AAI720	Digital Forensic	3	0	0	3	3	
5	AAI721	Natural Language Understanding	3	0	0	3	3	

VERTICAL - VI-Computing

	Course			Period	S	Total		
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits	
1	AAI722	Optimization Techniques	3	0	0	3	3	
2	AAI723	Bio Informatics	3	0	0	3	3	
3	AAI724	Information Retrieval System	3	0	0	3	3	
4	AAI725	Information Security	3	0	0	3	3	
5	AAI726	Soft Computing	3	0	0	3	3	
		Self Die	uine					

VERT	FICAL - V	II- Block Chain Technology						
	Course			Period	S	Total	Credits	
S.No	Code	Course Title	L	Τ	Р	Contact Periods		
1	AAI727	AI techniques for Game Development	2311	0	0	3	3	
2	AAI728	Principles of Block Chain Technology	3	0	0	3	3	
3	AAI729	Security in cloud Environment	3	0	0	3	3	
4	AAI730	Neuro Morphic design and Computing	3	0	0	3	3	

		OPEN	N ELECTI	VE	2					
C M.	Course	Commo Title	Catal	Pe	rio	ds	Coord litte	CIE	GEE	тотат
5.INO	Code	Course Inte	Category	L	Т	Р	Creatts	CIE	SEE	IUIAL
THE	ORY			-						
1	AME701	Drone Technologies	OE	3	0	0	3	40	60	100
2	AME702	Additive Manufacturing	OE	3	0	0	3	40	60	100
3	AME703	Electric and Hybrid Vehicle Technology	OE	3	0	0	3	40	60	100
4	AEC701	Sensors and Actuators	OE	3	0	0	3	40	60	100
5	AEC702	Applied Design Thinking	OE	3	0	0	3	40	60	100
6	AEC703	Project Report Writing	OE	3	0	0	3	40	60	100
7	AMB701	Corporate Governance	OE	3	0	0	3	40	60	100
8	AMB702	Digital Marketing	OE	3	0	0	3	40	60	100
9	AMB703	Rural Marketing	OE	3	0	0	3	40	60	100
10	ACS701	System Engineering	OE	3	0	0	3	40	60	100
11	ACS702	Green Computing	OE	3	0	0	3	40	60	100
12	ACS703	Fintech Regulation	OE	3	0	0	3	40	60	100
13	AIT701	Network Essentials	OE	3	0	0	3	40	60	100
14	AIT702	Soft Computing Methodologies	OE	3	0	0	3	40	60	100
15	AIT703	Knowledge Engineering	OE	3	0	0	3	40	60	100
16	ACB701	Business Research Methods	OE	3	0	0	3	40	60	100
17	ACB702	Automation Testing Tools	OE OE	3	0	0	3	40	60	100
18	ACB703	Social Network Analysis	OE	3	0	0	3	40	60	100
19	AAI701	Drinking Water Supply and Treatment	OE	3	0	0	3	40	60	100
20	AAI702	Geographical Information	² OE	3	0	0	3	40	60	100
21	AAI703	IT in Agricultural System	OE	3	0	0	3	40	60	100



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE AUTONOMOUS SYLLABUS R2024 (CBCS)



I YEAR I SEMESTER

AMA101 - MATRICES AND CALCULUS

		1		,		r					
Programme&Bran	nch B.Tech & AI&DS	Sem.	Category	L	Τ	P	C				
		1	BS	3	1	0	4				
	 Introduce the matrix t provide the necessary procedures for solving 	techniqu basic c	es and to explain the oncepts of a few nurically different life	e na mer	ture ical 1	of the nether	e matrix. ods and give				
	in Engineering and Te	echnolog	TRAILY UNICICIII KII	ius (n pro		ns occurring				
Preamble	\succ familiarize the studen	ts with	differential calculus	•							
	understand techniques of calculus which are applied in the Engineering problems.										
	 acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications 										
Unit 1	Unit 1 MATRICES 9+3										
Matrices - Eigenval	lues and eigenvectors - Diagon	alizatio	n of matrices using	orth	ogon	al tra	insformation				
– Cayley Hamilton	Theorem (without proof) - Q	Quadratic	forms - Reduction	n to	cano	nical	form using				
orthogonal transfor	mation						-				
Unit 2	SOLUTION OF LINEA	R SYS	<mark>FE</mark> M OF EQUATI	ON	S		9+3				
	AND EIGENVALUE										
	PROBLEMS										
Solution of linear s	ystem of equations - Gauss elin	mination	n method – Pivoting	g - G	auss	Jord	an method –				
Gauss Seidel iterat	ive method - Matrix Inversion	by Gau	ss Jordan method -	- Eig	en v	alues	of a matrix				
by Power method –	Jacobi method.										
Unit 3	DIFFERENTIAL CAL	CULUS	2				9+3				
Limit of a function	-Continuity-Derivatives-Differ	entiatio	n rules (sum, produ	ict, c	quoti	ent, o	chain rules)-				
Implicit Differentia	tion-Logarithmic Differentiation	on-Appl	ications: Maxima a	nd N	linin	na of	functions of				
one variable		10	50				0.2				
Unit 4	INTEGRAL CALCUL			41-			9+3				
Definite and Indefi	nue integrals - Substitution ru	ne - Teo	inniques of Integra	110n:	Inte	egrati	on by parts,				
fraction Integration	egrais, Irigonometric substitu	utions,	integrationol ratio	nal	runc	uons	by partial				
Traction, Integration	I OI IITALIONAL IUNCLIONS – IMPR	oper inte	egrais.				0+2				
Unit 5	MULTIPLE INTEGRA	LD	ouble integrals in	mc1-		ond:	9+3				
Double integrals –	Change of order of integration	ion – D	f solids. Change a	pola	I CO	orain	double and				
triple integrals Ar	onlications: Moments and centre	s of ma	so moment of inert	n va ia	1 1001	es m	uouble allu				
The integrals – Ap		25 01 111a		<i>ia</i> .			Total. 60				
TEXTROOKS							10141.00				
1 Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi											
	3rd Edition. 2014.		, initiality			~, 1 (
2 H	Erwin Kreyszig ." Advanced Er	ngineeri	ng Mathematics "]	ohn	Wile	ey an	d Sons. 10th				
	Edition, New Delhi, 2016	0	, , , , , , , , , , , , , , , , , , ,			,					
3 (Grewal. B.S., and Grewal. J.S.	., Num	erical methods in	Engi	neer	ing a	nd Science.				
ŀ	Khanna Publishers, 9th Edition,	New D	elhi, 2001.	U		0	- 7				
REFERENCES											
L											

1	Ramana. B.V., " Higher Engineering Mathematics ", Mc	Graw Hill Education Pvt.									
	Ltd, New Delhi, 2018.										
2	N.P. Bali and Manish Goyal, A text book of Engineer	ring Mathematics, Laxmi									
	Publications, Reprint, 2008	Publications, Reprint, 2008									
COURSEOU	ΓCOMES:	Bloom's Taxonomy									
At the end of	the course, learners will be able to	Level									
CO1	Demonstrate the matrix techniques in solving the related	K4									
	problems in engineering and technology.										
CO2	Apply matrix methods to solve system of linear equations	K3									
CO3	Apply differential calculus tools in solving various	K3									
	application problems										
CO4	Apply different methods of integration in solving	K3									
	practical problems.										
CO5	Evaluate multiple integrals to conduct investigations of	K5									
	complex problems										

	РО	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
	1	2	3	4	5	6	1	8	9	0	1	2	1	2	3
CO	3	2	1	-	-	-	/-/	-	-	-	1		1	1	-
1					K,						\mathbf{x}				
CO	3	2	1	- 1	5	-	-			-	-7		1	1	-
2							୍ଷିତ		K		S.				
CO	3	2	3	-	-	S.	-	<u>_</u>			-		1	1	-
3							elfD	lisein	ine	50					
CO	3	2	3	-	-	-	-	5	-	-	1		-	1	-
4					-		NED	111	DII						
CO	3	2	3	~	1				עיי	<i>U</i> ?			1	-	-
5					ן ו	2	EST	D. 2	011	N					
5					2	5	EST	D. 2	011	R	\int				

APH101 - COMPUTATIONAL PHYSICS											
Programme &	D Tool & ALGDC	Com	Catagory	т	T	р	C				
Branch	B. Iech & AlaDS	Sem.	Category	L	I	P	C				
		1	BS	3	1	0	4				
	To instill knowled	ge on p	hysics of semicondu	icto	rs, de	eterm	ination of				
Preamble	charge carriers and	d device	applications.								
	The students will acquire knowledge on the concepts of Photonics										

[To movide the basis series of the	ahaniaa ay d
	To provide the basic concepts of quantum me formations for the basic concepts of quantum me	echanics and various
	tormalism of quantum mechanics	• • • • • • • • •
	To acquire the knowledge of basic sciences red	quired to understand the
	fundamentals of nano materials	C A
	> To motivate the students towards the application	ons of quantum
TT • 4	mechanics and quantum computing	
	SEMICONDUCTOR AND DEVICES	9
Intrinsic Semiconduc	tor- Energy Band DiagramDirect and Indirect Band Ga	p Semi-Conductors –
Diode Laser-Hall Ell	Ct alle Devices- Logic Gales-AND, OK, NOT, NAND, E-	OR,E-INOR Gales.
Unit 2	DIFFERENTIAL EQUATIONS IN COMPUTATION	AL 9
	PHISICS	
Solution of differenti	al equations: Taylor series method, Euler method, Runge	Kutta method, predictor-
corrector method. Eig	en values and Eigen vectors of matrix: Determinant of a	matrix, characteristic
equation of a matrix,	eigen values and eigen vectors of a matrix, power method	1.
Unit 3	FUNDAMENTALS OF QUANTUM MECAHNICS	9
Photons and light wa	ves- Electrons and matter waves- The Schrodinger equation	on (Time dependent and
time independent way	e equation)- Physical significance of wave function- part	ticle in an infinite
potential well: 1D, 2I	and 3D Boxes-Degeneracy and Non-Degeneracy.	
Unit 4	INTRODUCTION TO NANO MATERIAL	9
Introduction to nanor	naterial -Electron density in bulk material - Size depender	nce of Fermi energy -
Quantum confinement	t - Quantum structures - Density of states in quantum w	vell, quantum wire and
quantum dot structur	e - Band gap of nanomaterial- Properties and Applicatio	ns of nano materials-
Tunneling: single ele	ctron phenomena and single electron transistor-Quantum	dot laser.
Unit 5	QUANTUM INFORMATION AND COMPUTING	9
Quantum computing:	Introduction - Postulates of quantum Mechanics- Different	ences between quantum
and classical comput	tion. Quantum system for information processing-quantu	Im states-Classical bits-
quantum bits or qubit	s - Density matrices- Entanglement-Quantum gates-C-NC	DT Gate-Bloch sphere.
	Discipline	Total: 45
TEXTBOOKS		
	endra K Malik, A K Singh, "Engineering Physics" Tata I	Vicgraw Hill Education
Pri	vate Limited, New Delhi 2010.	т
	nenna Singn, Sneetal Kumar, "Engineering Physics" Ceng	gage Learning India
PV		·
3 V.	kajendran, "Engineering Physics" Tata Mcgraw Hill Educ w Dolhi 2011	cation Private Limited,
	w Demi 2011.	
REFERENCES	the D. Lashi "Engineering Diversing" Teta Manuscriptil D. 1	postion Duinets I inite 1
1 Da	uu K Joshi, Engineering Physics Tata Mcgraw Hill Edu	ication Private Limited,
	w Dellii 2010. Aorikani "Enginaaring Dhygiaa" DIU Laaming Drivets L	mited New Dall: 2010
	mankani, Engineering Physics Pril Learning Private Li	C Drogg 21 January
	inem D. nowen, Ordinary Differential Equations' CR	C Fress, 21 January
20.		
COURSEOUTCOM	SC .	Bloom's Taxonomy
At the end of the cou	co. se learners will be able to	Level

CO1	Understand clearly of semiconductor physics and	K)
COI	functioning of semiconductor devices.	K2
CO2	Solution of differential equations to understand the	KJ
02	computational physics.	K2
CO3	Understand the basic concepts and principles of quantum	K2
005	mechanics	K2
	Explain the effects of quantum confinement on the	
CO4	electronic structure and corresponding physical and	K2
	chemical properties of materials	
CO5	Apply the quantum mechanical principals and basic	K3
005	concept of quantum computing	к.)

CO	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	1	-	-	-]					-	-	-	-	-
2	3	1	-	-	-	- 113		ur i	<u>-</u> LHN	LUGY	-	-	-	-	-
3	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-
4	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
AV	3	2	1.5	1.5	2	1	-	-	-	-	-	1	-	-	-

ACSI01 PRINCIPLES OF PROGRAMMING										
Programme &	D Tash	e ATEDE	Sam	Cotogowy	т	т	р	C		
Branch	D. Iech	a Alads	Sem.	Category	L	T	r	C		
			1	PC	3	0	0	3		
	Be exposed to the basics of computers and number systems.									
Learn to think logically and write pseudo code or draw flow charts for										
	problems.									
Preamble	Preamble > Be familiar with syntax and programming in C.									
To develop modular applications in C using functions, pointers and										
	structures									
	To do input/output and file handling in C									
Unit 1	INTRC	DUCTION TO CO	OMPUT	TERS		9				
Introduction - Characte	ristics of	f Computers – Evo	lution o	f Computers – Com	pute	er Ge	nerat	tions –		
Classification of Compu	iters – B	asic Computer org	anizatio	on – Number Systen	ns-N	lumb	er Co	onversion		
Unit 2	PROB	LEM SOLVING A	ND CC	MPUTER SOFTW	ARI	E 9				
Problem formulation –	Problem	Solving - Algorith	hm – Fl	ow Charts – Pseudo	cod	e - Co	ompu	iter		
Software – Types of Sof	tware –	Software Developr	nent Ste	eps – Internet						
Evolution - Basic Intern	Evolution - Basic Internet Terminology – HTML -Getting connected to Internet Applications.									
Application Software Packages- Introduction to Office Packages										
Unit 3	INTRO	DUCTION TO C				9				
Overview of C – structu	re of a C	C program – compi	lation a	nd linking processes	s, C	Const	ants,	Variables		
and Data Types – Operators and Expressions – Managing Input and Output operators – Decision										

	PO	PSO
CO's-PO's &	PSO's MAPPING	
005	file processing.	
C05	Design applications using sequential and random access	К3
CO4	functions, structures and pointers. 2011	K2
<u> </u>	Develop and implement modular applications in C using	WO IVO
CO3	constructs using arrays and strings	K2
262	Design and implement applications on C Programming	
CO2	problem solving	K2
	To demonstrate knowledge on logical thinking and	
CO1	computer system	K2
At the chu of the	To enable the student to learn the major components of a	
At the end of the	OWIED.	DIOOIII S TAXONOMY
COUDSEOUTO	OMES.	Dloom'a Towara aver
	Hill Publishing Company Limited.	
5	E.Balagurusamy, "Computing fundamentals and C Program	nming", Tata McGraw-
	Pearson Education Inc.	
4	Brian W.Kernighan and Dennis M.Ritchie, "The C Program	nming Language",
3	Stephen G.Kochan, "Programming in C", Third Edition, Pe	arson Education India.
2	TMH publications	
2	Byron Gottfried, "Programming with C", 2 nd Edition, (Indi	an Adapted Edition),
1	Pradip Dey, Manas Ghoush, "Programming in C", Oxford	University Press
REFERENCES		
	Using C", II Edition, Brooks-Cole Thomson Learning Publ	ication
2	Behrouz A.Forouzan and Richard.F.Gilberg, "A Structured	Programming Approach
1	Ashok.N.Kamthane," Computer Programming", Pearson E	ducation (India)
TEXTBOOKS		
	· · · ·	Total: 45
Introduction to P	reprocessor, Macro substitution, File Inclusion.	, - ,
High level Disk	O Functions. Direct Input Output. Error Handling functions	File Positioning.
Introduction Ch	aracter Input output in Files Command Line Arguments Str	ing Input Output in Files
$\frac{value - Suluciule}{Unit 5}$	$\frac{1}{10000000000000000000000000000000000$	
Built-in Function	s-User-defined Functions – Definitions – Declarations - Call	C Program
Unit 4 Duilt in Eurotion	FUNCTIONS, POINTERS AND STRUCTURES	9 hy noference Cell by
Iviaking – Arrays	EUNCTIONS DOINTEDS AND STRUCTURES	0
Making – Arrays Unit 4	, Branching and Looping, Handling of Character Strings. FUNCTIONS, POINTERS AND STRUCTURES	9

CO						P	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1
4 1 01							COD	DDI							

ACS102 - PYTHON PROGRAMMING

Programme &	B Toch & AL&DS	Som	Catagory	т	т	р	C
Branch	B. IECH & AI&DS	Sem.	Category	L	I	I	C
		1	ES	3	0	0	3
	To understand the basics	of algor	ithmic problem	solving.			
	To learn to solve problem	ns using	Python condition	onals and	l loo	ps.	
Preamble	To define Python function	ns and u	se function call	ls to solv	e pro	oblen	ns.
	To use Python data struc data.	tures - l	ists, tuples, dic	tionaries	to r	epres	sent complex
	To do input/output with f	iles in P	vthon				
Unit 1	BASICS OF PYTHON P	ROGR	MMING		()	
Overview of pros	gramming language- Python histo	rv-Inter	active mode $-$	script mo	de-7	, Toker	ns I iteral-
Keyword-Delimit	ter-Identifier-Data types: Integer.	-Floating	-Complex-Boo	olean-Str	ing_l	nder	tation-Input
operation-Comm	ents	1 louing	g complex bo	Sieun Str	<u>6</u> 1	maen	nution input
Unit 2		E OPE	RATORS AND	1	()	
Clift 2	FUNCTIONS	L, 01 L			-	•	
Statements: if, if-	else nested if, if -elif - Iterative	stateme	nts: while, for	Nested lo	ons	else	in loops
break, continue a	nd pass statements. Operators: A	rithmeti	c-Membership-	Identity-	Bitw	vise F	Functions:
Types, parameter	s, arguments: positional argumen	ts. kevw	ord arguments	. paramet	ers v	with	default
values, functions	with arbitrary arguments. Scope	of varia	bles: Local and	global s	cope	. Rec	cursion
Unit 3	COLLECTIONS, STRIN	IGS AN	DREGULAR	8	(,)	
C III C	EXPRESSIONS				-		
List: Create Acce	ss Negative Indices Slicing Sp	litting I	ist Methods, at	nd compr	eher	sion	s Tuples:
Create. Indexing	and Slicing. Operations on tuples	s. Dictio	nary: Create, a	dd. traver	sing	and	replace
values, operation	s on dictionaries. Sets: Create and	d operat	ions on set. Stri	ings: For	matt	ing. (Comparison.
Slicing, Splitting,	Stripping, Negative indices, Stri	ing funct	ions. Regular e	expressio	n: M	latch	ing the
patterns. Search a	and replace	8 1 1 1 1					
Unit 4	FILE HANDLING AND	EXCEF	TIONS		ļ)	
Files: Open, Read	l, Write, Append, Tell, Seek and	Close. E	rrors and Exce	ptions: S	ynta	x Err	ors,
Exceptions, Hand	lling Exceptions, Raising Except	ions, Ex	ception Chainin	ng, Userc	lefin	ed E	xceptions,
Defining Clean-U	Jp actions						
Unit 5	NUMPY, PANDAS, MA	TPLOTI	LIB		Ģ)	
Introduction - Ba	sics of NumPy - N-dimensional A	Array in	NumPy – Meth	nods and	Prop	pertie	es - Basics of
SciPy - Broadcas	ting in NumPy Array Operations	- Array	Indexing in Nu	mPy, Pa	ndas	- Int	roduction -
Series - Data Fran	me - Matplotlib - Basics - Figure	s and Ay	tes - Method su	ibplot() -	Axis	s con	tainer
							Total: 45
TEXTBOOKS							
1	Ashok Namdev Kamthane, Am	it Ashol	Kamthane "P	rogramm	ing a	and P	roblem
	Solving with Python", 2 nd editi	on , Mc	Graw Hill				
2	Dr.R.Nageswara Rao, "Core P	ython Pr	ogramming",3 ¹	^d edition,	Dea	amteo	ch Publisher
REFERENCES							

1	Paul Dietel, Harvey Deitel, "Python for Programmers", Po	earson
2	Reema Thareja," Problem Solving and programming with	Python, Oxford
	University Press	
COURSEOUTC	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	Develop algorithmic solutions to simple computational problems.	K3
CO2	Develop and execute simple Python programs.	К3
CO3	Write simple Python programs using conditionals and loops for solving problems.	K2
CO4	Decompose a Python program into functions.	K3
CO5	Represent compound data using Python lists, tuples, dictionaries etc.	K3

CO						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	1 1	12	1	2	3
1	2	2	1	2	2	-	- /	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-		2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	E	2	2	3	2	2	3	1
4	2	3	2	2	3	-)	2	2	3	2	2	3	1
5	2	3	1	2	2	-	30	(濃)	寮		8	1	3	2	2
AVG	2	2	1	2	2	-	-)1	1.2	1	1	2	2	2	1

AN	MC101 - EMPLOYMEN'	Γ ENCH	IANCEMENT S	KILL	S		
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С
	I	1	MC	2	0	0	0
Preamble						1	
Unit 1	RESUME WRITING				6	5	
Resume: Objective; For skills; Mistakes to avoid Corrections	rmats; Meticulous & Atten d; Qualification & Skill; S	tion to E WOT Ar	Detail; Organizing nalysis; Assignme	i Inform ent – D	natio raft I	on; H Resu	ighlight me &

	INTERVIEW SKILLS	6
Types of Intervie & Weakness; Im Communication;	ews; Preparation – Company, Role, Brush up Concepts, portance of Grooming; Interview Questions – HR & Te ; Negotiation Skills; How to start/end an interview; Gro	, Technical Strengths; Strength echnical; Non Verbal oup Discussion; Assignment –
Preparation for "	'Tell me about yourself', Mock Interviews.	
Unit 3	PROFESSIONAL ETIQUETTES	6
Workplace Etiqu Netiquettes – Ph Meetings: Types Meeting.	iette – Global & Local; Culture Sensitivity; Gender Sen none, Email, Social Media; Avoid Gossip; How to be per s of meetings; Agenda; Schedule & Participants; Materia	sitivity; Communication rsonable yet be professional. als required; Minutes of
Unit 4	PRESENTATION SKILLS	6
What is a Presen in Presentation; ' Feedback.	itation; Develop an effective slide; Know your Slides; K Time Management; Listening to the silent audience; Qu	Know your Audience; Barriers aestion & Answer session;
Unit 5	COMMUNICATION AT WORKPLACE	6
Direction of Cor Intelligence Total: 30	nmunication Flow – Downward, Upward, Lateral, Diag	gonal; Team Work; Emotional
TEXTBOOKS		
1	"Soft Skills & Employability Skills" by Sabina Pillai	
1	Soft Skills & Ellipto Justitis by Sublid Thid	&Agna Fernandez
1 2	"Soft Skills" by Meenakshi Raman &ShaliniUpadhya	&Agna Fernandez ay
1 2 3	"Soft Skills" by Meenakshi Raman &ShaliniUpadhya "Campus Recruitment" by Ramanadhan Ramesh Bab Bhutada&Vijaya Lakshmi Krishnan	&Agna Fernandez ay ou, Israel Battu, Akash R
1 2 3 REFERENCES	"Soft Skills" by Meenakshi Raman &ShaliniUpadhya "Campus Recruitment" by Ramanadhan Ramesh Bab Bhutada&Vijaya Lakshmi Krishnan	&Agna Fernandez ay ou, Israel Battu, Akash R
1 2 3 REFERENCES 1	 Soft Skills" by Meenakshi Raman & ShaliniUpadhya "Campus Recruitment" by Ramanadhan Ramesh Bab Bhutada&Vijaya Lakshmi Krishnan "Personality Development & Soft Skills (Old Edition) 	&Agna Fernandez ay ou, Israel Battu, Akash R n)" by Barun K Mitra
1 2 3 REFERENCES 1 2	 Soft Skills" by Meenakshi Raman & ShaliniUpadhya "Campus Recruitment" by Ramanadhan Ramesh Bab Bhutada&Vijaya Lakshmi Krishnan "Personality Development & Soft Skills (Old Edition "Soft Skills Training: A Workbook to develop Skills f H Wentz 	&Agna Fernandez ay ou, Israel Battu, Akash R n)" by Barun K Mitra for Employment" by Frederick
1 2 3 REFERENCES 1 2 3	 Soft Skills" by Meenakshi Raman & ShaliniUpadhya "Soft Skills" by Meenakshi Raman & ShaliniUpadhya "Campus Recruitment" by Ramanadhan Ramesh Bab Bhutada&Vijaya Lakshmi Krishnan "Personality Development & Soft Skills (Old Edition "Soft Skills Training: A Workbook to develop Skills for H Wentz "Ten Soft Skills You Need to Advance Your Career(A Smith) 	&Agna Fernandez ay ou, Israel Battu, Akash R n)" by Barun K Mitra for Employment" by Frederick Andre Keys Book 9)" by Lisa

CO						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

AMC	C102 - PROFESSIONAL	ETHIC	S AND HUMAN	VALU	UES		
	1031						
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	C
		1	MC	2	0	0	0
	To create an awareness o	n Engin	eering Ethics and I	Huma	n Va	lues.	
Preamble	To understand social resp	onsibili	ty of an engineer.				
	To appreciate ethical dile	mma wl	nile discharging du	ities i	n pro	fessi	onal life.
Unit 1	HUMAN VALUES				2	2	
Morals, Values and Eth – Character	ics – Integrity – Work Ethi	c – Hon	esty – Courage –E	mpatl	ny –	Self-	Confidence
Unit 2	ENGINEERING ETHIC	S	1 Per		4	1	
Senses of 'Engineering	Ethics' - variety of moral i	ssued - t	ypes of inquiry - r	noral	diler	nmas	s - moral
autonomy - Kohlberg's	theory - Gilligan's theory -	consen	sus and controvers	y - N	lode	ls of	Professional
Roles - theories about r	ight action - Self-interest -	custom	s and religion - use	es of e	ethica	al the	ories.
Valuing Time – Co-ope	ration – Commitment						
Unit 3	ENGINEERING AS SO	CIAL EX	XPERIMENTATIO	DN		3	
Engineering as experim	nentation - engineers as res	ponsible	experimenters - c	odes	of et	hics -	a balanced
outlook on law - the cha	allenger case study						
Unit 4	SAFETY, RESPONSIBI	LITIES	AND RIGHTS			3	
Safety and risk - assess	ment of safety and risk - ri	sk benef	it analysis and red	ucing	risk	- the	three mile
island and chernobyl ca	se studies						
Unit 5	GLOBAL ISSUES					3	
Multinational corporation	ons - Environmental ethics	- comp	uter ethics - weapo	ons de	velo	pmei	nt -
engineers as managers-	consulting engineers-engir	eers as	expert witnesses a	nd ad	visor	s -m	oral

leadership	
Total: 15	
TEXTBOOKS	
1	Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996
2	Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004
REFERENCES	
1	Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).
2	Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available).
3	John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4	Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

CO						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	147		U V	וענ	1	1	2	2	2	1
2	2	3	2	3	2	1	-	- 0	2	2	3	2	3	2	1
3	2	3	2	1	1	3-	EST	JZ	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

	AHS101 -	தமிழர்	юரц				
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С
		1	HS	1	0	0	1
Preamble							I
அலகு I	மொழிமற்றும்இல	க்கியம்)			3	
இந்திய மொழிக் (தமிழ் செவ்விலக்9 சங்க இலக்கியத்9 கருத்துக்கள்-தமிழ சமயங்களின் தாச சிற்றிலக்கியங்கள இலக்கியவளர்ச்9 பங்களிப்பு.	தடும்பங்கள்-திராவீ கியங்கள்-சங்க இல நில்பகிர்தல் அறம் – ந்க் காப்பியங்கள்,த க்கம்-பக்தி இலக்கிய ர்-தமிழில் நவீன இவ 1யில் பாரதியார் மற்	ிட மெ க்கியத் திருக்கு நமிழகத பம்,ஆ லக்கிய ற்றும் ப	ரழிகள்-தமி தின் சமயக தறளில் மேல ததில் சமண வார்கள் ம த்தின் வளர் ாரதிதாசன்	ழ் ஒரு ச்சார் ட பைண் ற்றும் ச்சி தட ஆகி	சொ பற்ற நை நா பிழ் யா	ம்பெ) தல க் பன் ரின்	மாழி எ்மை மார்கள் r
அலகு II	மரபு –பாறை ஓவிப ஓவியங்கள் வரை	பங்கள் சிற்பக்	முதல் நவீ கலை	Т		3	
நடுகல் முதல் நவீ மற்றும் அவர்கள் தேர்செய்யும்கனை முனையில் திருவ வீணை, யாழ், நாத கோவில்களின் பா	ன சிற்பங்கள் வரை தயாரிக்கும் கைவில ல – சுடுமண்சிற்பங் ள்ளுவர் சிலை – இவ தஸ்வரம் – தமிழர்கல ங்கு.	– ஐம் னைப் கேள் – ந சைக்க(ளின் ச	பான்சிவை பொருட்கள், எட்டுப்புற <u>ச்</u> நவிகள் – மி மூகபொருஎ	்கள்– ட பொம் நதெய்ல ருதங்க ராதார	பழா படை வங் 5ம் வா	ங்கு மகஎ கள் , பன ரழ்வ	டியினர் ா – – குமரி றற, பில்
அலகு III	நாட்டுப் புறக்கனை வீரவிளையாட்டுக	லகள் ம ள்	ற்றும்	>		3	
தெருக்கூத்து,கரக தோல்பாவைக்கூ விளையாட்டுகள்	ாட்டம் <mark>, வில்லுப்பாட</mark> த்து, சிலம்பாட்டம், எ	ட்டு, கஎ வளரி, ட	னியான்கூ <u>ச்</u> புலியாட்டம்	5து, ஒய , தமிழ	ில ர்க	ாட்ட ளின்	_ம், ர
அலகு IV	தமிழர்களின் தினை	ணக் ே	காட்பாடுக	जंग		3	
தமிழகத்தின் தாவ இலக்கியத்தில் அ அறக்கோட்பாடு – சங்ககால நகரங்க	பரங்களும்,விலங்கு கம் மற்றும் புறக்சே சங்ககாலத்தில் தம களும் துறைமுகங்க	களும் - காட்பா பிழகத்§ ரும் –	- தொல்காட் டுகள் – தமி தில் எழுத்தர சங்ககாலக்	பியம் ழர்கள் றிவும், கில் ஏ	 பெ கல் ந்று	ற்றுப் ாற் விய மதி	் சங்க றிய பும் – 1 மற்றும்

இறக்குமதி –	– கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.	
அலகு V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய 3 பண்பாட்டிற்குக்	
	தமிழர்களின் பங்களிப்பு	
இந்திய விடு	தலைப் போரில் தமிழர்களின் பங்கு – இந்தியாவின்	
பிறப்பகுதிக	sளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக் ச	5ம் –
இந்திய மருத்	த்துவத்தில், சித்த மருத்துவத்தின்பங்கு – கல்வெட்டுகள்,	
கையெழுத்த	தப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.	
Total: 15		
TEXTBOOKS	IFPPIAAR	
1	தமிழகவரலாறு – மக்களும்பண்பாடும் – கே.கே. பிள்ளை	
	(வெளியீடு:தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பண	ிகள்
	கழகம்).	
2	கணினித்த <mark>மி</mark> ழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரா	ف).
3	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC a	and
	KMRL – (in print)	
REFERENCES		
1	கீழடி – வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம்	
	(தொல்லியல்துறைவெளியீடு)	
2	பொருநை ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை	
	வெளியீடு)	
3	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Publish	hed by:
	International Institute of Tamil Studies	
4	The Contributions of the Tamils to Indian Culture (Dr.M. Valarmathi) (Publ	ished by:
	International Institute of Tamil Studies.)	
L		

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO 1	PSO2	PSO 3
CO1	1	-	-	-	I	-	I	-	-	-	-	-	1	-	-
CO2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	1	-	2	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APH301 COMPUTATIONAL PHYSICS LAB

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С			
		1	BS	0	0	4	2			
PreambleTo learn the proper use of various kinds of physics laboratory equipmentTo learn how data can be collected, presented and interpreted in a clear a concise mannerTo make the student an active participant in each part of all exercises.										
LIST OF EXPE	RIMENTS		D							
1. Determination	n of Band Gap of a semiconductor.	FCHNO	INGY							
2. Verification a	nd interpretation of truth table for	AND,	OR, NOT Gates.							
3. Verification a	nd interpretation of truth table for	NANC	, NOR, Ex-OR,	EX-NO	OR C	Bates				
4. Analysis and	Synthesis of Boolean expression us	ing log	ic gates.							
5. Laser- Determ	nination of the wavelength of the la	ser usir	ng grating							
6. Air wedge - D	Determination of thickness of a thin	sheet/w	vire							
7. (a) Optical fit(b) Compact of	re -Determination of Numerical Ap	perture groove	and acceptance a using laser.	ngle						
COURSEOUTO	COMES:		elf	Bl	oom	's Ta	xonomy			
At the end of the	e course, learners will be able to			Le	evel					
CO1	Understand the functioning of va equipment.	rious p	hysics laboratory	7		ŀ	K2			
CO2	Use graphical models to analyze	laborat	ory data.			ŀ	K4			
CO3Use mathematical models as a medium for quantitative reasoning and describing physical reality.K2										
CO4	Access, process and analyze scie	ntific i	nformation.			ŀ	Κ4			
CO5Solve problems individually and collaborative.K3										

СО	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	3	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AV	3	2	1.5	1	1	-	-	-	-	-	-	-	-	-	-

ACS301 - PYTHON PROGRAMMING LABORATORY												
		INSTITUTE	OF TECH	NOLOGY								
Programme & Branch	B.Tech &	AI&DS	Sem.	Category		L	Т	Р	С			
			1	ES		0	0	4	2			
Preamble	To underst	and the problem	m solvir	ng approache	es.		1					
	To learn the basic programming constructs in Python.											
To practice various computing strategies for Python-based solutions to real world problems.												
	To use Python data structures - lists, tuples, dictionaries.											
	To do input/output with files in Python.											
LIST OF EXPERIMEN	TS		scipiii									
1. Identification and solution charts for the same. (Ele of a steel bar, compute 2	ving of sim ectricity Bil Electrical C	ple real life or ling, Retail sho urrent in Three	scientifi op billin Phase 2	ic or technic g, Sin series AC Circuit, c	al probler , weight c etc.)	ms, of a	and mot	deve orbik	loping flow ke, Weight			
2. Python programming variables, circulate the	using simp values of n	le statements a variables, dista	nd expr	essions (exc ween two po	hange the ints).	e va	lues	oftv	VO			
3 Scientific problems us pyramid pattern)	sing Condit	ionals and Itera	tive loo	ps. (Number	r series, N	Nun	nber	Patte	erns,			
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples)												
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc operations of Sets & Dictionaries)												

6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)

7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)

8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy. Matplotlib, scipy)

9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)

10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)

11. Exploring Pygame tool. 12. Developing a game activity using Pygame like bouncing ball, car race etc.

	ТЕЛЬНИК	Total: 60
COURSEOUTC	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Develop algorithmic solutions to simple computational problems	К3
CO2	Develop and execute simple Python programs.	К3
CO3	Implement programs in Python using conditionals and loops for solving problems.	К3
CO4	Deploy functions to decompose a Python program.	К3
CO5	Process compound data using Python data structures.	К3



CO's-PO's & PSO's MAPPING

CO				<		Р	0		UUL	Ur		>		PSO	
	1	2	3	4	5	6	- 7	8	9	10	/11	12	1	2	3
1	2	2	1	2	2	-		-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	_	1.2	1	1	2	2	2	1

Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	P	С			
Branch										
		1	HS	0	0	2	1			
	Impart a thorough under	standing	of the principles un	derly	ying	effec	ctive			
	technical communication	1.								
	Develop the skills necessary to tailor technical communication to diverse									
	audience needs.									
Preamble	Enhance proficiency in u	ising lan	guage techniques an	d ur	ders	tand	ing genre			
Treamole	related to technical comm	nunicatio	on.							
	Equip students with the ability to utilize technological tools to improve									
	technical communication practices.									
	Foster an awareness of ethical considerations and global perspectives in									
	technical communication	1.								
Unit 1	PRINCIPLES OF TECH	INICAL	COMMUNICATIO	N	1	2				
Listening -Brief vi	deo snippets of conversation	nal mom	ents from movies an	d sh	ort c	locui	mentaries			
Speaking- Presenti	ng oneself, introducing othe	ers, inviti	ing people, and expl	aini	ng pl	aces	•			
Reading - Short pa	ssages that need understand	ing inclu	ide inference and cr	itica	l ana	lysis	5.			
Writing-Finishing	missing phrases and constru	cting su	ggestions based on s	upp	lied	infor	mation.			
Grammar- Who-Q	uestions and Yes/No Questi	ions - Pa	rts of Speech. Vocab	oular	y de	veloj	pment:			
prefixes, suffixes, a	articles, countable and unco	untable i	nouns.							
Unit 2	AUDIENCE-CENTERE	D COM	MUNICATION		1	2				
Listening: Deep Li	stening - Talk Shows and D	ebates.								
Reading. In denth	Reading: Scanning Passage									
Reading. In depth	Redding. Dealining I assage									
Speaking: Describe	e current issues, happenings	s , etc.								
Speaking: Describe Writing: Instructio	e current issues, happenings ns, Recommendations, Note	s , etc. e Taking,	and Paragraph Writ	ing						
Speaking: Describe Writing: Instructio Grammar: Continu	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and	s , etc. e Taking, l articles	and Paragraph Writ	ing						
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst	s , etc. e Taking, l articles itutes	and Paragraph Writ	ing						
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC	s , etc. e Taking, l articles itutes QUES Al	and Paragraph Writ	ing	1	2				
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU	s , etc. e Taking, l articles itutes QUES AI NICATIO	and Paragraph Writ ND GENRES IN ON	ing	1	2				
Speaking: Describe Writing: Instruction Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi	s , etc. e Taking, l articles itutes QUES AI NICATIO	and Paragraph Writ ND GENRES IN ON	ing	1	2				
Speaking: Describe Writing: Instruction Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audit ation of Tables, Charts and C	s , etc. e Taking, l articles itutes QUES Al NICATIO io books Graphs	and Paragraph Writ	ing	1	2				
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in	and Paragraph Writ	ing	1	2				
Speaking: Describe Writing: Instruction Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Le	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M	and Paragraph Writ	ing	1	2				
Speaking: Instructio Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Lo Grammar: Perfect	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M ers	and Paragraph Writ	ing	1	2				
Speaking: Describe Writing: Instruction Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Lee Grammar: Perfect	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M ers	and Paragraph Writ	ing	1	2				
Speaking: Instructio Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Lo Grammar: Perfect Vocabulary: Nouns Unit 4	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO	s , etc. e Taking, l articles itutes QUES AN NICATIO to books Graphs rating in er and M ers	and Paragraph Writ			2				
Speaking: Instruction Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal La Grammar: Perfect 7 Vocabulary: Nouns Unit 4	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO COMMUNICATION	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M ers	and Paragraph Writ	ing		2				
Speaking: Instruction Grammar: Continue Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Lea Grammar: Perfect A Vocabulary: Nouns Unit 4 Listening: Instruct	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO COMMUNICATION ional videos, webinars on pe	s , etc. e Taking, l articles itutes QUES Al NICATIO io books Graphs rating in er and M ers POLS US	and Paragraph Write ND GENRES IN ON cidents lemos. EED IN randing and network	king	1 1 and	2 2 TED) talks			
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Le Grammar: Perfect Vocabulary: Nouns Unit 4 Listening: Instructi Reading: Manuals,	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO COMMUNICATION ional videos, webinars on per Research papers or articles	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M ers OLS US ersonal b , Graphio	and Paragraph Write ND GENRES IN ON cidents lemos. SED IN rranding and networl c narratives, AI tools	king king	1 and ed in	2 2 TED read) talks ling			
Speaking: Instruction Grammar: Continut Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Los Grammar: Perfect A Vocabulary: Nouns Unit 4 Listening: Instructa Reading: Manuals, Speaking: Participa	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO COMMUNICATION ional videos, webinars on per Research papers or articles ating in and conducting mod	s , etc. e Taking, l articles itutes QUES Al NICATIO io books Graphs rating in er and M ers POLS US ersonal b , Graphic ck virtua	and Paragraph Write ND GENRES IN ON cidents lemos. EED IN randing and network c narratives, AI tools l meetings, focusing	king on j	1 and ed in prese	2 2 TED read	D talks ling ion skills			
Speaking: Describe Writing: Instructio Grammar: Continu Vocabulary: Phrasa Unit 3 Listening: Listenin Reading: Interpreta Speaking: SWOT A Writing: Formal Le Grammar: Perfect Vocabulary: Nouns Unit 4 Listening: Instructi Reading: Manuals, Speaking: Participa and etiquette. Moc	e current issues, happenings ns, Recommendations, Note ous tenses, prepositions and al verbs and one-word subst LANGUAGE TECHNIC TECHNICAL COMMU g to lectures, podcasts, audi ation of Tables, Charts and C Analysis on oneself and Nar etter Writing, Covering Lett Tenses and Discourse Mark s, usage of keywords TECHNOLOGICAL TO COMMUNICATION tonal videos, webinars on per Research papers or articles ating in and conducting mode k networking events and Ele	s , etc. e Taking, l articles itutes QUES AI NICATIO io books Graphs rating in er and M ers OLS US ersonal b , Graphic ck virtua evator Pi	and Paragraph Write ND GENRES IN ON cidents lemos. SED IN randing and networl c narratives, AI tools l meetings, focusing itch	king on j	1 and ed in prese	2 .2 .2 TED read entati	D talks ling ion skills			

Grammar: Ad	jectives Verbs and Adverbs								
Unit 5	ETHICAL AND GLOBAL PERSPECTIVES IN	12							
e int 5	TECHNICAL COMMUNICATION	12							
Listening: Po	deasts documentaries and webinars on digital ethics and cyb	ersecurity							
Reading: Arti	cles on fundamental ethical principles and case studies	erseeurry.							
Speaking: Cu	ltural sensitivity and representation ross-cultural communication	tion strategies Mock							
meetings to p	ractice global collaboration	tion strategies wheek							
Writing: Case	study analysis reports on legal and ethical responsibilities. P	Proposals for							
implementing	sustainable communication practices								
Grammar: Re	norted Speech Idioms and phrases and Loan words								
Total: 60	ported Speech, fulonis and phrases and Loan words								
TEXTBOOK	S								
	Effective Technical Communication by M. Ashraf Rizvi (A	(uthor) 2nd Edition							
1	Paperback 2017	Author) 2nd Edition							
2	Sylvan Barnet and Hugo Bedau 'Critical Thinking Reading	a and Writing'							
2	Bedford/st. Martin's: Fifth Edition (June 28, 2004)	g and writing,							
3	Meenakshi Unadhyay Arun Sharma Verhal Ability and P	and ing Comprehension							
3	Teaching Speaking: A Holistic Approach, Book by Appa Bu	urns and Christina Chuan							
4	Mang Coh, Cambridge								
DEEEDENCI	Meng Gon, Cambridge.								
KEFEKENCE	To shring! Communication: A Decider Contend Ammonsh"!	hay Douil V. Andonson							
1	Technical Communication: A Reader-Centered Approach	by Paul V. Anderson							
2	"Technical Writing: Process and Product" by Sharon J. Ger	son and Steven M.							
3	"English for Engineers and Technologists: A Skill Approach	h" by Jeyanthi G. and							
	Ramasamy P	.1 .1.16							
4	"A Handbook for Technical Writers and Editors" by M. Rag	gunathan and M.							
	Sundararajan								
	elf Discipline								
COURSEOU	TCOMES:	Bloom's Taxonomy							
At the end of	the course, learners will be able to	Level							
CO1	To create clear and successful technical publications, use	K2							
	core technical communication concepts.								
CO2	Modify technical communication to the requirements and	К2							
	expectations of various audiences.								
CO3	Use proper language and genres to effectively	K2							
	communicate technical knowledge.	112							
CO4	Use technology technologies to improve the generation,	К2							
	management, and dissemination of technical material.								
CO5	Navigate ethical quandaries and explore global views in	K2							
	technological communication methods.								



(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



DISCRETE MATHEMATICS AMA102 **Programme &** B.Tech & AI&DS С Sem. Category L Т Р Branch 2 BS 1 4 3 0 Extend student's Logical and Mathematical ability to deal with abstraction Acquire basics of set theory, functions and counting ,apply them in day to day problems Understand the fundamental concepts of the Graph theory and Network Preamble connectivity Gain the concepts to identify structures of algebraic nature, prove and use properties about them Learn relations, Lattice, Boolean algebras and their properties to comprehend problems in computer Science. FOUNDATION OF LOGIC AND PROOFS Unit 1 9+3 Propositional Logic- Connectives - Propositional equivalences -Normal form -Predicates and Quantifiers – Nested Quantifiers - Validity of a well-formed formula– Rules of inference. COMBINATORICS Unit 2 9+3Counting: The basics of counting - The pigeonhole principle - Permutations and Combinations -Recurrence relations: solving recurrence relations, generating functions - Inclusion-Exclusion principle : application of inclusion-exclusion. Unit 3 RELATIONS 9+3Relations - Equivalence relations - Functions - Bijections - Binary relations and graphs- Posets and Lattices -Hasse Diagrams – Boolean algebra. **GRAPH THEORY** Unit 4 9+3Graphs and Graph models- Graph terminology and special types of Graphs – Matrix representation of Graphs and Graph isomorphism – connectivity – Eulerian and Hamiltonian Graphs. Unit 5 ALGEBRAIC STRUCTURE 9+3 Algebraic structures with one binary operation - Semi groups and monoids - Groups - Subgroups -Homomorphism's - Normal subgroup and cosets - Lagrange's theorem - Algebraic structures (Definitions and simple examples only) with two binary operation- Ring, Integral domain and field. Total: 60 TEXTBOOKS

1	J.P.Tremblay., R.Manohar., "Discrete Mathematical Structures with Applications" Tata MCGRAW Hill 38 th edition 2010									
2	Kenneth.H. Rosen "Discrete Mathematics and its Applicat Hill Special edition 2010	ions" Tata MCGRAW								
3	T.Veerarajan "Discrete Mathematics with Graph Theory and MCGRAW Hill 33rd edition 2021	d Cominatorics" Tata								
REFERENCES										
1	Bernard Kolman., Robert Busby., Sharon C.Ross "Discrete "Pearson Publications 6 th edition 2013.	Mathematical Structures								
2	Varsha H.Patil., Seymour Lipschutz., Mare lars lipson., "D Revised 3 rd edition 2013	iscrete Mathematics"								
3	https://home.iitk.ac.in/~arlal/book/mth202.pdf									
4	https://archive.nptel.ac.in/courses/106/103/106103205									
COURSEOUTC	OMES:	Bloom's Taxonomy								
At the end of the	course, learners will be able to	Level								
CO1	Demonstrate the ability to write and evaluate a proof or outline the basic structure and give examples of each proof technique described.	К2								
CO2	Apply counting principles to determine probabilities in engineering problems.	К3								
CO3	Demonstrate the relations and functions and to determine their properties in solving engineering problems.	К2								
CO4	Develop graph theory tools to map day-to-day applications.	K4								
CO5	Expose to the concepts and properties of algebraic structures which provides solutions in design and analysis of algorithms.	К2								

CO With PO & PSO Mapping

						I	POs						PSOs			
COs	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS	
	1	2	3	4	5	6	7	8	9	10	11	12	01	02	03	
CO1	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-	
CO2	3	2	1	-	-	-	-	-	-	-	-	-	1	-	-	
CO3	3	3	3	1	-	-	-	-	-	-	-	-	1	1	-	
CO4	3	2	3	-	-	-	-	-	-	-	-	-	-	1	-	
CO5	3	2	3	-	-	-	-	-	-	-	-	1	1	-	-	
Avera	3	22	22	1								1	1	1		
ge	3	2.2	2.2	1								1	1	1	-	

1 - low, 2 - medium, 3 - high, '-' - no correlation

AEC103 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING											
		LINGI									
Programme &Branch	B.Tech-AI&DS		Sem.	Category	L	Т	Р	Credit			
Prerequisites			2	ES	3	0	0	3			
						l	1				
Preamble	This course provides	the foundat	ion for u	under standing	variou	s aspects	of el	ectrical and			
	electronics engineer	ing. From	the bas	ics of circuit	theor	ry to th	ne int	tricacies of			
semiconductor devices, this subject delves into the heart of electrical and electronic											
systems.											
Unit–I	ELECTRICAL CI	RCUITS						9			
DC Circuits: Ci	rcuit Components: Co	onductor, Res	sistor, In	ductor, Capaci	or – C	0hm's La	w - K	irchhoff's			
Laws –Independ	lent and Dependent	Sources – Si	mple pro	oblems- Nodal	Analy	vsis, Mes	h ana	lysis with			
Independent sou	rces only (Steady state	e) Introductio	on to AC	Circuits and Pa	aramete	ers: Wave	forms	, Average			
value, RMS Val	ue, Instantaneous pov	ver, real pow	er, reacti	ve power and	appare	nt power,	powe	er factor –			
Steady state anal	lysis of RLC circuits (Simple proble	ems only					0			
Unit–II	ELECTRICAL MA	ACHINES	JISCIPI					9			
Construction and	d Working principle-	DC Separate	ely and S	Self excited Ge	nerator	s, EMF	equation	on, Types			
and Application	ns. Working Princip	le of DC 1	notors,	Torque Equat	ion, T	ypes and	1 Ap	plications.			
Construction, W	orking principle and	Applications	of Trans	stormer, Three	phase	Alternato	or, Syr	nchronous			
motor and Three	Phase Induction Moto	or.			>			0			
	ANALOG ELECT	KUNICS	· · ·		1	0.1.	00				
Resistor, Inducto	or and Capacitor in El	ectronic Circ	uits- Ser	niconductor M	aterials	: Silicon	&Ger	manium –			
PN Junction Di	odes, Zener Diode –	_naracteristic	s Applic	ations – Bipo	ar Jun	ction Tra	.nsisto	r-Biasing,			
JFEI, SCK, MO	$\mathbf{DICITAI} = \mathbf{I} \mathbf{y} \mathbf{p} \mathbf{e} \mathbf{s},$	PONICS	eristics a	nd Application	s, Rect	iner and	Inverto	ers 0			
Review of num	ber systems binary of	odes error (latection	and correction		Combi	nation	al logic			
representation of	f logic functions-SOI	P and POS f	forms K	-man represent	1 Coues	, Comor	ization	a logic -			
mans (Simple Pr	oblems only)		orms, K	-map represen	autoris	- 111111111	1201101	i using K			
Unit_V	MEASUREMENT	S AND INST	RUME	NTATION				9			
Functional elem	ents of an instrument	Standards ar	nd calibra	ation Operatin	Princ	inle type	es -Mo	oving Coil			
and Moving Iron	n meters. Measuremen	t of three ph	ase powe	er. Energy Met	er. Insti	rument T	ransfo	ormers-CT			
and PT. DSO- Block diagram- Data acquisition.											
Totole 45											
Total:45											
TEXT	TBOOK:										
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1.	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics En Hill Education, 2020	gineering", Second Edition, McGraw									
2.	S.K.Bhattacharya "Basic Electrical and Electronics Engineering" 2017.	, Pearson Education, Second Edition,									
3.	Sedha R.S., "A textbook book of Applied Electronics", S. Chand	& Co., 2008									
4.	James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Elec	tric Circuits", Wiley, 2018.									
5.	A.K. Sawhney, PuneetSawhney 'A Course in Electrical Instrumentation', DhanpatRai and Co, 2015.	& Electronic Measurements &									
REFE	CRENCES:										
1.	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fou 2019.	arth Edition, McGraw Hill Education,									
2.	Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson	Education, 2017.									
3.	Albert Malvino, David Bates, 'Electronic Principles, McGraw Hi	ll Education; 7th edition, 2017.									
4.	MahmoodNahvi and Joseph A. Edminister, "Electric Circuits", So	chaum' Outline Series, McGraw Hill,									
COUI At the	RSEOUTCOMES: e end of the course, learners will be able to	Bloom's Taxonomy Level									
CO1	Compute the electric circuit parameters for simple problems.	K4									
CO2	Explain the working principle and applications of electrical machines.	К2									
CO3	Analyze the characteristics of analog electronic devices.	K4									
CO4	Explain the basic concepts of digital electronics.	К2 К2									
CO5	Explain the operating principles of measuring instruments	К2									

						I	POs							PSOs	
COs	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS
	1	2	3	4	5	6	7	8	9	10	11	12	01	O2	03
CO1	3	2	1	-		1417	E			12	7	-	1	-	-
CO2	3	2	1	/	-	-		-0			-	-	1	-	-
CO3	3	3	3	1	N	-	9	. 40		V	-	-	1	1	-
CO4	3	2	3	_ \	-	-	-	-	-	-	7	-	-	1	-
CO5	3	2	3	-	-	-	-	-	-	-	-	1	1	-	-
Avera	3	2.2	2.2	1								1	1	1	
ge	3	2.2	2.2	1								1	1	1	-

Duo que monte o	D Tool O ATO DO	S	Catagor	т	T	р	C				
Programme & Branch	B. lech & Al&DS	Sem.	Category		T	P	C				
		2	ES	3	0	0	3				
	To understand the data	science fu	indamentals and	process	5.		1				
	To learn to describe the	e data for t	the data science	process.							
Preamble	To learn to describe the	e relations	hip between data	ι.							
	To utilize the Python li	To utilize the Python libraries for Data Wrangling.									
	To present and interpret data using visualization libraries in Python										
Unit 1	INTRODUCTION	UTE OF TEC	HNOLOGY		Ģ)					
Data Science: Bene	efits and uses – facets of da	ita - Data S	Science Process:	Overvi	ew –	Def	iningresearcl				
goals – Retrieving	data – Data preparation - E	Exploratory	y Data analysis –	- build t	he m	odel	-presenting				
findings and buildi	ng applications - Data Min	ing - Data	warehousing –	Basic Si	tatist	icald	lescriptions of				
Data											
Unit 2	DESCRIBING DATA				Ç)					
Types of Data - Typ	pes of Variables -Describin	g Data wit	th Tables and Gr	aphs –D	escr	ibing	g Datawith				
Averages - Describ	ing Variability - Normal D	istribution	s and Standard (z) Score	es						
Unit 3	DESCRIBING RELAT	TIONSHIP	PS		9)					
Correlation –Scatte	er plots –correlation coeffic	ient for qu	antitative data -	comput	atior	nal fo	ormula				
forcorrelation coeff of estimate – interp	ficient – Regression –regre pretation of r2 –multiple reg	ssion line gression ec	–least squares re quations –regress	gression sion tow	n line vards	e – S s the	tandarderror mean				
Unit 4	PYTHON LIBRARIES	S FOR DA	TA WRANGLIN	NG	()					
Basics of Numpy a	rrays – aggregations – com	outations o	on arrays –compa	risons.	masl	ks. b	ooleanlogic -				
fancy indexing – st	ructured arrays – Data mar	nipulation	with Pandas $-$ da	ata inde	xing	ands	selection –				
operating on data – grouping – pivot ta	- missing data – Hierarchica bles	al indexing	g – combining da	atasets -	-agg	regat	ion and				
Unit 5	DATA VISUALIZATIO	ON			ļ)					
Importing Matplot	lib – Line plots – Scatter pl	ots – visua	alizing errors – d	lensitv a	ind c	onto	ur plots –				
Histograms – leger	r = r = r = r = r r = r = r = r = r = r = r = r = r = r =	xt and ann	otation – custom	nization	– th	ree d	imensional				
-	hic Data with Basemap - Vi	isualizatio	n with Seaborn.								
plotting - Geograph											
plotting - Geograph Total: 45											

1	David Cielen, Arno D. B. Meysman, and Mohamed Ali, "It	ntroducing Data Science".									
1	Manning Publications, 2016. (Unit I)	into a comp Data Science ,									
2	Robert S. Witte and John S. Witte, "Statistics", Eleventh Ed	lition, Wiley Publications,									
	2017.(Units II and III										
3	Jake Vander Plas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)										
REFERENCES	S										
1	Allen B. Downey, "Think Stats: Exploratory Data Analysis	in Python", Green Tea									
	Press,2014.										
COURSEOUT	COMES:	Bloom's Taxonomy									
At the end of th	ne course, learners will be able to	Level									
CO1	Define the data science process	K1									
CO2	Understand different types of data description for data	К2									
002	science process										
CO3	Gain knowledge on relationships between data	K2									
CO4	Use the Python Libraries for Data Wrangling	К3									
CO5	Apply visualization Libraries in Python to interpret and	К3									
	explore data										

CO/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 0	PO	PO	PO 12	PSO1	PSO2	PSO3
PO	T	4	3	4	3	0		0	9	10	11	14			
CO1	2	3	3	2	3	3-1	Ţ	UV	1	2	2	2	1	1	2
CO2	2	2	2	3	3	-	101		2	1	1	21	1	3	2
CO3	3	3	2	2	2	2	101	V <u>-</u> 4	2	1<	2	2	2	2	1
CO4	2	2	1	3	3	-	-	-	1	1	1	1	1	2	2
CO5	2	2	2	3	2	-	-	-	2	2	1	2	3	3	1

		DATA S	STRUCTUR	ES ANI) ALGORIT	HMS						
Programm & Branch	ne B.Te	ch & AI&DS		Sem.	Category	L	Т	Р	Credit			
Prerequisi	tes			2	PC	3	0	0	3			
1 ~-	I			1		1	I	<u> </u>				
Preamble	•	To understar	nd the concept	ts of AD	DTs.							
	•	To Learn line	ear data struc	tures – l	ists, stacks, a	nd queue	es.					
	•	To understar	nd non-linear	data stru	ictures – tree	s and gra	phs					
	•	To understar	nd sorting, sea	arching a	and hashing a	lgorithm	S					
Unit_I		To apply Tr	ee and Graph	structur	es. TURES AN	DALG	ORITH	MS	9			
Introductio	on to Data	Structures - Ne	ed - Classific	cation-A	rrays - Singl	v linked	list - R	enresent	tation of a			
linked list	in memory	v - Operations	on a singly	linked	list - Circula	r linked	list - Γ	Ooubly 1	inked list.			
Fundament	tals of Algo	orithmic Proble	m Solving -	Time C	omplexity - S	Space co	mplexit	y with e	examples -			
Growth of	f Functions	- Asymptotic	Notations a	nd its 1	properties -	Complex	ity Ana	alysis E	xamples -			
Performan	ce measure	ment - Instance	Size, Test Da	ata, Exp	erimental set	ıp.	.	-	*			
Unit–II	STA	ACK AND QU	EUES			÷			9			
Basic Stack	k Operatior	ns - Representat	tion of a Stac	k using	Arrays - Algo	orithm fo	or Stack	Operati	ons - Infix			
to postfix '	Transforma	tion - Evaluati	ng Arithmetic	Expres	sions.Basic (Queue O	peration	s - Repr	resentation			
of a Queue	e using arra	ay - Enqueue -	Dequeue - C	Circular	Queues - Pri	ority Qu	eues. So	olving F	Recurrence			
Equations	- Substituti	ion Method - R	lecursion Tre	e Metho	od - Master N	Aethod -	Sorting	; in Line	ear Time -			
Lower bou	inds for Sor	ting: Counting	Sort.						0			
Trees_ Rin	ary Trees	Properties of B	inary troop I	mnleme	ntation using	Array	nd Link	ed list	7 Recursive			
and Non-F	ary 11008 - Recursive I	Binary Tree tr	aversals - Ri	narv Se	arch Tree -	Insertio	n and I	Deletion	Granh -			
Representa	ation using	Array and Lir	ked List - T	vpes of	graphs - G	raph tray	versals -	\cdot BFS a	nd DFS -			
Minimum	Spanning 7	Free - Kruskal	s. Prim's Ale	orithm	- Shortest na	th using	Diikstr	a's, Bell	man Ford			
and Flovd	Warshall A	lgorithm.	,	0	p			-, 201				
Unit–IV	AL	<u>ĞORITHM</u> D	ESIGN TEC	HNIQU	ES				9			
Divide and	l Conquer	methodology: F	Finding maxim	num an	d minimum ·	Merge	sort - Q	uick so	rt, Binary			
Search: D	ynamic pro	ogramming: Ele	ements of dy	namic p	programming	- Multi	stage	graph —	– Optimal			
Binary Sea	arch Trees.	Greedy Technie	que: Element	s of the	greedy strate	gy - Act	ivity-sel	lection p	oroblem			
Optimal M	lerge patter	n — Huffman T	rees.	CODIT	TIME	2			0			
Unit-V		AIE SPACE S	LAKCH AL	GORIT	HINIS t. Duchless	Calent	C)moh1	y Creat			
Backtrack1	ng: n-Que	ens problem -	Hamiltoniar	1 Circu	it Problem -	Subset	Sum I	roblem	- Graph			
Colouring	problem Bi	ranch and Boun	nu: Solving	iol time	algorithms	Assignr	nent pro	voblama	кпарsаск			
FIODIEIII -	Travening	Salesillali Probl	enii- Polynom	nai time	argoriums -	INF COM	ipiete Pr	oblems.				
									Total:45			
TEXTBO	OK:											
1. Anar Educ	ny Levitin, cation, 2012	—Introduction 2.	to the Design	and An	alysis of Alg	orithms ,	3rd Edi	ition, Pe	arson			
2. Ellis Algo	Horowitz, prithms , 2n	Sartaj Sahni an d Edition, Univ	d Sangutheva ersities Press	r Rajase , 2007.	karan, —Fur	damenta	ls of Co	mputer				
3. Thor Algo	nas H. Corr prithms∥, 4tl	as H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, —Introduction to thmsl, 4th Edition, MIT Press, 2022.										
REFEREN	NCES:											

- 1. Goodrich MT, Tamassia R, Goldwasser MH., Data structures and Algorithms in Pythonl, John Wiley and Sons Ltd; 2013.
- 2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms David E. Goldberg, —Genetic Algorithm In Search Optimization And Machine Learning Pearson Education India, 2013

COUI Atthe	RSEOUTCOMES: endof thecourse, learners willbeable to	Bloom'sTaxonomyLevel
CO1	Comprehend the concepts of data structures and analyze the efficiency of an algorithm based on time and space complexity.	K4
CO2	Design applications of linear data structures and apply appropriate algorithms for solving problems like sorting and searching.	K2
CO3	Demonstrate the representation and traversal techniques of graphs and their applications.	K4
CO4	Design a solution by using branch and bound, backtracking techniques and implement the various non-linear data structures and perform the intended operations.	K2
CO5	Utilize the state space tree method for solving problems.	K2

CO/	PO 1	PO	PO	PO	PO 5	PO	PO 7	PO	PO	PO 10	PO	PO 12	PSO1	PSO2	PSO3
PO	I	2	3	4	Э	0 <		8	9	10	11	12			
CO1	2	3	3	2	2	-	-		1	2	2	2	3	1	2
CO2	2	2	2	1	3	-	-		2	1	3	1	1	3	2
CO3	3	3	3	1	2	-	9.0	ぼ	2	2	2	2	3	2	2
CO4	1	2	1	1	3	ST.	-	°,	1	1	1	1	1	2	1
CO5	2	2	3	3	2	\sim			3	52	1	2	3	3	2

iscipli

AC	CS104 - FUNDAMENTAL	SOF (CLOUD COMPUT	INC	T T							
	DIDER	MIN										
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С					
		2	ES	3	0	0	3					
To understand the principles of cloud architecture, models and infras												
	To understand the concepts of virtualization and virtual machines.											
Preamble	To gain knowledge about	virtuali	zation Infrastructure	e.								
	To explore and experiment	t with v	various Cloud deploy	yme	nt en	viroi	nments.					
	To learn about the securit	y issues	in the cloud environ	nme	nt.							
Unit 1	Unit 1 BASIC CONCEPTS OF CLOUD COMPUTING 9											

Network-Based S	ystems- Concepts of Distributed Systems. Definition of Cl	oud, Concepts of Cloud
Computing. Clou	d Service Providers, NIST Cloud Computing, Cloud Chara	cteristics
Unit 2	CLOUD INFRASTRUCTURE	9
Cloud Pros and C	ons. Layered Architectural Design, Cloud Delivery Models	s. Cloud Deployment
Models, Architect	tural Design Challenges, Cloud Storage - Storage-as-a-Serv	vice – Advantages of Cloud
Storage - Cloud S	torage Providers - S3.	
Unit 3	VIRTUALIZATION BASICS	9
Virtual Machine a	and its architecture-VM primitive operations- Virtual Infras	structures- Data Center
Virtualization for	Cloud Computing-Levels of Virtualization Implementation	n – VMM Design
Requirements, Vi	rtualization Support at the OS Level, Physical versus Virtua	al Clusters. Live VM
Migration Steps		
Unit 4	BUILDING CLOUD NETWORKS	9
	Delebito elocol nel works	,
Designing and Im	plementing a Data Center-Based Cloud Installing Open So	urce Cloud service. Virtual
Box – Eucalyptu	s Public Cloud Platforms: Google App Engine, Amazon W	eb Services (AWS).
Google Cloud Pla	ttform. Emerging Cloud Software Environments	
Unit 5	CLOUD SECURITY AND APPLICATIONS	9
Cloud Security In	frastructure Security Network level security- Host level sec	curity. Application level
security- Data pri	vacy and security Issues. Access Control and Authenticatio	n in cloud computing.
IAM Security Sta	ndards	
Total: 45		
TEXTBOOKS		
1	Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distribu	ted and Cloud Computing,
	From Parallel Processing to the Internet of Things, Morga	n Kaufmann Publishers,
	2012.	
2	Mastering Cloud Computing Foundations and Application	s Programming
2	RaikumarBuyya Christian Vechhiola S. ThamaraiSelvi	is i logi allilling
	Kajkumarbuyya, Christian veennoia, 5. Thamaraiservi	
REFERENCES		
1	Cloud Computing: Concepts, Technology & Architecture	by Thomas Erl, Ricardo
	Puttini, Zaigham Mohammad 2013	-
2	Krutz P. I. Vines P. D. "Cloud scourity: A Commentance	ive Guide to Secure Claud
<u>ک</u>	Computing" Wiley Publishing 2010	ive Julue to secure Cloud
	computing, whey rubining, 2010	
COURSEOUTCO	DMES:	Bloom's Taxonomy
		Level
At the end of the	course, learners will be able to	
		1

CO1	Understand the design challenges in the cloud.	K2
CO2	Apply the concept of virtualization and its types.	K3
CO3	Experiment with virtualization of hardware resources.	К3
CO4	Develop and deploy services on the cloud and set up a cloud environment.	K3
CO5	Explain security challenges in the cloud environment.	K2

CO						P	0						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	3	1	STHU	TE OF '	TECHN	2	3	1	2	3	3	3
2	2	2	2	3	3	-	-	-	1	2	2	3	1	1	3
3	3	3	3	3	3	-	-	I	2	1	1	2	2	1	3
4	3	3	1	1	1	-	-	-	1	3	1	3	2	1	1
5	3	2	2	2	3	-	-	-	2	3	2	2	2	3	3
AVG	2.8	2.4	2	2.4	2.2	-	-	-	1.6	2.4	1.4	2.4	2	1.8	2.6
							/								

AHS301	- COMMUNICATION S	KILLS	AND TECHNI	CAL V	VRI	FIN	J
	a de						
Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	P	С
Branch	2		Sell				
	elf D	2	HS	0	0	2	1
	Impart a thorough underst	tanding	of the principles	underl	ying	effec	ctive
	technical communication.						
	Develop the skills necessa	ary to ta	ilor technical con	mmunio	catio	n to	diverse
	audience needs.						
Dreamble	Enhance proficiency in us	sing lan	guage techniques	and ur	nders	tand	ing genres
Preamole	related to technical comm	unicatio	on.				
	Equip students with the al	bility to	utilize technolog	gical to	ols to	o imp	prove
	technical communication	practice	es.				
	Foster an awareness of eth	hical co	nsiderations and	global	pers	pecti	ves in
	technical communication.						
Unit 1	PRINCIPLES OF TECHN	NICAL	COMMUNICAT	ION	1	12	
Listening -Brief vide	eo snippets of conversationa	al mom	ents from movies	s and sh	nort o	locu	mentaries
Speaking- Presenting	g oneself, introducing other	s, inviti	ng people, and e	xplaini	ng p	laces	•
Reading - Short pass	sages that need understanding	ng inclu	de inference and	critica	l ana	lysis	.
Writing-Finishing m	issing phrases and construc	cting sug	ggestions based o	on supp	lied	infor	mation.
Grammar- Who-Qu	estions and Yes/No Questio	ons - Pa	rts of Speech. Vo	cabular	y de	velo	pment:

prefixed ouffin	ves articles countable and uncountable nouns	
prenxes, sum		10
Unit 2	AUDIENCE-CENTERED COMMUNICATION	12
Listening: Dee	ep Listening - Talk Snows and Debates.	
Reading: In de	epth Reading: Scanning Passages	
Speaking: Des	cribe current issues, happenings, etc.	
Writing: Instru	ictions, Recommendations, Note Taking, and Paragraph Writing	
Grammar: Co	ntinuous tenses, prepositions and articles	
Vocabulary: P	hrasal verbs and one-word substitutes	
Unit 3	LANGUAGE TECHNIQUES AND GENRES IN	12
	TECHNICAL COMMUNICATION	
Listening: List	tening to lectures, podcasts, audio books.	
Reading: Inter	pretation of Tables, Charts and Graphs	
Speaking: SW	OT Analysis on oneself and Narrating incidents	
Writing: Form	al Letter Writing, Covering Letter and Memos.	
Grammar: Per	fect Tenses and Discourse Markers	
Vocabulary: N	ouns, usage of keywords	
Unit 4	TECHNOLOGICAL TOOLS USED IN	12
	COMMUNICATION	
Listening: Inst	ructional videos, webinars on personal branding and networking	and TED talks
Reading: Man	uals, Research pap <mark>er</mark> s or articles, Graphic narratives, AI tools use	ed in reading
Speaking: Part	ticipating in and conducting mock virtual meetings, focusing on p	presentation skills
and etiquette.	Mock networking events and Elevator Pitch	
Writing: E-Ma	ils, drafting formal messages in social media handles, and Usage	e of AI prompts.
Grammar: Adj	ectives, Verbs and Adverbs.	
Unit 5	ETHICAL AND GLOBAL PERSPECTIVES IN	12
	TECHNICAL COMMUNICATION	
Listening: Poc	lcasts, documentaries and webinars on digital ethics and cybersec	curity.
Reading: Artic	eles on fundamental ethical principles and case studies.	-
Speaking: Cul	tural sensitivity and representation ross-cultural communication	strategies Mock
meetings to pr	actice global collaboration.	
Writing: Case	study analysis reports on legal and ethical responsibilities. Propo	sals for
implementing	sustainable communication practices.	
Grammar: Rep	ported Speech, Idioms and phrases and Loan words	
Total: 60	5 1510. 2011	
TEXTBOOKS		
1	Effective Technical Communication by M. Ashraf Rizvi (Autho	or) 2nd Edition
	Paperback 2017	<i>`</i>
2	Sylvan Barnet and Hugo Bedau, 'Critical Thinking Reading and	l Writing',
	Bedford/st. Martin's: Fifth Edition (June 28, 2004)	
3	Meenakshi Upadhyay, Arun Sharma – Verbal Ability and Reading	ng Comprehension.
4	Teaching Speaking: A Holistic Approach. Book by Anne Burns	and Christine Chuen
	Meng Goh, Cambridge.	
REFERENCE	S	
1	~ Technical Communication: A Reader-Centered Approach" by Pa	aul V Anderson
1	reennear communication. A reader-centered Approach by 17	iui v. miuci 5011

2	"Technical Writing: Process and Product" by Sharon J. Ger	son and Steven M.
	Gerson	
3	"English for Engineers and Technologists: A Skill Approace	h" by Jeyanthi G. and
	Ramasamy P	
4	"A Handbook for Technical Writers and Editors" by M. Rag	gunathan and M.
	Sundararajan	
	· · ·	
COURSE	EOUTCOMES:	Bloom's Taxonomy
At the en	d of the course, learners will be able to	Level
CO1	To create clear and successful technical publications, use	K)
COI	core technical communication concepts.	K2
CO2	Modify technical communication to the requirements and	K)
	expectations of various audiences.	K2
CO3	Use proper language and genres to effectively	K)
	communicate technical knowledge.	K2
CO4	Use technology technologies to improve the generation,	K2
	management, and dissemination of technical material.	K2
CO5	Navigate ethical quandaries and explore global views in	K2
005	technological communication methods.	112

	AMC103 - INDIA	N CON	STITUTION							
Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	Т	Р	Credit			
	Čelje,	2	MC	2	0	0	0			
PreambleThis Course intends to impart a comprehensive outlook about the nature of the Indian constitution; rights and duties of the citizens, Political Institutions of Central and State governments and its relationship with each other and the organization and functions of local government. A detailed analysis of the functions of the statutory bodies are incorporated in this course.										
Unit 1					9)				
Constitutional Assembly	y – Philosophy – Preamble	– Salie	nt Features of Indi	an Co	nstit	ution	l			
Unit 2					9)				
Fundamental Rights – I	Directive Principles of State	Policy	– Fundamental D	uties.						
Unit 3 9										
Union Executive – Pres	ident : Election – Powers a	nd Fund	ctions – Council o	f Min	isters	s – Pı	rime			
Minister : Position and	Powers – Relationship betw	veen Pri	me Minister and I	Presid	ent. S	State	Executive –			
Governor : Powers and functions – Chief Minister : Position and Powers – Relationship between Chief										

Minister and Gov	vernor.											
Unit 4											9	
Union Legislatur	e : Struc	cture, Pow	vers and	Functio	ns –	Speak	er : Po	we	r and I	Functi	ions –	Procedures of
Constitutional A	mendme	ent – State	Legisla	ture : St	ructu	ire, Po	owers a	nd	Functi	ions.		
Unit 5											9	
Judiciary – Supre Review	eme Cou	ırt: Power	s and Fu	Inctions	– Hi	igh Co	ourt : Po	ow	ers and	l Fund	ctions	– Judicial
Total: 45												
TEXTBOOKS								1				
1	Siwaci 1985.	h,J.R, Dyı	namics o	of India	n Gov	vernm	ent and	l Po	olitics,	New	Delhi	: Sterling,
2	Naran	g, A.S., In	idian Go	vernme	nt an	d Poli	tics Ne	ew]	Delhi:	Gitan	ijali ,1	995
REFERENCES												
1	Thaku	r, R. The	Governn	nent and	d Pol	itics o	f India	: L	ondon	: Mac	emilla	n, 1995.
2	Gupta	,D.C, Indi	an Gove	rnment	and	Politic	e, New	De	elhi, 19	96		

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO 1	PSO2	PSO 3
CO1	1		-	-	-	3	3	3		3	1	2	I	1	-
CO2	2		-	-	-	3	3,	3	une)	3	-	2	-	1	-
CO3	2		-	-	-	3	3	3		3	-	2	I	1	-
CO4	-	3	-	-	-	3	3	3		3	-	2	1	1	-
CO5	1		-	-		3	3	3	R II	3	/	2	I	1	-
					\leq	Sh					$\langle \rangle$	>			

AEC302 - BASICS OI	FELECTRICAL AND EI	LECTR	ONICS ENGINER	ERIN	IG L	ABC	ORATORY
Programme &	B Tech & AL&DS	Som	Catagory	T	Т	P	C
Branch	b. iecii & Ai&b5	Sem.	Category		1		C
		2	ES	0	0	4	2
Preamble	Soldering and testing sim Assembling and testing si Study of basic electrical a	ple elec imple el ind digit	tronic circuits; ectronic component al equipment.	ts on	PCI	3.	

LIST OF EXPERIMENTS

1. Soldering simple electronic circuits and checking continuity.

2. Assembling and testing electronic components on a small PCB.

3. Study of electronic components and equipment's.

(a) Resistor Color coding using digital multi-meter.

(b) Assembling electronic components on breadboard.

4. Verification of Logic Gates

5. Verification of Half Adder and Full Adder

6. Measurement of electrical quantities-voltage current, power & power factor in RLC circuit

7. Verification of KVL, KCL

8. Verification of Thevenin, Norton, Superposition Theorem

9. Fluorescent lamp wiring

10. Stair case wiring

11. Study of iron box wiring and working

12. Assembly and dismantle of computer/ laptop

Total: 60

COURSEOUTC	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	Solder and test simple electronic circuits; Assemble and	K3
	test simple electronic components on PCB.	
CO2	Demonstrate the wiring of various electrical joints in	K3
	common household electrical wire work.	
CO3	Test the working of basic logic gates.	К3
CO4	Understand the working of basic electrical devices	K3
CO5	Apply basic electrical concepts to implement basic	K3
	electrical circuits.	

CO's-PO's & PSO's Mapping

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO 1	PSO2	PSO 3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

Programme & Branch	B.Tech & AI&DS	Sem.	Categ ry	go L	Т	Р
Prerequisites	5	² JEPPIHHK	PC	0	0	4
Preamble	To demonstrate a	rray implementation of linear data stru	icture algor	rithms	•	
	To implement the	e applications using Stack				
	To implement the	e applications using Linked list				
	To implement Bi	nary search tree and AVL tree algorith	ms.			
	To implement the	e Heap algorithm.				
	To implement Di	jkstra's algorithm.				
	To implement Pr	im's algorithm				
	To implement So	rting, Searching and Hashing algorithi	ns.			
ListofExercis	ses/Experiments:					
1.	Implement Linea search for an eler elements in the li	r Search and recursive Binary Search. ment. Repeat the experiment for different st to be searched and plot a graph of th	Determine ent values one time take	the tin of n, th en vers	me requie num sus n.	uired to ber of
2.	Given a text txt [char txt []) that [0n-1] and a pattern pat [0m-1], write or ints all occurrences of pat [] in txt []	ite a functio]. You may	on sear assum	rch (ch ne that	ar pat [] n > m.
3.	Sort a given set of determine the tin values of n, the n taken versus n.	of elements using the Insertion sort and ne required to sort the elements. Repea umber of elements in the list to be sort	Heap sort t the experi ted and plo	metho iment t a gra	ods and for diff ph of t	erent he time
4.	Develop a progra First Search.	am to implement graph traversal using	Breadth Fi	rst Sea	arch an	d Depth
5.	From a given ver shortest paths to	tex in a weighted connected graph, devote other vertices using Dijkstra's algorith	velop a pro m.	gram	to find	the
6.	Find the minimum	m cost spanning tree of a given undired	cted graph	using	Prim's	

	algorithm.	
7.	Develop a program to find out the maximum and minimum numbers in a	given list of n
	numbers using the divide and conquer technique.	
8.	Implement Merge sort and Quick sort methods to sort an array of elemen	ts and
	determine the time required to sort. Repeat the experiment for different v	values of n, the
	number of elements in the list to be sorted and plot a graph of the time ta	ken versus n.
9.	Implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem.	
	Total: 60	
	REFERENCES/MANUAL/SOFTWARE:	
1.	LaboratoryManual	
COURSEO	UTCOMES:	Bloom's
Attheendoft	hecourse learners will be able to	Taxonomy
Attricendon		Level
CO1	Implement Linear data structure algorithms using arrays and Linked lists	. K3
CO2	Analyze the efficiency of algorithms using various frameworks	К3
CO3	Analyze the various searching and sorting algorithms.	K4
CO4	Apply graph algorithms to solve problems and analyze their efficiency.	K2
CO5	Make use of algorithm design techniques like divide and conquer,	К3
	dynamic programming and greedy techniques to solve problems.	
Mapping of	Cos with Pos and PSOs	

COs/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	2	1	-	- <	2	2	3	1	2	2	2	2	3	3	3
CO2	3	2	-	-	3	3	3	1	2	2	2	2	3	3	3
CO3	3	-	1	-	2	2	2	1	2	2	2	2	3	3	3
CO4	3	2	1	1	2	2	2	1	2	2	2	2	3	3	3
CO5	3	2	1	-	2	2	2	1	2	2	2	1	3	3	3
1–Slig	1-Slight,2-Moderate,3-Substantial,BT-Bloom'sTaxonomy														

Programme & Branch	B.Tech & AI&DS	Sem.	Category	L	T	P	C
		2	ES	0	0	4	2
Preamble	To learn the basics and	types of V	ritualization	I		1	
	To understand the Hyp	ervisors ar	nd its types				
	To Explore the Virtuali	ization Sol	utions				
	To Experiment the virt	ualization	platforms				
LIST OF EXPERIN	1ENTS	PIA	AR				
Create type 2 virtua	lization in VMWARE or any	y equivale	nt Open Source	Fool. Al	locat	te me	emory and
storage space as per	requirement. Install Guest	OS on that	VMWARE.				
2. Find a procedure	for the following						
Shrink and extend v	rirtual disk						
Create, Manage, Co	nfigure and schedule snapsh	nots					
Create Spanned, Mi	rrored and Striped volume						
Create RAID 5 volu	ime						
3.Desktop Virtualiz	ation using VNC and Chrom	ne Remote	Desktop				
4.Create type 2 virtu	alization on ESXI 6.5 serve	er 🗠	AL PROVIDENCE				
5.Create a VLAN ir	CISCO packet tracer	Disciplin	8 50				
6.Install KVM in Li	nux						
7.Create Nested Vir	tual Machine(VM under and	other VM)					
8.Install a C compil	er in the virtual machine cre	ated using	a virtual box an	d execu	te Si	mple	Program
9. Install Google Ap python/java.	op Engine. Create a hello wo	orld app an	d other simple w	veb app]	licati	ons ı	ising
10.Find a procedure	to transfer the files from on	ne virtual n	nachine to anoth	er virtu	al ma	achin	e
Total: 60							
COLIDGEOLITCON	MEC.			D1	0000	2	VONOMI

CO1	Analyze the virtualization concepts and Hypervisor	K4
CO2	Apply the Virtualization for real-world applications	K3
CO3	Install & Configure the different VM platforms	K2
CO4	Experiment with the VM with various software	K4

СО		РО												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	3	2	2	3	1	-	-	-	2	3	1	2	3	3	3	
2	2	2	2	3	3	-	-	-	1	2	2	3	1	1	3	
3	3	3	3	3	3	Eſ	P	F	2	1	1	2	2	1	3	
4	3	3	1	1	1	Ŀſ	F	-	1	3	1	3	2	1	1	
5	3	2	2	2	3	STITU	TE OF	TEC i n	2	3	2	2	2	3	3	
AVG	2.8	2.4	2	2.4	2.2	-	-	-	1.6	2.4	1.4	2.4	2	1.8	2.6	





JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



	AAI102 - ARTIFIC	CIAL IN	FELLIGENCE				
Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	Т	P	С
		3	РС	3	1	0	4
Preamble	 Learn the basic AI ap Develop problem sol Perform logical and problem 	pproaches ving age probabili	s nts stic reasoning				
Unit 1	INTELLIGENT AGENT	ΓS					9
Introduction to AI – A	Agents and Environments	- concep	ot of rationality –	natu	re o	f env	ironments –
structure of agents. Pro	blem solving agents – sear	ch algori	thms – uninforme	d sea	rch s	trateg	gies
Unit 2	PROBLEM SOLVING						9
in continuous space environments – online	- search with non-deter search agents and unknow	rministic n enviror	actions – searc	h in	par	ms – tially	observable
Come theory ontine	decisions in comes	ho hoto	aanah manta aa	<u>rlo</u> +		anak	7
games – partially obs backtracking search for	servable games. Constrair r CSP – local search for CS	nt satisfa SP – struc	ction problems – cture of CSP.	- con	strai	nt pr	- stochastic opagation -
Unit 4	LOGICAL REASONING	G					9
representation and eng – resolution Unit 5 Acting under uncerta	PROBABILISTIC REAS	st-order l SONING e – naïv	e Bayes models.	aining Prot	g — ba babili	ackw	ard chaining 9 reasoning -
Bayesian networks – e	xact inference in BN – app	roximate	inference in BN -	- caus	al ne	twor	ks.
TEVTDOOKS	- 16,	<u>_</u>					Total: 60
1 Stua Four	rt Russell and Peter Norvig rth Edition, Pearson Educa	g, "Artific tion, 202	cial Intelligence – 1.	A Mo	derr	App	roach",
REFERENCES							
1 Dan	W. Patterson, "Introduction	n to AI a	nd ES", Pearson E	ducat	ion,2	2007	
2 Kev	in Night, Elaine Rich, and	Nair B., '	'Artificial Intellige	ence"	, Mc	Graw	Hill, 2008
3 Patr	ick H. Winston, "Artificial	Intelliger	nce", Third Edition	n, Pea	rson	Educ	cation, 2006
4 Dee	pak Khemani, "Artificial Ir	ntelligenc	e", Tata McGraw	Hill I	Educ	ation	2013.
COURSEOUTCOMI At the end of the cour	ES: rse, learners will be able t	0		Bl Le	oom [:] vel	's Tay	konomy
CO1 Exp	lain intelligent agent frame	works				K	4
CO2 App							
CO2 ripp	ly problem solving techniq	ues				K	3

CO4	Perform logical reasoning	К3
CO5	Perform probabilistic reasoning under uncertainty	K5

CO /	PO	PO	PO	PO	PO	PO	PSO1	PSO2	PSO						
PO	1	2	3	4	5	6	7	8	9	10	11	12			3
CO1	3	1	3	3	-	-	-	-	2	3	3	1	2	1	1
CO2	2	2	1	1	1	-	-	-	2	2	3	1	3	2	2
CO3	2	1	2	1	-	-	-	-	2	1	1	3	1	2	1
CO4	2	1	2	2	1	-	- -		2	1	2	2	2	2	1
CO5	3	2	2	1	1	-	· -	y -1	3	2	1	2	2	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

Programme&Branch	B.TECH& AI&DS	Sem.	Category	L	Τ	P	С		
		3	PC	3	0	0	<u>3</u>		
 Preamble Preamble To understand the fundamental concepts of database design, database languages, database-system implementation and maintenance. To represent a database system using ER diagrams and to learn normalization techniques To understand the fundamental concepts of transaction, concurrency and recovery processing To understand the internal storage structures using different file and indexing techniques which will help in physical DB design To have an introductory knowledge about the Distributed databases, NOSQL and database security 									
Unit 1	RELATIONAL DATAH	BASES	\leq				9		
Introduction: Overview	of DBMS fundamentals	– Overv	iew of Relation	al Da	tabas	ses ar	nd Keys.		
Relational Data Model:	Structure of relational d	atabases -	- Database sche	ma –	Form	nal R	elational		
Query Languages – Ov	erview of Relational Alg	ebra and l	Relational Opera	ations.	Dat	abase	Design:		
Overview of the design	process - The E-R Mode	ls – Const	raints - Removi	ng Re	dund	ant A	Attributes		
in Entity Sets - E-R D	Diagrams - Reduction to	Relational	Schemas - Ent	ity Re	elatio	onship) Design		
Issues - Extended E-R Features - Alternative E-R Notations - Overview of Unified Modeling									
Language (UML).									
Unit 2	DATABASE DESIGN						9		
Relational Database D	esign: Features of Good	Relationa	l Designs - Ato	mic D	oma	ins a	nd 1NF -		
Decomposition using H	Functional Dependencies	: 2NF, 3N	F, BCNF and H	ligher	Nor	mal I	Forms.		
Functional Dependence	v Theory - Algorithm for	r Decomn	osition _ Decon	nnasit	ion i	ısino	multi-		

Unit 3	TRANSACTIONS	9					
Transaction con- durability - Tran Concurrency co protocol, imple prevention, Dead	cept – A simple transaction model - Storage structure - Transaction isolation – Serializability – Recoverable schedules, Centrol: Lock-based protocols – Locks, granting of locks, Tenentation of locking, Graph-based protocols. Deadlock llock detection and recovery.	nsaction atomicity and Cascadeless schedules. The two-phase locking handling: Deadlock					
Unit 4	DISTRIBUTED DATABASE	9					
Distributed Data Distributed Data Distributed Cata Query processor Cursor and Trigg	abase concepts, Data Fragmentation, Replication, Allocate base Design, Distributed Database Architectures, Types of log Management, Transaction Management, Concurrency C and optimization in distributed database, Views - Integrity B gers	ation Techniques for f distributed database Control and Recovery, Procedures, Functions,					
Unit 5	NOSQL Databases	9					
Based on Map Case Study: Di Cloudant, Dynar given problem.	Reduce and Hadoop: Introduction, HDFS, MapReduce, Ha fferent types of high level databases – MongoDB, Hadoo noDB, Cassandra and CouchDB etc. Tips for choosing the	doopV2 alias YARN. pp/Hbase, Redis, IBM right database for the					
		Total: 6					
TEXTBOOKS							
1	Silberschatz A, Korth HF, Sudharshan S. Database Sy Edition, TMH publishing company limited; 2011. (unit 1,2,	stem Concepts. Sixth 3)					
2	Elmasri R, Navathe SB. Fundamentals of Database Syste Addison Wesley;2017. (unit 4&5).	ems. Seventh Edition,					
REFERENCES							
I	Garcia-Molina H, Ullman JD, Widom J. Database System Second Edition, Pearson Education India, 2011. Ramakrishnan R, Gehrke J. Database Management Sy TMH; 2003.	stems. Third Edition,					
2	Ramakrishnan R, Gehrke J. Database Management Sy TMH; 2003.	stems. Third Edition,					
COURSEOUT At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy Level					
CO1	Formulate and apply relational algebraic expressions, SQL and PL/SQL statements to query relational databases.	K4					
CO2	Design and build ER models for real world databases. K3						
CO3	Design and build a normalized database management K3						
	system for real world databases.						
CO4	Understand and apply the principles of transaction processing and concurrency control.	К3					

CO-PO-PSO Mapping

CO		РО											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

AMA105 - PROBABILITY AND STATISTICS								
		INSTITUTE O	F TECH	NOLOGY				
Programme&Branch	B.TEC	H& AI&DS	Sem.	Category	L	Т	Р	С
			3	PC	3	0	0	<u>3</u>
	> De	termine the pro	bability	value of one-dime	nsioi	nal ra	ndon	n variables.
	≻ Illı	ustrate the conce	epts of	covariance, correlat	ion a	and re	egres	sion.
	> Di	scuss the conc	ept of	testing of hypoth	esis	for	smal	l and large
Preamble	sar	mples.						
> Demonstrate the difference between the types of design to								
	exp	periments.						
	≻ Ide	entify and interp	oret the	control charts for va	ariab	les a	nd at	tributes
Unit 1	ONE DIM	IENSIONAL F	RAND	OM VARIABLES				9+3
Random variable – Di	iscrete and	continuous rai	ndom v	variables – Momer	nts –	- Mo	ment	generating
functions – Binomial, P	oisson, Geo	ometric, Uniform	n, Expo	onential and Normal	dist	ributi	ions.	
Unit 2TWO DIMENSIONAL RANDOM VARIABLES9+3								
Joint distributions - Marginal and Conditional distributions - Covariance - Correlation and linear								
regression – Transforma	ation of rand	dom variables.						
Unit 3	TESTING	GOF HYPOTH	IESIS					9+3
Sampling distributions	– Estimatio	on of parameters	s – Stat	istical hypothesis -	Lar	ge sa	mple	e tests based
on Normal distribution	for single 1	mean and differ	ence of	f means – Tests bas	ed o	n t, (Chi-s	quare and F
distributions for mean,	variance, an	nd proportion –	Conting	gency table (test for	· inde	epend	lent)	- Goodness
of fit.								
Unit 4	DESIGN	OF EXPERIM	ENTS					9+3
One way and Two-way	classificatio	ons – Complete	y rando	omized design – Rai	ndor	nized	bloc	k design –
Latin square design.								
Unit 5	STATIST	ICAL QUALI	ГҮ СО	NTROL				9+3
Control charts for measurements (\overline{X} and R charts) – Control charts for attributes (p, c and np charts) –								
Tolerance limits - Acceptance sampling.								
Total: 60								
TEXTBOOKS								

1	R.A. Johnson, I. Miller and J. Freund, "Miller and Freund's	Probability and Statistics								
	for Engineers", Pearson Education, Asia, 8th Edition, 2015									
2	J.S. Milton and J.C. Arnold, "Introduction to Probabil	lity and Statistics", Tata								
	McGraw Hill, 4th Edition, 2007.									
REFERENCES										
1	J.L. Devore, "Probability and Statistics for Engineering an	d the Sciences", Cengage								
	Learning, New Delhi, 8th Edition, 2014.									
2	A. Papoulis, and S. Unni Krishna pillai, Probability, "Random Variables and									
	Stochastic									
3	.M. Ross, "Introduction to Probability and Statistics for Engineers and Scientists",									
	3rd Edition, Elsevier, 2004.									
4	M.R. Spiegel, J. Schiller and R.A. Srinivasan, "Schaum's Outline of Theory and									
	Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.									
5	R.E.Walpole, R.H.Myers, S.L. Myers and K.Ye, "Prob.	ability and Statistics for								
	Engineers and Scientists". Pearson Education, Asia, 9th Edition, 2012									
COURSEOUTC	OMES:	Bloom's Taxonomy								
At the end of the	e course, learners will be able to	Level								
CO1	Understand the fundamental knowledge of modern	K4								
	probability theory and standard distributions.									
CO2	Categorize the probability models and function of random	К3								
	variables based on one and two dimensional random									
	variables.									
CO3	Employ the concept of testing the hypothesis in real life	К3								
	problems.									
CO4	Implement the analysis of variance for real life problems.	К3								
CO5	Apply the statistical quality control in engineering and	K5								
	management problems.									

	PO's													PSO	's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
1	3	3	3	2	2	1	1			_	V	-	3	3	1	1
2	3	3	2	2	2	1	-	-	-	-	-	7	3	3	1	1
3	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
4	3	3	2	2	2	1	-	-	-	-	-	-	3	3	1	1
5	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
AVg	3	3	3	2	2	1	-	-	-	-	-	-	3	3	1	1
•																

1 - low, 2 - medium, 3 - high, '-' - no correlation

Programme&Branch	B.TECH& AI&DS						
	Differing made	Sem	Category	L	Т	Р	C
Ι		3	MC	3	0	0	
	➢ To introduce the b	asic con	cepts of environm	ent, e	ecosy	stem	is and
	biodiversity and en	nphasiz	e on the biodivers	ity of	Indi	a anc	l its
	conservation.	-		-			
	➢ To impart knowled	lge on tl	he causes, effects a	and co	ontro	lor	prevention
	measures of enviro	onmenta	l pollution and nat	ural	disast	ters.	
	\succ To facilitate the un	derstan	ding of global and	India	n sce	enari	o of
	renewable and nor	irenewa	ble resources, caus	ses of	thei	r deg	radation
Preamble	and measures to pr	eserve t	them.				
	To familiarize the	concept	of sustainable dev	elop	ment	goal	is and
	appreciate the inte	rdepend	ence of economic	and s	social	l asp	ects of
	sustainability, reco	gnize ai	nd analyze climate	char	iges,	conc	ept of
	\sim To inculate and \sim	ne chan	enges of environm	ienta.	i mar	lagei	lon a
	 For a logical control of the second se	ling on	green materials ei	uces pergy	cvcl		iop a 11 analyze
	the role of sustain	able urb	anization	leigy	cyci		
Unit 1 E	NVIRONMENT AND	BIODI	VERSITY		6		
Definition, scope and impo	ortance of environment –	- need fo	or public awarenes	s. Ec	o-svs	tem	and Energy
flow- ecological successio	n. Types of biodiversity:	genetic	, species and ecos	ysten	n div	ersity	y– values of
biodiversity, India as a meg	ga-diversity nation – hot	-spots o	f biodiversity – th	reats	to bi	odive	ersity:
habitat loss, poaching of w	ildlife, man-wildlife cor	flicts –	endangered and en	ndem	ic sp	ecies	of India –
conservation of biodiversit	y: In-situ and ex-situ.		3				
Unit 2 E	NVIRONMENTAL PC	DLLUT	ION		6)	
Causes, Effects and Preven	tive measures of Water,	Soil, Ai	r and Noise Pollut	ions.	Solie	d, Ha	izardous
and E-Waste management.	Case studies on Occupa	tional H	lealth and Safety N	Aanag	geme	ent sy	/stem
(OHASMS). Environmenta	al protection, Environme	ental pro	otection acts				
Unit 3 R	ENEWABLE SOURCI	ES OF I	ENERGY) CC	
Energy management and co	onservation, New Energ	y Source	es: Need of new so	burce	S. Di Fidal	nere	nt types
new energy sources. Applic	n and power plants of ge	otherm	l energy	ces,	liuai	ener	ду
Unit A SI	II and power plants of ge		A CEMENT		6		
Development GDP Susta	inability- concept need	and ch	allenges-economic	- SOC	ial ai	nd as	nects of
sustainability-from unsusta	inability to sustainabilit	v-miller	mium developmer	nt goa	ils. ar	nd pr	otocols-
Sustainable Development (Goals-targets, indicators	and inte	ervention areas Cli	mate	char	ige-	Global.
Regional and local environ	mental issues and possil	ole solut	tions-case studies.	Conc	cept of	of Ca	rbon Credit,
Carbon Footprint. Environ	mental management in i	ndustry	A case study.		•		,
Unit 5 St	USTAINABILITY PRA	ACTIC	ES		6		
Zero waste and R concept,	Circular economy, ISO	14000 \$	Series, Material Li	fe cyc	cle as	sess	ment,
Environmental Impact Asse	essment. Sustainable hal	oitat: Gr	een buildings, Gre	en m	ateri	als, I	Energy
efficiency, Sustainable tran	sports. Sustainable ener	gy: Non	-conventional Sou	irces,	Ener	gy	

Cyclescarbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization-Socioeconomical and technological change.

		Total:30
TEXTBOOKS		
1	Anubha Kaushik and C. P. Kaushik's "Perspectives in Envir	onmental Studies", 6th
	Edition, New Age International Publishers, 2018.	
2	Benny Joseph, 'Environmental Science and Engineering', T	ata McGraw-Hill, New
	Delhi, 2016	
3	Gilbert M.Masters, 'Introduction to Environmental Enginee	ring and Science', 2nd
	edition, Pearson Education, 2004.	
4	Allen, D. T. and Shonnard, D. R., Sustainability Engineerin	g: Concepts, Design and
	Case Studies, Prentice Hall	
5	Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applica	tions in sustainable
	design and development, Cengage learning.	
6	Environment Impact Assessment Guidelines, Notification o	f Government of India,
	2006.	
REFERENCES		
1	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, G	uidelines, Compliances
	and Standards', Vol. I and II, Enviro Media. 38 . edition 201	0.
2	Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental E	incyclopedia', Jaico
3	Publ., House, Mumbal, 2001. Dharmendra S. Sengar, 'Environmental law' Prentice hall (of India PVT ITD New
5	Delhi, 2007.	
4	Rajagopalan, R, 'Environmental Studies-From Crisis to Cur	e', Oxford University
	Press, Third Edition, 2015.	
COURSEOUTCO	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	To recognize and understand the functions of	K4
	environment, ecosystems and biodiversity and their	
	conservation.	
CO2	To identify the causes, effects of environmental pollution	K3
	and natural disasters and contribute to the preventive	
	measures in the society.	
CO3	To identify and apply the understanding of renewable and	K3
	non-renewable resources and contribute to the sustainable	
	measures to preserve them for future generations.	
CO4	To recognize the different goals of sustainable	K3
	development and apply them for suitable technological	
	advancement and societal development.	
CO5	To demonstrate the knowledge of sustainability practices	K5
	and identify green materials, energy cycles and the role of	
	sustainable urbanization.	

CO /	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO	PS	PS
РО													1	02	03
CO1	3	2	3	1	3	-	-	-	2	2	2	2	3	1	2
CO2	2	2	3	2	1	-	-	-	2	3	3	3	3	3	2
CO3	3	3	1	2	2	-	-	-	3	2	1	2	3	1	3
CO4	3	2	2	2	2	-	-	-	2	2	2	3	3	2	1
CO5	2	2	2	3	2	-	-	-	3	2	1	2	3	3	3

AHS3	02 COMPREHENSIVI	E SOFT S	KILLS DEVEL	OPM	ENT	I	
	INSTITUT	E OF TECH	VOLOCY			1	
Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	Р	C
Branch							
		3	HS	0	0	2	0
Preamble							
Unit 1	FOUNDATIONS OF	COMM	UNICATION SE	KILLS			8
Introduction to Commu	nication Skills						
Understanding the Com	municative Environment	ţ					
Active Listening Skills							
Effective Speaking Tech	nniques						
Initiating and Sustaining	g Conversations						
Unit 2	ADVANCED COM	MUNICA	TION TECHNIC	QUES			8
Presentation Skills - Str	ructuring Content						
Using Multimedia in Pr	esentations						
Understanding Commun	nication Styles						
Group Communication	and Dynamics						
Unit 3	CRITICAL THINK	ING AND	COMMUNICA	TION			8
Introduction to Critical	Thinking						
Analyzing Arguments a	nd Information						
Constructing Clear and	Persuasive Arguments						
Problem-Solving and D	ecision-Making						
Interactive Exercises an	d Case Studies						
Unit 4	EMOTIONA	L INTEI	LIGENCE IN				8
	COM	IMUNIC	ATION				
Introduction to Emotion	al Intelligence (EI).						
Self-Awareness and Sel	f-Regulation Empathy a	nd Social S	Skills				
Managing Stress and Er	notions in Communication	on.					
Practical Exercises in E	I						
Init 5	INTECRATING SO	FT SKIL	LS FOR EFFEC	TIVE			8

Motivation and Persuasion Techniques Negotiation Skills Leadership Communication Applying Soft Skills in the Workplace Final Project and Presentations

Total: 40

REFERENCES	
1	Business Communication: Making Connections in a Digital World by Raymond V.
	Lesikar, Marie E. Flatley, Kathryn Rentz.
2	Everyone Communicates, Few Connect: What the Most Effective People Do
	Differently by John C. Maxwell
3	Emotional Intelligence: Why It Can Matter More Than IQ by Daniel Goleman
4	Leaders Eat Last: Why Some Teams Pull Together and Others Don't by Simon Sinek

JEPPIHHK Institute of technology

ACS306	5 DATABA	SE MAN	IAG	EMI	ENT	SYSTEM	I <mark>S</mark> LABO	RA	ΓOR	Y	
Programme &	B.Tech &	AI&DS		S	e m .	Category	y	L	Т	Р	С
Branch											
				3		P	C	0	0	4	2
Preamble	To learn a	nd impler	nent	impo	ortan	t comman	ds in SQL				
	To learn th	e usage o	of nea	sted	and j	oint querie	es.				
	To underst	and funct	tions	, pro	cedu	res and pro	ocedural e	exte	nsior	ns of	databases.
	To underst	and desig	gn an	id im	plen	entation o	f typical o	lata	base	appl	ications.
	To be fami	liar with	the u	ise o	f a fi	ont end to	ol for GU	I ba	sed a	ppli	cation
	developme	ent.		°°-		. .					
LIST OF EXPERIMEN	ITS	S.	y.			50					
1. Create a database tab	le, add cons	traints (p	rima	ry ke	ey, ui	nique, cheo	ck, Not nu	ıll),	inser	t rov	vs, update
and delete rows using S	QL DDL an	d DML c	omn	nand	5.						
2. Create a set of tables,	, add foreigr	n key con	strai	nts a	nd in	corporate	referentia	l int	egrit	y.	
3. Query the database ta	ables using o	lifferent '	whe	re' c	ause	condition	s and also	im	plem	ent a	ggregate
functions.			T93	n (001						
4. Query the database ta	ables and ex	plore sub	que	ries a	ind s	imple join	operation	ıs.			
5. Query the database ta	ables and ex	plore nati	ural,	equi	and	outer joins	8.				
6. Write user defined fu	nctions and	stored pr	oced	lures	in S	QL.					
7. Execute complex tran	nsactions an	d realize	DCL	and	TCI	. command	ds.				
8. Write SQL Triggers f	for insert, de	lete, and	upda	ate of	perat	ions in a d	atabase ta	ble.			
9. Create View and inde	ex for databa	ase tables	with	n a la	rge i	number of	records.				
10. Create an XML data	abase and va	lidate it u	using	g XM	L sc	hema.					
11. Create Document, c	olumn and g	graph bas	ed da	ata u	sing	NOSQL d	atabase to	ols.			
12. Develop a simple G	UI based da	tabase ap	plica	ation	and	incorporat	e all the a	lbov	e-me	entio	ned features
13. Case Study using an	ny of the rea	l life data	lbase	app	licati	ons from t	he follow	ing	list		
a) Inventory Manageme	ent for a EM	art Groce	ery S	hop							

b) Society Financial Management

c) Cop Friendly App – Eseva

d) Property Management - eMall

e) Star Small and Medium Banking and Finance

Build Entity Model diagram. The diagram should align with the business and functional goals stated in the application.

Apply Normalization rules in designing the tables in scope.

Prepared applicable views, triggers (for auditing purposes), functions for enabling enterprise grade features.

Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer.

• Ability to showcase ACID Properties with sample queries with appropriate settings

		10tal: 60
COURSEOUTC	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Create databases with different types of key constraints.	K4
CO2	Construct simple and complex SQL queries using DML	K3
	and DCL commands.	
CO3	Use advanced features such as stored procedures and	K3
	triggers and incorporate in GUI based application	
	development.	
CO4	Create an XML database and validate with meta-data	K3
	(XML schema).	
CO5	Create and manipulate data using NOSQL database.	K5

CO						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1			4	1	3	3	3	2	1	3
2	3	1	1	2	2		_	_	3	2	1	>1	3	1	2
3	3	3	2	1	2 <	5-	EST	J2	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

Programme &	B.Tech &	AI&DS	Sem.	Category	L	Τ	P	C
Branch								
			3	PC	0	0	4	2
Preamble	• To	design and in	nplement	search strategies				
	• To	o implement g	ame playi	ng techniques				
	• To	o implement C	CSP techni	iques				
	• To	develop syste	ems with l	ogical reasoning				
	• To	develop syste	ems with p	probabilistic reaso	oning			
LIST OF EXPERIM	MENTS							
1. Implement basic	search strategie	s – 8-Puzzle,	8 – Queer	ns problem, Cryp	arithn	netic.		
2. Implement A* an	nd memory bour	nded A* algor	ithms	HK				
3. Implement Minin	max algorithm f	or game playi	ng (Alpha	-Beta pruning)				
4. Solve constraint	satisfaction pro	blems						
5. Implement propo	ositional model	checking algor	rithms					
6. Implement forwa	ard chaining, ba	ckward chaini	ng, and re	esolution strategie	s			
7. Build naïve Baye	es models							
8. Implement Baye	sian networks a	nd perform inf	ferences					
9. Mini-Project								
								Total:
COURSEOUTCON	MES:				B	oom	's Ta	xonomy
At the end of the co	ourse, learners w	vill be able to		8	Le	evel		
CO1 I	Design and impl	ement search	strategies				k	K 4
CO2 I	mplement game	playing and	CSP techr	iques			k	K3
CO3 I	Develop logical	reasoning syst	tems				k	K3
		liatio		lini			L	72
104	Jevelop probabi	listic reasonin	ig system				ľ	3

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	-	1	2	2	2	3	1	2
CO2	3	3	3	2	3	-	-	-	2	1	1	1	1	3	2
CO3	3	3	3	2	2	-	-	-	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	-	1	1	1	1	1	2	1
CO5	2	2	3	3	2	-	-	-	3	2	1	2	3	3	1



JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



		1		1	n	T	
Programme & Branch	B.Tech&AI&DS	Sem.	Category	L	Т	Р	C
				<u>3</u>	0	0	3
	To understand Data Wa Tools.	arehouse c	oncepts, Archited	cture, E	Busin	ess A	analysis and
Preamble	To understand Data Pr	eprocessin	g and Data Visua	lizatio	n tec	hniqu	ues.
	To study algorithms fo	r finding H	lidden and Intere	esting p	atter	ns in	Data.
	To understand and app	ly various	Classification an	d Clus	terin	g tec	hniques.
Unit 1	DATA WAREHOUSIN ON-LINE ANALYTIC	NG, BUSIN CAL PROC	IESS ANALYSI: ESSING	S AND			9
Sasic Concepts – Da Architectures for Pa Data Warehouse Sch Systems – Typical C	ata warenousing Componer arallel Processing – Parallel nemas for Decision Support DLAP Operations - OLAP a	DBMS Ve - Concept nd OLTP.	ing a Data warer endors – Multidii Hierarchies - Ch	nouse – nension naracter	nal E ristic	abase Data N s of (e Model – DLAP
Unit 2	INTRODUCTION TO	DATA MI	NING				9
	M [°] · G · V 1			· · · ·		T 1	•
Introduction to Data Issues – Applicatio Preprocessing – C Visualization – Data	Mining Systems – Knowle ons- Data Objects and Attrib leaning - Integration - Redu Similarity and Dissimilarit	edge Disco oute Types oction - Tra by Measure	very Process – D - Statistical Desc insformation and s.	ata Mir ription Discre	ning of D tizat	Tech Data - ion -	niques – Data Data
Introduction to Data Issues – Applicatio Preprocessing – C Visualization – Data Jnit 3	Mining Systems – Knowle ons- Data Objects and Attrib leaning - Integration - Redu Similarity and Dissimilarit FREQUENT PATTER	edge Disco oute Types action - Tra cy Measure N ANALY	very Process – D - Statistical Desc insformation and s. SIS	Pata Mi pription Discre	ning of D etizat	Tech Data - ion -	niques – Data Data 9
Introduction to Data Issues – Applicatio Preprocessing – C Visualization – Data Unit 3 Mining Frequent Pa Method – Pattern M Mining - Classificat	Mining Systems – Knowle ons- Data Objects and Attrib leaning - Integration - Redu Similarity and Dissimilarit FREQUENT PATTER tterns - Associations and Co lining in Multilevel - Multi tion Using Frequent Pattern	edge Disco oute Types action - Tra by Measure N ANALY orrelations Dimension as.	very Process – D - Statistical Desc insformation and s. SIS – Mining Metho al Space – Const	Pata Mir pription Discre ds- Pat traint B	ning of E etizat tern Based	Tech Data - ion - Evalu	niques – Data Data 9 Jation Juent Patter
Introduction to Data Issues – Applicatio Preprocessing – C Visualization – Data Unit 3 Mining Frequent Pa Method – Pattern M Mining - Classificat	Mining Systems – Knowle ons- Data Objects and Attrib leaning - Integration - Redu Similarity and Dissimilarit FREQUENT PATTER tterns - Associations and Co fining in Multilevel - Multi tion Using Frequent Pattern CLASSIFICATION A	edge Disco oute Types action - Tra y Measure N ANALY orrelations Dimension as.	very Process – D - Statistical Desc insformation and s. SIS – Mining Metho al Space – Const TERING	Pata Mir ription Discre ds- Pat traint B	ning of D etizat tern Based	Tech Data - ion - Evalu	niques – Data Data 9 Justion Juent Patter 9
Introduction to Data Issues – Applicatio Preprocessing – C Visualization – Data Unit 3 Mining Frequent Pa Method – Pattern M Mining - Classificat Unit 4 Decision Tree Induc propagation – Suppo Fechniques to impro Partitioning Method Evaluation of Cluste Analysis - Outlier D	A Mining Systems – Knowle ons- Data Objects and Attrib cleaning - Integration - Redu a Similarity and Dissimilarit FREQUENT PATTER tterns - Associations and Co fining in Multilevel - Multi tion Using Frequent Pattern CLASSIFICATION A ction – Bayesian Classification ort Vector Machines – Lazy ove Classification Accuracy ls – Hierarchical Methods – ering – Clustering High Dim petection Methods.	edge Disco oute Types action - Tra cy Measure N ANALY orrelations Dimension as. ND CLUS ion – Rule Learners - - Clusterin - Density E mensional I	very Process – D - Statistical Desc insformation and s. SIS – Mining Metho al Space – Const TERING Based Classifica - Model Evaluati ig Techniques – G Based Methods – Data - Clustering	ata Mir ription Discree ds- Pat traint B tion – 0 on and Cluster Grid B with C	ning of D etizat tern Based Class Sele Ana Based Const	Tech Data - ion - Evalu Frec sifica ection lysis Met raints	niques – Data Data 9 uation quent Patter 9 tion by Bac 1 - - hods – s - Outlier
ntroduction to Data ssues – Applicatio Preprocessing – C Visualization – Data Jnit 3 Mining Frequent Pa Method – Pattern M Mining - Classificat Jnit 4 Decision Tree Induc propagation – Suppo Fechniques to impro Partitioning Method Evaluation of Cluste Analysis - Outlier D Jnit 5	A Mining Systems – Knowle ons- Data Objects and Attrib cleaning - Integration - Redu a Similarity and Dissimilarit FREQUENT PATTER tterns - Associations and Co clining in Multilevel - Multi- tion Using Frequent Pattern CLASSIFICATION A ction – Bayesian Classification ort Vector Machines – Lazy ove Classification Accuracy ove Classification Accuracy s – Hierarchical Methods – ering – Clustering High Dim Detection Methods.	edge Disco oute Types action - Tra cy Measure N ANALY orrelations Dimension as. ND CLUS ion – Rule Learners - - Clusterin - Density E mensional I	very Process – D - Statistical Desc insformation and s. SIS – Mining Metho al Space – Const TERING Based Classifica - Model Evaluati ing Techniques – G Based Methods – Data - Clustering	Pata Mir ription Discree ds- Pat traint B tion – 0 on and Cluster Grid B with C	ning of D etizat tern Based Class Sele Ana Cased	Tech Data - ion - Evalu Frec sifica ction lysis Met raints	niques – Data Data 9 uation quent Patter 9 tion by Bac 1 - - hods – s - Outlier 9

Total: 45 P	ERIODS	
TEXTBO	DKS	
1	Jiawei Han and MichelineKamber, "Data Mining Concept Edition, Elsevier, 2012.	s and Techniques", Third
2	Alex Berson and Stephen J.Smith, "Data Warehousing, Da McGraw – Hill Edition, 35 th Reprint 2016.	ta Mining & OLAP", Tata
REFEREN	ICES	
1	K.P. Soman, ShyamDiwakar and V. Ajay, "Insight into Dat Practice", Eastern Economy Edition, Prentice Hall of India	ta Mining Theory and a, 2006.
2	Ian H.Witten and Eibe Frank, "Data Mining: Practical Mac Techniques", Elsevier, Second Edition, 2005.	chine Learning Tools and
3	Parteek Bhatia, "Data Mining and Data Warehousing: Prin Techniques", Cambridge University Press, 2019.	ciples and Practical
4	Pranjali Deshpande, Soudamini Patil, "Data Warehousing Edition, Technical Publications, 2020.	and Data Mining", First
5	Dr. B. Shadaksharappa, Mr. P.Ramkumar, Dr. T.N. Prabakar Data Mining", First Edition, Book Rivers, 2022.	r, " Data Warehousing and
COUDEE		
At the end	of the course, learners will be able to	Level
CO1	Use a Data Warehouse system and perform Business Analysis with OLAP Tools.	K4
CO2	Recognize and identify suitable Pre-processing and Visualization techniques for Data Analysis.	K3
CO3	Apply frequent Pattern and Association Rule Mining techniques for Data Analysis.	K3
CO4	Apply appropriate Classification techniques for Data Analysis.	K3
	Apply appropriate Clustering techniques for Data	K5
CO5	Analysis.	

CO/	PO 1	PO	PO 2	PO	PO 5	PO	PO 7	PO	PO	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
PO	I	2	3	4	3	0	/	ð	9	10	11	12			
CO1	3	3	3	2	3	-	-	-	1	2	2	2	3	1	2
CO2	3	3	3	2	3	-	-	-	2	1	1	1	1	3	2
CO3	3	3	3	2	2	-	-	-	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	-	1	1	1	1	1	2	1
CO5	2	2	3	3	2	-	-	-	3	2	1	2	3	3	1

ACS107 OPERATING SYSTEM										
		ICD		0.0						
Programme &	B.Tech &	AI&DS	Sem.	Category	7	L	Т	P	С	
Branch			CF TECH	IOLOGY						
4 MC 3 0 0 3										
	To underst	and the basics	and fun	ctions of o	perating s	syste	ems.		I	
	To underst	and processes	and thre	ads.						
	To analyze	scheduling al	gorithm	and proce	ess synchi	oni	zatio	n.		
Preamble	To underst	and the conce	pt of dea	dlocks.						
	To analyze	To analyze various memory management schemes.								
	To be familiar with I/O management and file systems.									
	To be fami	liar with the b	asics of	virtual mad	chines and	d M	obile	OS	like iOS and	
	Android.									
Unit 1	INTROD	UCTION					7	,		
Operating System Over	view - Obje	ctives and Fur	ctions -	Evolution	of Operat	ing	Syst	em; (Operating	
System Structures - Use	er Operating	System Interf	ace - Sy	stem Calls	– System	n Pro	ogran	ns - I	Design and	
Implementation - Struct	uring metho	ods. EST								
Unit 2	PROCESS	MANAGEM	ENT				1	1		
Processes - Process Cor	ncept - Proce	ess Scheduling	g - Opera	tions on P	rocesses -	Int	er-pr	ocess	5	
Communication; CPU S	Scheduling -	Scheduling cr	riteria - S	Scheduling	algorithm	ns: '	Threa	nds -l	Multithread	
Models – Threading iss	Models – Threading issues; Process Synchronization - The Critical-Section problem - Synchronization								hronization	
hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock -										
Methods for handling de	eadlocks, D	eadlock preven	ntion, De	eadlock ave	oidance, I	Dead	dlock	dete	ection,	
Recovery from deadloc	k.									
Unit 3	MEMORY	' MANAGEM	ENT				1	0		
Main Memory - Swapp	ing - Contig	uous Memory	Allocati	on – Pagin	g - Struct	ure	of th	e Pag	ge Table -	

Segmentation, Segment	tation with paging; Virtual Memory - Demand Paging – Cop	y on Write – Page
Replacement - Allocati	on of Frames – Thrashing.	
Unit 4	STORAGE MANAGEMENT	10
Mass Storage system – concept - Access metho File System Implement - Free Space Manageme subsystem.	Disk Structure - Disk Scheduling and Management; File-Systeds - Directory Structure - File system mounting - File Sharir ation - File System Structure – Directory implementation - A ent; I/O Systems – I/O Hardware, Application I/O interface,	stem Interface - File ng and Protection; Allocation Methods Kernel I/O
Unit 5	VIRTUAL MACHINES AND MOBILE OS	7

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio economic and technological change.

Total: 45 PERIODS

TEXTBOOKS

1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System
	Concepts" I, 10th Edition, John Wiley and Sons Inc., 2018.
2	Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022
	New Delhi.
REFERENCES	
I	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral

Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.

2	William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2018.
3	Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education

		7	
		2011	
5	Achydr 5.0000010, Atul Kallate,	Operating Systems, Met	

At the end of the	Bloom's Taxonomy Level				
CO1	CO1 Analyze various scheduling algorithms and process synchronization.				
CO2	Explain deadlock prevention and avoidance algorithms.	К2			
CO3	Compare and contrast various memory management schemes.	К2			

CO4	Explain the functionality of file systems, I/O systems, and Virtualization	K2
CO5	Compare iOS and Android Operating Systems.	K2

CO's-PO's & PSO's Mapping

СО	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	00	D	-	-	2	-	-	-
3	3	-	1	-	- ၂	2	2			-	-	2	-	-	-
4	3	2	1	1	-	2	2			-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
AVG	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С		
Branch	eller,	<u>୍</u> ଟ୍ର	All Re						
	Self	Disciplin	МС	<u>3</u>	0	0	3		
	To understand the prot	ocol layeri	ng and physical	level co	omm	unica	ation.		
	To analyze the perform	nance of a	network.						
Preamble To understand the various components required to build different networ						networks.			
	To learn the functions	To learn the functions of network layer and the various routing protocols							
				Turner		5 pro			
	To familiarize the func	tions and j	protocols of the	Transpo	ort la	yer.			
Unit 1	INTRODUCTION AN	D PHYSI	CAL LAYER		Ç)			
Networks – Netwo	rk Types – Protocol Layering	g – TCP/IP	Protocol suite –	- OSI M	lodel	– Pł	nysical		
Layer: Performanc	e – Transmission media – Sw	vitching –	Circuit-switche	d Netwo	orks	– Pao	cket		
Switching.									
	DATA LINK LAVED		ACCESS		()			

Media Access Co Bluetooth – Conr	ontrol - Wired LA necting Devices.	ANs: Ethernet - Wireless LANs – Introdu	ction –IEEE 802.11,							
Unit 3	NETWOF	NETWORK LAYER 9								
Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.										
Unit 4	TRANSP	ORT LAYER	9							
Introduction – T Transmission Con	ransport Layer P ntrol Protocol – S	Protocols – Services – Port Numbers – U CTP.	User DatagramProtocol –							
Unit 5	APPLICA	TION LAYER	9							
WWW and HTTI	P – FTP – Email –	Telnet –SSH – DNS – SNMP.								
Total: 45 PERIO	DS	INSTITUTE OF TECHNOLOGY								
TEXTBOOKS										
1	Behrouz A. Ford 2013.	ouzan, Data Communications and Networki	ing, Fifth Edition TMH,							
REFERENCES										
1	Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.									
2	William Stalling Education, 2013	s, Data and Computer Communications, Te	enth Edition, Pearson							
3	Nader F. Mir, Co Hall, 2014.	omputer and Communication Networks, Se	cond Edition, Prentice							
4	Ying-Dar Lin, R Source Approact	en-Hung Hwang and Fred Baker, Compute h, McGraw Hill Publisher, 2011.	er Networks: An Open							
5	James F. Kurose	, Keith W. Ross, Computer Networking, A	Top-Down Approach.							
6	Featuring the Internet, Sixth Edition, Pearson Education, 2013.									
COURSE OUTC	OMES:		Bloom's Taxonomy Level							
At the end of the	course, learners w	vill be able to								
CO1	Understand the b networks.	pasic layers and its functions in computer	К2							
CO2	Evaluate the per	Evaluate the performance of a network. K3								

CO3	Understand the basics of how data flows from one node to	K2		
03	another.	K2		
CO4	Analyze and design routing algorithms.	K4		
CO5	Design protocols for various functions in the network.	К3		
CO6	Understand the working of various application layer protocols.	K2		

СО						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
2	3	1	1	2	2	STFTU	TE OF	TEC i hi	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

NATURE OF THE COURSE: SKILL ENHANCEMENT COURSE (SEC)									
Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	Р	C		
Branch	Self								
		4	МС	3	0	0	3		
	To acquaint the student	s with son	ne very relevant	and nec	cessa	ry so	ft skills and		
	also to help them to develop their personality as well as to be self motivated.								
Preamble	The different units are designed in such a manner so as to give the students inputs on personality development, social skills, etiquette, communication skills, attitude, appearing and grooming.								
Unit 1	FOUNDATIONS OF PERSONAL DEVELOPMENT 8								
Attitude and Motiv	ation-Significance – Positive a	and Negati	ve Attitude Attit	tude-Ad	lvant	ages	and		
Disadvantages of A	Attitude- Relationship between	n Attitude	and Motivation-	- Conce	pt, S	ignif	icance and		
Importance of Self	Motivation- De-motivation-H	Factors Af	fecting Motivati	on in L	earni	ng-S	elf and		
Identity-Distinction	n between Self- Respect and I	Ego-Trans	forming Ego to	Self-Re	spect	t-Ind	ian		
Perspective in Pers	onality Development.								
TT 1: 0	DEDSONALITY DEVI		NT		5	2			

Concept of Person Development- Det Ambivert- Dimens Perception- Conce	ality and Personality Development Definition-Determinants of P terrents to Personality Development-Types of Personality-Introve sions of Personality-Physical, Intellectual, Emotional, Moral, Soc ept and Definition-Perceptual Process-Self.	ersonality ert, Extrovert, and cial, and Spiritual-					
Unit 3	MORAL OF ESTEEM AND LEADERSHIP 8						
Esteem-Maslow an 360Degree Assess Leadership.	nd Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competer ment-Cultivating Assertiveness-Leadership: Concept, Dimensior	ncy Mapping, and ns, and Types of					
Unit 4	ETIQUETTE AND GROOMING	8					
Etiquette-Importan Gender Sensitivity Etiquette-Online E Appearance.	nce in Personal and Professional Life- Principles and their Signifi in Communication-Conversation Skills and Small Talk-Email a Etiquette: Managing Digital Presence and Reputation- Dress Cod	cance-Culture and nd Telephone e and Professional					
Unit 5	EXPERIENTIAL PARADIGM IN PRACTICE	8					
Skills-Self-Manag Examples-Positive Gratitude. Total: 40 PERIOD RECOMMENDEI	ement Skills Definition and Examples-Goal Setting-Definition, P e Emotions and Well-being Resilience, Optimism, Compassion, F oS D BOOKS	Process and Forgiveness,					
1	Atherton, J.B. (2002) Learning and teaching: Teaching from experience, Columbus. Ohio: Merrill. Carr, A. (2011). Positive Psychology: The Science of happiness and human strength. Routledge.						
2	Cornelissen, R. M. M., Misra, G., & Varma, S., (2011). Foundation of Indian Psychology: Concepts and Theories. (Vol. 1), New Delhi: Pearson.						
3	Covey, S. R. (2013). The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change. Simon & Schuster.						
4	Exeter, D. J. (2001). Learning in the outdoors. London: Outward Bound.						
5	Salmon, D & Maslow, J., (2007). Yoga Psychology and the Transformation of Consciousness: Seeing through the eyes of infinity. St. Paul, MN., USA: Paragon House						
6	Vohra, S. S. & Kailash. S. (2010). Experiential learning (section III) in Psychology of Turbulent Relationships. New Delhi: Icon Publishers.						
7	Wentz, Frederick H. (2012). Soft Skills Training: A Workbook to Develop Skills for Employment. Create Space Independent Publishing Platform.						
COURSE OUTC	COMES:]	Bloom's Taxonomy			
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At the end of the	At the end of the course, learners will be able to						
CO1	On the completie to appreciate the augmentation with their professional the employability nutshell, the mode schools'.	on of this course, the students will be significance of soft skills and perso ith reference to their personal as we il lives. This course module will enh y quotient of the students as well. In dule is on the lines of the 'finishing	be able conality Il as nance n a	K4			

IFDDIOOD

ACS305 OPERATING SYSTEMS LABORATORY											
Programme & Branch	B.Tech &	AI&DS		Sem.	Category	y	L	Т	Р	С	
	L			<u>4</u>	ES		0	0	4	2	
	To install	windows	operat	ing syst	ems.			1			
Preamble To understand the basics of Unix command and shell programming.											
To implement various CPU scheduling algorithms.											
To implement Deadlock Avoidance and Deadlock Detection Algorithms											
	To implen	nent Page	Repla	cement	Algorithm	IS					
To implement various memory allocation methods.											
	To be familiar with File Organization and File Allocation Strategies.										
LIST OF EXPERIMEN	TS	2111	eth	201		$\langle \rangle$					
1. Installation of window	ws operatin	g system	2010	. 201		1					
2. Install any guest oper	ating system	m like Lin	iux usi	ng VM	ware.						
3. Illustrate UNIX com	mands and s	Shell Prog	gramm	ing							
4. Process Management	using Syst	em Calls :	Fork,	Exit, C	Betpid, Wa	it, Close					
5. Write C programs to	implement	the variou	is CPU	J Sched	uling Algo	orithms					
6.Illustrate the inter pro	cess comm	unication	strateg	gy							
7. Implement mutual ex	clusion by	Semaphor	re								
8. Write C programs to	avoid Dead	lock using	g Bank	ker's Alg	gorithm an	d to Imple	eme	nt D	eadlo	ock	

Detection A	Algorithm	
9. Write C J	programs to implement the following Memory Allocation Method	ls
First Fit b.	Worst Fit c. Best Fit	
10. Write C	programs to implement the various Page Replacement Algorithm	ns
11. Implem	ent the following File Allocation Strategies using C programs	
Sequential	b. Indexed c. Linked	
12. Write C	programs for the implementation of various disk scheduling algo	orithms
	Total: 60	PERIODS
COURSEO At the end of	DUTCOMES: of the course, learners will be able to	Bloom's Taxonomy Level
CO1	Define and implement UNIX Commands.	K3
CO2	Compare the performance of various CPU Scheduling Algorithms.	K2
CO3	Compare and contrast various Memory Allocation Methods.	K4
CO4	Define File Organization and File Allocation Strategies.	К3
CO5	Implement various Disk Scheduling Algorithms.	K2

CO's-PO's & PSO's Mapping

СО	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	1	EST): 20	1	3	3	3	2	1	3
2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2

ACS307

COMPUTER NETWORKS LABORATORY

Programme &	B.Tech & AI&DS	Sem.	Category	L	Т	Р	С						
Branch													
		<u>4</u>	ES	0	0	4	2						
	To understand the concept of layering in networks.												
Preamble	eamble To know the functions of protocols of each layer of TCP/IP protocol suite.												
	To visualize the end-to-end flow of information.												
	To learn the functions of network layer and the various routing protocols.												
	To familiarize the functions and protocols of the Transport layer.												
LIST OF EXPERI	MENTS												
1.Learn to use con trace route PDUs	nmands like tcpdump, netstat, ifour stat, ifour stat, ifour states and the states of t	config, 1 er and ex	nslookup and trace xamine.	eroute	. Cap	oture	ping and						
2. Write a HTTP v	veb client program to download	a web p	age using TCP soc	ekets.									
3.Applications usi	ng TCP sockets like: a) Echo cli	ent and	echo server b) Cha	at									
4. Simulation of D	NS using UDP sockets.		5										
5. Use a tool like	Wireshark to capture packets and	l examir	ne the packets.										
6. Write a code sir	nulating ARP /RARP protocols.		Sell										
7. Study of Netwo	rk simulator (NS) and Simulatio	n of Co	ngestion Control A	Algori	thms	usin	g NS.						
8 Study of TCP/U	DP performance using Simulation	on tool.											
9. Simulation of D	vistance Vector/ Link State Routi	ng algo	rithm.										
10. Simulation of	an error correction code (like CF	RC).											
			Total: 60	PERI	ODS	5							
COURSEOUTCO	MES:			Bl	oom	's Ta	xonomy						
At the end of the c	ourse, learners will be able to			Le	vel								
CO1	Device various protocols using	TCP and	I UDP.			k	3						
CO2	Compare the performance of dif protocols.	ferent ti	ansport layer			k	32						
CO3	Use simulation tools to analyze	the perf	ormance of			k	4						

	variousnetwork protocols.	
CO4	Analyze various routing algorithms.	К3
CO5	Implement error correction codes.	K2

CO's-PO's & PSO's Mapping

СО						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	Г				3	3	3	2	1	3
2	3	1	1	2	2			-ŪUO	3	2	1	1	3	1	2
3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
AVG	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2







JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



&Branch	B.Tech&AI&DS	Sem.	Category	L	Τ	P	С
		5	BS	3	0	0	<u>3</u>
Preamble	The objective of the court • To understand the data appropriate features for • To learn to implement datasets and evaluate the • To experiment the undatasets and evaluate the • To build the graph base	urse is to a sets and analysis. t supervise e performa supervisec e performa sed learning	apply suitable ed machine learn nce. 1 machine learn nce. g models for sta	algorit ning a ing al ndard	hms lgori gorit data	for se thms o hms o sets.	lecting th n standar n standar
Unit 1	To compare the perf suitable one based on the INTRODUCTION TO	formance of e application MULTI	of different ML on. MODAL DAT	algor A AN	rithm D	s and	select th
Introduction – Def	APPLICATIONS	rical Bac	kground. Signi	ficanc	e. N	Iultim	odal dat
Applications, Challen	ges of multimodal data, Da	ta collectio	on & cleaning.	lieune	c , 1	Turrin	Jui uu
Unit 2	TEXT PROCESSING						9
Text Processing: Te processing and statis techniques; Vector sp	ext normalization, Lemma tics: TFIDF, BM-25, Zipf [*] ace models.	itization, 1 's law, Hip	Morphology, So of's law; Langu	ubwor age m	d to nodel	keniza s and	tion; Tex smoothin
Unit 3	SPEECH PROCESSIN	NG	50				9
Speech Processing: S analysis: Need and	peech production and perce windowing, Energy, Zer am; Short-term synthesis: ostrum.	eption, Acc ro-crossing Overlap-a	oustic and articu g rate, Autoco dd method; Ce	latory rrelation pstrun	phor on f	netics; function alysis:	Short-ter n, Fouri Basis ar
transform, Spectrogr development, mel-cep				r			Λ
transform, Spectrogr development, mel-cep Unit 4	DIGITAL IMAGE AN	D VIDEO	PROCESSING	J			9
transform, Spectrogr development, mel-cep Unit 4 Digital Image and Vi detection, Segmenta transforms, Spatial ar	DIGITAL IMAGE AN deo Processing: Point proce ation, Feature descriptors ad temporal data handling.	D VIDEO essing, Nei s, Restora	PROCESSING ighborhood proc ation, Morphol	essing ogical	g, En op	hancer eratior	9 nent, Edg ns, Imag
ransform, Spectrogr development, mel-cep Unit 4 Digital Image and Vi detection, Segmenta transforms, Spatial ar Unit 5	DIGITAL IMAGE AN deo Processing: Point proce ation, Feature descriptors id temporal data handling. OTHER MODALITIE LEARNING	D VIDEO essing, Net s, Restora	PROCESSING ighborhood proc ation, Morphol	eessing ogical	g, En op	hancer eratior	9 nent, Edg ns, Imag 9
transform, Spectrogr development, mel-cep Unit 4 Digital Image and Vi detection, Segmenta transforms, Spatial an Unit 5 Other Modalities: E	DIGITAL IMAGE AN deo Processing: Point processing ation, Feature descriptors ad temporal data handling. OTHER MODALITIE LEARNING Biomedical signals, and C	D VIDEO essing, Nei s, Restora CS AND M Convention	PROCESSING ighborhood proc ation, Morphol ULTIMODAL al multi-modal	eessing ogical	g, En op	hancer eratior Appli	9 nent, Edg ns, Imag 9 cations

R. C. Gonzalez, R. E. Woods, Digital Image Processing	g, Pearson, Prentice-Hall,
R. Klette, Concise Computer Vision: An Introduction into	Theory and Algorithms,
Springer, 2014.	
L. R. Rabiner, R. W. Schafer, Introduction to Digital	Speech Processing, Now
Publishers Inc, 2007.	
·	
D. Jurafsky, J.H. Martin, Speech and Language Processing,	3rd ed. Jan 2022
·	
COMES:	Bloom's Taxonomy
e course, learners will be able to	Level
Demonstrate the matrix techniques in solving the related	K4
problems in engineering and technology.	
Apply matrix methods to solve system of linear equations	К3
Apply differential calculus tools in solving various	К3
application problems	
	KO KO
Apply different methods of integration in solving	К3
Apply different methods of integration in solving practical problems.	К3
Apply different methods of integration in solving practical problems. Evaluate multiple integrals to conduct investigations of	K3 K5
	 R. C. Gonzalez, R. E. Woods, Digital Image Processing 2008. R. Klette, Concise Computer Vision: An Introduction into Springer, 2014. L. R. Rabiner, R. W. Schafer, Introduction to Digital Publishers Inc, 2007. D. Jurafsky, J.H. Martin, Speech and Language Processing, COMES: e course, learners will be able to Demonstrate the matrix techniques in solving the related problems in engineering and technology. Apply matrix methods to solve system of linear equations Apply differential calculus tools in solving various application problems

					K A										
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
	1	2	3	4	5	6	୍ୱୀତ	8	9	0	1	2	1	2	3
CO	3	1	3	1	1	<u></u>	-	977	1	3	3	3	2	1	3
1							elf D	iscip	line						
CO	3	1	1	2	2	-	_	-	3	2	1	1	3	1	2
2				<	5	SRI	PE	UN	BU	DUR	7	Þ			
CO	3	3	2	1	2	5	EST	D- 2	3	3	1	2	2	2	2
3											7				
CO	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
4															
CO	2	2	1	2	3	-	-	-	1	2	2	3	1	3	3
5															

	AAII05- MAC	HINE LI	EARNING					
Programme &Branch	B.Tech&AI&DS	Sem.	Category	L	Т	Р	С	
		5	BS	3	0	0	3	
			D 5	0	v	v	5	
Preamble	 The objective of the cou To understand the data appropriate features for To learn to implement datasets and evaluate the To experiment the undatasets and evaluate the To build the graph base To compare the performance of the	arse is to a sets and analysis. t supervise e performa sed learnin formance of e applicati	apply suitable and machine learn nce. d machine learn nce. g models for star of different ML	algorit ning a ing al ndard algor	ihms Igorit gorit data rithm	for s thms hms sets. s and	on standard on standard on standard	
Unit 1	INTRODUCTION TO I	MACHINE	E LEARNING				9	
Examples of machine learning applications, Vapnik-Chervonenkis (VC) dimension, Probably Approximately Correct (PAC) learning, Hypothesis spaces, Inductive bias, Generalization, Bias variance trade-off.								
TT		DVG	× 1					
Unit 2	SUPERVISED LEARN	ING	, A				9	
Unit 2 Linear Regression Me gradient descent, Lir Probabilistic discrimin Maximum margin clas	SUPERVISED LEARN odels: Least squares, sing near Classification Mode native model - Logistic reg sifier – Support vector ma	ING gle & mul- els: Discri ression, Pr chine, Dec	tiple variables, minant functior obabilistic gener ision Tree, Rand	Bayes 1 – I ative 0m Fo	ian l Perce mode	inear ptron el – N	9 regression, algorithm, laive Bayes,	
Unit 2 Linear Regression Me gradient descent, Lin Probabilistic discrimin Maximum margin clas Unit 3	SUPERVISED LEARN odels: Least squares, sing near Classification Mode native model - Logistic reg sifier – Support vector ma ENSEMBLE TECHNIC LEARNING	ING gle & mult els: Discri ression, Pr chine, Dec QUES ANI	tiple variables, minant functior obabilistic gener ision Tree, Rand O UNSUPERVIS	Bayes n – I ative om Fo ED	ian l Perce mode	inear ptron el – N s.	9 regression, algorithm, laive Bayes, 9	
Unit 2 Linear Regression Mo gradient descent, Lin Probabilistic discrimin Maximum margin clas Unit 3 Combining multiple 1 boosting, stacking, U mixture models and Ex	SUPERVISED LEARN odels: Least squares, sing near Classification Mode ative model - Logistic reg sifier – Support vector ma ENSEMBLE TECHNIC LEARNING learners: Model combinat Unsupervised learning: K	ING gle & multels: Discrite ression, Pr chine, Dec QUES ANI ion schem -means, In	tiple variables, minant functior obabilistic gener ision Tree, Rand O UNSUPERVIS es, Voting, Ense nstance Based	Bayes 1 – F ative om Fo ED emble Learn	ian 1 Perce mode prests Lea	inear ptron el – N s. rning KNN	9 regression algorithm Vaive Bayes 9 9 5 - bagging V, Gaussiar	
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Unit 2 Linear Regression Me gradient descent, Lin Probabilistic discrimin Maximum margin clas Unit 3 Combining multiple I boosting, stacking, U mixture models and Ex Unit 4 Multilayer perceptrom stochastic gradient de saturation (aka the var regularization, dropout Unit 5 Guidelines for machin	SUPERVISED LEARN odels: Least squares, sing near Classification Mode native model - Logistic reg sifier – Support vector ma ENSEMBLE TECHNIC LEARNING learners: Model combinat Insupervised learning: K xpectation maximization. NEURAL NETWORKS n, activation functions, mescent, error backpropagat nishing gradient problem) t. DESIGN AND ANALY EXPERIMENTS ne learning experiments, mescent	ING gle & multers: Discriterssion, Pression, Pression, Pression, Pression, Pression, Pression, Pression, Pression, Interstation,	tiple variables, minant function obabilistic gener ision Tree, Rand D UNSUPERVIS es, Voting, Ense nstance Based aining – gradie shallow networ hyperparameter to ACHINE LEAR	Bayes a – F ative om Fo ED ED ED ED Learn nt de ks to uning NING 1 resa	ian 1 Perce mode orests Lea ing: scent deep , bato	inear ptron el – N s. rning KNN	9 regression algorithm Vaive Bayes 9 5 - bagging V, Gaussian 9 imization - vorks –Uni rmalization 9 K-fold CV	

comparing two classification algorithms – t test, Mc	IcNemar's test, K-fold CV paired t test
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Total: 45

TEXTBOOKS

1	Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition,
	2020
2	Stephen Marsland, "Machine Learning: An Algorithmic Perspective, "Second
	Edition", CRC Press, 2014
DEEDDENGEG	

REFERENCES

1	D Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer,
	2006.

COURSE OUT At the end of the	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Explain the basic concepts of machine learning.	K4
CO2	Construct supervised learning models	К3
CO3	Construct unsupervised learning algorithms	К3
CO4	Evaluate and compare different model	К3

	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
	1	2	3	4	5	6	ାଂ	8	9	0	1	2	1	2	3
CO	3	1	3	1	1	~/	-	(f	1	3	3	3	2	1	3
1							elf D	iscip	line						
CO	3	1	1	2	2		-	-	3	2	1	1	3	1	2
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CO	3	3	2	1	2	2	521	U <u>.</u> Z	3	3	1	2	2	2	2
3											7				
CO	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
4															
CO	2	2	1	2	3	-	-	-	1	2	2	3	1	3	3
5															

	AAI303-MACHINE I	LEARNIN	G LABORATORY	l							
Programme&Branch	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С				
		<u>5</u>	PC	0	0	4	2				
Preamble	• To understand the da	ata sets an	d apply suitable alg	gorit	hms	for	selecting the				
	appropriate features for	r analysis.									
	• To learn to impleme	nt supervi	sed machine learnin	ng al	gorit	hms	on standard				
	datasets and evaluate the performance.										
	• To experiment the unsupervised machine learning algorithms on standard										
	datasets and evaluate the	he perform	ance.								
	• To build the graph ba	ased learni	ng models for stand	ard d	lata	sets.					
	• To compare the per	formance	of different ML a	lgor	ithm	s an	d select the				
	suitable one based on t	he applicat	tion.								
LIST OF EXPERIMEN	NTS	E OF TECHI	IOLOGY								
1.For a given set of t	raining data examples s	tored in a	.CSV file, implem	nent	and	den	nonstrate the				
Candidate-Elimination	algorithm to output a de	scription o	f the set of all hypo	thes	es co	onsis	tent with the				
training examples.											
2. Write a program to	o demonstrate the worki	ng of the	decision tree based	1 ID	3 al	gori	thm. Use an				
appropriate data set for	building the decision tre	e and appl	y this knowledge to	clas	sify	a ne	w sample.				
3 Build an Artificial	Neural Network by imp	olementing	the Backpropagati	on a	lgor	ithm	and test the				
same using appropriate	e data sets.										
4. Write a program to i	mplement the naïve Baye	esian class	ifier for a sample tr	ainir	ng da	ita se	et stored as a				
CSV file and compute	the accuracy with a few t	est data se	ts.								
5. Implement naïve Ba	yesian Classifier model to	o classify a	a set of documents a	nd n	neasi	ure t	he accuracy,				
precision, and recall.	9/6		. 20								
6. Write a program to c	construct a Bayesian netw	ork to diag	gnose CORONA inf	ectio	on us	sing	standard				
WHO Data Set.	SIFL	Disciplin	2								
7. Apply EM algorithm	n to cluster a set of data st	tored in a.	CSV file. Use the sa	ame	data	set f	or clustering				
using the k-Means algo	orithm. Compare the result	lts of these	two algorithms.								
8.Write a program to in	nplement k-Nearest Neig	hbour algo	orithm to classify the	e iris	data	a set	. Print both				
correct and wrong prec	lictions.	10 001									
9. Implement the non-p	parametric Locally Weigh	ted Regree	ssion algorithm in o	rder	to fi	t dat	a points.				
Select an appropriate d	ata set for your experime	nt and dra	w graphs.								
							Total: 60				
	N			5							
COURSEOUTCOMES	5:			Blo	oom [*]	's Ta	xonomy				
At the end of the cours	e, learners will be able to			Le	vel						
CO1 App	ly suitable algorithms for	selecting	the appropriate			ŀ	K 4				
featu	ares for analysis.										
CO2 Imp	lement supervised machin	ne learning	algorithms on			ŀ	K3				
stand	dard datasets and evaluate	e the perfo	rmance.								
CO3 App	ly unsupervised maching	ne learnir	ng algorithms on			ł	\$3				

	standard datasets and evaluate the performance.	
CO4	Build the graph based learning models for standard data sets.	К3
CO5	Assess and compare the performance of different ML algorithms and select the suitable one based on the application.	К5

CO's-PO's & PSO's MAPPING

CO/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
10			•	-	-	v	-	Ŭ	-						
CO1	3	3	3	2	3	-	- ה		1	2	2	2	3	1	2
CO2	3	3	3	2	3	-	- 2	2	2	1	1	1	1	3	2
CO3	3	3	3	2	2	INC	ITTITI	OF T	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	-	1	1	1	1	1	2	1
CO5	2	2	3	3	2	_	-	-	3	2	1	2	3	3	1

AAI302-MULTI -MODAL DATA PROCESSING AND LEARNING LABORATORY

Programme&Branch	B.Tech& AI&DS	Sem.	Category	L	Τ	P	С			
	S S	<u>5</u>	PC	0	0	4	2			
Preamble	• To understand the Data Collection and Data Preprocessing Techniques from									
	Various Modalities									
	• To learn to Noise Reduc	tion and	l Filtering and hand	ling	miss	sing o	lata			
	• To experiment the uns	upervise	ed machine learning	g al	gorit	hms	on standard			
	datasets and evaluate th	e perfor	mance.							
	• To build the graph	Dimen	sionality Reduction	n T	echn	iques	s, Real-time			
	Multimodal Data Process	ing								
	• To compare the perform	nance m	ultimodal data tools	5						
LIST OF EXPERIMEN	ITS SI	. 201								
1. Write a program to d	emonstrate Data Collectior	and Pr	eprocessing from Va	riou	ıs Mo	odali	ties.			
2. Write a program to p	erform									
a.Noise Reducti	on and Filtering									
b.Data Annotati	on and Labeling									
c.Handling Miss	sing Data									
d.Integration of	Multimodal Data									
3. Write a program to p	erform Dimensionality Rec	luction '	Fechniques							
4. Write a program to p	erform Real-time Multimo	dal Data	Processing.							
5. Write a program Priv	acy and Ethical Considerat	tions								
6. Write a program Vali	dation and Quality Control	,Case S	tudy Analysis.							

7. Write a program to demonstrate tool Exploration for Multimodal Data.

8. Write a program to demonstrate Feature Extraction from Multimodal Data

9. Write a program to demonstrate Multimodal Data Fusion Techniques.

10. Write a program to Multimodal Machine Learning

Total: 60

COURSEOUTCO	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	Apply suitable algorithms for selecting the appropriate	K4
	features for analysis.	
CO2	Implement supervised machine learning algorithms on	К3
	standard datasets and evaluate the performance.	
CO3	Apply unsupervised machine learning algorithms on	К3
	standard datasets and evaluate the performance.	
CO4	Build the graph based learning models for standard data	К3
	sets.	
CO5	Assess and compare the performance of different ML	K5
	algorithms and select the suitable one based on the	
	application.	

CO's-PO's & PSO's MAPPING

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	So.	Y	° P	1	2	2	2	3	1	2
CO2	3	3	3	2	3	Ň	010		2	51	1	1	1	3	2
CO3	3	3	3	2	2	-	2	iscip	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	I	1	1	1	1	1	2	1
CO5	2	2	3	3	2	-	n E D	H	3	2	1	2	3	3	1



JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



		AAI106-DE	CEP LEAR	RNING				
Programm	16	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С
&Branch	1		Jein	Cutegory		•	•	C
			6	BS	3	0	0	<u>3</u>
		The objective of the cou	rse is to					
Droomblo		• To understand and need	d and princ	ciples of deep ne	ural n	etwo	rks	
Treamble		• To understand CNN an	d RNN are	chitectures of de	ep nei	ıral n	etwo	orks
		 To comprehend advand 	ced deep le	earning models				
		• To learn the evaluation	metrics for	or deep learning	model	S		
Unit 1		DEEP NETWORKS B.	ASICS					9
Linear Algebra:	Scalars	Vectors Matrices an	nd tensors.	Probability Dist	ributi	ons -	- Gr	adient-base
Optimization -	Machin	e Learning Basics: Canad	vity Ove	rfitting and und	erfitti	0113 nσ	Hype	rnaramete
and validation	sets]	Estimators Rias and v	ariance	Stochastic grad	lient 4		nt	Challenge
motivating deep	learnin	g: Deen Networks: Deen	feedforwa	d networks. Rec	mlariz	vation	nu 0 C	ntimizatio
		g, Deep Networks. Deep	iccului wai	iu networks, Reg	3010112	ation	I C	primizario
Unit 2		CONVOLUTIONAL N	IEURAL I	NETWORKS				9
Convolution Or	peration	Sparse Interactions	Parame	ter Sharing 1	Equiv	arian	ce	Pooling
Convolution Va	ariants:	Strided Tiled Tra		U U	-			0
		Sulucu Illeu Ila	nsposed a	and dilated con	voluti	ons;	CNN	V Learning
Nonlinearity Fu	nctions	Loss Functions Regu	nsposed a	and dilated con Optimizers(voluti Gradie	ons; ent C	CNN ompt	N Learning tation.
Nonlinearity Fu Unit 3	nctions	Loss Functions Regu RECURRENT NEURA	nsposed a larization LNETW	nd dilated con Optimizers (ORKS	voluti Gradie	ons; ent C	CNI ompt	N Learning tation. 9
Nonlinearity Fundation	nctions hs RN	Loss Functions Regu RECURRENT NEURA	nsposed a larization LNETW	nd dilated con Optimizers(ORKS coderTransduc	voluti Gradie	ons; ent Co radie	CNN ompu nt Co	N Learning Itation. 9 omputation
Nonlinearity Fu Unit 3 Unfolding Graph - Sequence Mod	nctions hs RM leling C	Loss Functions Regu RECURRENT NEURA NN Design Patterns: Acce Conditioned on Contexts -	nsposed a larization L NETW ptor End - Bidirecti	nd dilated con Optimizers(ORKS coderTransduc onal RNN Se	voluti Gradie cer; G	ons; ent Cont radie	CNI ompu nt Co Seque	N Learning itation. 9 omputation ence RNN
Nonlinearity Fu Unit 3 Unfolding Graph - Sequence Mod Deep Recurrent	nctions hs RN leling C	Loss Functions Regu RECURRENT NEURA NN Design Patterns: Acce Conditioned on Contexts - rks Recursive Neural	nsposed a larization L NETW ptor End - Bidirecti Networks	nd dilated con Optimizers(ORKS coderTransduc onal RNN Set Long Term I	voluti Gradie cer; G quenc Depend	ons; ent Contraction radie e to	CNN ompu nt Co Sequa es: L	N Learning tation. 9 omputation ence RNN Leaky Unit
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REFERENCE	2S									
1	1 Salman Khan, HosseinRahmani, Syed Afaq Ali Shah, Mohammed Bennamoun, Guide to Convolutional Neural Networks for Computer Vision", Synthesis Lecture on Computer Vision, Morgan & Claypool publishers, 2018.									
2	Yoav Goldberg, ``Neural Network Methods for Natura Synthesis Lectures on Human Language Technologie publishers, 2017.	l Language Processing", s, Morgan & Claypool								
3	Francois Chollet, ``Deep Learning with Python", Manning	Publications Co, 2018								
4	1. Charu C. Aggarwal, ``Neural Networks and Deep Springer International Publishing, 2018. 5. Josh ``Deep Learning: A Practitioner's Approach'', O'Reil	D Learning: A Textbook", Patterson, Adam Gibson, Ily Media, 2017.								
COURSE OU At the end of t	TCOMES: the course, learners will be able to	Bloom's Taxonomy Level								
CO1	Explain the basics in deep neural networks	K4								
CO2	Apply Convolution Neural Network for image processing	К3								
CO3	Apply Recurrent Neural Network and its variants for text analysis	К3								
CO4	Apply model evaluation for various applications	К3								
CO5	Applyautoencoders and generative models for suitable applications	K5								

CO/ PSO1 PSO2 PSO3 PO **CO1** ---CO₂ -_ -**CO3** ---**CO4** ---CO5 ---

	AAI304-DEEP LE	CARNING	LABORATORY				
Programme&Brancl	h B.Tech& AI&DS	Sem.	Category	L	Т	P	С
		<u>6</u>	PC	0	0	4	2
Preamble	• To understand the too	ols and tech	niques to implement	nt de	ep n	eural	networks
	• To apply different de	ep learning	architectures for so	olvin	g pro	obler	ns
	• To implement genera	tive model	s for suitable applic	atio	15		
	• To learn to build and	validate di	fferent models				
LIST OF EXPERIME	ENTS						
1. Solving XOR prob	lem using DNN						
2. Character recogniti	on using CNN						
3. Face recognition us	ing CNN						
		PIH	HKL				
4.Language modeling	using RNN	TE OF TECH	IOLOGY				
5.Sentiment analysis	using LSTM						
6. Parts of speech tag	ging using Sequence to Se	equence arc	hitecture.				
7.Machine Translation	n using Encoder-Decoder	model					
8.Image augmentation	1 using GANs 9. Mini-pro	oject on rea	l world applications				
	*		×				Total: 60
	o l						
COURSEOUTCOME	ES:			Ble	oom	's Ta	xonomy
At the end of the cour	se, learners will be able to		5	Le	vel		
CO1 Ap	ply deep neural network f	for simple p	roblems			k	K 4
CO2 Ap	ply Convolution Neural N	letwork for	image processing			k	K3
CO3 Ap	ply Recurrent Neural Netw	work and it	s variants for text			k	Χ3
ana	lysis	RUMB	Inun				
CO4 Ap	ply generative models for	data augm	entation			k	K3
CO5 De net	velop real-world solutions works	s using suit	able deep neural			k	35

CO's- PO's & PSO's MAPPING

CO/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO o	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
PO	T	4	3	-	2	U	/	0	•	10	11	14			
CO1	3	3	3	2	2	-	-	-	1	2	2	2	3	1	2
CO2	3	3	3	2	3	-	-	-	2	1	2	1	2	3	2
CO3	3	3	3	2	2	-	-	-	3	2	3	2	3	1	1
CO4	3	3	3	2	3	-	-	-	1	2	2	2	1	2	1
CO5	2	2	3	3	2	-	-	-	3	2	1	2	3	3	1



JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604



	AAI107-CY	BER SEC	URITY				
Programme &Branch	e B.Tech& AI&DS	Sem.	Category	L	Τ	Р	С
		7	BS	<u>3</u>	0	<u>0</u>	<u>3</u>
	The objective of the co	urse is to					
	• To learn cybercrime a	nd cyberlay	17				
Preamble	• To understand the cyb	or attacks a	v. nd tools for miti	antino	that	n	
Treamole	• To understand inform	otion gother	ind tools for finit	gating	g thei	11.	
	• To learn how to detec	ation gather	ing.				
	• To learn how to detect	a cyber al	lack.				
Unit 1		levent a cyu					0
Unit 1	INTRODUCTION						•
Cyber Security -	History of Internet – Impact of	f Internet –	CIA Triad; Reas	on for	r Cyt	ber C	rime – Nee
for Cyber Securi	ty – History of Cyber Crime;	Cybercrin	ninals – Classifi	cation	of	Cybe	rcrimes –
Global Perspectiv	ve on Cyber Crimes; Cyber Lav	vs – The Ind	dian IT Act – Cy	bercri	me a	nd Pu	unishment.
Unit 2	ATTACKS AND COU	INTERME	ASURES				9
OSWAP:Malicio	us Attack Threats and Vulnera	bilities: Sc	ope of Cyber-A	ttacks	– S	ecuri	ty Breach
Types of Malicie	ous Attacks – Malicious Softy	ware – Cor	nmon Attack Ve	otora	Š	oriol	onginoorir
Types of muller	Jus Millers Mullerous Solly					11 12 1	envineern
Attack _ Wireless	Network Attack - Web Applic	eation Attac	k – Attack Tools	-Col	unter	meas	ures
Attack – Wireless	s Network Attack – Web Applic	ation Attac	k – Attack Tools	-Col	unter	meas	ures.
Attack – Wireless Unit 3	Network Attack – Web Applic	cation Attac	k – Attack Tools	– Coi	unter	meas	ures.
Attack – Wireless Unit 3 Harvester – Who	s Network Attack – Web Applic RECONNAISSANCE Dis – Netcraft – Host – Extrac	ation Attac	k – Attack Tools	-Con S - E	unter	meas	ures. 9 Informatic
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser	s Network Attack – Web Applic RECONNAISSANCE Dis – Netcraft – Host – Extrac vers – Social Engineering Re	eation Attac ting Inform connaissan	hation from DN ce; Scanning –	$-Con \overline{S - E}$	unter Cxtrac Scar	ting	9 Informatic – Networ
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Vi	RECONNAISSANCE Dis – Netcraft – Host – Extrac vers – Social Engineering Re alnerability Scanning – Scann	eation Attac eting Inform econnaissan ing Methoo	hation from DN ce; Scanning – dology – Ping S	$\frac{-\text{Cons}}{-\text{Cons}}$	unter Extrac Scar Tec	ting ning	9 Information – Network Network
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Vo Command Switch	S Network Attack – Web Applic RECONNAISSANCE Dis – Netcraft – Host – Extrac vers – Social Engineering Re- ulnerability Scanning – Scann hes – SYN – Stealth – XMAS	eation Attac eting Inform econnaissan ing Methoo – NULL –	hation from DN ce; Scanning – dology – Ping S IDLE – FIN Sc	– Cou S – E Port Sweer ans –	unter Cxtrac Scar Tec Banı	cting ning hniqu	9 Informatic – Networ hes – Nma rabbing ar
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Vi Command Switch OS Finger printir	RECONNAISSANCE Dis – Netcraft – Host – Extractivers – Social Engineering Re- ulnerability Scanning – Scann hes – SYN – Stealth – XMAS ng Techniques.	eation Attac eting Inform econnaissan ing Method – NULL –	hation from DN ce; Scanning – dology – Ping S IDLE – FIN Sc	– Cou S – E Port Sweer ans –	unter Extrac Scar Tec Bann	cting ning hniqu	9 Informatic – Networ ies – Nma rabbing ar
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Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Vo Command Switch OS Finger printin Unit 4 Host -Based Int Intrusion Detection	RECONNAISSANCE Dis – Netcraft – Host – Extractivers – Social Engineering Re- alnerability Scanning – Stealth – XMAS INTRUSION DETECTION DETECTION DETECTION DETECTION DETECTION – Network for – Intrusion Detection Exchanged and the scalar structure of	eting Inform econnaissan ing Method – NULL – TION -Based Int nge Format	hation from DN ce; Scanning – dology – Ping S IDLE – FIN Sc rusion Detection – Honeypots – J	$\frac{-Con}{S - E}$ Port Sweer ans - $\frac{-E}{D}$	Extrac Scar Tec Banı Distri	cting nning hniqu her G	9 Informatic – Networ les – Nma rabbing an 9 I or Hybri n Snort.
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Vo Command Switch OS Finger printir Unit 4 Host -Based Int Intrusion Detection Unit 5	RECONNAISSANCE Dis – Netcraft – Host – Extractivers – Social Engineering Re- alnerability Scanning – Stealth – XMAS INTRUSION DETECTION DETECTION DETECTION DETECTION – Network for – Intrusion Detection – Network for – Intrusion Detection Exchanting – Stealer – Steal	eation Attac eting Inform econnaissan ing Method – NULL – TION -Based Int nge Format NTION	hation from DN ce; Scanning – dology – Ping S IDLE – FIN Sc rusion Detection – Honeypots – J	$\frac{-Con}{S - E}$ Port Sweer ans - $\frac{-Con}{D}$ $\frac{-Con}{D}$	Extrac Scar Tec Banı Distri ole S	cting nning hniqu her G butec ysten	9 Informatic – Networ les – Nma rabbing an 9 I or Hybri n Snort. 9
Attack – Wireless Unit 3 Harvester – Who from E-mail Ser Scanning and Va Command Switch OS Finger printir Unit 4 Host -Based Int Intrusion Detection Unit 5 Firewalls and Int	RECONNAISSANCE Dis – Netcraft – Host – Extractivers – Social Engineering Re- ulnerability Scanning – Stealth – XMAS INTRUSION DETECTION DETECTION DETECTION DETECTION DETECTION DETECTION – Network and – Intrusion Detection Exchaning – Statematical Scanning – Statematical Scanning – Scann	eation Attac eting Inform econnaissan ing Method – NULL – TION -Based Intender Format NTION eed for Fire	hation from DN ce; Scanning – dology – Ping S IDLE – FIN Sc rusion Detection – Honeypots – I	$\frac{-Con}{S - E}$ $\frac{S - E}{Port}$ $\frac{-Con}{Sweer}$ $\frac{-Con}{Sweer}$ $\frac{-Con}{Sweer}$ $\frac{-Con}{Sweer}$	Extrac Scar Tec Bann Distri ole S acter	ting ning hniqu her G butec ysten	9 Informatic – Networ ies – Nma rabbing an 9 I or Hybri n Snort. 9 and Acces
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REFERENC	ES
1	David Kim, Michael G. Solomon, "Fundamentals of Information Systems Security",
	Jones & Bartlett Learning Publishers, 2013 (Unit 2)
2	Patrick Engebretson, "The Basics of Hacking and Penetration Testing: Ethical
	Hacking and Penetration Testing Made easy", Elsevier, 2011 (Unit 3)
3	Kimberly Graves, "CEH Official Certified Ethical hacker Review Guide", Wiley
	Publishers, 2007 (Unit 3)
4	William Stallings, Lawrie Brown, "Computer Security Principles and Practice",
	Third Edition, Pearson Education, 2015 (Units 4 and 5)
5	Georgia Weidman, "Penetration Testing: A Hands-On Introduction to Hacking", No
	Starch Press, 2014 (Lab)

COURSE OUT At the end of the	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Explain the basics of cyber security, cyber crime and cyber law	K4
CO2	Classify various types of attacks and learn the tools to launch the attacks	К3
CO3	Apply various tools to perform information gathering	К3
CO4	Apply intrusion techniques to detect intrusion	К3
CO5	Apply intrusion prevention techniques to prevent intrusion	K5

							S/6 _								
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
	1	2	3	4	5	6	1	8	9	0	1	2	1	2	3
CO	3	2	1	-	5	3		UΝ	HJ	lid	1		1	1	-
1				<	$^{-1}$		FST	D. 2	011		12				
CO	3	2	1	-	-	-	-	-	-	-	7		1	1	-
2															
CO	3	2	3	-	-	-	-	-	-	-	-		1	1	-
3															
CO	3	2	3	-	-	-	-	-	-	-	1		-	1	-
4															
CO	3	2	3	-	-	-	-	-	-	-	-		1	-	-
5															

	A A 1305-CVBFF	SFCU	RITVLAR				
Programme&Bra	nch B.Tech& AI&DS	Sem.	Category	L	Т	Р	С
		<mark>7</mark>	PC	0	0	4	2
Preamble	• Get the skill to ide	entify cy	ber threats/attacks.				
	• Get the knowledge	e to solv	ve security issues in	day	to d	ay lif	e.
	• Able to use Autop	sv tools	5	5		5	
	Perform Memory	capture	and analysis				
	Demonstrate Netv	vork ana	lysis using Networl	c mi	ner f	ools	
LIST OF EXPERI	MENTS	vork un		x mn		0015	
1 Perform an Expe	eriment for port scanning with n	man					
2. Set Up a honey	ot and monitor the honeypot on	the net	work.				
3. Install Iscript/Cr	vptool tool (or any other equiva	lent) an	d demonstrate Asyn	nme	tric	Svm	metric
crypto algorithm H	Hash and Digital/PKI signatures	lient) an			,	~	
4. Generate minim	um 10 passwords of length 12 c	haracter	s using open SSL co	omn	nand		
5. Perform practica	and to puss of the or the set of	rinting-(Gathering target info	orma	tion	usin	g Dmitry-
Dmagic. UAtester							8 -2 million J
6. Working with sn	iffers for monitoring network co	ommuni	cation (Wireshark).				
7.Using Snort, perf	form real time traffic analysis ar	nd packe	et logging				
8. Perform email a	nalysis using the Autopsy tool.	1					
9. Perform Registr	y analysis and get boot time log	ging usi	ng process monitor	tool			
10. Perform File ty	pe detection using Autopsy tool						
11. Perform Memo	ry capture and analysis using F	TK imag	ger too				
12. Perform Netwo	ork analysis using the Network M	Miner to	ol				
	194	名)					Total: 60
	Sele		199				
COURSEOUTCO	MES:	scipiii		Bl	oom	's Ta	xonomy
At the end of the co	ourse, learners will be able to			Le	vel		-
CO1	Get the skill to identify cyber th	reats/att	acks			k	K 4
CO2	Get the knowledge to solve sec	curity is	sues in day to day			k	Χ3
	life.						
CO3	Able to use Autopsy tools .					k	X3
CO4]	Perform Memory capture and an	nalysis				k	K3
CO5	Demonstrate Network analysis u	using Ne	etwork miner tools			k	35

	PROFESSION AAI701-DATA	NAL ELE VISUAL	CTIVE-I ZATION				
Programme &Branch	B.Tech& AI&DS	Sem.	Catego	ry L	T	Р	С
		4	BS	3	0	0	<u>3</u>
Preamble Unit 1 EDA fundamentals – U	 The objective of the court To outline an overvie To implement data v To perform univariat To apply bivariate dat To use Data explorate time series data. EXPLORATORY DAT	rse is to ew of expl isualizatio e data exp ata explora ion and vi AANALY – Signific	oratory data on using Ma oloration and ation and an sualization Y SIS cance of ED	a analysis. tplotlib. 1 analysis. alysis. techniques A – Makir	s for 1	multiv	variate and 9
Comparing EDA with c Data transformation tec Grouping Datasets - da	lassical and Bayesian ana hniques-merging database ta aggregation – Pivot tabl	lysis – So: , reshapin es and cro	ftware tools g and pivot ss-tabulatic	for EDA - ing, Transtons.	Visu forma	al Ai ation	ds for EDA- techniques -
Unit 2	VISUALIZING USING	HATPL	OTLIB	*			9
Importing Matplotlib - contour plots – Histogr dimensional plotting - G	- Simple line plots – Sin ams – legends – colors – s Geographic Data with Base	nple scatt subplots – emap - Vis	er plots – text and ar sualization	visualizing motation – with Seabo	; erro - cust orn	ors – omiz	density and ation – three
Unit 3	UNIVARIATE ANALY	SIS	Ser				9
Introduction to Single v	variable: Distributions and	Variables	- Numerica	l Summar	ies of	Leve	el and
Spread - Scaling and St	andardizing – Inequality -	Smoothin	ng Time Ser	ies.			
Unit 4	BIVARIATE ANALYS	IS					9
Relationships between Several Batches - Scatt	Two Variables - Percentag erplots and Resistant Lines	e Tables - s – Transf	Analyzing ormations.	Contingen	су Та	bles	- Handling
Unit 5	MULTIVARIATE AND	TIME S	ERIES AN	ALYSIS			9
Introducing a Third Van Longitudinal Data – F Time-based indexing –	iable - Causal Explanatio undamentals of TSA – C Visualizing – Grouping –	ns - Three haracteris Resamplin	e-Variable C tics of time ng	contingenc e series da	y Tał ta –	oles a Data	nd Beyond - Cleaning –
							Total: 45
TEXTBOOKS							
1 Sure Pythe	sh Kumar Mukhiya, Usma on", Packt Publishing, 202	n Ahmed, 20. (Unit 1	"Hands-Or)	n Explorato	ory D	ata A	nalysis with

2	Jake Vander Plas, "Python Data Science Handbook: Essent	ial Tools for Working
	with Data", Oreilly, 1st Edition, 2016. (Unit 2)	
3	Catherine Marsh, Jane Elliott, "Exploring Data: An Introdu	ction to Data Analysis for
	Social Scientists", Wiley Publications, 2nd Edition, 2008. (Unit 3,4,5)
REFERENCE	s	
1	Eric Pimpler, Data Visualization and Exploration with R, G	eoSpatial Training
	service, 2017.	
2	Claus O. Wilke, "Fundamentals of Data Visualization", O'n	eilly publications, 2019.
3	Matthew O Ward Georges Grinstein Daniel Keim "Inter	octive Data Visualization:
	Foundations, Techniques, and Applications", 2nd Edition, 0	CRC press. 2015.
		···· · · · · · · · · · · · · · · · · ·
COURSE OUT	TCOMES:	Bloom's Taxonomy
At the end of t	he course, learners will be able to	Level
CO1	Understand the fundamentals of exploratory data analysis.	K4
CO2	Implement the data visualization using Matplotlib.	К3
CO3	Perform univariate data exploration and analysis.	К3
	Self Discusione	
	Olscipiin	
CO4	Apply bivariate data exploration and analysis.	К3
	COLDERUMRIA	
CO5	Use Data exploration and visualization techniques for	K5
	multivariate and time series data.	

CO		РО												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	3	1	3	3		-	-	-	2	3	3	3	2	2	2	
2	2	2	2	1	1	-	-	-	3	2	3	1	3	1	3	
3	2	1	2	1	1	-	-	-	3	2	1	2	2	2	1	
4	2	2	2	1	-	-	-	-	1	2	1	3	1	3	2	
5	3	1	1	2	1	-	-	-	3	2	1	2	2	2	3	
AVG	2	1	2	2	1	-	-	-	2	2	2	2	2	2	2	

	AA	1702-DATA ANA	ALYTICS	FOR FINANCE	2			
Programme &Branch	B.	Tech& AI&DS	Sem.	Category	L	Т	Р	С
			4	BS	3	0	0	<u>3</u>
Preamble	The o	bjective of the co To understand t To comprehend To understand v To model the su To apply analyt	burse is to the Analytic the process various type upply chain ics for diffe	s Life Cycle. s of acquiring Bu s of analytics for management for rent functions of	siness Busi Analy	s Inte ness ytics.	lliger Fored	nce casting
Unit 1	INTE	RODUCTION TO	O BUSINES	SS ANALYTICS	5			9
Analytics and Dat – Data Collection – Interpretation –	a Science – A – Data Prepa Deployment	Analytics Life Cy aration – Hypothe and Iteration	cle – Types esis Generat	of Analytics – B ion – Modeling -	usine - Valio	ss Production	obler n and	n Definition Evaluation
Unit 2	BUSI	INESS INTELLI	GENCE					9
Data Warehouses Process - Decision	and Data Ma n Support Sy	art - Knowledge N stems – Business	/lanagement Intelligence	–Types of Decis –OLAP – Analy	sions - ytic fu	- Dec	ision ons	Making
Unit 3	BUS	INESS FORECA	STING	X				9
Introduction to Bu Mining and Predie	siness Forective Analysi	casting and Predic is Modelling –Ma	tive analytic chine Learn	cs - Logic and Da ing for Predictiv	ata Di e ana	riven lytics	Mod	els – Data
Unit 4	HR &	& SUPPLY CHA	IN ANALY	TICS				9
Human Resources Planning Demand Applying HR Ana	s – Planning , Inventory a llytics to mal	and Recruitment and Supply – Log a prediction of	– Training a istics – Anal the demand	nd Development lytics application for hourly emple	- Sup s in H oyees	oply of R & for a	chain Supj a year	network - oly Chain -
Unit 5	MAR	RKETING & SA	LES ANAL	YTICS				9
Marketing Strate Analytics applica marketing and sal	gy- Marketi tions in Ma es.	ing Mix-Custom arketing and Sale	er Behavio es - predict	ur –selling Pro tive analytics fo	ocess or cus	– S stome	ales ers' t	Planning – behaviour in Total: 45
								101411 40
TEXTBOOKS								
TEXTBOOKS	R Fvans Ia	mes Business An	alytics 2nd	Edition Pearson	<u>, 201</u>	7		
TEXTBOOKS 1 2	R. Evans Ja R N Prasac Wiley, 2016	mes, Business An l, Seema Achary	alytics, 2nd a, Fundame	Edition, Pearsor entals of Busine	n, 201 ess Ai	7 nalyti	ics, 2	2nd Edition,
TEXTBOOKS 1 2 3	R. Evans Ja R N Prasac Wiley, 2016 Philip Kotle	mes, Business An l, Seema Achary r and Kevin Kelle	alytics, 2nd a, Fundame er, Marketin	Edition, Pearsor entals of Busine g Management,	n, 201 ess Ai 15th e	7 nalyti editio	ics, 2	2nd Edition, HI, 2016

5	Mahadevan B, "Operations Management -Theory and Prac	tice", 3rd Edition, Pearson
	Education,2018.	
REFERENCES		
1	VSP RAO, Human Resource Management, 3rd Edition, Ex	cel Books, 2010.
2	Mahadevan B, "Operations Management -Theory and Prac	tice",3rd Edition, Pearson
	Education,2018.	
COURSE OUT	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Explain the real world business problems and model with analytical solutions	K4
CO2	Identify the business processes for extracting Business Intelligence	К3
CO3	Apply predictive analytics for business fore-casting	К3
CO4	Apply analytics for supply chain and logistics	К3
	management	
CO5	Use analytics for marketing and sales.	K5
	C// Discipline	

CO					PSO										
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3 <	1	1	-	_		1	2	1	1	3	2	1
2	3	3	3	2	3	-ES	٩.	2911	1	2	2	2	3	1	2
3	2	2	3	3	2	-	-	-	3	1	1	3	3	1	2
4	2	1	1	2	2	-	-	-	3	3	2	1	1	3	1
5	2	3	2	3	2	-	-	-	3	3	1	3	3	1	1
AVG	2.2	2.2	2.4	2.2	2	-	-	-	2.2	2.2	1.4	2	2.6	1.6	1.4

	AAI703-INTER	NET O	FTHING	S				
Programme &Branch	B.Tech& AI&DS	Sem.	Categ	gory	L	Т	Р	С
		4	BS	5	3	0	0	<u>3</u>
Preamble	 The objective of the cour To understand Smart To build simple IoT To understand Data To develop IoT infras 	se is to t Objects Systems Analytic structure	, IoT Arch using Ard s and Clou for popula	itectures a uino and l d in the co r applicat	and Rasj onte	IoT pbern ext of	proto ry Pi f IoT	cols
Unit 1	FUNDAMENIALS OF	INTER	NET OF 1	IHINGS				9
Forum (IoTWF) and Stack - Fog, Edge and Smart Objects and Co	Alternative IoT models – S d Cloud in IoT – Functional onnecting Smart Objects.	Simplifie Blocks	d IoT Arcl of an IoT	hitecture Ecosyster	and m –	Cor Sen	e Io7 sors -	Functional Actuators -
Unit 2	IOT PROTOCOLS							9
IoT Access Techno 802.15.4,802.15.4g, 8 Constrained Nodes a Routing Over Low Po and Data Acquisition	logies - Physical and M 802.15.4e, 1901.2a, 802.11a nd Constrained Networks – ower and Lossy Networks – – Application Layer Protoco	IAC La h and I Optimi Applicat	yers - To LoRaWAN zing IP for tion Transp P and MO	opology – Netwo r IoT - Fi ort Metho TT.	and ork 1 rom ods	Se Laye 6Lo - Suj	curity r - Il oWPA pervis	y of IEEE P Versions - AN to 6Lo - sory Control
Unit 3	DESIGN AND DEVEL	OPMEN	T					9
Design Methodology Building Blocks - A Raspberry Pi with Pyt	- Embedded Computing Log rduino - Board Details – thon Programming	gic - Mio IDE Pro	crocontrollo ogramming	er – Syste ; - Raspb	em c erry	on Cł 7 Pi	nips - - Int	IoT System terfaces and
Unit 4	IOT PHYSICAL SERV	ERS CI	LOUD	7				9
Physical servers and c – Designing a REST	cloud - XaaS, M2M , WAMI ul Web API –Google cloud f	P- AutoH for IoT.	ahn for Io'	T – Xivel	y C	loud	for I	oT – Django
Unit 5	APPLICATIONS							9
Retail, Health care, military, Smart home.	Transportation, Agriculture	e and e	nvironment	tal, Smar	t ci	ity,	Gove	rnment and
								Total: 45
TEXTBOOKS								
1 Da	vid Hanes, Gonzalo Salgueir	o, Patric	k Grossete	ete, Rob B	arto	on an	dJero	ome Henry,
I								

	"IoT Fundamentals: Networking Technologies, Protocolsa of Things", Cisco Press, 2017.	and Use Cases for Internet
2	Rajkamal,"Internet of Things: Architecture, AndApplications",McGraw Hill HigherEducation,2017	Design Principles
3	Olivier Hersent, David Boswarthick, Omar Elloumi, – Key Applications and Protocols ^{II} , Wiley, 2012.	-The Internet of Things -
REFERENCI	ES	
1	Vijay Madisetti and ArshdeepBahga, —Internet o Approach)II,1st Edition,VPT, 2014.	f Things (A Hands-on-
2	Francis daCosta, —Rethinking the Internet of Things: ConnectingEverything ^{II} , 1st Edition, Apress Publications,	A Scalable Approach to 2013.
COURSE OU At the end of	TCOMES: the course, learners will be able to	Bloom's Taxonomy Level
C01	Interpret the concept of IoT ,its Components and its architecture	K4
CO2	Learn the design methods of various protocol	К3
CO3	Build the design methodology for a IoT system using Raspberry	К3
CO4	Apply the Data analytics and Support servicing tool related to IoT	К3
CO5	Experiment the case study and application of IoT in real time scenario	K5

CO		PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	1	2	1	-	-	-	-	-	2	3	2	2	2
2	2	3	1	2	1	-	-	-	-	-	2	3	2	2	2
3	3	2	3	-	3	-	-	-	-	-	2	1	3	3	3
4	2	3	2	3	2	-	-	-	-	-	1	1	3	3	3
5	2	3	3	3	2	2	2	2	1	2	1	2	3	3	3
AVG	2.2	2.8	2	2.5	1.8	2	2	2	1	2	1.6	2.6	2.6	2.6	2.6

	AAI704-NETV							
Programme &Branch	B.Tech& AI&DS	Sem.	Cate	gory	L	Т	Р	С
		4	В	S	3	0	0	<u>3</u>
	The objective of the cou	rse is to						
	\succ To learn the fundame	entals of	cryptogram	ohv.				
Preamble	\succ To learn the key mar	agement	technique	s and au	thent	icatio	on ap	proaches.
	\succ To explore the netwo	ork and tr	ansport la	yer secu	rity te	chni	ques.	
	\succ To understand the ap	plication	layer secu	urity star	ndard	s.	-	
	\succ To learn the real time	e security	practices					
Unit 1	INTRODUCTION							9
Basics of cryptograp	bhy, conventional and public	-key cryp	tography,	<mark>h</mark> ash fur	nctior	is, au	then	tication, and
digital signatures								
TL :4 0								
Key Management ar Certificates, Public-2	MEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au	CANDA Key Dist thenticat	UTHENT ribution, I ion: Remo	ICATIO Distribut Distribut	DN ion o -Autł	f Pul	blic 1 cation	9 Keys, X.509 n Principles
Key Management ar Certificates, Public- Remote User-Author Authentication Using	KEY MANAGEMENT nd Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption	CANDA Key Dist thenticat ic Encr	UTHENT ribution, I ion: Remo yption, K	ICATIC Distribut ote User Cerberos	DN ion o -Auth Sys	f Pul nentio tems	blic l cation , Re	9 Keys, X.509 n Principles emote User
Unit 2 Key Management ar Certificates, Public-1 Remote User-Author Authentication Using Unit 3	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A	CANDA Key Dist thenticat ic Encry	UTHENT ribution, l ion: Remo yption, K CURITY	ICATIC Distribut ote User Cerberos	DN ion o -Auth Sys	f Pul nentic tems	blic l cation , Re	9 Keys, X.509 n Principles emote User 9
Unit 2 Key Management ar Certificates, Public-2 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A ntrol: Network Access Control a Access Control - IP Secure urity Considerations, Secure entic (SSH) application.	CANDA Key Dist thenticat ic Encry AND SEC rol, Exten fity - Inte Sockets	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key S Layer, T	ICATIC Distribut Die User Cerberos henticati Exchan Franspor	ON ion o -Auth Sys on Pr ge (I t La	f Pul nentio tems rotoc KE).	olic l cation , Re ol, II Tran Secur	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS
Unit 2 Key Management ar Certificates, Public-3 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She Unit 4	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A entrol: Network Access Control access Control - IP Secur erity Considerations, Secure ell (SSH) application. APPLICATION LAYE	CANDA Key Dist thenticat ic Encry AND SEC col, Exter ity - Into Sockets	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, T	ICATIC Distribut ote User Cerberos henticati Exchan Transpor	ON ion o -Auth Sys on Pi ge (I t Lay	f Pul nentic tems rotoc KE). yer S	olic l cation , Re ol, II Tran Secur	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9
Unit 2 Key Management ar Certificates, Public-3 Remote User-Authon Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She Unit 4 Electronic Mail Security	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric Encryption ACCESS CONTROL A Introl: Network Access Control Access Control - IP Secure arity Considerations, Secure ell (SSH) application. APPLICATION LAYE curity: Pretty Good Privacy	CANDA Key Dist thenticat ic Encry AND SEC col, Exter ity - Into col, Exter Sockets CR SECU y, S/MIN	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, T RITY IE, Doma	ICATIO Distribut ote User Cerberos henticati Exchan Transpor	ON ion o -Auth Sys on Pi ge (I t Lay Iden	f Pul nentic tems rotoc KE). yer S	olic l cation , Re ol, II Tran Secur	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 iil. Wireless
Unit 2 Key Management ar Certificates, Public-1 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security: Web Security standard, Secure She Unit 4 Electronic Mail Security: Metwork	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A introl: Network Access Control antrol: Network Access Control	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter fity - Into Sockets CR SECU y, S/MIN	UTHENT ribution, I ion: Remo yption, K CURITY asible Aut ernet Key s Layer, T TRITY IE, Doma	ICATIC Distribut Die User Cerberos henticati Exchan Franspor	ON ion o -Auth Sys on Pr ge (I t Lay Iden	f Pul nentio tems rotoc KE). yer S	olic l cation , Re ol, II Tran Secur	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 iil. Wireless
Unit 2 Key Management ar Certificates, Public-2 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She Unit 4 Electronic Mail Sec Network Security: Mail Sec Unit 5	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A introl: Network Access Control antrol: Secure antrol: Security SECURITY PRACTIC	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter fity - Into Sockets CR SECU y, S/MIN	UTHENT ribution, I ion: Remo yption, K CURITY asible Aut ernet Key S Layer, T TRITY ME, Doma	ICATIC Distribut Die User Cerberos henticati Exchan Franspor	ON ion o -Auth Sys on Pr ge (I t Lay Iden	f Pul nentic tems rotoc KE). yer S	olic l cation , Re ol, II Tran Secur	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 nil. Wireless 9
Unit 2 Key Management ar Certificates, Public-1 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She Unit 4 Electronic Mail Sec Network Security: Mail Sec Unit 5 Firewalls and Intru	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Auge entication Using Symmetric Encryption ACCESS CONTROL A antrol: Network Access Control antrol: Security: antrol: Security PRACTIC sion Detection Systems:	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter rity - Inte sockets CR SECU y, S/MIN CES	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, T TRITY IE, Doma Detection	ICATIO Distribut ote User Cerberos henticati Exchan Franspor	DN ion o -Auth Sys on Pi ge (I t La Iden Iden	f Pul nentic tems cotoc KE). yer S tifiec	olic l cation , Re ol, II Tran Secur l Ma	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 nil. Wireless 9 nt, Firewall
Unit 2 Key Management ar Certificates, Public-3 Remote User-Authon Authentication Using Unit 3 Network Access Comport-Based Network Security: Web Security Standard, Secure She Unit 4 Electronic Mail Security: Mail Security Network Security: Mail Security Unit 5 Firewalls and Intru Characteristics Typ	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A ntrol: Network Access Control antrol: Secure antrol: Secure antrol: Security antrol: Security SECURITY PRACTIC sion Detection Systems: Ir es of Firewalls, Firewall	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter rity - Into Sockets CR SECU y, S/MIN CES ntrusion Basing	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, 7 RITY IE, Doma Detection , Firewa	ICATIO Distribut Die User Cerberos henticati Exchan Transpor hinKeys Passwo Il Loca	ON ion o -Auth Sys on Pi ge (I t Lay Iden Iden	f Pul nentio tems rotoc KE). yer S tifiec flanag and	olic l cation , Re ol, II Tran Secur l Ma geme Con	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 nil. Wireless 9 nt, Firewall nfigurations
Unit 2 Key Management ar Certificates, Public-3 Remote User-Authon Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security Standard, Secure She Unit 4 Electronic Mail Security: M Unit 5 Firewalls and Intru Characteristics Typ Blockchains, Cloud S	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Auge entication Using Symmetric Encryption ACCESS CONTROL A antrol: Network Access Control antrol: Network Access Control access Control - IP Secure arity Considerations, Secure antrol: SECURITY PRACTIC sion Detection Systems: Ir es of Firewalls, Firewall Security and IoT security	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter fity - Inte Sockets CR SECU g, S/MIN CES ntrusion Basing	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, 7 TRITY IE, Doma Detection , Firewal	ICATIO Distribut ote User Cerberos henticati Exchan Transpor ninKeys Passwo Il Loca	DN ion o -Auth Sys on Pi ge (I t Lay Iden Iden	f Pul nentio tems rotoc KE). yer S tifieo Ianag and	olic l cation , Re ol, II Tran Secur I Ma geme Con	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 nil. Wireless 9 nt, Firewall nfigurations
Unit 2 Key Management ar Certificates, Public-1 Remote User-Author Authentication Using Unit 3 Network Access Con Port-Based Network Security: Web Security standard, Secure She Unit 4 Electronic Mail Sec Network Security: Mail Sec Unit 5 Firewalls and Intru Characteristics Typ Blockchains, Cloud S	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A antrol: Network Access Control antrol: Security Considerations, Secure antrol: Security Pretty Good Privacy Interview Pretty Good Privacy Interview Interview Pretty Pretty Pretty Pretty Security and IoT security Security and IoT security	CAND A Key Dist thenticat ic Encry AND SEC rol, Exter rity - Inte Sockets CR SECU y, S/MIN CES ntrusion Basing	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, T TRITY ME, Doma Detection , Firewal	ICATIO Distribut ote User Cerberos henticati Exchan Franspor ninKeys Passwo Il Loca	DN ion o -Auth Sys on Pr ge (I t Lay Iden Iden	f Pul nentic tems rotoc KE). yer \$ tifiec Ianag and	olic l cation , Re ol, II Tran Secur I Ma geme Con	9 Keys, X.509 h Principles emote User 9 EEE 802.1X hsport-Leve ity, HTTPS 9 hil. Wireless 9 nt, Firewall hfigurations Total: 45
Unit 2 Key Management ar Certificates, Public-3 Remote User-Authon Authentication Using Unit 3 Network Access Comport-Based Network Security: Web Security Standard, Secure She Unit 4 Electronic Mail Security: Mail Security: Mail Network Security: Mail Security: Mail Security Security: Mail Security Unit 5 Firewalls and Intru Characteristics Typ Blockchains, Cloud Security TEXTBOOKS	KEY MANAGEMENT and Distribution: Symmetric Key Infrastructure. User Au entication Using Symmetric g Asymmetric Encryption ACCESS CONTROL A antrol: Network Access Control antrol: Security antrol: Security Security PRACTIC sion Detection Systems: In es of Firewalls, Firewall Security and IoT security	CANDA Key Dist thenticat ic Encry AND SEC rol, Exter rity - Into Sockets CR SECU y, S/MIN CES ntrusion Basing	UTHENT ribution, I ion: Remo yption, K CURITY nsible Aut ernet Key s Layer, 7 RITY IE, Doma Detection , Firewa	ICATIO Distribut Die User Cerberos henticati Exchan Transpor ainKeys Passwo Il Loca	DN ion o -Auth Sys on Pi ge (I t Lay Iden rd M tion	f Pul nentic tems rotoc KE). yer S tifiec flanag and	blic l cation , Re ol, II Tran Secur I Ma geme Con	9 Keys, X.509 n Principles emote User 9 EEE 802.1X nsport-Leve ity, HTTPS 9 nil. Wireless 9 nt, Firewall nfigurations Total: 45

	Stallings, 2014, Pearson, ISBN 13:9780133354690.	
REFERENC	ES	
1	Network Security: Private Communications in a Public Perlman, C. Kaufman, Prentice Hall, 2002.	c World, M. Speciner, R.
2	Linux iptables Pocket Reference, Gregor N. Purdy, O'Re 0596005696.	zilly, 2004, ISBN-13: 978-
COURSE OU	JTCOMES:	Bloom's Taxonomy
At the end of	the course, learners will be able to	Level
CO1	Classify the encryption techniques	K4
CO2	Illustrate the key management technique and authentication	К3
CO3	Evaluate the security techniques applied to network and transport layer	К3
CO4	Discuss the application layer security standards.	К3
CO5	Apply security practices for real time applications	K5

CO						P	0						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	2	1	Isci	DIII	2	1	2	1	2	3	1
2	1	1	3	2	2	-	1	-	2	2	1	1	3	1	2
3	1	2	1	1	2	-	-		3	3	1	3	2	1	3
4	2	2	3	2	3	F	P-	401	3	3	2	1	2	1	3
5	2	1	3 <	2	2	_	_	_	2	1	1	3	2	1	1
AVG	1.8	1.8	2.4	1.8	2.2	-ES	ŢIJ.	201	2.4	2	1.4	1.8	2.2	1.4	2

	AAI705-BRAIN CO	MPUTE	R INTERFACE				
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С
&Branch							
		4	BS	3	1	0	4
Preamble	 The objective of the cou Introduce the matrix provide the necessar 	rse is to technique y basic co	s and to explain the stand to explain the standard stand Standard standard stan	he na	ture	of the	e matrix.

		1 6 1 ' ' 11 1'66 / 1 ' 1	C 11 '
		in Engineering and Technology	s of problems occurring
		 familiarize the students with differential calculus. 	
		understand techniques of calculus which are app	lied in the Engineering
		problems.	
		acquaint the student with mathematical tools needed	ed in evaluating multiple
TT •4 4		integrals and their applications	0
Unit I	1	INTRODUCTION TO BCI	9
Introduction - Br	ain struc	ture and function, Brain Computer Interface Types - S	ynchronous and
Asynchronous -I	nvasive l	BCI -Partially Invasive BCI - Non Invasive BCI, Struc	ture of BCI System,
BCI Monitoring	Hardwar	e, EEG, ECoG, MEG, fMRI	
Unit 2]	BRAIN ACTIVATION	9
Brain activation	natterns	- Spikes Oscillatory potential and FRD slow cortice	al potentials Movement
related potentials	-Mu rhv	thms motor imagery Stimulus related potentials - Vis	ual Evoked Potentials –
P300 and Audito	rv Evoke	ed Potentials Potentials related to cognitive tasks	sual Evoked i otentials
1 500 and Addito		of Fotominais, Fotominais related to cognitive tasks.	
Unit 3]	FEATURE EXTRACTION METHODS	9
Data Processing	– Spike	sorting Frequency domain analysis. Wavelet analysis	Time domain analysis
Spatial filtering	-Princin	al Component Analysis (PCA) Independent Com	onent Analysis (ICA).
Artifacts reduction	on Featu	re Extraction - Phase synchronization and coherence	
7 in thirdets reduction	, i cutu	The Extraction of hase system of Earlier and concretioned.	
Unit 4	1	MACHINE LEARNING METHODS FOR BCI	9
Classification tec	chniques	-Binary classification, Ensemble classification, Multie	class Classification,
Evaluation of cla	ssificatio	on performance, Regression - Linear, Polynomial, RBI	F's, Perceptron's,
Multilayer neura	l networl	ks, Support vector machine, Graph theoretical function	al connectivity
analysis.			5
Unit 5	1	APPLICATIONS OF BCI	9
Casa Stadian In	D	Charles diagonal de line and the diagonal de line and	- 11:
Case Studies - In	vasive B	CIs: decoding and tracking arm (hand) position, contr	olling prostnetic
devices such as c	orthotic n	ands, Cursor and robotic control using multi electrode	array implant, Cortical
control of muscle	es via fui	ictional electrical stimulation. Noninvasive BCIs: P30	0 Mind Speller, Visual
cognitive BCI, E	motion c	letection, Ethics of Brain Computer Interfacing	
		2 1010. 2011	Total: 45
TEVTDOOKS			
IEAIDUUKS			
1	Rajesh	.P.N.Rao, "Brain-Computer Interfacing: An Introduction	on", Cambridge
	Univer	sity Press, First edition, 2013.	
2	Jonatha	an Wolpaw, Elizabeth Winter Wolpaw, -Brain	Computer Interfaces:
	Princip	les and practicel, Oxford University Press, USA, Edition	on 1, January 2012.
3	Grewa	BS and Grewal IS Numerical methods in Fr	gineering and Science
5	Khann	a Publishers Oth Edition New Dalhi 2001	sincering and selence,
REFERENCES			

1	Ella Hassianien, A & Azar.A.T (Editors), "Brain-Computer	Interfaces Current Trends
	and Applications", Springer, 2015.	
2	Bernhard Graimann, Brendan Allison, Gert Pfurtsc	cheller, "Brain-Computer
	Interfaces: Revolutionizing Human-Computer Interaction",	Springer, 2010
3	Ali Bashashati, Mehrdad Fatourechi, Rabab K Ward, Gary	E Birch," A survey of
	signal Processing algorithms in brain-computer interfaces	based on electrical brain
	signals" Journal of Neural Engineering, Vol.4, 2007, PP.32	-57.
4	Arnon Kohen, "Biomedical Signal Processing", Vol I and I	I, CRC Press Inc, Boca
	Rato, Florida.	
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COURSE OU	JTCOMES:	Bloom's Taxonomy
At the end of	the course, learners will be able to	Level
CO1	Understand Comprehend and appreciate the significance	K4
	and role of this course in the present contemporary world	
CO2	Analyse Differentiate various concept of BCI.	K3
CO3	Apply Allocate functions appropriately to the human and	К3
	to the machine	
	See See	
CO4	Analyse Select appropriate for feature extraction methods	К3
CO5	Apply Design a system using machine learning	K5

	PO	PO	PO	PO	РО	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
	1	2	3	4	5	6	1 EST	8	9	0	1	2	1	2	3
CO	3	2	1	-		-	-	-	-	-	1		1	1	-
1															
CO	3	2	1	-	-	-	-	-	-	-	-		1	1	-
2															
CO	3	2	3	-	-	-	-	-	-	-	-		1	1	-
3															
CO	3	2	3	-	-	-	-	-	-	-	1		-	1	-

4														
CO	3	2	3	-	-	-	-	-	-	-	-	1	-	-
5														

## PROFESSIONAL ELECTIVE II AAI706-DATA AUGMENTATION AND VIRTUAL REALITY

			,		-	1	1					
Programm	B.Tech& AI&	DS	Sem.	Category	L	Т	P	С				
e &Branch												
	<u> </u>		5	BS	3	0	0	<u>3</u>				
	The objective of t	he cou	rse is to	терилогору								
			JIIIUIE UF									
	Identify, examination	ine, ar	nd develop	software that reflect	s funda	amenta	l techn	iques for				
	<ul> <li>Describe how VR and AR systems work.</li> </ul>											
Preamble	<ul> <li>Choose, devel</li> </ul>	on ex	plain and	defend the use of p	articul	ar desig	ons for	r AR and				
	VR experience	es.	prani, and	aerena ine ase or p	ui tio uii			i i ii c uii u				
	<ul> <li>Evaluate the benefits and drawbacks of specific AR and VR techniques on the human body.</li> </ul>											
	Identify and examine state-of-the-art AR and VR design problems and solutions from the industry and academia											
TI	trom the industry and academia.											
Unit I												
Introduction to Augmented-Virtual and Mixed Reality, Taxonomy, technology and features of												
augmented reality, difference between AR, VR and MR, Challenges with AR, AR systems and												
functionality, Augmented reality methods, visualization techniques for augmented reality.												
Unit 2	VR SYSTEM	S						9				
VR as a disc	ipline, Basic featur	res of	VR system	s, Architecture of V	R syst	ems, V	R ha	ardware :				
VR input har	dware: tracking sy	stems,	motion cap	oture systems, data	gloves,	VR ou	itput h	ardware:				
visual display	ys.											
Unit 3	STEREOSCOPI	C V	ISION&H	APTICRENDERI	NG			9				
Fundamenta	ls of the human	visual	system, De	epth cues, Stereops	is, Ret	inal di	sparit	y, Haptic				
sense, Hapt	ic devices, Algoritl	nms fo	or haptic re	ndering and paralla	x, Syn	thesis	of ster	eo pairs,				
Pipeline for	stereo images.											
Unit 4	VRSOFTWARE	D	EVELOP	MENT				9				
Challenges	in VR software de	velopr	nent, Mast	er/slave and Client/	server	archite	ectures	, Cluster				
rendering, C	Game Engines and	availa	ble sdk to	develop VR applica	tions t	for diff	erent	hardware				
(HTC VIVE	, Oculus, Google V	'R).										
Unit 5	3D INTERA	CTION	NTECHNI	QUES &				9				

### ARSOFTWAREDEVELOPMENT

3D Manipulation tasks, Manipulation Techniques and Interaction Techniques for 3D Manipulation. ARsoftware development : AR software, Camera parameters and camera calibration, Marker-based augmented reality, AR Toolkit.AR software development : AR software, Camera parameters and camera calibration, Marker-based augmented reality, AR Toolkit.

Total: 45

#### TEXTBOOKS George Mather, Foundations of Sensation and Perception:Psychology Press; 2 edition, 20 1 09. Erwin Kreyszig," Advanced Engineering Mathematics", John Wiley and Sons, 10th 2 Edition, New Delhi, 2016 3 Grewal. B.S., and Grewal. J.S., Numerical methods in Engineering and Science, Khanna Publishers, 9th Edition, New Delhi, 2001. REFERENCES Ramana. B.V., "Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, 1 New Delhi. 2018. 2 The VR Book: Human-Centered Design for Virtual Reality, by Jason Jerald 3. 2.Learning Virtual Reality by Tony Parisi, O' Reilly 4. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Pres 3 s, 2003/2006. **COURSE OUTCOMES: Bloom's Taxonomy** At the end of the course, learners will be able to Level Identify, examine, and develop software that reflects CO1 K4 fundamental techniques for the design and deployment of VR and AR experiences. CO2 Describe how VR and AR systems work. K3 CO3 Choose, develop, explain, and defend the use of particular K3 designs for AR and VR experiences. Evaluate the benefits and drawbacks of specific AR and VR K3 CO4 techniques on the human body. CO5 Identify and examine state-of-the-art AR and VR design K5 problems and solutions from the industry and academia.

CO PO PSO	CO PO PSO
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	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

	AAI706-IMAGE AN	D VIDE	CO ANALYTICS										
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С						
&Branch													
	IFD	5	BB BS	<u>2</u>	0	<u>2</u>	<u>3</u>						
	The objective of the cour	se is to											
	$\succ$ To understand the ba	sics of ir	nage processing tec	chniq	ues f	for co	omputer						
	vision.		8.1				L						
Preamble	<ul> <li>To learn the techniques used for image pre-processing.</li> <li>To discuss the various object detection techniques.</li> </ul>												
	$\succ$ To understand the var	rious Ob	ject recognition me	echar	nisms								
	$\succ \text{ To elaborate on the v}$	ideo ana	lytics techniques.										
Unit 1	INTRODUCTION	TRODUCTION 9											
Computer Vision – I	mage representation and	image	analysis tasks -	Ima	ge r	epres	sentations –						
digitization – propertie	digitization – properties – color images – Data structures for Image Analysis - Levels of image data												
representation - Tradition	onal and Hierarchical imag	e data st	ructures.										
Unit 2IMAGE PRE-PROCESSING9													
Local pre-processing -	Image smoothing - Edge d	etectors	- Zero-crossings of	the s	secor	nd de	rivative -						
Local pre-processing - Scale in image processi	Image smoothing - Edge d ng - Canny edge detection	etectors - Param	- Zero-crossings of etric edge models -	the s Edg	secor ses in	nd de mul	rivative - ti-speralct						
Local pre-processing - Scale in image processi images - Local pre-proc	I Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do	etectors - Param main - I	- Zero-crossings of etric edge models - Line detection by lo	the s Edg	secor ses in pre-pr	nd de mult	rivative - ti-speralct sing						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image resto	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration.	etectors - Param main - I	- Zero-crossings of etric edge models - Line detection by lo	the s Edg cal p	secor ses in pre-p	nd de mult roces	rivative - ti-speralct sing						
Local pre-processing - Scale in image processi images - Local pre-pro- operators - Image restor <b>Unit 3</b>	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration.	etectors - Param omain - I	- Zero-crossings of etric edge models - Line detection by lo G MACHINE	the s Edg cal p	secor ges in pre-p:	nd de mult roces	rivative - ti-speralct sing 9						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b>	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING	etectors - Param main - I NUSINC	- Zero-crossings of etric edge models - Line detection by lo G MACHINE	the s Edg cal p	secon ges in pre-p	nd de mult roces	rivative - ti-speralct sing 9						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image resto <b>Unit 3</b> Object detection– Object	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Detection	etectors - Param omain - I N USINC ep Learn	- Zero-crossings of etric edge models - Line detection by lo <b>G MACHINE</b> ing framework for	the s Edg cal p Obje	secon ses in pre-pr	nd de mult roces	rivative - ti-speralct sing 9						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b> Object detection– Objec bounding box approach	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Dea -Intersection over Union (	etectors - Param omain - I N USINC ep Learn IoU) –D	- Zero-crossings of etric edge models - Line detection by lo <b>G MACHINE</b> ing framework for eep Learning Archi	the structure of the st	secon ges in pre-p: ct de ures-l	nd de mult roces tection R-CN	rivative - ti-speralct sing 9 0n– IN-Faster						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b> Object detection– Object bounding box approach R-CNN-You Only Lool	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Dea -Intersection over Union ( k Once(YOLO)-Salient fea	etectors - Param omain - I N USINC ep Learn IoU) –D tures-Lo	- Zero-crossings of etric edge models - ine detection by lo <b>G MACHINE</b> ing framework for eep Learning Archioss Functions-YOL	the solution of the solution o	secon secon pre-pr ct de ures-l chite	nd de mult roces tection R-CN cture	rivative - ti-speralct sing 9 0n– IN-Faster s						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b> Object detection– Object bounding box approach R-CNN-You Only Lood <b>Unit 4</b>	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Dea -Intersection over Union ( k Once(YOLO)-Salient fea FACE RECOGNITION	etectors - Param omain - I N USINC ep Learn IoU) –D tures-Lo NAND C	- Zero-crossings of etric edge models - Line detection by lo <b>G MACHINE</b> ing framework for eep Learning Archi oss Functions-YOL GESTURE	the s Edg cal p Obje	secon ges in pre-pr ct de ures-l chite	nd de mult roces tection R-CN cture	rivative - ti-speralct sing 9 9 on– IN-Faster s 9						
Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b> Object detection– Object bounding box approach R-CNN-You Only Lood <b>Unit 4</b> Face Recognition-Intro	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Dec -Intersection over Union ( & Once(YOLO)-Salient fea FACE RECOGNITION duction-Applications of Fa	etectors - Param omain - I N USINC ep Learn IoU) –D tures-Lo N AND C ace Reco	- Zero-crossings of etric edge models - Line detection by lo <b>G MACHINE</b> ing framework for eep Learning Archi oss Functions-YOL <b>GESTURE</b> gnition-Process of	the s Edg cal p Obje tectu O are Face	secon ges in pre-pr ct de ures-l chite	nd de mult roces tection R-CN cture	rivative - ti-speralct sing 9 9 Dn– IN-Faster s 9						
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Local pre-processing - Scale in image processi images - Local pre-proc operators - Image restor <b>Unit 3</b> Object detection– Object bounding box approach R-CNN-You Only Lood <b>Unit 4</b> Face Recognition-Intro RecognitionDeepFace of FaceNetGesture Recog <b>Unit 5</b> Video Processing – use	Image smoothing - Edge d ng - Canny edge detection cessing in the frequency do ration. OBJECT DETECTION LEARNING ct detection methods – Dec -Intersection over Union ( & Once(YOLO)-Salient feat FACE RECOGNITION duction-Applications of Fat colution by Facebook-Face nition. VIDEO ANALYTICS e cases of video analytics-	etectors - Param omain - I N USINC ep Learn IoU) –D tures-Lo NAND C Ice Reco Net for I Vanishir	- Zero-crossings of etric edge models - ine detection by lo <b>G MACHINE</b> ing framework for eep Learning Archioss Functions-YOL <b>GESTURE</b> gnition-Process of Face Recognition-	the second plot	secon ges in pre-pr ct de ures-l chite emer	tection tatio	rivative - ti-speralct sing 9 9 on- IN-Faster s 9 n using 9 ent problem-						

RestNet architecture-RestNet and skip connections-Inception Network-GoogleNetarchitecture-Improvement in Inception v2-Video analytics-RestNet and Inception v3.

Total: 45

TEXTBOOKS											
1	Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, and										
	Machine Vision", 4nd edition, Thomson Learning, 2013.										
2	Vaibhav Verdhan, (2021, Computer Vision Using Deep Learning Neural Network										
	Architectures with Python and Keras, Apress 2021(UNIT-III, IV and V)										
REFERENCES											
1	Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer Verlag										
	London Limited,2011.										
2	Caifeng Shan, FatihPorikli, Tao Xiang, Shaogang Gong, "Video Analytics for										
	Business Intelligence", Springer, 2012.										
3	D. A. Forsyth, J. Ponce, "Computer Vision: A Modern Approach", Pearson										
	Education, 2003.										
COURSE OUT	COMES: Bloom's Taxonomy										

At the end of th	e course, learners will be able to	Level
CO1	Understand the basics of image processing techniques for computer vision and video analysis.	K4
CO2	Explain the techniques used for image pre-processing.	К3
CO3	Develop various object detection techniques.	К3
CO4	Understand the various face recognition mechanisms.	К3
CO5	Elaborate on deep learning-based video analytics.	К5

CO						PO	)						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С						
		5	BS	3	0	<u>2</u>	<u>0</u>						
	The objective of the cou	rse is to				1 1							
Preamble	<ul> <li>To enable learning of a data science skills and m Learning Projects.</li> <li>To demonstrate an und symbols,</li> <li>To enable classification multiple variables</li> <li>To understand the theory of the second second</li></ul>	Multivaria nultivariat derstandin on or regree	ate calculus as it's e calculus is used g of Calculus bey ession when opera ethods of Calculu	s one of l every yond t ations	of the whe he m are r olve	e mos re in anipu elatec a vari	: important Machine lation of l with ety of						
Unit 1	FUNCTIONS OF SEVE	problems in terms of multivariate dataset       FUNCTIONS OF SEVERAL VARIABLES       9											
Domtical dominant income	E	En1	T-(-1.1			Гат-1.							
Partial derivatives – I expansion – Maxima	and minima of functions of	two varia	bles – Constraine	rivativ d max	/e – . kima	and r	ninima:						
Lagrange's multiplier	r method with single constra	ints – Jac	obians.										
Unit 2	PARTIAL DIFFERENT	IAL EQU	ATIONS				9						
Hours Linear Homog coefficients	geneous partial differential	equations	s of second and	highe	r orc	ler w	ith constan						
Unit 3	DIFFERENTIAL CAL	CULUS					9						
Limit of a function-C Implicit Differentiation one variable	Continuity-Derivatives-Diffe on-Logarithmic Differentiat	erentiatior ion-Appli	n rules (sum, proc cations: Maxima	duct, o and N	quoti Iinin	ent, c	hain rules) functions of						
Unit 4	MULTIPLE INTEGRA	LS					9						
Hours Signature of B of integration – Tripl Volume as triple integ	BOS chairman, CSE Double e integration in Cartesian co gral.	integratio pordinates	on – Cartesian coo s – Applications:	ordina Area	tes – as do	Chai uble	nge of orde						
Unit 5	VECTOR CALCULUS						9						
Hours Gradient, dive	rgence and curl – Directiona	al derivati	ve – Irrotational a	and Sc	leno	idal v	ector field						
· · · · · · · · · · · · · · · · · · ·	-												

excluding pro	ofs)	
	,	Total: 45
ТЕХТВООК	ΣS	
1	Grewal B.S., "Higher Engineering Mathematics", Khanna 44th Edition, 2014.	Publishers, New Delhi,
2	Ramana B.V., "Higher Engineering Mathematics", Tata M Delhi, 11th Reprint, 2010.	cGraw Hill Co. Ltd., New
3	Grewal B.S. and Grewal J.S., "Numerical methods in Engin Edition, Khanna Publishers, New Delhi, 2007.	neering and Science", 9th
4	Montgomery D.C., Johnson. L.A., Gardiner J.S., "Forecast Analysis", McGraw Hill, 1990.	ing and Time series
REFERENCI	ES	
1	Kreyzig E., "Advanced Engineering Mathematics", 10th sons, 2011.	Edition, John Wiley and
2	Venkataraman M.K., "Engineering Mathematics", The Chennai,2003	National Publishing Co.,
COURSE OU At the end of	JTCOMES: The course, learners will be able to	Bloom's Taxonomy Level
CO1	Evaluate the total derivative of a function, expand the given function as a series and locate the maximum and minimum for multivariate functions which is an important part of data science.	K4
CO2	Solve higher order partial differential equations arising in real world situations.	K3
CO3	Evaluate double and triple integrals in Cartesian coordinates and apply them to calculate area and volume.	K3
CO4	Evaluate gradient, divergence and curl which form the basis of gradient descent and apply them to real life problems.	K3
CO5	Analyze and apply the knowledge of time series and interpolation to predict the future	K5

CO						PO	)							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
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3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-	-	I	3	2	2	3	3	2	2
5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

&Branch	B.Tech& AI&DS	Sem.	Category	L	Τ	Р	С
		5	BS	3	0	0	<u>3</u>
Preamble	<ul> <li>The objective of the cou</li> <li>Introduce the matrix</li> <li>provide the necessar procedures for solvi in Engineering and T</li> <li>familiarize the stude</li> <li>understand techniqu problems.</li> <li>acquaint the student integrals and their ar</li> </ul>	rse is to technique y basic co ng numer Cechnolog nts with d es of calo with math oplications	es and to explain oncepts of a few r ically different k y. ifferential calculu culus which are nematical tools ne	the na numer inds o is. applic eded	ture ical 1 of pro ed in in ev	of the netho oblen the aluat	e matrix. ods and giv ns occurrin Engineerin ing multip
Unit 1	HISTORY						9
Permissions, Privac SignatureHash chain	y- : Block chain Archite to Block chain-Basic conse	ecture an ensus mec	nd Design-Basic hanisms.	cryp	to p	primit	ives: Has
Unit 2	CONSENSUS FROTO	COLS	3				9
	e consensus protocols-Proc	of of Wor	k (PoW)-Scalabi	lity as	spect	s of	Block cha
Requirements for the consensus protocols: Block chains.	Permissioned Block chain	s-Design	goals-Consensus	proto	cols	tor F	Permissione
Requirements for the consensus protocols: Block chains. Unit 3	Permissioned Block chain CONSENSUS PROCE	s-Design SS	goals-Consensus	proto		tor F	Permissione 9
Requirements for the consensus protocols: Block chains. Unit 3 Decomposing the consensation: Hyper- composer tool.	Permissioned Block chain CONSENSUS PROCE consensus process-Hyper per ledger Fabric II:-Beyond	s-Design SS ledger fa l Chain co	goals-Consensus bric components ode: fabric SDK a	s-Cha	in cont H	ode End-H	Permissione 9 Design ar Hyper ledg
Requirements for the consensus protocols: Block chains. Unit 3 Decomposing the c Implementation: Hyp composer tool. Unit 4	Permissioned Block chain CONSENSUS PROCE consensus process-Hyper per ledger Fabric II:-Beyond BLOCK CHAIN INFS	s-Design SS ledger fa l Chain co S	goals-Consensus bric components ode: fabric SDK a	s-Cha nd Fr	in cont H	ode End-H	Permissiona 9 Design ar Hyper ledg 9
Requirements for the consensus protocols: Block chains. Unit 3 Decomposing the control Implementation: Hype composer tool. Unit 4 Block chain in Fin Insurance- Block chain finance, invoice man	Permissioned Block chain CONSENSUS PROCE consensus process-Hyper per ledger Fabric II:-Beyond BLOCK CHAIN INFS ancial Software and Syst ain in trade/supply chain: agement/discounting.	s-Design SS ledger fa l Chain co S ems (FSS Provenas	goals-Consensus bric components ode: fabric SDK a S): -Settlements, nce of goods, vi	s-Cha and Fr -KY sibilit	cols in cont F cont F C, - y, tr	ode End-H Capit ade/s	Permissione 9 Design an Hyper ledg 9 tal market upply cha

Privacy and Security on Block chain

TEXTBOOKS	
1	Mark Gates, "Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money", Wise Fox Publishing and Mark Cotes 2017
2	Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, "Hands-On Block chain with Hyper ledger: Building
	decentralized applications with Hyperledger Fabric and Composer", 2018.
3	Bahga, Vijay Madisetti, "Block chain Applications: A Hands-On Approach",
	Arshdeep Bahga, Vijay Madisetti publishers 2017.

### INSTITUTE OF TECHNOLOGY

COURSE OU	JTCOMES:	<b>Bloom's Taxonomy</b>
At the end of	the course, learners will be able to	Level
CO1	State the basic concepts of block chain	K4
CO2	Paraphrase the list of consensus and Demonstrate and Interpret working of Hyper ledger Fabric	К3
CO3	Implement SDK composer tool and explain the Digital identity for government	K3
CO4	To understand the concepts of block chain technology	К3
CO5	To understand the consensus and hyper ledger fabric in block chain technology	K5

						ESTU	. 2	111							
CO	РО												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	1	-	-	-	1	-	-	2	3	3	1
2	3	3	3	3	1	-	-	-	2	-	-	2	3	3	1
3	3	3	3	3	2	-	-	-	3	-	-	2	3	3	3
4	3	2	3	2	3	-	-	-	3	-	-	2	3	2	3
5	3	3	2	2	1	-	-	-	1	-	-	2	3	3	
AVG	3	2.75	2.75	2.5	1.75	2.25	2	3	2.75	2	3	2.75	2.75	2.5	1.75

#### AAI709-CRYPTOGRAPHY

Programme	B.Tech	n& AI&DS	Sem.	Cate	gory	L	Т	Р	С				
&Branch													
		IFDI	5		S	3	0	0	3				
					2	Ũ	v	v	5				
	The objec	tive of the cour	se is to										
	Introd	uce the matrix t	echniqu	les and to	explain t	he na	ture	of the	e matrix.				
	> provid	le the necessary	basic c	oncepts of	a few n	umer	ical 1	netho	ods and give				
Preamble	procee	lures for solvin	g nume	rically dif	ferent ki	nds o	of pro	oblen	ns occurring				
	in Eng	ineering and Te	echnolog	gy.			•		C				
familiarize the students with differential calculus.													
> understand techniques of calculus which are applied in the Engineering													
	problems.												
Unit 1	INTROD	UCTION TO S	SECUR	ITY					9				
Computer Security Con	ncepts – Th	e OSI Security	Archite	ecture – S	ecurity A	Attack	s - s	Secu	rity Services				
and Mechanisms – A	Model for	Network Secu	rity – C	Classical e	ncryptio	n tec	hniq	ues:	Substitution				
techniques, Transposition	on techniqu	es, Steganograp	hy – Fo	undations	of mode	rn							
teeninques, runsposition teeninques, stegunography – roundations of modern													
Unit 2SYMMETRIC CIPHERS9													
Unit 2	SYMME'	TRIC CIPHE	RS	selfe					9				
Unit 2 Number theory – Alge	SYMME' braic Struct	TRIC CIPHER	RS r Arithr	netic - Eu	clid's alg	gorith	1m –	Con	9 gruence and				
Unit 2 Number theory – Alge matrices – Group, Ring	SYMME' braic Struct s, Fields, F	TRIC CIPHEI ures – Modula inite Fields SY	RS r Arithr MMET	netic - Eu RIC KEY	clid's alg CIPHEF	gorith RS: S	ım – DES	Con – Bl	<b>9</b> gruence and ock Ciphers				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of Dl	<b>SYMME</b> ' braic Struct s, Fields, F ES – Differ	TRIC CIPHEI cures – Modula cinite Fields SY cential and line	r Arithr MMET ar cryp	netic - Eu RIC KEY tanalysis -	clid's alg CIPHEF - Block	gorith RS: S ciphe	um – DES er de	Con – Bl sign	<b>9</b> gruence and ock Ciphers principles –				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o	<b>SYMME</b> ' braic Struct gs, Fields, F ES – Differ operation –	TRIC CIPHEI Tures – Modula Finite Fields SY Trential and line Evaluation crit	RS r Arithr MMET ar cryp eria for	netic - Eu RIC KEY tanalysis - AES – Ps	clid's alş CIPHEF - Block seudoran	gorith RS: S ciphe dom	ım – DES er de Num	Con – Bl sign ber (	<b>9</b> gruence and ock Ciphers principles – Generators –				
Unit 2 Number theory – Alger matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution	SYMME' braic Struct s, Fields, F ES – Differ operation –	TRIC CIPHEI Tures – Modula Vinite Fields SY rential and line Evaluation crit	RS r Arithr MMET ar cryp eria for	netic - Eu RIC KEY tanalysis - AES – Ps	clid's al CIPHEI - Block seudoran	gorith RS: S ciphe dom	im – DES er de Num	Con – Bl sign ber (	<b>9</b> gruence and ock Ciphers principles – Generators –				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3	SYMME' braic Struct gs, Fields, F ES – Differ operation – ASYMM	TRIC CIPHEI Tures – Modula Finite Fields SY rential and line Evaluation crit	RS r Arithr MMET ar cryp eria for TOGR	netic - Eu RIC KEY tanalysis - AES – Ps APHY	clid's al CIPHEF - Block seudoran	gorith SS: S ciphe dom	um – DES er de Num	Con – Bl sign ber C	9 gruence and ock Ciphers principles – Generators – 9				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME	TRIC CIPHEI Tures – Modula Vinite Fields SY rential and line Evaluation crit ETRIC CRYP	RS r Arithr MMET ar cryp eria for TOGR	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY	clid's alį CIPHEF - Block seudoran /: Prime	gorith SS: S ciphe dom	um – DES er de Num Prin	Con – Bl sign ber (	9 gruence and ock Ciphers principles – Generators – 9 7 Testing –				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of Dl Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func	TRIC CIPHEI Tures – Modula Finite Fields SY rential and line Evaluation crit ETRIC CRYP TRIC KEY C ction, Fermat's	RS r Arithr MMET ar cryp eria for TOGR TOGR CRYPTC and Eul	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor	clid's alg CIPHEF - Block seudoran /: Prime rem – Ch	gorith RS: S ciphe dom es – ninese	um – DES er de Num Prin	Con – Bl sign ber ( nality nainc	9 gruence and ock Ciphers principles – Generators – 9 7 Testing – ler Theorem				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's – Exponentiation and	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func- logarithm	TRIC CIPHEI Tures – Modula Tinite Fields SY rential and line Evaluation crite ETRIC CRYP TRIC KEY C ction, Fermat's ASYMMETH	RS r Arithr MMET ar cryp eria for TOGR TOGR CRYPTC and Eul RIC KH	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor EY CIPH	clid's alg CIPHEF - Block seudoran :: Prime rem – Ch ERS: R	gorith SS: S ciphe dom es – ninese SA (	um – DES er de Num Prim e Rer	Con – Bl sign ber C nality nainc	9 gruence and ock Ciphers principles – Generators – 9 7 7 Testing – ler Theorem em – Key				
Unit 2 Number theory – Alger matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's – Exponentiation and distribution – Key man	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func- logarithm agement –	TRIC CIPHEI Tures – Modula Finite Fields SY Tential and line Evaluation crite ETRIC CRYP TRIC KEY C Ction, Fermat's ASYMMETH Diffie Hellman	RS r Arithr MMET ar crypt eria for TOGR TOGR CRYPTC and Eul RIC KH	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor EY CIPH change –	clid's alg CIPHEF - Block seudoran ?: Prime rem – Ch ERS: R Elliptic	gorith SS: S ciphe dom es – ninese SA o curve	um – DES er de Num Prin e Rer crypt e arit	Con – Bl sign ber C nality nainc osyst hmet	9 gruence and ock Ciphers principles – Generators – 9 7 Testing – ler Theorem em – Key ic – Elliptic				
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Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's – Exponentiation and distribution – Key man curve cryptography. Unit 4	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func- logarithm agement –	TRIC CIPHEI Sures – Modula Finite Fields SY cential and line Evaluation crite ETRIC CRYP TRIC KEY C Cotion, Fermat's ASYMMETH Diffie Hellman	RS r Arithr MMET ar cryp eria for TOGR TOGR CRYPTC and Eul RIC KH key ex	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor EY CIPH change	clid's alg CIPHEF - Block seudoran ceudoran cem – Ch ERS: R Elliptic	gorith SS: S ciphe dom es – ninese SA o curve	im – DES er de Num Prin e Rer crypt e arit	Con – Bl sign ber C nality nainc osyst hmet	9 gruence and ock Ciphers principles – Generators – 9 7 7 Testing – ler Theorem em – Key ic – Elliptic 9				
Unit 2 Number theory – Alger matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's – Exponentiation and distribution – Key man curve cryptography. Unit 4	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func- logarithm agement – INTEGR ALGORI	TRIC CIPHEI Sures – Modula Sinite Fields SY rential and line Evaluation crite ETRIC CRYP TRIC KEY C ction, Fermat's ASYMMETH Diffie Hellman ITY AND AUT THMS	RS r Arithr MMET ar cryp eria for TOGRA TOGRA CRYPTC and Eul RIC KH key ex	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor EY CIPH change	clid's alg CIPHEF - Block seudoran 2: Prime rem – Ch ERS: R Elliptic	gorith SS: S ciphe dom es – ninese SA o curve	um – DES er de Num Prin e Rer crypt e arit	Con – Bl sign ber C nality nainc osyst hmet	9 gruence and ock Ciphers principles – Generators – 9 7 V Testing – ler Theorem em – Key ic – Elliptic 9				
Unit 2 Number theory – Alge matrices – Group, Ring – DES, Strength of DI Block cipher mode of o RC4 – Key distribution Unit 3 MATHEMATICS OF Factorization – Euler's – Exponentiation and distribution – Key man curve cryptography. Unit 4	SYMME' braic Struct s, Fields, F ES – Differ operation – ASYMME totient func- logarithm agement – INTEGR ALGORI ment – Aut	TRIC CIPHEI Tures – Modula Finite Fields SY rential and line Evaluation crite ETRIC CRYP TRIC KEY C Ction, Fermat's ASYMMETH Diffie Hellman ITY AND AUT THMS thentication fur	RS r Arithr MMET ar cryp eria for TOGR TOGR CRYPTC and Eul RIC KH key ex THENT	netic - Eu RIC KEY tanalysis - AES – Ps APHY OGRAPHY er's Theor EY CIPH change ICATION	clid's alg CIPHEH - Block seudoran 2: Prime rem – Ch ERS: R Elliptic	gorith SS: S ciphe dom es – ninese SA o curve	n – DES per de Num Prim e Rer crypt e arit	Con – Bl sign ber C nality nainc osyst hmet	9 gruence and ock Ciphers principles – Generators – 9 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1				

Digital Signature Challenge Respo management and encryption – Dist	e Scheme – ElGamal cryptosystem – Entity Authentication onse protocols – Authentication applications – Kerberos d distribution – Symmetric key distribution using syn tribution of public keys – X.509 Certificates.	a: Biometrics, Passwords, MUTUAL TRUST: Key nmetric and asymmetric
Unit 5	CYBER CRIMES AND CYBER SECURITY	9
Cyber Crime an	d Information Security – classifications of Cyber Crimes	– Tools and Methods –
Password Cracki	ng, Keyloggers, Spywares, SQL Injection – Network Access Wireless Security	Control – Cloud Security
	There is boot any	Total: 45
TEXTBOOKS		
1	William Stallings, "Cryptography and Network Security - P Seventh Edition, Pearson Education, 2017.	Principles and Practice",
2	Nina Godbole, Sunit Belapure, "Cyber Security: Unde Computer Forensics and Legal Perspectives", First Edition,	erstanding Cyber crimes, Wiley India, 2011.
REFERENCES		
1	Behrouz A. Ferouzan, Debdeep Mukhopadhyay, "Cry Security", 3rd Edition, Tata Mc Graw Hill, 2015.	ptography and Network
2	Charles Pfleeger, Shari Pfleeger, Jonathan Margulies, "Secu Edition, Prentice Hall, New Delhi, 2015.	urity in Computing", Fifth
	g - A	
COURSE OUT	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K4
CO2	Apply the different cryptographic operations of symmetric cryptographic algorithms	К3
CO3	Apply the different cryptographic operations of public key cryptography	К3
CO4	Apply the various Authentication schemes to simulate different applications.	К3
CO5	Understand various cyber crimes and cyber security.	К5

CO	РО	PSO

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3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

AAI710-COMPUTATIONAL NEUROSCIENCE												
Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	T	Р	С					
	INSTITU	5	BS	3	1	0	4					
<ul> <li>Preamble</li> <li>Preamble</li> <li>Preamble</li> <li>A familiarize the students with differential calculus.</li> <li>A understand techniques of calculus which are applied in the Engineering problems.</li> <li>A acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications</li> </ul>												
Unit 1	Unit 1INTRODUCTION9											
Domains in Computat Basic synaptic mechan equations ,The propaga	onal Neuroscience, Brass and the generation ion of action potentials	in metaph of action	ors-computer an potentials , Nerns	d brair st Poter	n, Baa ntial	sic n Hodį	euroscience, gkin-Huxley					
Unit 2	SPIKING NEURON VARIABILITY	S AND RI	CSPONSE	,			9					
Spiking neurons- conce	ot neurons- the neural c	ode, Spike	trains- cable the	ory- Sp	ike ti	ime v	variability ,.					
Post synaptic potential	PSP), firing threshold a	nd action	potential ,Neuror	is in a l	Netw	ork-	Population					
Dynamics ,Rate code a models , Hodgkin-Hux neuron models- compa	d Information in spike ey Model, spiking neur tmental modeling.	trains ,Pop on models,	ulation coding an Integrate and fir	nd deco ing mo	ding del ,	- sing Nois	gle neuron e in spiking					
Unit 3	FEED-FORWARD N	IAPPING	NETWORKS				9					
Perception function re	resentation, and look-u	n tables 7	The sigma node a	s perce	ption	. Mi	ılti-laver					
mapping networks . Le	rning, generalization ar	nd biologic	al interpretations	, Self-	orgai	nizing	g network					
architectures and genet	c algorithms, Mapping	networks	with context unit	s, Proł	abili	stic r	napping					
networks, Associators and synaptic plasticity, Associative memory and Hebbian learning, Hebian												
plasticity- features of a	sociators and Hebbian	earning.	-			_						

Unit	4	AUTO-ASSOCIATIVE MEMORY AND NET DYNAMICS	WORK 9
Long-term m	emory and	d auto-associators, Point attractor networks, The	Grossberg-Hopfield model
sparse attract	or neural	networks, Chaotic networks, biologically more re	alistic variations of attractor
networks, Co	ontinuous a	attractor and competitive networks	
Unit	5	SUPERVISED LEARNING AND REWARDS	9
		SYSTEMS	
The delta rule	e and back	propagation, Generalized delta rules, plasticity a	nd coding , Reward learning
System level	organizat	ion and coupled networks, System level anat	omy of the brain, Modular
mapping net	works ,	Coupled attractor networks, working memory	y, Attentive vision, ar
interconnecti	ng worksp	ace hypothesis, CASE STUDY Introduction to	the MATLAB programming
environment	.A MATI	LAB guide to computational neuroscience, Spik	ing neurons and numerical
integration in	MATLAE		
			Total: 45
TEXTBOOH	KS		
1	Thon	nas Trappenberg, Fundamentals of Computational N	Neuroscience, oxford
	Univ	ersity Press, June 2002	
2	Lytto	n William W From Computer to Brain - Foundation	ons of Computational
_	Neur	oscience. Springer publications, 2002	nis of computational
REFERENC	ES		
1	Gerst	ner and Kistler, Spiking Neuron Models. Single Ne	eurons, Populations,
1			

CO		PO													
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4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
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	PROFESSION	NAL ELEC	CTIVE III								
AAI711-DEPENDABLE ARTIFICIAL INTELLIGENCE											
Programma	B Tach & AL&DS	Som	Cotogory	T	т	ъ	~				

& Branch													
CDranen													
			6	В	S	3	1	0	4				
		The Instructor will:	Provide char	acteristic	details of	AI	and	mach	ine learning				
		systems to make th	em dependa	able, such	as expl	aina	oility	, inte	erpretability,				
_		safety etc.											
Preamble		Learning Outcomes	The students	s are expe	cted to ha	ve tł	ne ab	ility t	0:				
		1. Assess the dependation	ability of AI	systems.									
		2. Develop explainable, robust, and safe AI models.											
Unit 1		Introduction to Exp				9							
Overview, Moti	vation,	Challenges – med	ical and su	urveillance	e Accura	су-е	xpla	inabil	lityTradeoff,				
Interpretability P	roblem,	Predictability, Trans	parency, Tra	ceability,	Causality,	Rea	isoni	ng, A	ttention and				
Saliency													
Unit 2		Interpretable AI	UTE OF TECH	NOLOGY					9				
Prediction Consi	istency.	Application Level	Evaluation.	Human	Level Ev	alua	tion.	Fun	ction Level				
Evaluation	, , , , , , , , , , , , , , , , , , ,	II	,				,						
Unit 3		Adversarial Robust	ness						9				
Advargarial Attac	aka and l	Dafanaas			_								
Auversariai Attac	LKS allu I	Defences											
Unit 4		Trustworthy AND F	Bias-free AI						9				
Integrity, Reprod	ucibility	, Accountability , Acc	cessibility, Fa	air, Data A	Agnostics	Des	ign, l	Disen	tanglement				
	•		10 (iiii) A		e la				C				
Unit 5		Privacy Preserving	AI						9				
				sell									
Federated Learnin	ng, Diff	erential Privacy and	Encrypted C	omputatio	n								
									Total: 45				
TEXTBOOKS		CRIP	RUMB		2								
1	J. PEA	RL (2018), The Boo	ok of Why:	The New	Science o	of Ca	use	and E	Effect, Basic				
	Books	151	<u>std. 201</u>	$1 \mathbf{Z}$	1								
2	N. BO	OSTROM (2014), 7	The Ethics	of Artifi	cial Intel	lige	nce.	The	Cambridge				
	Handb	ook of Artificial II	ntelligence,	Cambridg	ge Univer	rsity	Pre	ss. S	Self-learning				
	Materi	al Udacity	course	on Se	ecure	anc	l	Priv	vate AI:				
	https://	www.udacity.com/co	ourse/secure-	<u>-and-priva</u>	<u>te-ai ud</u>	<u>185</u>							

CO						PC	)						PSO			
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3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2	
4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2	



	AAI712-COM	PUTEI	R VISION				
Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С
		6	BS	<u>2</u>	0	<u>2</u>	<u>3</u>
Preamble	<ul> <li>The objective of the cours</li> <li>To understand the and processing.</li> <li>To learn feature de</li> <li>To become fam estimation</li> <li>To develop skills of To understand image</li> </ul>	se is to e funda etection iliar w on 3D re age base	mental concepts re , matching and dete ith feature based econstruction ed rendering and rec	lated ctio: ali	d to n gnme	Imag	e formation and motion
Unit 1	INTRODUCTION TO I PROCESSING	MAGE	FORMATION A	ND			9
Computer Vision - Ge	cometric primitives and tra	nsform	ations - Photometri	ic in	nage	form	ation - The
digital camera - Point o	perators - Linear filtering -	More	neighborhood opera	tors	- Fo	urier	transforms -
Pyramids and wavelets	- Geometric transformation	ns - Glo	bal optimization.				
Unit 2	FEATURE DETECTIO SEGMENTATION	N, MA'	<b>FCHING AND</b>				9
Points and patches - Ec	lges - Lines - Segmentation	- Activ	e contours - Split an	nd n	nerge	- Me	ean shift and
Unit 3	FEATURE-BASED ALI	GNME	CNT & MOTION				9
		IMR					
2D and 3D feature-base Two-frame structure free motion - Translational a motion.	ed alignment - Pose estimat om motion - Factorization - alignment - Parametric mot	ion - Ge Bundle ion - Sp	adjustment - Const line-based motion -	train Op	ed st	- Tru ructu flow	angulation - re and - Layered
Unit 4	<b>3D RECONSTRUCTIO</b>	N					9
Shape from X - Active representations - Mode	rangefinding - Surface repr l-based reconstruction - Rec	esentati covering	ons - Point-based re g texture maps and a	epres albe	senta dosos	tions` s.	Volumetric
Unit 5	IMAGE-BASED REND RECOGNITION	ERINO	AND				9
View interpolation Lay based rendering-Object Context and scene under	ered depth images - Light f detection - Face recognitio erstanding- Recognition dat	ields an n - Inst abases a	d Lumigraphs - Env ance recognition - C and test sets.	viror Categ	men gory	t mat recog	tes - Video- nition -

Total: 45 **TEXTBOOKS** Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer- Texts in Computer Science, Second Edition, 2022. Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, Second Edition, 2015. REFERENCES Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004. Christopher M. Bishop; Pattern Recognition and Machine Learning, Springer, 2006 E. R. Davies, Computer and Machine Vision, Fourth Edition, Academic Press, 2012 **COURSE OUTCOMES: Bloom's Taxonomy** Level At the end of the course, learners will be able to CO1 To understand basic knowledge, theories and methods in K4 image processing and computer vision. CO₂ To implement basic and some advanced image processing K3 techniques in OpenCV. CO3 To apply 2D a feature-based based image alignment, K3 segmentation and motion estimations. CO₄ To apply 3D image reconstruction techniques K3 CO5 To design and develop innovative image processing and K5

#### PO PSO CO 6 7 -_ _ _ _ -_ _ _ _ _

computer vision applications.

#### AAI713-QUANTUM COMPUTING

rogramme		B.Tech& AI&DS	Sem.	Category	L	Т	P	С
&Branch								
			6	BS	3	0	0	<u>3</u>
	]	The objective of the cou	rse is to					
		To know the background the backgr	ound of cla	ssical computir	g and	auan	tum o	computing
	2	To learn the fundame	ental conce	pts behind quar	ntum c	ompi	utatio	on.
	>	To study the details	of quantu	m mechanics a	nd its	relat	ion t	o Computer
Preamble		Science.	-					-
	>	To gain knowledge	about the b	basic hardware	and m	athen	natica	al models of
		quantum						
		computation.	ЧНЧ	4 K				
	X	To learn the basics o	f quantum	information and	the tl	neory	v behi	ind it.
Unit 1		QUANTUM COMPUT	FING BAS	IC CONCEPT	S			9
Complex Number	rs - Lin	ear Algebra - Matrice	s and Ope	erators - Globa	l Pers	pectiv	ves F	Postulates of
Quantum Mechan	ics – Qu	antum Bits - Represent	tations of Q	ubits - Superpo	osition	S		
Unit 2	(	QUANTUM GATES A	ND CIRC	UITS				9
Universal logic ga	ates - Ba	sic single qubit gates -	Multiple q	ubit gates - Cir	cuit de	velop	pmen	t - Quantum
error correction								
Unit 3	(	QUANTUM ALGORI	THMS					9
Quantum paralle	lism -	Deutsch's algorithm -	The Deu	tsch–Jozsa alg	orithm	ı - (	Quant	tum Fourier
transform and its	applicat	ions - Quantum Search	Algorithms	s: Grover's Alg	orithm			
Unit 4	(	QUANTUM INFORM	ATION T	HEORY				9
Data compression	ı - Shan	non's noiseless channe	el coding t	heorem - Schu	mache	r's q	uantu	ım noiseless
	eorem -	Classical information of	over noisy o	quantum channe	els			
channel coding th								0
channel coding th Unit 5	(	QUANTUM CRYPTO	GRAPHY					9
channel coding th Unit 5 Classical cryptog Quantum Key Dis	raphy b stributio	<b>QUANTUM CRYPTO</b> pasic concepts - Privat n - BB84 - Ekart	GRAPHY e key cry	ptography - Sł	or's H	Factor	ring	9 Algorithm -
channel coding th Unit 5 Classical cryptog Quantum Key Dis	graphy b stributio	<b>QUANTUM CRYPTO</b> asic concepts - Privat n - BB84 - Ekart	GRAPHY	ptography - Sł	nor's H	Factor	ring	Algorithm - Total: 45
channel coding th Unit 5 Classical cryptog Quantum Key Dis TEXTBOOKS	graphy b stributio	QUANTUM CRYPTO pasic concepts - Privat n - BB84 - Ekart	GRAPHY	ptography - Sł	or's F	Facto	ring	9 Algorithm - Total: 45
channel coding th Unit 5 Classical cryptog Quantum Key Dis TEXTBOOKS	graphy b stribution Parag	QUANTUM CRYPTO Pasic concepts - Privat n - BB84 - Ekart K Lala, Mc Graw H	GRAPHY e key cry	ptography - Sh ion, "Quantum	nor's F	Factor	ring	Algorithm - Total: 45
channel coding th Unit 5 Classical cryptog Quantum Key Dis TEXTBOOKS	raphy b stribution Parag Introdu	QUANTUM CRYPTO pasic concepts - Privat n - BB84 - Ekart K Lala, Mc Graw H ction", First edition (1 1	GRAPHY e key cry fill Educat	ptography - Sh ion, "Quantum 2020).	nor's F		ring	Algorithm - Total: 45
channel coding th         Unit 5         Classical cryptog         Quantum Key Dis         TEXTBOOKS         1         2	Parag Introdu	QUANTUM CRYPTO         pasic concepts - Privat         n - BB84 - Ekart         K Lala, Mc Graw H         ction", First edition (11)         1 A. Nielsen, Issac	GRAPHY e key cry fill Educat November L. Chuang	ptography - Sh ion, "Quantum 2020). g, "Quantum Q	nor's F	Factor putin	ring ng, A n an	Algorithm - Total: 45 A Beginners d Quantum
channel coding th         Unit 5         Classical cryptog         Quantum Key Dis         TEXTBOOKS         1         2	Parag Introdu Informa	QUANTUM CRYPTO pasic concepts - Privat n - BB84 - Ekart K Lala, Mc Graw H ction", First edition (1 1 1 A. Nielsen, Issac 1 ation", Tenth Edition, C	GRAPHY e key cry fill Educat November L. Chuang cambridge	ptography - Sh ion, "Quantum 2020). g, "Quantum Q University Pres	nor's F	Factor oputin tatio	ring ng, A n an	Algorithm - Total: 45 A Beginners d Quantum
channel coding th         Unit 5         Classical cryptog         Quantum Key Dis         TEXTBOOKS         1         2         3	Parag Introdu Michae Informa	QUANTUM CRYPTO Pasic concepts - Privat n - BB84 - Ekart K Lala, Mc Graw H ction", First edition (1 1 A. Nielsen, Issac ation", Tenth Edition, C Bernhardt, The MIT Pr	GRAPHY ie key cry fill Educat November L. Chuang cambridge ress; Repri	ptography - Sh ion, "Quantum 2020). g, "Quantum Q University Press nt edition (8 S	nor's F Compu S, 2010 eptem	putin tatio ).	ring ng, <i>A</i> n an 2020)	Algorithm - Total: 45 A Beginners d Quantum
channel coding th         Unit 5         Classical cryptog         Quantum Key Dis         TEXTBOOKS         1         2         3	Parag Introdu Michae Chris H Compu	QUANTUM CRYPTO pasic concepts - Privat n - BB84 - Ekart K Lala, Mc Graw H ction", First edition (11 1 A. Nielsen, Issac 1 ation", Tenth Edition, C Bernhardt, The MIT Pu ting for Everyone".	GRAPHY e key cry lill Educat November L. Chuang cambridge ress; Repri	ion, "Quantum 2020). g, "Quantum Q University Pres nt edition (8 S	nor's F n Com Compu s, 2010 eptem	putin tatio ). ber 2	ring ng, A n an 2020)	Algorithm - Total: 45 A Beginners d Quantum , "Quantum

1	Scott Aaronson, "Quantum Computing Since Democri	tus", Cambridge University
	Press, 2013.	
2	N. David Mermin, "Quantum Computer Science: An	n Introduction", Cambridge
	University Press, 2007.	
COURSE OU	JTCOMES:	Bloom's Taxonomy
At the end of	the course, learners will be able to	Level
C01	Understand the basics of quantum computing	K4
CO2	Understand the background of Quantum Mechanics.	К3
CO3	Analyze the computation models.	K3
	INSTITUTE OF TECHNOLOGY	
<u> </u>	Madal the sinusite value executive computation	
04	wide the circuits using quantum computation.	КЭ
	environments and frameworks	

	environnents une			
CO5	Understand the querror-correction.	uantum operat	ions such as noise and	K5

CO		РО										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	- 70	3	<u>9,10</u>	Ч.	見	2	2	1	2	2	1	2
2	3	2	2	1	3	-/	-	М	3	$2^{\circ}$	2	3	3	1	2
3	3	3	2	2	3	-	1.5		3	2	1	2	3	2	2
4	3	3	3	2	3	14	-	-	3.0	2	2	3	3	2	2
5	3	3	3	3	3	1	3	сīb	3	3	3	3	3	3	3

## SRIPERUMBUDUR

	AAI714- COGNITIVE AND BEHAVIOR SCIENCE											
Programme &BranchB.Tech& AI&DSSem.CategoryLTPC												
	1	6	BS	2	0	<u>2</u>	<u>3</u>					
Preamble	Preamble       The objective of the course is to         > To know the theoretical background of cognition.         > To understand the link between cognition and computational intelligence.         > To explore probabilistic programming language.         > To study the computational inference models of cognition											

		> To stu	v the computational le	orning mo	dels of cognition	n
Unit 1		<b>PHILOS</b>	PHY PSYCHOLOG	<b>V AND</b>	ters of cognition	9
		NEUROS	CIENCE			
Philosophy: Ment	tal-phy	sical Relat	on – From Materialism	to Menta	l Science – Log	gic and the Sciences
of the Mind – Ps	sychol	ogy: Place	of Psychology within	Cognitive	Science – Scie	nce of Information
Processing –Cog	nitive	Neuroscier	ce – Perception – Dec	cision – L	earning and M	emory – Language
Understanding an	d Proc	cessing.		anuan		0
Unit 2		COMPU	ATIONAL INTELLI	GENCE		9
Machines and Co	ognitio	on – Artific	al Intelligence – Arch	itectures	of Cognition –	Knowledge Based
Systems – Logica	al Repr	resentation	nd Reasoning – Logica	al Decisio	n Making –Lear	rning – Language –
Vision.						
Unit 3		PROBAB	ILISTIC PROGRAM	MING LA	NGUAGE	9
WebPPL Langua	ge –	Syntax –	Jsing Javascript Libra	ries – M	anipulating pro	bability types and
distributions – Fir	- nding l	Inference –	Exploring random com	putation –	Coroutines: Fu	nctions that receive
continuations -Er	numera	ation				
Tinit A		INFEDEN	CE MODELS OF CO	CNITIO	NT	0
Unit 4		INFERE	CE MODELS OF CC	JGNIIIO		9
Generative Mode	els – C	Conditioning	- Causal and statistic	al depend	ence – Conditi	ional dependence –
Data Analysis – A	lgorit	hms for Inf	rence			
1						
TI:4 5				CNUTION		0
Unit 5		LEARNI	G MODELS OF CO	GNITION		9
Unit 5 Learning as Cond	ditiona	<b>LEARNI</b> Il Inference	G MODELS OF CO	GNITION	Thought – Hi	<b>9</b> erarchical Models–
Unit 5 Learning as Cond Learning (Deep) (	ditiona Contin	<b>LEARNI</b> Il Inference uous Funct	G MODELS OF CO – Learning with a La ons – Mixture Models.	GNITION	Thought – Hi	9 erarchical Models–
Unit 5 Learning as Cond Learning (Deep) (	ditiona Contin	LEARNI Il Inference uous Funct	G MODELS OF CO – Learning with a La ons – Mixture Models.	GNITION	Thought – Hi	9 erarchical Models– Total: 45
Unit 5 Learning as Cond Learning (Deep) (	ditiona Contin	LEARNI Il Inference uous Funct	G MODELS OF CO – Learning with a La ons – Mixture Models.	GNITION	Thought – Hi	9 erarchical Models– Total: 45
Unit 5 Learning as Cond Learning (Deep) ( TEXTBOOKS	ditiona Contin	LEARNI Il Inference uous Funct	G MODELS OF CO – Learning with a La ons – Mixture Models.	GNITION	Thought – Hi	9 erarchical Models– Total: 45
Unit 5 Learning as Cond Learning (Deep) 6 TEXTBOOKS	ditiona Contin Vijay	LEARNI al Inference uous Funct V Raghava	G MODELS OF CO – Learning with a La ons – Mixture Models.	GNITION nguage of /enuGovin	Thought – Hi	9 erarchical Models– Total: 45 no, Cognitive
Unit 5 Learning as Cond Learning (Deep) of TEXTBOOKS	ditiona Contin Vijay Comp	LEARNI Il Inference uous Funct V Raghava puting: The	G MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, V ory and Applications: (H	GNITION nguage of /enuGovin Handbook	Thought – Hi daraju, C.R. Ra of Statistics 35)	9 erarchical Models– Total: 45 no, Cognitive ), Elsevier
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Unit 5 Learning as Cond Learning (Deep) 0 TEXTBOOKS 1 2 3	ditiona Contin Vijay Comp public Judith Data Robe	LEARNI al Inference uous Funct V Raghava puting: The cations, 202 n Hurwitz, Analytics, V	AG MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, V ory and Applications: (H 6 Marcia Kaufman, Adr Viley Publications, 201. on Frank C Keil "	GNITION nguage of /enuGovin landbook ian Bowle 5 The MIT	Thought – Hi daraju, C.R. Ra of Statistics 35) es, Cognitive C Encyclopedia	9 erarchical Models– Total: 45 to, Cognitive ), Elsevier
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Unit 5 Learning as Cond Learning (Deep) 0 TEXTBOOKS 1 2 3 4	ditiona Contin Vijay Comp publid Judith Data Scien Jose I	LEARNI al Inference auous Funct V Raghava puting: The cations, 202 n Hurwitz, Analytics, V rt A. Wils aces", The M Luis Bermú	G MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, V ory and Applications: (H 6 Marcia Kaufman, Adr Viley Publications, 201: on, Frank C. Keil, " IT Press, 1999. lez, Cognitive Science	GNITION nguage of /enuGovin landbook ian Bowle 5 The MIT -An Introe	Thought – Hi daraju, C.R. Ra of Statistics 35) es, Cognitive C Encyclopedia	9 erarchical Models– Total: 45 no, Cognitive 0, Elsevier Computing and Big of the Cognitive cience of the Mind,
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Unit 5 Learning as Cond Learning (Deep) ( TEXTBOOKS 1 2 3 4 REFERENCES	ditiona Contin Vijay Comp public Judith Data Robe Scien Jose I Camb	LEARNI al Inference uous Funct V Raghava outing: The cations, 201 n Hurwitz, Analytics, V rt A. Wils aces", The M Luis Bermú pridge Univ	G MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, W ry and Applications: (H 6 Marcia Kaufman, Adr Viley Publications, 2011 on, Frank C. Keil, " IT Press, 1999. lez, Cognitive Science ersity Press 2020	GNITION nguage of /enuGovin Handbook ian Bowle 5 The MIT -An Introd	Thought – Hi daraju, C.R. Ra of Statistics 35) es, Cognitive C Encyclopedia duction to the S	9 erarchical Models– Total: 45 no, Cognitive o, Elsevier Computing and Big of the Cognitive cience of the Mind,
Unit 5 Learning as Conc Learning (Deep) 0 TEXTBOOKS 1 2 3 4 REFERENCES 1	ditiona Contin Vijay Comp public Judith Data Scien Jose I Camb	LEARNI al Inference auous Funct V Raghava puting: The cations, 202 n Hurwitz, Analytics, V rt A. Wils aces", The M Luis Bermú pridge Univ	G MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, V ory and Applications: (H 6 Marcia Kaufman, Adr Viley Publications, 2011 on, Frank C. Keil, " IT Press, 1999. lez, Cognitive Science prisity Press 2020 man, Andreas Stuhlmu	GNITION nguage of /enuGovin landbook ian Bowle 5 The MIT -An Introd	Thought – Hi daraju, C.R. Ra of Statistics 35) es, Cognitive C Encyclopedia duction to the S	9 erarchical Models– Total: 45 to, Cognitive 0, Elsevier Computing and Big of the Cognitive cience of the Mind, Implementation of
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Unit 5 Learning as Conc Learning (Deep) 0 TEXTBOOKS 1 2 3 4 REFERENCES 1	ditiona Contin Vijay Comp public Judith Data Robe Scien Jose I Camb Noah Proba https:	LEARNI al Inference uous Funct V Raghava puting: The cations, 202 n Hurwitz, Analytics, V rt A. Wils aces", The M Luis Bermú pridge Univ	AG MODELS OF CO – Learning with a La ons – Mixture Models. n, VenkatN.Gudivada, V ory and Applications: (H 6 Marcia Kaufman, Adr Viley Publications, 2011 on, Frank C. Keil, " IT Press, 1999. lez, Cognitive Science ersity Press 2020 man, Andreas Stuhlmu rogramming Langua	GNITION nguage of /enuGovin Iandbook ian Bowle 5 The MIT -An Introd Iller, "The ages", F	Thought – Hi daraju, C.R. Ra of Statistics 35) es, Cognitive C Encyclopedia duction to the S e Design and electronic ver	9 erarchical Models– Total: 45 to, Cognitive o, Elsevier Computing and Big of the Cognitive cience of the Mind, Implementation of rsion of book,

2	Noah D. Goodman, Joshua B. Tenenbaum, The	ProbMods Contributors,
	"Probabilistic Models of Cognition", Second Edition, 201	16, https://probmods.org/.
	·	
COURSE OUT	TCOMES:	Bloom's Taxonomy
At the end of the	he course, learners will be able to	Level
CO1	Understand the underlying theory behind cognition	K4
CO2	Connect to the cognition elements computationally.	K3
CO3	Implement mathematical functions through WebPPL.	K3
CO4	Develop applications using cognitive inference model	К3
CO5	Develop applications using cognitive learning model.	K5

	·											·			
CO						PO	)							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-/	-	-	3	2	2	3	3	2	2
5	3	3	3 <	3	3	-	ł	6	3	3	3	3	3	3	3
				S.							57				

	PROFESSION	VAL ELEC	CTIVE IV				
	AAI/15-KESUUK	CE CONS	I KAINED AI				
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С
&Branch	<b>DIDER</b>	IMR					
		6	BS	3	1	0	4
Preamble	The objective of the could 1. To provide motivation deploying Machine Lean 2. To provide detailst algorithms in Machine I Learning Outcomes The 1. Understand the con- memory devices 2. Design and develop to of machine learning motion	rrse is to on and unc rning in res s about v Learning students a straints of techniques dels	lerstanding of the cource constrained arious optimize re expected to ha implementing to reduce inferen	e new d dev d ar ve th AI a nce t	ed an vices nd ro le abi llgori ime 1	nd im esour llity to thms memo	nportance of rce efficient o: on limited ory footprint

Unit 1	INTRODUCTION	9
Overview and m	otivation, challenges of resource constrained AI, why AI on edge	
Unit 2	EDGE COMPUTING	9
Edge devices an	d their limitations, Edge and fog computing, Distributed computin	ng, communication
links, communic	ation overhead in IoT devices	0
Unit 3	MONITORING, MEMORY OPTIMIZATION OF MODELS	9
Prediction accura	acy, numeric accuracy, precision, memory footprints, computationa	al complexity of AI
models, KiloByt	e-size models, floating-point v/s fixed-point, SeeDot	
Unit 4	EDGE AI	9
Resource-efficient	nt kNN, SVM and deep learning models, Toeplitz matrix, Bonsai, P	rotoNN, EMIRNN,
FastRNN, FastG	RNN	
Unit 5	CURRENT TRENDS AND FUTURE	9
Hardware accele	erators for Edge AI, Vision Processing Unit (VPU), Streaming H	Iybrid Architecture
Vector Engine (	SHAVE), Intel's Movidius Neural Compute Stick (NCS), Open	n Neural Network
Exchange (ONN	X), Future trends	
		Total: 45
TEXTBOOKS		
1	C. ALIPPI (2014), Intelligence for Embedded Systems: A Method	lological Approach,
	Springer, 1st Edition.Preparatory Course Material 1	. EdgeML by
	Microsoft, https://github.com/Microsoft/EdgeML/#edge-machine-	learning
	erscipint	
2	NCSDK by Intelhttps://github.com/movidius/ncsdk	
	SRIPERUMBUDUR	
	ESTD. 2011	

CO	РО										PSO				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

		AAI716-DA	TA ENG	INEERING				
Programme &Branch	e	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С
			6	RS	3	1	0	4
		The chiective of the cou		<b>D</b> 5	5		U	•
		The Instructor will:						
		1. Introduce fundament analysing it	tal conce	epts in representir	ng d	ata,	acces	ssing it and
Preamble		2. Explore applications i	n data sc	ience and big data	proje	ects		
Treamble		Learning Outcomes	<b>n I N</b>					
		The students will have the students will be determined as the second second second states and the students will be determined as the students will be determined as the second se	ne ability	to:	ivon	appl	iontic	n
		2. Understand various da	science e	e and retrieval tech	miar	appi		)[]
		3. Understand SQL and	NoSQL o	latabases and their	usag	e		
		4. Analyse data using Py	thon and	Python-based tool	s			
Unit 1		INTRODUCTION						9
Data source, Big	Data, S	tructured and unstructure	ed data (2	Lectures)				
Unit 2		DATA MODELS AND	STORA	GE				9
Relational databa	ases, N	oSQL database, normal	ized and	denormalized dat	a m	odels	, Da	ta cleaning
Distributed Data	Storage	and Management, Hash	ing, Inde	xing				
Unit 3		QUERY PROCESSIN	Gen )					9
Querying big d maintaining ACI query processing	ata usi D prop , Query	ng SQL and NoSQL, erty, Design Patterns, I optimization and Proces	Elastic Data reli sing	Search, Query of ability, quality and	otimi 1 pro	zatio ovena	n, sj ance,	peeding up Distributec
Unit 4		DATA WAREHOUSIN	G					9
OLAP, OLTP (4 dashboards, Pred	4 Lectu ictive A	res) Streaming Data a nalytics (6 Lectures)	nalytics:	In-memory Anal	ytics	, da	ta pi	pelines and
Unit 5		CASE STUDY						9
Data Collection	Techniq	ues, Indexing implemen	tation fo	r the structured da	ita ai	nd ur	nstruc	ctured data
SQL queries (sch	iema, D	DL, DML, DQL), Data	format in	terchange using X	ML,	JSOI	N No	SQL system
(HBase, Hive, M	MongoE	B), Data wrangling,	data ope	rations (e.g. Num	Py)	Hao	loop	, Spark and
MapReduce								Total· 44
TEXTBOOKS								100010 10
1	14 171		· · ·			- 4 •	- T ¹	- D' 11
1	M. K.	LEPPMANN (2017), D	esigning Maintair	Data-Intensive Ap		ation	s Th	e Big Ideas
	Benind	i Keliable, Scalable, and	Maintai	lable Systems, O R	lemy	/ <b>.</b>		

2	L. WEISE (2015), Advanced Data Management: For SQL, NoSQL, Cloud and
	Distributed Databases, Walter de Gruyter GmbH.
3	A. SILBERSCHATZ, H.F. KORTH, S. SUDARSHAN (2011), Database System
	Concepts, McGraw Hill Publications, 6th Edition.
REFERENCES	
1	H.G. MOLINA, J. ULLMAN, J. WIDOM (2014), Database Systems: The Complete
	Book, Pearson, 2nd Edition.
2	P. RAJ, A. RAMAN, D. NAGARAJ, S. DUGGIRALA (2015), High-Performance
	Big-Data Analytics: Computing Systems and Approaches, Springer, 1st Edition.

CO	PO										PSO				
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2	2	3	2	3	2	INST	TUTE	OF-TE	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	_			2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1
				•						•			•		•

AAI717-ETHICAL HACKING										
*										
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С			
&Branch	್ಟ್ ರೆಂ									
	197 S	6	BS	<u>2</u>	0	<u>2</u>	<u>3</u>			
	The objective of the cour	se is to		•						
	• To understand the basic	s of com	puter based vulne	rabili	ties.					
Draambla	• To explore different foo	t printing	g, reconnaissance	and s	cann	ing n	nethods.			
rieanioie	• To expose the enumera	tion and	vulnerability anal	ysis r	netho	ods.				
	• To understand hacking	options a	vailable in Web a	nd wi	reles	s app	lications.			
	• To explore the options f	for netwo	ork protection.							
	• To practice tools to perf	form ethi	cal hacking to exp	oose t	he vi	ılnera	bilities.			
Unit 1	INTRODUCTION						9			
Ethical Hacking Over	rview - Role of Securi	ty and	Penetration Test	ers .	- Pe	enetra	tion-Testing			
Methodologies- Laws o	f the Land - Overview of	ГСР/IР-	The Application L	Layer	- The	e Trar	nsport Layer			
- The Internet Layer - I	P Addressing Network a	and Com	puter Attacks - M	alwar	e - P	rotec	ting Against			
Malware Attacks Intruder Attacks - Addressing Physical Security										
Unit 2	FOOT PRINTING, RE	CONNA	ISSANCE AND				9			
	SCANNING NETWOR	KS								
Footprinting Concepts	- Footprinting through Sea	rch Engi	nes, Web Service	s, Soo	cial N	Jetwo	orking Sites,			

Website, Email Footprinting To	- Competitive Intelligence - Footprinting through So ols - Network Scanning Concepts - Port-Scanning Tools	cial Engineering - 136 - Scanning Techniques -
Scanning Beyond Unit 3	d IDS and Firewall ENUMERATION AND VULNERABILITY ANALYSIS	9
Enumeration Co Vulnerability A Vulnerabilities VulnerabilitiesVu	ncepts - NetBIOS Enumeration – SNMP, LDAP, NTP, SMTI ssessment Concepts - Desktop and Server OS Vulnera - Tools for Identifying Vulnerabilities in V ulnerabilities of Embedded Oss	P and DNS Enumeration - abilities - Windows OS Windows- Linux OS
Unit 4	SYSTEM HACKING	9
Hacking Web Se Security Tester WardrivingWirel	ervers - Web Application Components- Vulnerabilities - Toc s Hacking Wireless Networks - Components of a ess Hacking - Tools of the Trade	ols for Web Attackers and Wireless Network –
Unit 5	NETWORK PROTECTION SYSTEMS	9
Access Control I Tools for Firewa Host-Based IDS	Lists Cisco Adaptive Security Appliance Firewall - Configuential and Routers - Intrusion Detection and Prevention Systems and IPSs - Web Filtering - Security Incident Response Team	uration and Risk Analysis ms - Network-Based and us – Honeypots. <b>Total: 45</b>
TEXTBOOKS		
1	Michael T. Simpson, Kent Backman, and James E. Corley, Hacking and Network Defense, Course Technology, Delma 2010.	Hands-On Ethical r Cengage Learning,
2	The Basics of Hacking and Penetration Testing - Patrick E Elsevier, 2013. 137	ingebretson, SYNGRESS,
3	The Web Application Hacker's Handbook: Finding and E Dafydd Stuttard and Marcus Pinto, 2011.	exploiting Security Flaws,
REFERENCES	CRIPERUMBUDID	
1	Black Hat Python: Python Programming for Hackers and 2014.	Pentesters, Justin Seitz,
COURSE OUT At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	To express knowledge on basics of computer based vulnerabilities	K4
CO2	To gain understanding on different foot printing, reconnaissance and scanning methods.	К3

CO3	To demonstrate the enumeration and vulnerability analysis methods	К3
CO4	To gain knowledge on hacking options available in Web and wireless applications.	К3
CO5	To acquire knowledge on the options for network protection. CO6: To use tools to perform ethical hacking to expose the vulnerabilities.	K5

CO		РО											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2		1		<u>-</u>	1	1	2	2	2	1
2	2	3	2	3	2	-		<b>J</b> -	2	2	3	2	3	2	1
3	2	3	2	1	1		_	_	2	2	3	2	2	3	1
4	2	3	2	2	3	I <u>N</u> SI	IUIE	Ut-It	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	1	-	1	3	2	2
AVG	2	2	1	2	2	-	-	_	1.2	1	1	2	2	2	1

Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	Τ	Р	С
		7	BS	3	0	0	<u>3</u>
Preamble Unit 1	<ul> <li>Introduce the difference</li> <li>Study about Tabular</li> <li>Study about policy of</li> <li>Learn current advant</li> <li>BASICS OF REINFORM</li> </ul>	ent basic ele methods a optimizatio cements an <b>RCEMEN</b>	ements of Reinfo nd Q-networks. n. d applications in <b>T LEARNING</b>	n RL. ( <b>RL</b> )	ent L	earni	ng (RL)
Elements of RL- RL policies value function	framework- Markov prop ns and Bellman equations.	erty- Partia	ally Observable	Mark	ov E	Decisi	on Proces
Unit 2	TABULAR METHOD	S					9
Planning with dynai nethods - TD (0), SA	mic Programming- Monto RSA, and Q-Learning.	e Carlo co	ontrol- and Te	mpora	l-Dif	feren	ce learni

Unit 3		Q-NETWORKS		9
Deep O-networks	- DO	N, DDON, Dueling DON, Prioritized Experience Repl	av	
Unit 4		POLICY OPTIMIZATIONS		9
Optimal policies	and	optimal value functions- Bellman optimality ec	uations	- Vanilla Policy
GradientREINFO	RCE	algorithm and stochastic policy search- Actor-critic r	nethods	- A2C and A3C-
Advanced policy	gradie	nt - PPO, TRPO, DDPG.		
Unit 5		RECENT ADVANCEMENTS AND APPLICATIO	DNS	9
Meta-learning, M	ulti-A	gent RL, Model-based RL approach, Code Standards a	and Pyth	non Libraries used
in RL: SuperSuit,	Stable	Baselines3, Pistonball and MAgent. RL for real-work	ld probl	ems: Autonomous
Driving- Train a	n RL	agent to navigate a self-driving car through comp	olex urb	an environments,
obeying traffic ru	les, an	d making safe decisions.		
		IFPPIAAR		Total: 45
TEXTBOOKS		INSTITUTE OF TECHNOLOGY		
1	Richa	rd S. Sutton and Andrew G. Barto, "Reinforcement Le	earning:	An Introduction",
	MIT	Press, 2nd edition, 2018.	U	
REFERENCES				
1	Russe	ell, Stuart J., and Peter Norvig. "Artificial intelliger	nce: a 1	modern approach.
	"Pear	son Education Limited, 2022.		
2	Kevir	P. Murphy, "Machine Learning: A Probabilistic Perse	pective"	.2012.
				,_ *
	0 1			
3	Csaba	a Szepesvari, "Algorithms for Reinforcement learning"	,2009.	
4	Wieri	ng, Marco, and Martijn Van Otterlo. "Reinforceme	nt learr	ning." Adaptation,
	learni	ng, and optimization 12 (2012).		
5	Li, Y	uxi. "Deep reinforcement learning." arXiv preprint a	arXiv:18	310.06339 (2018).
	Good	fellow, Ian, Yoshua Bengio, and Aaron Courville. "De	eep lear	ming." MIT press,
	2016.			
COURSE OUT	COME	S:	Bloom	i's Taxonomy
At the end of the	cours	e, learners will be able to	Level	
CO1	Expla	in the elements of reinforcement learning.		K4
CO2	Appl	y tabular methods and Q-networks to solve classical		K3
	probl	ems.		

CO3	Interpret policy gradient methods from vanilla to more complex cases.	К3
CO4	Implement real-world problems applying code standards.	К3

CO		РО												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2				0-0	ſ	-	1	3	2	2
AVG	2	2	1	2	2	_		J-I	1.2	1	1	2	2	2	1

# INSTITUTE OF TECHNOLOGY

	AAI719-TIME	SERIES A	NALYSIS				
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С
&Branch							
		7	BS	3	1	0	4
	The objective of the cou	rse is to	le la				
	1.To provide working kr	owledge o	f time series and	l fore	castii	ng me	ethods
Droomblo	2. To provide with tech	niques and	l receipts for est	timati	on a	nd as	ssessment of
Preamble	quality of economic mod	lels with ti	me series data				
	Learning Outcomes						
	To develop the skills ne	eded to do	empirical resea	rch in	fiel	ds op	erating with
	time series data sets Cor	itents	NIID 7				
Unit 1	STATIONARY PROCI	ESSES					9
Strong and weak, aut	ocorrelation function, lir	ear proce	sses, estimation	of	nean	and	covariance
functions, Wold decom	position Theorem.						
Unit 2	ARMA MODELS						9
ARMA (p, q) processes	s, ACF and PACF, Model	ing using A	ARMA processes	s, esti	mati	on of	parameters,
testing model adequacy	, Order estimation.						
Unit 3	FORECASTING						9
Prediction in stationary	processes, special referer	ice to ARN	A processes, Fr	eque	ncy d	lomai	in analysis –
spectral density and its	estimation, transfer functi	ons.					
Unit 4	NON-STATIONARY N	<b>IODELS</b>					9
ARMAX, ARIMAX mo	dels and introduction to A	ARCH mo	lels.				

Unit	5

#### MULTIVARIATE TIME SERIES

9

Multivariate Time Series, State Space Models.

Total: 45

#### TEXTBOOKS

1	P.J. BLOCKWELL, R.A. DAVIS (2017), Introduction to Time Series and									
	orecasting, Springer, 2nd Edition.									
2	C. CHATFIELD (2004), The Analysis of Time Series – An Introduction, Chapman									
	and Hall / CRC, 4th Edition.									
REFERENCES										
1	G.E.P. BOX, G. JENKINS, G. REINSEL (1994), Time Series Analysis-Forecasting									
	and Control, Pearson, 3rd Edition. Online Learning material https://									
	ocw.mit.edu/courses/economics/14-384-time-series-analysis-fall-2013/recitations/.									

						J	. ۲		ПП	Π					
CO						Р	0	OF TE	CHNOI	NGY				PSO	
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2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	- /	-	1.2	1	1	2	2	2	1

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	AAI720-DIGI	TAL FOR	ENSICS				
	89. S	<u>1</u>	colf				
Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	Τ	P	С
	SRIPER	7	BS	2	0	2	<u>3</u>
	The objective of the cour	se is to			•		
	• To understand basic dig	ital forens	ics and techniqu	ies.			
Preamble	• To understand digital cr	rime and in	vestigation.				
	• To understand how to b	e preparec	l for digital fore	nsic re	eadin	ess.	
	• To understand and use	forensics t	ools for iOS dev	vices.			
	• To understand and use	forensics t	ools for Android	l devi	ces.		
Unit 1	INTRODUCTION TO	DIGITAL	FORENSICS				9
Forensic Science – Di	gital Forensics – Digital Ev	idence – T	The Digital Fore	nsics l	Proce	ess – I	ntroduction
– The Identification P	Phase – The Collection Phase	se – The I	Examination Pha	ase –	The	Analys	sis Phase –
The Presentation Phas	se Installation of Sleuth Kit	on Linux	. List all data b	locks.	Ana	alyze a	llocated as
well as unallocated da	ta blocks of a disk image. I	Data extrac	tion from call lo	ogs us	ing S	Sleuth	Kit.

Unit 2	DIGITAL	CRIME AND INVESTIGATION	9
Digital Crime –	Substantive Crimin	nal Law – General Conditions – Offer	ses – Investigation Methods
for Collecting Di	gital Evidence – Ir	nternational Cooperation to Collect Dig	ital Evidence
Unit 3	DIGITAL	FORENSIC READINESS	9
Introduction – La Forensic Readin Readiness – Chal	w Enforcement weeks – Framework lenges in Digital F	ersus Enterprise Digital Forensic Read ss, Standards and Methodologies – Forensics	iness – Rationale for Digital Enterprise Digital Forensic
Unit 4	iOS FORI	ENSICS	9
Mobile Hardware – iPhone Securi MobilEdit– iClou decrypt encrypted	and Operating Sy ty – iOS Forensi d. Data extraction l iOS backups. Pro	stems - iOS Fundamentals – Jailbreaki ics – Procedures and Processes – To a using Sleuth Kit. Install Mobile Veri ocess and parse records from the iOS s	ng – File System – Hardware ools – Oxygen Forensics – fication Toolkit or MVT and ystem.
Unit 5	ANDROI	D FORENSICS	9
Tools – Android Oxygen Forensid Android devices Generate a unifie	Forensics – Foren s – MobilEdit – Extract diagnostic d chronological tir	asic Procedures – ADB – Android On Android App Decompiling .Extract information from Android devices t neline of extracted records,	ly Tools – Dual Use Tools – installed applications from through the adb protocol. 8.
	с У		Total: 45
TEXTBOOKS			
1	Andre Arnes, "Di	igital Forensics", Wiley, 2018.	
2	Chuck Easttom, CRC Press, 2022	"An In-depth Guide to Mobile Devi	ce Forensics", First Edition,
REFERENCES	5	ONDERIMAN	
1	Vacca, J, Comp Charles River Me	uter Forensics, Computer Crime Scedia, 2005, ISBN: 1-58450-389.	zene Investigation, 2nd Ed,
COURSE OUT	COMES:	will be able to	Bloom's Taxonomy
	course, learners		
CO1	Have knowledge	on digital forensics.	K4
CO2	Know about digit	al crime and investigations.	K3
CO3	Be forensic ready	Ι.	K3

CO4	Investigate, identify and extract digital evidence from iOS devices.	К3
CO5	Investigate, identify and extract digital evidence from Android devices.	К5

РО												PSO		
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
2	3	2	2	3				2	2	3	2	2	3	1
2	3	1	2	2	-	2			T.	-	1	3	2	2
2	2	1	2	2				1.2	1	1	2	2	2	1
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      -       -       2       2         2       3       1       2       2       -       -       -       -       -         2       2       1       2       2       -       -       -       1.2       1	1       2       3       4       5       6       7       8       9       10       11         2       2       1       2       2       -       -       -       1       1         2       2       1       2       2       -       -       -       1       1         2       3       2       3       2       -       -       -       2       2       3         2       3       2       1       1       -       -       -       2       2       3         2       3       2       1       1       -       -       -       2       2       3         2       3       2       2       3       -       -       -       2       2       3         2       3       1       2       2       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - 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Programme	B.Tech& AI&DS	Sem.	Category	Т	Р	С	
&Branch							
	*	7	BS	3	1	0	4
	The objective of the cou	urse is to			·		
	1. To provide insights	into fund	amental concepts	and	algo	rithm	s related to
<b>D</b>	Natural Language Unde	rstanding			0		
Preamble	2. Impart working expen	tise by in	troducing practical	l prol	blem	s.	
	Learning Outcomes The	students	are expected to ha	ve th	e abi	lity to	o:
	1. Formulate natural lan	guage un	derstanding tasks				
	2. Design and implement	nt basic ap	plications of NLU	ſ			
Unit 1	TRADITIONAL NLU	UIVID	UUR />				9
Introduction to NLU	J, Motivation, Morpholog	y, Parts-	of-Speech, Langu	age	Mod	els, '	Word Sense
Disambiguation, Ana	phora Resolution, Basics o	f Supervi	sed and Semi-supe	ervis	ed Le	earnii	ng for NLU
Hidden Markov Mo	dels for language modeling	g, EM Al	gorithm, Structure	ed Pr	edict	ion,	Dependency
Parsing, Topic Model	s, Semantic Parsing, Sentin	nent analy	vsis.				
Unit 2	DEEP LEARNING FO	OR NLU					9
Intro to Neural NLU,	Word Vector representation	ns, Neural	Networks and bac	ckpro	paga	tion -	for named
entity recognition, Pr	actical tips: gradient checks	, overfitti	ng, regularization,	activ	vatior	n func	ctions,
Unit 3	RECURRENT NEUR	AL NET	WORKS FOR NL	JU			9
RNN for language n	nodeling and other tasks, G	RUs and	LSTMs for mac	hine	trans	latio	n, Recursive
noural nativorka fo	r parsing						

Unit	4	CONVO NLU	LUTION	IAL NEUR	RAL NE'	FWORK	SFOR		9
CNN for sent	ence class	ification, (	Question	answering	and dial	ogue syste	em, Graph	Neural Ne	etwork for
NLU, Natural	l Language	e Generatio	on, Analy	sis and Inte	rpretabil	ity of Net	ural NLU.	(22 Lecture	es)
Unit	5	KNOWL	EDGE (	GRAPHS I	FOR NL	U			9
Knowledge g	raph embe	dding tech	niques, Iı	nference on	knowled	dge graph	s.		
	1	0	1 /			001			Total: 45
TEXTBOOK	KS								
1	C. M	ANNING,	H. SCHÜ	JTZE (1999	), Found	lations of	Statistical	Natural La	inguage
	Proce	essing, MI	Γ Press.						
2	D. J.	JRAFSKY	, J.H. MA	ARTIN, Sp	eech and	l Languag	ge Processi	ing: An In	troduction
	to Na	tural Lang	uage Pro	cessing, Co	mputatio	onal Ling	uistics and	Speech Re	ecognition
	(3rd 1	Edition Dra	aft), 2019						C
REFERENC	ES								
1	E. E	BENDER	(2013),	Linguistic	Funda	mentals	for NLP,	Morgan	Claypool
	Publi	shers							
2	J. AL	LEN (1995	5), Natura	al Language	e Unders	tanding, I	Pearson Ed	ucation, 19	995.
3	Resea	arch	Literatu	ire.	Self	Learn	ning	Material	1.
	http:/	/web.stanfo	ord.edu/c	lass/cs224r	/index.h	tml#scheo	lule (Deep	learning for	or NLP)
	I		100	<b>6</b>					



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2	2	3	2	3	2		5	J. <u>_</u> Z	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

#### PROFESSIONAL ELECTIVE VI

#### AAI722-OPTIMIZATION TECHNIQUES

Programme	B.Tech& AI&DS	Sem.	Category	L	Τ	P	С				
&Branch											
		8	BS	3	0	0	3				
	The chieve of the court						-				
	The objective of the cour	se is to									
	• To understand fundame	ntal topi	cs in bio-inspired of	ptim	nizati	on te	chniques				
	• To Learn the collective	systems	s such as ACO, PSO	), an	d BC	O					
	• To develop skills in bio	ologicall	y inspired algorithi	n de	sign	with	an emphasis				
Preamble	on solving real world pro	blems									
	• To understand the most	st appro	priate types of alg	orith	nms f	or d	ifferent data				
	analysis problems and	l to ir	ntroduce some o	f th	ne n	nost	appropriate				
	implementation strategies	S.									
	• To implement the Bio-i	nspired	technique with othe	er tra	ditio	nal al	gorithms.				
	JEPI		HR								
Unit 1	INTRODUCTION						9				
Optimization Techniqu	ues: Introduction to Opti	mizatio	n Problems – Sir	ngle	and	Mut	i- objective				
Optimization – Classic	cal Techniques – Overvie	w of va	rious Optimization	n me	thod	s – I	Evolutionary				
Computing: Genetic A	lgorithm and Genetic Prog	rammin	g: Basic concept –	enco	oding	– re	presentation				
– fitness function – Re	eproduction – differences	between	GA and Tradition	al op	otimiz	zatioi	n methods –				
Applications – Bio- ins	pired Computing (BIC): M	lotivatio	n – Overview of B	[C –	usag	e of I	BIC – merits				
and demerits of BIC.		and demerits of BIC.									
Unit 2	SWARM INTELLIGEN	NCE					9				
Unit 2	SWARM INTELLIGEN	NCE		11.			9				
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Unit 2 Introduction – Biologia Ant Colonies: Ant For	SWARM INTELLIGEN cal foundations of Swarm aging Behavior – Towards	NCE Intellige Artifici	ence – Swarm Inte al Ants – Ant Colo	lliger	nce i	n Op nizati	9 timization – on (ACO) –				
Unit 2 Introduction – Biologia Ant Colonies: Ant For SACO – Ant Colony C	SWARM INTELLIGEN cal foundations of Swarm aging Behavior – Towards Optimization Metaheuristic:	NCE Intellige Artifici Combin	ence – Swarm Inte al Ants – Ant Colo natorial Optimizati	lliger ony ( on –	nce i Dptim ACC	n Op nizati ) Me	9 timization – on (ACO) – taheuristic –				
Unit 2 Introduction – Biologia Ant Colonies: Ant For SACO – Ant Colony C Problem solving using	SWARM INTELLIGEN cal foundations of Swarm aging Behavior – Towards Optimization Metaheuristic: ACO – Other Metaheuri	NCE Intellige Artifici Combin stics – S	ence – Swarm Inte al Ants – Ant Colo natorial Optimizati Simulated annealir	lligen ony ( on – eg –	nce i Dptim ACC Tabu	n Op nizati ) Me 1 Sea	9 timization – on (ACO) – taheuristic – rch – Local				
Unit 2 Introduction – Biologia Ant Colonies: Ant For SACO – Ant Colony C Problem solving using search methods – Scop	SWARM INTELLIGEN cal foundations of Swarm aging Behavior – Towards ptimization Metaheuristic: ACO – Other Metaheuri e of ACO algorithms.	NCE Intellige Artifici Combin stics – S	ence – Swarm Inte al Ants – Ant Colo natorial Optimizati Simulated annealir	lliger ony ( on – g –	nce i Dptim ACC Tabu	n Op nizati ) Me 1 Sea	9 timization – on (ACO) – taheuristic – rch – Local				
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Problems – Travelling Salesman problem.

Total: 45

TEXTBOOKS		
1	A. E. Elben and J. E. Smith, "Introduction to Evolutionary 2010.	Computing", Springer,
2	Floreano D. and Mattiussi C., "Bio-Inspired Artificia Methods, and Technologies", MIT Press, Cambridge, MA,	l Intelligence: Theories, 2008.
3	Leandro Nunes de Castro, "Fundamentals of Natural Co. Algorithms and Applications", Chapman & Hall/ CRC, T 2007	mputing, Basic Concepts, aylor and Francis Group,
REFERENCES	JEPPINNK	
1	Eric Bonabeau, Marco Dorigo, Guy Theraulaz, "Swarm Into Artificial Systems", Oxford University press, 2000.	ntelligence: From Natural
2	Christian Blum, Daniel Merkle (Eds.), "Swarm Intelli Applications", Springer Verlag, 2008.	gence: Introduction and
3	Leandro N De Castro, Fernando J VonZuben, "Recent Dev Inspired Computing", Idea Group Inc., 2005.	elopments in Biologically
4	Albert Y.Zomaya, "Handbook of Nature-Inspired and Springer, 2006.	Innovative Computing",
5	C. Ebelhart et al., "Swarm Intelligence", Morgan Kaufmann	n, 2001.
COURSE OUT At the end of the	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Familiarity with the basics of several biologically inspired optimization techniques.	K4
CO2	Familiarity with the basics of several biologically inspired computing paradigms.	K3
CO3	Ability to select an appropriate bio-inspired computing method and implement for any application and data set.	К3
CO4	Theoretical understanding of the differences between the major bio-inspired computing methods.	К3
CO5	Learn Other Swarm Intelligence algorithms and implement the Bio-inspired technique with other	K5

#### traditional algorithms.

CO						P	0						PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1	
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1	
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1	
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1	
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2	
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1	

## JEPPIAAR

		AAI723-I	BIOINFO	RMATICS				
Programme	B.Tech	& AI&DS	Sem.	Cate	gory l	LT	Р	С
&Branch								
			7	B	S í	3 0	0	<u>3</u>
Dreamble	The object • To	ive of the c launch the	course is to Bioinform	atics core c	oncepts to s	student	S.	
Preamble	• To ana and	provide Ilysis,evolu I applicatio	knowled tionary an ons of Bioin	ge on alysis nformatics.	Biological	datał	oases,	sequence
Unit 1	BIOLOG	ICAL DAT	TABASES	relation				9

Introduction to Bioinformatics and Computational Biology, Biological sequences, Classification of biological databases - Sequence Databases, Structure Databases, Genome specific databases, Special Databases and applications- Microarray, Metabolic pathway, motif, and domain databases, Data file formats

Unit 2	SEQUENCE ANALYSIS	9
Sequence Alignment- H	Homology vs Similarity, Similarity vs Identity. Types of Se	quence alignment -
Pairwise and Multiple	sequence alignment, Global alignment, Local alignment,	Dotplot, Alignment
algorithms- Needleman	wunsch and Smith and waterman algorithm, Substitution	matrices- PAM, 97
BLOSUM.Multiple Seq	uence Alignment- Application of multiple alignments, View	wing and editing of
MSA and Scoring fur	nction.Database Similarity Searching- Basic Local Align	ment Search Tool
(BLAST), FASTA, PHI	BLAST, PSI BLAST, BLAST algorithm.	

Unit 3	MOLECULAR PHYLOGENY	9
Phylogenetics Basics, N	Iolecular clock theory, Ultrametric trees, Distance matrix m	ethodsUPGMA,NJ,
Character based metho	ds-Maximum Parsimony. Methods of evaluating phylogen	etic methods- boot

Unit 4	MACROMOLECULAR STRUCTURE ANALYS	IS 9
Gene prediction,	Conserved domain analysis, Protein structure visualization	on, Prediction of protein
secondary struc	ture, Tertiary structure prediction- Homology modelin	g, Threading, Ab-inition
prediction. Valid	ation of the predicted structure using Ramachandran plot,	steriochemical properties
Structure- structu	rre alignment.	
Unit 5	APPLICATIONS	9
Introduction to S	Systems Biology and Synthetic Biology, Microarray data a	nalysis, DNA computing
Bioinformatics a	approaches for drug discovery, Applications of Bioinform	matics in genomics and
proteomics- Asse	embling the genome, STS content mapping for clone contig	gs, Functional annotation
Peptide mass fing	gerprinting.	
		Total: 4
TEXTBOOKS	INSTITUTE OF TECHNOLOGY	
1	Arthur K. Lesk- Introduction to Bioinformatics, Oxford Un	iversity Press
2	Baxivanis and FouletteD- Bioinformatics: A Practical C	uide to the Analysis o
-	Genes and Proteins. Wiely Indian Edition 2001	funde to the finalysis o
3	Attwood TK, parry DJ-Smith, Introduction to Bioinform	atics, Pearson Education
	1st Edition, 11th Reprint 2005.	,
4	David W. Mount-Bioinformatics Sequence and Genome	e Analysis, Cold Spring
	Harbor Laboratory Press. 1st edition 2001.	
COURSE OUT	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Apply computational based solutions for biological	K4
	perspectives	
CO2	Analyze the evolutionary relationship between the	К3
	organisms	
CO3	Understand the macromolecules structure prediction	K3
	methods	
CO4	Relate how bioinformatics methods can be used in	K3
	sequence to structure and function	
CO5	analysis. Learn the applications of bioinformatics	K5
	approach for drug discovery, genomics and	
	proteomics.	1

CO						Р	0							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3

1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2	1	2	2	-	-	-	1.2	1	1	2	2	2	1

AAI724-INFORMATION RETRIEVAL SYSTEM										
Programme	B.Tech	n& AI&D	S	Sem.	Cate	gory	L	Т	P	С
&Branch										
		10		7		S	3	0	0	<u>3</u>
	The objec	tive of the	cour	se is to	ΠΠ		1			
	≻ To un	derstand	the b	pasics of	of informa	ation reti	rieva	l wi	th pe	ertinence to
	model	ing								
Preamble	≻ To uno	lerstand v	arious	s compo	nents of Il	R system				
	≻ To un	derstand	mach	ine lea	ming tech	niques f	or te	ext c	lassit	fication and
	cluster	ring								
	> To exp	olore vario	ous IR	applica	tions.					
Unit 1	Unit 1   INTRODUCTION AND MODELING   9									
Basic Concepts: Retrie	val proces	s – Archi	itectu	re – Bo	olean reti	rieval; IR	R Mo	odels	: Tax	conomy and
characterization of IR	models –	Classical	IR m	odels –	Alternativ	ve algebr	aic	mode	els –	Models for
Browsing – Retrieval E	valuation: H	Performan	ce eva	aluation	2					
Unit 2	INDEXIN	NG AND	QUEI	RYING						9
Indexing: Inverted indic	ces – Suffiz	x trees – S	Suffix	arrays	<ul> <li>Compre</li> </ul>	ession; Qu	ueryi	ng: (	Query	/ languages;
Query Operations: Rele	vance feedl	back and c	query	expansi	on – Auto	matic loc	al an	d glo	obal a	nalysis.
Unit 3	SEARCH	IING	1911	. 201						9
Searching: Sequential s	searching –	- Pattern	match	ning; Se	arching th	ne Web:	Char	acter	rizing	the Web -
Search engines – Brows	sing – Searc	ching usin	g hyp	erlinks.						
Unit 4	CLASSIE	FICATIO	NAN	D CLU	STERIN	J				9
Text Classification: Na	ive Bayes;	Vector S	pace (	Classifi	cation: Ro	cchio – I	k-Ne	arest	Neig	ghbour; Flat
Clustering: K-Means - Model-based clustering - Hierarchical clustering - Matrix decom- positions										
and latent semantic inde	exing.									

Unit 5	APPLICATIONS	9
XML Retrieval	– Multimedia IR – Parallel and Distributed IR – Digital I	Libraries – Social Media
Retrieval – Cont	ent-based Image Retrieval – Online Public Access Catalogs (	OPACs).
		Total: 45
TEXTBOOKS		
1	Ricardo Baeza Yates, Berthier Ribeiro Neto, "Modern Infor Concepts and Technology behind Search", ACM Press Boo	mation Retrieval: The ks, 2nd Edition, 2011.
2	Christopher D Manning, Prabhakar Raghavan, Hinrich S Information Retrieval", Cambridge University Press, 1st So	Schutze, "Introduction to uth Asian Edition, 2008.
REFERENCES	INSTITUTE OF TECHNOLOGY	
1	Stefan Buttcher, Charles L A Clarke, Gordon V Cormack, Implementing and Evaluating Search Engines", The Massachusetts London, England, 2010.	"Information Retrieval – MIT Press, Cambridge,
2	Cheng Xiang Zhai, Sean Massung, "Text Data Manag Practical Introduction to Information Retrieval and Text 2016.	gement and Analysis: A Mining", ACM Books
3	Reza Zafarani, Mohammad Ali Abbasi, Huan Liu, "So Introduction", 1st Edition, Cambridge University Press, 201	ocial Media Mining: Ar 4.
4	Vipin Tyagi, "Content-Based Image Retrieval: Ideas, Trends", 1st Edition, Springer, 2017.	Influences, and Current
5	Marcia J Bates, "Understanding Information Retrieval Types, and Standards", CRC Press, 2012.	Systems: Management
	A F210. 2011	
COURSE OUT At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Apply the IR modeling techniques for the document retrieval problem and measure the performance of IR systems by making use of IR evaluation metrics (K3)	K4
CO2	Construct the basic components of an IR system namely indexing and querying	K3

CO3	Explain the searching techniques for IR and Web	К3
CO4	Apply machine learning techniques to text classification and clustering for efficient In- formation Retrieval	К3
CO5	Develop an IR application by applying best practices with proper documentation in teams	K5

CO						P	0						PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	2	3	2	_	-	-	3	2	1	2	3	3	2
2	2	2	222	3	3		-	-	1	2	2	3	3	3	2
3	2	1	1	3	2		-	-	1	2	1	1	1	3	3
4	3	3	3	3	2	TITUT	E <mark>G</mark> F 1	EC <del>i</del> n	1	1	1	1	2	1	3
5	1	3	2	2	2		- /	-	1	1	3	1	2	3	2

	AAI725-INFORM	ATION	SECURITY				
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С
&Branch	See and						
	846. ×	7	BS	3	0	0	<u>3</u>
	The objective of the cours	se is to	Sel				
D 11	$\succ$ To understand the bas	ics of In	formation Secur	itv			
Preamble	$\succ$ To know the legal, eth	ical and	professional iss	sues in 1	Infor	matio	on Security
	> To equip the students?	knowle	dge on digital si	gnature	e, em	ail se	curity and
	web security	JVIDU		-			
Unit 1	INTRODUCTION						9
History, What is Inform	ation Security?, Critical Cl	naracteri	stics of Informa	tion, N	STIS	SC S	Security
Model, Components of	an Information System, Se	curing th	e Components,	Balanc	ing S	Secur	ity and
Access, The SDLC, The	e Security SDLC	-	-		-		-
Unit 2	SECURITY INVESTIG	ATION					9
Need for Security, Busi	ness Needs, Threats, Attack	ks, Legal	, Ethical and Pr	ofessio	nal Is	ssues	- An
Overview of Computer	Security - Access Control	Matrix, H	Policy-Security	policies	s, Co	nfide	ntiality
policies, Integrity polici	es and Hybrid policies						
Unit 3	DIGITAL SIGNATURE	AND A	UTHENTICAT	ΓΙΟΝ			9
Digital Signature and Authentication Schemes: Digital signature-Digital Signature Schemes and their							
Variants- Digital Sig	gnature Standards-Auther	tication:	Overview-	Requir	emer	nts	Protocols -

Applications - K	erberos -X.509 Directory Services	
Unit 4	E-MAIL AND IP SECURITY	9
E-mail and IP Se	ecurity: Electronic mail security: Email Architecture -PGF	P – Operational Descriptions-
Key managemen	tt- Trust Model- S/MIME.IP Security: Overview- Archit	ecture - ESP, AH Protocols
IPSec Modes – S	ecurity association - Key management.	
Unit 5	WEB SECURITY	9
Web Security: R	equirements- Secure Sockets Layer- Objectives-Layers -	SSL secure communication-
Protocols - Tran	sport Level Security. Secure Electronic Transaction- E	ntities DS Verification-SET
processing.		
		Total: 45
TEXTBOOKS		
1	Michael E Whitman and Herbert J Mattord, "Princip Course Technology, 6th Edition, 2017.	les of Information Security,
2	Stallings William. Cryptography and Network Securi Seventh Edition, Pearson Education, 2017.	ty: Principles and Practice,
REFERENCES		
1	Harold F. Tipton, Micki Krause Nozaki,, "Informa Handbook, Volume 6, 6th Edition, 2016.	tion Security Management
2	Stuart McClure, Joel Scrambray, George Kurtz, "Hackin Seventh Edition, 2012.	ng Exposed", McGraw- Hill,
3	Matt Bishop, "Computer Security Art and Science, Add 2015.	ison Wesley Reprint Edition,
4	Behrouz A Forouzan, Debdeep Mukhopadhyay, Cryptog 3rd Edition, . McGraw-Hill Education, 2015.	graphy And network security,
	ESTD. 2011	
COURSE OUT At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	Understand the basics of data and information security	K4
CO2	Understand the legal, ethical and professional issues in information security	К3
CO3	Understand the various authentication schemes to simulate different applications.	K3

CO4	Understand various security practices and system security standards	К3
CO5	Understand the Web security protocols for E-Commerce applications	K5

CO	РО											PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	1		-	-	-	1	3	1	2	3	1	1
2	1	3	3	3	2	-	-	-	1	2	2	2	1	2	2
3	2	3	3	3	1	-	-	-	1	3	1	2	1	2	1
4	3	3	1	1	1				3	1	1	3	2	3	3
5	3	2	2	3	2	-	7-	-	- 1	2	1	2	2	2	1



Programme &Branch	B.Tech& AI&DS	Sem.	Category	L	Т	Р	С
	0°0	7	BS	3	1	0	4
Preamble	<ul> <li>To introduce the ideas based on human expension based on human expensin based on human expension based on human expension based on hu</li></ul>	se is to s of fuzz rience. matical l networ utionary rith neur ize to fo dies util based o	background for car background for car k learning Algorithms. al networks that ca orm appropriate rule izing the above and on soft computing	and un leas for lillus	use o g out rn fro r infe	f heu the o om av erence the l	ristics ptimizatior vailable e systems. ntelligent
Unit 1	INTRODUCTION TO S FUZZY LOGIC	SOFT (	COMPUTING AN	D			9
Introduction - Fuzzy Lo Fuzzy Relations, Opera Systems	bgic - Fuzzy Sets, Fuzzy M tions on Fuzzy Relations, I	embersl Fuzzy R	nip Functions, Open ules and Fuzzy Rea	ratio1 asoni	ns on ng, F	Fuzz Fuzzy	y Sets, Inference
Unit 2	NEURAL NETWORKS	5					9
Supervised Learning N Unsupervised Learning	eural Networks – Perceptro Neural Networks – Kohor	ons - Ba en Self-	ckpropagation -Mu Organizing Netwo	ltilay rks	ver Po	ercep	trons –

Unit 3	GENET	IC ALGORITHMS	9
Chromosome En	coding Schemes	-Population initialization and selection meth	nods - Evaluation function
- Genetic operato	ors- Cross over –	Mutation - Fitness Function – Maximizing	function
Unit 4	NEURO	FUZZY MODELING	9
ANFIS architect	ure – hybrid learn	ing – ANFIS as universal approximator – C	Coactive Neuro fuzzy
modeling – Fram	nework – Neuron	functions for adaptive networks – Neuro fu	zzy spectrum - Analysis
OI Adaptive Lear		ATIONS	0
Unit 5			9
Modeling a two Plasma Spectrun Prediction.	input sine functio 1 Analysis – Hanc	n - Printed Character Recognition – Fuzzy f l written neural recognition - Soft Computir	filtered neural networks – ng for Color Recipe
			Total: 45
TEXTBOOKS			
1	SaJANG, JS. I	R., SUN, CT., & MIZUTANI, E. (1997). N	Jeuro-fuzzy and soft
	computing: A c	omputational approach to learning and macl	hine intelligence. Upper
	Saddle River, N	IJ, Prentice Hall,1997	
2	Himanshu Sing	h, Yunis Ahmad Lone, Deep Neuro-Fuzzy S	Systems with Python
3	With Case Stud	ies and Applications from the Industry, Apro	ess, 2020
REFERENCES	*		
1	Roj Kaushik a Applications, 1	nd Sunita Tiwari, Soft Computing-Funda st Edition, McGraw Hill, 2018.	amentals Techniques and
2	S. Rajasekarar Algorithms", Pl	n and G.A.V.Pai, "Neural Networks, Fu HI, 2003.	zzy Logic and Genetic
3	Samir Roy, Ud Genetic Algorit	it Chakraborthy, Introduction to Soft Com hms, Pearson Education, 2013.	puting, Neuro Fuzzy and
4	S.N. Sivananda India Pvt Ltd, 2	m, S.N. Deepa, Principles of Soft Computir 019.	ng, Third Edition, Wiley
5	R.Eberhart, P.S Professional, B	impson and R.Dobbins, "Computational Into oston, 1996	elligence - PC Tools", AP
	· · · · ·		
COURSE OUT At the end of th	COMES: e course, learner	s will be able to	Bloom's Taxonomy Level
CO1	Inderster 141	fundamentale of furner la sin energie and	IZ A
COI	inference mech	anisms	K4
CO2	Understand neu	ral network architecture for AI	К3

	applications such as classification and clustering	
CO3	Learn the functionality of Genetic Algorithms in Optimization problems	K3
CO4	Use hybrid techniques involving Neural networks and Fuzzy logic	K3
CO5	Apply soft computing techniques in real world applications	K5

CO					POLOD								PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	3	3	TITUT			3	1	3	2	3	1	2
2	2	3	3	2	3	IIIII		: <u>L</u> UNI	3	2	3	2	2	1	3
3	1	3	2	2	1	-	-	-	3	1	1	2	1	3	2
4	1	2	1	3	2	-	-	-	3	3	1	1	2	1	1
5	2	3	1	2	1	-	-	-	3	3	3	2	1	2	3
AVG	1.8	2.6	2	2.4	2	-	-	-	3	2	2.2	1.8	1.8	1.6	2.2

PROFESSIONAL ELECTIVE 7 AAI727-AI TECHNIQUES FOR GAME DEVELOPMENT									
Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С		
&Branch	er sa								
	U D	iscip7im ⁸	BS	3	0	0	<u>3</u>		
Preamble	<ul> <li>The objective of the course is to</li> <li>To have an introduction into the Game programming and rendering.</li> <li>To learn the principles, mechanics and logics of Game Design.</li> <li>To learn the various Game Development process and its design attributes.</li> <li>To gain working knowledge in various game platforms.</li> </ul>								
Unit 1	INTRODUCTION						9		
Elements of Game P	lay — Artificial Intellig	gence —	Getting Input	from	the	Playe	er - Sprite		
Programming — Sprite	e Animation - Multithread	ding — In	nportance of Gar	me De	esign	— C	Game Loop,		
Software and Hardware Rendering.									
Unit 2	GAME DESIGN PRIN	CIPLES					9		
Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level									

design. Genres of	of Gan	nes, Collision Detection, Game Logic, Path Finding,	Game Engine Design:
Rendering. Cont	roller	based animation, collision detection, standard objects	and physics. Design
Scope in Redesig	ning g	ames.	, und physics, Design
Unit 3		GAME DEVELOPMENT	9
Game developm	ent: D	eveloping 2D and 3D interactive games using OpenC	JL, DirectX — Puzzle
games, Single /N	Multi-p	player games-Games using HTML and Java Script, Sc	cratch 2.0, Unity 3D -
Introduction, Cre	ating g	ames and Designing and Coding game play systems.	
Unit 4		GAMING PLATFORMS AND FRAMEWORKS	9
Basics of Augm Python, XNA wi Game Studio, DX	ented ith Visi K Studi	Reality, Virtual Reality and Mixed Reality- Flash, Dau ual Studio, Mobile Gaming for the Android, iOS, Gamo o	irectX, OpenGL, Java, ne engines - Adventure
Unit 5		GAME PROGRAMMING USING PYTHON	9
Basic game obj	ects, C	Getting started with cocos2d, Creating game assets,	Implementing steering
behaviours, Seek	andfle	ee, Arrival, Pursuit and evade Wander, Obstacle avoida	nce, Gravitation game,
Pygame and 3D.			
			Total: 45
TEXTBOOKS			
1	Jeann	nie Novak, Game Development Essentials, Third Edi	tion, Delmar Cengage
	Learn	ning, ISBN-13:978-1111307653, 2011.	
2	Jeann	nie Novak, Game Development Essentials, Third Edi	tion, Delmar Cengage
	Learn	ning, ISBN-13:978-1111307653, 2011.	
3	Josep	oh Howse, Alejandro Rodas de Paz, Python Game Prog	gramming by Example,
	Packt	Publishing, First edition, 2015.	
REFERENCES		<b>ODERUMBIINUD</b>	
1	Jerem	y Gibson, "Introduction to Game Design, Prototypi	ng. and Development:
	From	Concept to Playable Game with Unity and C#". Addiso	on-Weslev Professional
	3rd e	dition 2016.	
2	John	Horton — Learning Java by Building Android Gan	nes Packt Publishing
-	I imit	red 1st edition 2015	ines, ruckt ruonsning
3	Lorge	Palacios L'Inity 5 v Game AI Drogramming Casth	ook Dackt Dublishing
5	Joige	ratacios, — Ontry 5.X Game Ar Frogramming Cooko	OUN, I AUNT FUUIISIIIIIg
	LIIIIt		
COURSE OUT	COME	CS: B	Bloom's Taxonomy
At the end of t	the course, learners will be able to	Level	
-----------------	--------------------------------------------------------------------	-------	
CO1	Identify the need for Game programming.	K4	
CO2	Have knowledge on the concepts and techniques used in Game design.	K3	
CO3	Design and model interactive game.	K3	
CO4	Understand the need for advanced game development platforms	K3	
CO5	Design and develop games with open source components.	K5	

#### INSTITUTE OF TECHNOLOGY

CO						PO	)							PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	2	1	1	-	-	-	3	2	2	2	2	2	2
2	2	3	2	1	1	-	-	-	3	2	3	2	2	2	2
3	2	3	2	2	2	-/	-	-	-	-	-	2	2	3	2
4	2	-		2	3	-		Ţ	-	<i>.</i>	*-	-	2	2	-
5	2	2	-	- 3	3	-		2	3	2	- 1	3	2	3	-

#### AAI728-PRINCIPLES OF BLOCK CHAIN TECHNOLOGY B.Tech& AI&DS Programme Sem. Category L Т Р С &Branch 7 BS 3 0 0 <u>3</u> The objective of the course is to > Introduce the matrix techniques and to explain the nature of the matrix. > provide the necessary basic concepts of a few numerical methods and give procedures for solving numerically different kinds of problems occurring Preamble in Engineering and Technology. ➢ familiarize the students with differential calculus. > understand techniques of calculus which are applied in the Engineering problems. > acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications

Unit 1	HISTORY	9
Digital Money t Privacy- : Block	to Distributed Ledgers -Design Primitives: Protocols, Securi k chain Architecture and Design-Basic crypto primitives: Ha	ty, Consensus, Permissions, ash, SignatureHash chain to
Block chain-Bas	sic consensus mechanisms	
Unit 2	CONSENSUS PROTOCOLS	9
Requirements consensus prot Block chains.	for the consensus protocols-Proof of Work (PoW)-Scalabi cocols: Permissioned Block chains-Design goals-Consensus	lity aspects of Block chain protocols for Permissioned
Unit 3	CONSENSUS PROCESS	9
Decomposing Implementation composer tool.	the consensus process-Hyper ledger fabric components n: Hyper ledger Fabric II:-Beyond Chain code: fabric SDK a	s-Chain code Design and and Front End-Hyper ledger
Unit 4	BLOCK CHAIN INFSS	9
Insurance- Bloc finance, invoice	ck chain in trade/supply chain: Provenance of goods, vi management/discounting	sibility, trade/supply chain
Unit 5	BLOCK CHAIN FOR GOVERNMENT ULTI INTEGRALS	PLE 9
government ent Privacy and Sec	ities, public distribution system / social welfare systems: curity on Block chain	Block chain Cryptography: Total: 45
TEXTBOOKS		
1	Mark Gates, "Block chain: Ultimate guide to understanding crypto currencies, smart contracts and the future of money and Mark Gates 2017.	ng block chain, bit coin, y", Wise Fox Publishing
2	Salman Baset, Luc Desrosiers, Nitin Gaur, Petr No. Venkatraman Ramakrishna "Hands-On Block chain w	ovotny, Anthony O'Dowd,
	decentralized applications with Hyperledger Fabric and C	ith Hyper ledger: Building Composer", 2018.
3	<ul> <li>decentralized applications with Hyperledger Fabric and C</li> <li>Bahga, Vijay Madisetti, "Block chain Applications: Arshdeep Bahga, Vijay Madisetti publishers 2017.</li> </ul>	ith Hyper ledger: Building Composer", 2018. A Hands-On Approach",
3	decentralized applications with Hyperledger Fabric and C Bahga, Vijay Madisetti, "Block chain Applications: Arshdeep Bahga, Vijay Madisetti publishers 2017.	ith Hyper ledger: Building Composer", 2018. A Hands-On Approach", Bloom's Taxonomy
3 COURSE OUT At the end of th	decentralized applications with Hyperledger Fabric and C Bahga, Vijay Madisetti, "Block chain Applications: Arshdeep Bahga, Vijay Madisetti publishers 2017.	ith Hyper ledger: Building Composer", 2018. A Hands-On Approach", Bloom's Taxonomy Level
3 COURSE OUT At the end of th CO1	Venkutralian Ramakrishna, Trands off Block chain W         decentralized applications with Hyperledger Fabric and C         Bahga, Vijay Madisetti, "Block chain Applications: Arshdeep Bahga, Vijay Madisetti publishers 2017. <b>COMES:</b> he course, learners will be able to         State the basic concepts of block chain	ith Hyper ledger: Building         Composer", 2018.         A Hands-On Approach",         Bloom's Taxonomy         Level         K4

	Interpret working of Hyper ledger Fabric	
CO3	Implement SDK composer tool and explain the Digital identity for government	К3
CO4	To understand the concepts of block chain technology	К3
CO5	To understand the consensus and hyper ledger fabric in block chain technology	K5

## JEPPIAAR

СО					INST	PO		'HUI	JLUGY					PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	1	-	-	-	1	-	-	2	3	3	1
2	3	3	3	3	1	-	-	-	2	-	-	2	3	3	1
3	3	3	3	3	2	-	-	-	3	-	-	2	3	3	3
4	3	2	3	2	3	-	-	-	3	-	-	2	3	2	3
5	3	3	2	2	1	-	-	-	1	-	-	2	3	3	
AVG	3	2.75	2.75	2.5	1.75	2.25	2	3	2.75	2	3	2.75	2.75	2.5	1.75

	A1720 SECUDITY IN CLOUD ENVIDONMENT				
P.	AI729-SECURITTIN CLOUD ENVIRONMENT				
Programme	B.Tech& AI&DS Sem. Category	L	Т	Р	С
&Branch					
	T BS	3	0	0	<u>3</u>
Preamble	<ul> <li>The objective of the course is to</li> <li>To Introduce Cloud Computing terminology, defi</li> <li>To understand the security design and archite Cloud</li> <li>To understand the Identity, Access control in Clou</li> <li>To follow best practices for Cloud security using</li> <li>To be able to monitor and audit cloud application</li> </ul>	nitio ctur ud vari s foi	on & al co ous o r sect	conc onsid lesig urity	epts erations for n patterns
Unit 1	FUNDAMENTALS OF CLOUD SECURITY				9
	CONCEPTS				
Overview of cloud	security- Security Services - Confidentiality, I	nteg	grity,	Au	thentication,
Nonrepudiation, Acces	s Control - Basic of cryptography - Conventional and	put	olic-k	ey ci	ryptography,

hash functions, a	uthentication, and digital signatures. \	
Unit 2	SECURITY DESIGN AND ARCHITECTURE FOR CLOUD	9
Security design p control - Commo Virtualization str Data retention, Tokenization, Ot	principles for Cloud Computing - Comprehensive data protection on attack vectors and threats - Network and Storage - Secure Is categies - Inter-tenant network segmentation strategies - Data Pr deletion and archiving procedures for tenant data, Encryption of uscation, PKI and Key	- End-to-end access solation Strategies - rotection strategies: n, Data Redaction,
Unit 3	ACCESS CONTROL AND IDENTITY MANAGEMENT	9
Access control Authorization - Federation - Ider OS Hardening ar <b>Unit 4</b>	requirements for Cloud infrastructure - User Identification - Roles-based Access Control - Multi-factor authentication - Single ntity providers and service consumers - Storage and network acce ad minimization - Verified and measured boot - Intruder Detection a CLOUD SECURITY DESIGN PATTERNS	Authentication and le Sign-on, Identity ass control options - and prevention 9
Introduction to Resource Access	Design Patterns, Cloud bursting, Geo-tagging, Secure Cloud Control, Secure On-Premise Internet Access, Secure External Clou	Interfaces, Cloud
Unit 5	MONITORING, AUDITING AND MANAGEMENT	9
Proactive activit traffic, abuse of Management, T management, Ide	y monitoring - Incident Response, Monitoring for unauthorized system privileges - Events and alerts - Auditing – Record genera amper-proofing audit logs, Quality of Services, Secure Mentity management, Security Information and Event Management	access, malicious tion, Reporting and Management, User
		Total: 45
TEXTBOOKS	Sole Sol	
1	Raj Kumar Buyya , James Broberg, andrzejGoscinski, "Cloud Co 2013	mputing:", Wiley
2	Dave shackleford, "Virtualization Security", SYBEX a wiley Bra	nd 2013
3	Mather, Kumaraswamy and Latif, "Cloud Security and Privacy",	OREILLY 2011
REFERENCES		
1	Mark C. Chu-Carroll —Code in the Cloudl,CRC Press, 2011 Computing Foundations and Applications Programming Rajkum Vechhiola, S. ThamaraiSelvi	2. Mastering Cloud harBuyya, Christian
COURSE OUT At the end of the	COMES: Bloo e course, learners will be able to Leve	m's Taxonomy l

CO2	Explain the security challenges in the cloud.	К3
CO3	Define cloud policy and Identity and Access Management.	К3
CO4	Understand various risks and audit and monitoring mechanisms in the cloud.	К3
CO5	Define the various architectural and design considerations for security in the cloud	K5

### JEPPIAAR

Programme &Branch       B.Tech& AI&DS       Sem.       Category       L       T       P       C          7       BS       3       0       0       3         The objective of the course is to       1. To provide information about neuroscientific progress towards reverse- engineering the brain       2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural       9	AA	M730-NEUROMORPHIC	C DESIG	GN AND COMPU	J <b>TIN</b>	G					
Programme &Branch         B.Tech& AI&DS         Sem.         Category         L         T         P         C            7         BS         3         0         0         3           The objective of the course is to         1. To provide information about neuroscientific progress towards reverse- engineering the brain         2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems           Preamble         Learning Outcomes The students are expected to have the ability to:         1. View neuromorphic computing as a computer architecture research problem 2. Perform software and hardware implementation of basic biological neural circuits           Unit 1         FOUNDATIONAL CONCEPTS         9           Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons         9           LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural         9											
&Branch       7       BS       3       0       0       3         The objective of the course is to       1. To provide information about neuroscientific progress towards reverse- engineering the brain       2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural       9	Programme	B.Tech& AI&DS	Sem.	Category	L	Т	P	С			
The objective of the course is to       3       0       0       3         The objective of the course is to       1. To provide information about neuroscientific progress towards reverse-engineering the brain       2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural       9	&Branch										
The objective of the course is to         1. To provide information about neuroscientific progress towards reverse- engineering the brain         2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:         1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural			7	BS	3	0	0	<u>3</u>			
Image: 1. To provide information about neuroscientific progress towards reverse- engineering the brain       1. To provide information about neuroscientific progress towards reverse- engineering the brain         2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Learning Outcomes         The students are expected to have the ability to:         1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural		The objective of the cour	se is to					L			
engineering the brain       2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural       9		1. To provide information	on aboi	it neuroscientific	prog	ress	towa	rds reverse-			
Preamble       2. To provide essentials on key hardware building blocks, system level VLSI design and practical realworld applications of neuromorphic Systems         Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural       9		engineering the brain			1 0						
Preamble       design and practical realworld applications of neuromorphic Systems         Learning Outcomes       The students are expected to have the ability to:         1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural circuits       9		2. To provide essentials	on key l	nardware building	block	ks, sy	stem	level VLSI			
Preamble       Learning Outcomes         The students are expected to have the ability to:       1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits       Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural circuits       9		design and practical realv	vorld ap	plications of neuro	omorp	ohic S	Syste	ms			
The students are expected to have the ability to:         1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS         9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons         Unit 2       NEURON MODELS         9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural circuits	Preamble	Learning Outcomes									
1. View neuromorphic computing as a computer architecture research problem         2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS         9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons         Unit 2       NEURON MODELS         9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural		The students are expected to have the ability to:									
2. Perform software and hardware implementation of basic biological neural circuits         Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         Unit 2       NEURON MODELS       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural		1. View neuromorphic computing as a computer architecture research problem									
Circuits       Structure		2. Perform software and	hardwa	re implementation	n of b	asic	biolo	gical neural			
Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         Unit 2       NEURON MODELS       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural		circuits									
Unit 1       FOUNDATIONAL CONCEPTS       9         Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons       9         Unit 2       NEURON MODELS       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural		ESTI									
Introduction to neuromorphic engineering, neuroanatomy of human brain, signaling and operation of biological neurons         Unit 2       NEURON MODELS       9         LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural	Unit 1	FOUNDATIONAL CON	NCEPT	S				9			
biological neurons     Image: Second se	Introduction to neurom	orphic engineering, neuro	anatom	/ of human brain.	signa	ling	and	operation of			
Unit 2     NEURON MODELS     9       LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural	biological neurons		••••••	,	8						
Unit 2NEURON MODELS9LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural											
LIF, IF, HH, synapses and plasticity rules, spike-time-dependent plasticity (STDP), biological neural	Unit 2	NEURON MODELS						9			
	LIF, IF, HH, synapses	and plasticity rules, spike-	-time-de	pendent plasticity	(STI	DP),	biolo	gical neural			
circuits, non-von Neumann computing approach, learning rules, retina, cochlea. (14 Lectures)	circuits, non-von Neum	ann computing approach, l	earning	rules, retina, coch	lea. (	14 Le	ecture	es)			
Unit 3NEUROMORPHIC COMPUTING9	Unit 3	NEUROMORPHIC CO	MPUT	ING				9			

Spiking Neural I	Networks (SNN), Advanced Nanodevices for Neuron Implen	nentation, Synaptic
emulation		
Unit 4	MEMORY	9
Non-volatile mer	nory (NVM), Flash, RRAM, memristors, CNT, Case study	on Intel's Loihi
neuromorphic chip	p.	
Unit 5	HARDWARE IMPLEMENTATION	9
Electronic synaps	ses, Digital/Analog neuromorphic VLSI, Hardware Implement	ntation of Neuron
circuits, Hardwar	re Implementation of Synaptic and Learning circuits, Syna	aptic programming
methodology optin	mization.	
		Total: 45
TEXTBOOKS		
1	S. C. LIU (2002), Analog VLSI: Circuits and Principles, MIT Pres	ss.
2	R. KOZMA (2012), Advances in Neuromorphic Memristor Science	ce, Springer.
3	E. KANDEL (2012), Principles of Neural Science, McGraw Hill.	



#### **OPEN ELECTIVES**

<b>AME701 - DRONE TECHNOLOGIES</b>	5
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0	BE	& MEC	Н		Sem.		Catego	ry	L	Τ	Р	С
&Branch					וחו	0 0						
			J			пп	OE		3	0	0	3
Preamble	> To i	indersta	nd the b	asic	es of dro	ne coi	ncents					
Treamore	> To	learn	and u	nder	stand	the fi	undame	nts of	de	sign.	fab	rication an
	prog	grammin	g of dro	one.						0 /		
	> To i	impart th	e know	ledg	ge of a f	lying a	and ope	ration o	f dro	one.		
	> To l	know abo	out the	vario	o <mark>us</mark> app	licatio	ns of di	one.				
	> Το ι	understai	nd the s	afet	y risks a	and gu	idelines	s of fly s	safel	y.		
Unit 1	INTRODU	JCTION	TO D	RON	NE TE	CHNC	DLOGY	7				9
Drone Concep	t - Vocabula	ry Termi	inology	- Hi	istory o	f dron	e - Typ	es of c	urrei	nt gei	nerat	ion of drone
based on their	method of	propulsi	on- Dr	one	techno	logy i	mpact of	on the l	ousir	nesse	s- D1	one busines
through entrep	reneurship- C	Opportun	ities/ap	plic	ations f	or enti	reprene	urship a	nd e	mplo	yabil	ity
Unit 2	DRONE D	ESIGN,	FABR	ICA	TION	AND	PROG	RAMM	INC	Ţ		9
Classifications	of the UAV	-Overvi	ew of t	he r	nain dr	one pa	urts- Te	chnical	char	acter	istics	-Function (
the component	s -Assemblin	ig a dron	e- The	ener	gy sour	ces- L	evel of	autonoi	ny- I	Dron	es co	nfigurations
The methods	of programn	ning dro	one- Do	ownl	load pr	ogram	-Instal	l progr	am (	on co	ompu	ter- Runnin
Drograma Mu	lti rotor stabi	lization-	Flight	mod	es -Wi-	Fi con	nection	.7				
i iogranis- mu			AND C	)PE	RATIO	Ν		7				9
Unit 3	DRONE F	LY ING.									11 1	
Unit 3	<b>DRONE F</b> Deration for c	lrone -F	light m	ode	s- Oper	ate a	small c	lrone in	a c	ontro	llea	environmen
Unit 3 Concept of op Drone controls	DRONE F peration for c Flight opera	lrone -F ations –	light m manage	ode: men	s- Oper it tool -	ate a -Senso	small c rs-Onb	lrone in oard sto	a c orage	ontro capa	acity	environmen - Removabl
Unit 3 Concept of op Drone controls storage devices	DRONE F peration for c Flight opera s- Linked mo	lrone -F ations –I bile devi	light m manage ices and	ode: men 1 app	s- Oper at tool – plication	ate a -Senso ns.	small c ors-Onb	lrone in oard sto	a c orage	ontro capa	acity	environmen - Removabl
Unit 3 Concept of op Drone controls storage devices Unit 4	DRONE F beration for c Flight opera S- Linked mo DRONE C	lrone -F ations –1 bile devi	light m manage ices and	iodes men l app L <b>AP</b>	s- Oper at tool - plication <b>PPLIC</b>	ate a -Senso ns.	small c rs-Onb	lrone in oard sto	a c orage	ontro capa	acity	environmen - Removabl 9
Unit 3 Concept of op Drone controls storage devices Unit 4 Choosing a dro	DRONE F beration for c Flight opera - Linked mo DRONE C one based on	drone -F ations –I bile devi COMME the appl	light m manage ices and <b>RCIAI</b> lication	iodea men l app L <b>AF</b> -Dr	s- Oper at tool - plication <b>PPLIC</b> ones in	ate a -Senso ns. ATION	small c rs-Onb NS	lrone in oard sto	a c orage - Dro		in de	environmen - Removabl 9 livering mai
Unit 3 Concept of op Drone controls storage devices Unit 4 Choosing a dro parcels and ot	DRONE F         peration for c         s Flight operations         s- Linked mo         DRONE C         one based on         her cargo- D	drone -F ations –I bile devi COMME the appl rones in	light m manage ices and <b>RCIAI</b> lication agricul	nodes men l app L <b>AP</b> -Dr ture	s- Oper at tool - plication <b>PPLIC</b> rones in - Drong	ate a -Senso ns. ATION the in es in in	small c ors-Onb NS asurance nspectio	lrone in oard sto e sector on of tra	a c orage - Dro ansm	ontro capa capa ones	in de	environmen - Removabl 9 livering mai es and powe
Unit 3 Concept of op Drone controls storage devices Unit 4 Choosing a dro parcels and ot distribution -D	<b>DRONE F</b> peration for c         s Flight operations         s- Linked mode <b>DRONE C</b> one based on         her cargo- Dir         rones in film	drone -F ations –I bile devi COMME the appl rones in ing and j	light m manage ices and <b>RCIAI</b> lication agricul panorar	iodes men l app L AP -Dr ture nic p	s- Oper at tool - plication <b>PPLIC</b> rones in - Drone picturin	rate a -Senso ns. ATION the in es in in g.	small c ors-Onb NS asurance nspectio	lrone in oard sto e sector on of tra	a c orage - Dro ansm	ontro capa capa	in de	environmen - Removabl 9 livering mai es and powe
Unit 3 Concept of op Drone controls storage devices Unit 4 Choosing a dro parcels and oth distribution -D Unit 5	DRONE F.         peration for complexity         s Flight operations         s Flight operations         s Flight operations         b DRONE C         one based on         her cargo- Dir         rones in film         FUTURE 1	drone -F ations –I bile devi <b>OMME</b> the appl rones in ing and I <b>DRONE</b>	light m manage ices and RCIAI lication agricul panorar	iodes men d app L AF -Dr ture nic p SA	s- Oper offication PPLICA ones in - Drone picturin FETY	rate a -Senso ns. ATION the in es in in g.	small c rs-Onb VS surance nspectio	lrone in oard sto e sector- on of tra	a c prage - Dro ansm	ontro capa ones i	in de	environmen - Removab 9 livering mai es and powe

license- N	Miniaturization of drones- Increasing autonomy of drones -The use	of drones in swarms.
		Total: 45
TEXTBO	DOKS	
1	Daniel Tal and John Altschuld, "Drone Technology in Arch Construction: A Strategic Guide to Unmanned Aerial Implementation", John Wiley & Sons, Inc, 2021.	itecture, Engineering and Vehicle Operation and
2	Terry Kilby and Belinda Kilby, "Make:Getting Started with D Edition, 2016.	rones ",Maker Media, 1 st
REFERI	ENCES	
1	John Baichtal, "Building Your Own Drones: A Beginners' Gui ROVs", Que Publishing, 2016	de to Drones, UAVs, and
2	Zavrsnik, "Drones and Unmanned Aerial Systems: Legal and Security and Surveillance", Springer, 2018.	d Social Implications for
COURS At the er	EOUTCOMES: nd of the course, learners will be able to	Bloom's Taxonomy Level
CO1	Know about a various type of drone technology, drone fabrication and programming.	K2
CO2	Execute the suitable operating procedures for functioning a drone.	K3
CO3	Select appropriate sensors and actuators for Drones.	K3
CO4	Develop a drone mechanism for specific applications.	K4
CO5	Create the programs for various drones.	K6

CO/P	PO	PO1	PO1	PO1	PSO	PSO	PSO								
Ο	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
CO1	1	2	3	1	3	2						1	2	1	3
CO2	1	2	3	1	3	2						1	2	1	3
CO3	1	2	3	1	3	2						1	2	1	3

CO4	1	2	3	1	3	2			1	2	1	3
CO5	1	2	3	1	3	2			1	2	1	3

	AME702 - ADDIT	FIVE N	IANUFACTU	JRING				
Programme &Branch	BE& MECH	Sem.	Catego	ry	L	T	Р	C
			OE		3	0	0	3
Preamble	<ul> <li>To introduce the d Manufacturing (AM), a</li> <li>To be acquainted with</li> <li>To be familiar with pow</li> <li>To gain knowledge on jetting processes.</li> </ul>	evelopr and its b vat poly wder been applic	nent, capabi pusiness oppor merization an d fusion and b ations of dire	lities, a tunities. d materi inder jet ct energ	appli appli ial e: tting y de	catic xtrus proc eposi	ion p cesses tion,	of Additive rocesses s. and material
Unit 1	INTRODUCTION	ii sileet			will			<b>9</b>
Rapid Tooling 52900 Classific in AM. Unit 2 Photo polymeri up approach - Advantages - A - Applications a	- Rapid Manufacturing - Add cation - Benefits - AM File form VAT POLYMERIZATION A ization: Stereolithography Appa Advantages - Limitations - Applications. Material Extrusion nd Limitations	Itive M nats: ST ND MA ratus (S oplications: Fused	Ianufacturing. L, AMF – Ap ATERIAL EX LA)- Materia ons. Digital L Deposition M	AM Proplication	ione ns - ione ess - ocess (FD	top M) -	down (DLF Proc	<ul> <li>ASTM/ISO Opportunities</li> <li>9</li> <li>n and bottom-</li> <li>P) - Process - cess-Materials</li> </ul>
Unit 3	POWDER BED FUSION AN	JD BIN	DER JETTI	NG				9
Powder Bed Fu and Application Advantages an Benefits - Limi	asion: Selective Laser Sintering n. Selective Laser Melting (SLM ad Applications. Binder Jetting tations -Applications.	(SLS): (SLS): (I), Elec (I), Elec	Process - Pov tron Beam Me e-Dimensional	wder Fu elting (E	sion EBM 1g -	Mec ): M Mat	hani ateria erial	sm -Materials als - Process - s - Process -
Unit 4	MATERIAL JETTING AND DEPOSITION	DIRE	CTED ENER	GY				9
Material Jetting Deposition: Las Applications.	g: Multijet Modeling- Material ser Engineered Net Shaping (LE	s - Pro ENS) - F	cess - Benefi Process – Mate	ts - App erial Del	olica	tions y -M	. Dir ateri	rected Energy als -Benefits -

Unit	5	SHEET LAMINATION AND DIRECT WRITE	9
		TECHNOLOGI	
Sheet La Adhesive Writing ( DW.	uminati e Bonc (DW):	on: Laminated Object Manufacturing (LOM)- Basic Princip ling - Thermal Bonding - Materials - Application and Lin Nozzle Dispensing Processes, Inkjet Printing Processes, Aero	le- Mechanism: Gluing or nitation. Ink-Based Direct osol DW - Applications of
			Total: 45
TEXTB	OOKS	6	
1	Ian ( techr	Gibson, David Rosen, Brent Stucker, Mahyar Khorasani, nologies", Springer Cham, 3rd edition, 2021.	"Additive manufacturing
2	Andr Proto	eas Gebhardt and Jan-Steffen Hotter "Additive Manufa otyping and Manufacturing", Hanser publications, 2016.	cturing: 3D Printing for
REFER	ENCE	S INSTITUTE OF TECHNOLOGY	
1	Andr Manu	eas Gebhardt, "Understanding Additive Manufacturing: I ufacturing", Hanser Gardner Publication, 1 st Edition, 2012.	Rapid Prototyping, Rapid
2	Mila Appl	n Brandt, "Laser Additive Manufacturing: Materials, Dications", Woodhead Publishing, 1 st Edition, 2016.	esign, Technologies, and
3	Amit 2021	Bandyopadhyay and Susmita Bose, "Additive Manufacturing	;", 2 nd Edition, CRC Press,
4	Kam	rani A.K. and Nasr E.A, "Rapid Prototyping: Theory and prac	tice", Springer,2006.
5	Liou, proto	, L.W. and Liou, F.W., "Rapid Prototyping and Engineering a otype development", CRC Press, 2019.	applications: A toolbox for
		Discipline	
COURS At the er	EOUT nd of t	COMES: he course, learners will be able to	Bloom's Taxonomy Level
CO1	Reco techn oppo	gnize the development of AM technology and how AM nology propagated into various businesses and developing rtunities.	K2
CO2	Acqu extru	ire knowledge on process vat polymerization and material sion processes and its applications.	K2
CO3	Elabo binde	brate the process and applications of powder bed fusion and er jetting.	K2
CO4	Evalı jettin	uate the advantages, limitations, applications of material g and directed energy deposition processes.	K2

	1								
CO5	Acquire	knowledge	on	sheet	lamination	and	direct	write	K
	technolo	gy.							

CO/P	PO	PO	PO	PO	PO	PO	РО	PO	РО	PO1	PO1	PO1	PSO	PSO	PSO
0	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
CO1	2	2	2	2	2							2	2	2	2
CO2	2	2	2	2	2							2	2	2	2
CO3	2	2	2	2	2	JE	P	ן	98	R		2	2	2	2
CO4	2	2	2	2	2	INST	TUTE	DF TEO	HNOL	DGY		2	2	2	2
CO5	2	2	2	2	2							2	2	2	2

	*.						
Programme &Branch	BE& MECH	Sem.	Category	L	Т	Р	С
	Silos -	<u></u>	OE	3	0	0	3
Preamble	<ul> <li>To introduce the con</li> <li>To alaborate on the</li> </ul>	ncept of hybr	rid and electric driv	e trai	ns.	a driva	troing
	To evaluate on differ	ant types and ut	$\frac{1113}{100} = \frac{111}{100} = \frac{111}{100} = \frac{1110}{100} = 1110$	for el	ectric	vehic	los
	<ul> <li>To learn and utilise</li> </ul>	different type	es of energy storag	e svet	eme	venic	105.
	<ul> <li>To introduce concer</li> </ul>	of energy	management strates	vies a	nd dr	ive siz	ving
Unit 1	INTRODUCTION	ESTD. 20		<u></u>			<u>9</u>
Basics of veh	icle performance, vehicle p	ower source	characterization,	transi	nissi	on ch	aracteristics,
History of hyl	orid and electric vehicles, so	ocial and en	vironmental impor	tance	of h	ybrid	and electric
vehicles, impa	ct of modern drivetrains on e	nergy suppli	es.				
Unit 2	HYBRID ELECTRIC DE	RIVE TRAI	NS				9
Basic concept	of hybrid traction, introduc	ction to vari	ous hybrid drive-t	rain t	opol	ogies,	power flow
control in hybr	rid drive-train topologies, fue	el efficiency	analysis. Electric I	Drivet	rains	: Basi	c concept of
electric tractio	n, introduction to various ele	ectric drive-	train topologies, po	ower	flow	contro	ol in electric
drive-train top	ologies, fuel efficiency analys	sis.					

Unit 3 CONTROL OF AC & DC DRIVES								9
Introdu DC Mc Motor c	ction to otor driv lrives, c	electric component ves, Induction Mo lrive system efficie	nts used in hyb tor drives, Per ncy.	orid and manent	electric ve Magnet M	hicles, C lotor driv	onfiguration on figuration on figuration of the second sec	on, and control vitch Reluctanc
Uni	t 4	ENERGY STOP	RAGE					9
Introdu analysis storage	ction to s - Batte devices	Energy Storage R ery based, Fuel Cel	equirements ir l based, and Su	ı Hybric ıper Cap	l and Elect pacitor base	ric Vehic d, Hybrid	les, Energy lization of	y storage and it different energ
Uni	t 5	DRIVE SIZING STRATEGIES	AND ENERG	Y MAN	IAGEMEN	NT		9
Sizing Sizing echnole rehicles	the driv the pro ogy, En s, classi	ve system: Matchi pulsion motor, siz ergy Management fication, and comp	ng the electric ting the power Strategies: Ene arison of energ	machin electro ergy man y manag	ne and the phics, select magement s gement stra	internal tion of a trategies tegies, In	combustio appropriate used in hy aplementat	n engine (ICE energy storag brid and electri ion issues.
FYT	ROOKS	3						Total: 4
1	Iqba 3 rd Ec	Husain, "Electric lition, 2021	and Hybrid Ve	hicles: I	Design Fun	damental	s", Routled	lge publication
	_							
2	Jame Editi	es Larminie and . on, 2012.	John Lowry, "	Electric	Vehicle 7	Cechnolog	gy Explain	ned", Wiley, 2
2 REFER	Jame Editi	es Larminie and 3 on, 2012.	John Lowry, "	Electric	Vehicle 7	[echnolog	gy Explair	ed", Wiley, 2
2 REFER 1	Jame Editi RENCE Meh and I	es Larminie and Jon, 2012. S rdad Ehsani, Yimi Fuel Cell Vehicles:	John Lowry, " Gao, Sebastian Fundamentals,	Electric E. Gay Theory	Vehicle 7 Ali Emad and Design	Cechnolog i, "Moden n", CRC	gy Explain m Electric, Press, 3 rd H	ed", Wiley, 2 Hybrid Electri Edition 2018.
2 REFER 1 2	Jame Editi RENCE Meh and I Ranc 1998	es Larminie and Jon, 2012. S rdad Ehsani, Yimi Fuel Cell Vehicles: I D.A.J, Woods, R	John Lowry, " Gao, Sebastian Fundamentals, & Ronald Dell	Electric E. Gay Theory , "Batte	Vehicle T , Ali Emad and Design ries for Ele	Cechnolog i, "Moder n", CRC	y Explain n Electric, Press, 3 rd H	Hybrid Electri Edition 2018. n Wiley & Son
2 REFER 1 2 3	Jame Editi RENCE Meh and I Ranc 1998 Jack Editi	es Larminie and Jon, 2012. S rdad Ehsani, Yimi Fuel Cell Vehicles: I D.A.J, Woods, R J. Erjavec, "Hybrid, on, 2012.	John Lowry, " Gao, Sebastian Fundamentals, & Ronald Dell Electric and	Electric E. Gay Theory , "Batte Fuel-Ce	Vehicle T Ali Emadi and Design ries for Elect Il Vehicles	Technolog i, "Moden n", CRC Tectric veh	gy Explain en Electric, Press, 3 rd H icles", Joh	Hybrid Electri Edition 2018. n Wiley & Son e Learning, 2 ¹
2 <b>REFER</b> 1 2 3 4	Jame Editi RENCE Meh and I Ranc 1998 Jack Editi Chris	es Larminie and Jon, 2012. S rdad Ehsani, Yimi Fuel Cell Vehicles: I D.A.J, Woods, R Erjavec, "Hybrid, on, 2012. Stian Paar, "Energy I Verlag, 2011.	John Lowry, " Gao, Sebastian Fundamentals, & Ronald Dell Electric and	Electric E. Gay Theory , "Batte Fuel-Ce in Hyl	Vehicle T , Ali Emad and Design ries for Electronic Ele	Technolog i, "Moder n", CRC Tectric veh	m Electric, Press, 3 rd H icles", Joh ar Cengag	Hybrid Electri Edition 2018. n Wiley & Sons e Learning, 2 ¹ Co-Simulation
2 <b>REFER</b> 1 2 3 4 5	Jame Editi Editi RENCE Meh and I Ranc 1998 Jack Editi Chris VDN Yang and 2014	es Larminie and Con, 2012. S rdad Ehsani, Yimi Fuel Cell Vehicles: I D.A.J, Woods, R Erjavec, "Hybrid, on, 2012. stian Paar, "Energy I Verlag, 2011. sheng Xu, Jingyu Y Control: Intelligen	John Lowry, " Gao, Sebastian Fundamentals, & Ronald Dell Electric and Management Yan, Huihuan Q nt Omnidirectio	Electric E. Gay Theory , "Batte Fuel-Ce in Hyl Dian and Dian Hy	Vehicle T Ali Emadi and Design ries for Ele Il Vehicles orid Electr Tin Lun La brids", Mo	Cechnolog i, "Moder n", CRC ctric veh ctric veh ic Vehic um, "Hyb cGraw H	y Explain rn Electric, Press, 3 rd I icles", Joh ar Cengag les using rid Electric ill Educta	Hybrid Electri Edition 2018. n Wiley & Sons e Learning, 2 ^r Co-Simulation' c Vehicle Desig ion, 1 st Edition

CO1	Discuss, categorize and configure hybrid drivetrains requirement for a vehicle.	K2
CO2	Design and apply appropriate hybrid and electric drive trains in a vehicle.	K5
CO3	Design and install suitable AC and DC drives for electric vehicles.	К5
CO4	Discuss arrive at a suitable energy storage system for a hybrid / electric vehicle.	К2
CO5	Apply energy management strategies to ensure better economy and efficiency.	К3

CO/P	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO							
Ο	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
CO1	3	2	1	1	1		2						1	2	3
CO2	3	2	1	1	1		2						1	2	3
CO3	3	2	1	1	1		2				×		1	2	3
CO4	3	2	1	1			2		- AFA		100		1	2	3
CO5	3	2	1	1	1%		2	) दू	Ø				1	2	3

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	201	5.5	

	AEC7	01 - SENS	ORS AN	D ACTUA	ТО	RS				
							1			1
Programme&B	BE& ECE			Sem.	Ca	tegory	L	Т	Р	С
ranch	DEC ECE		STD. 20	11 - 2		OE	3	0	0	3
Preamble	The course is t	to make the	e students	to list cor	nmo	n types o	of ser	isor ai	nd actu	ators
	used in autom	otive vehic	eles.							
Unit–I	INTRODUC	CTION TO	) MEASU	J <b>REMEN</b>	TS A	AND			9	
	SENSORS									
Sensors: Functions-	Classifications	- Main te	chnical r	equiremen	t an	d trends	Uni	ts an	d stand	lards
Calibration methods-	Classificatio	n of erro	ors- Error	analysis-	- Li	miting o	error	- Pro	bable	error
Propagation of erro	r- Odds and	uncertain	nty- prin	ciple of	trans	sduction	-Clas	sificat	tion. S	Static
characteristics- mathe	ematical mode	el of trans	sducers-	Zero, Fir	st a	nd Seco	ond o	order	transdu	icers
Dynamic characteristi	cs of first and	second ord	ler transdı	acers for st	tanda	ard test				
Unit–II	VARIABLE	RESISTA	ANCE AN	ND INDU'	TAN	ICE			9	

	SENSORS	
Princip	le of operation- Construction details- Characteristics and ap	plications of resistive
potenti	ometer- Strain gauges- Resistive thermometers- Thermistors- Piezore	sistive sensors Inductive
potenti	ometer- Variable reluctance transducers: - EI pick up and LVDT	
Unit-	III         VARIABLE AND OTHER SPECIAL SENSORS	9
Variab Piezoe Sensor	le air gap type, variable area type and variable permittivity type lectric, Magneto strictive, Hall Effect, semiconductor sensor- digit Rain sensor climatic condition sensor solar light sensor antiglare se	- capacitor microphone al transducers-Humidity
Unit-	IV AUTOMOTIVE ACTUATORS	9
Flectro	mechanical actuators. Fluid-mechanical actuators. Electrical m	achines- Direct-current
machir	ues. Three-phase machines. Single-phase alternating-current Machine	s - Duty-type ratings for
electric	al machines. Working principles, construction and location of actual	ors viz Solenoid relay
stenne	motor etc.	ions vizi. Solonola, relay,
Unit-	V AUTOMATIC TEMPERATURE CONTROL	9
cint	ACTUATORS INSTITUTE OF TECHNOLOGY	
Differe	nt types of actuators used in automatic temperature control- Fixed ar	d variable displacement
temper	ature control- Semi Automatic- Controller design for Fixed and varial	ble displacement type air
conditi	oning system.	1 71
		Total. 15
TEX'	FROOK.	10(a).43
1		
1.	McGraw Hill Publishers, 2019.	bebelinDhaneshN.Manik
2.	Robert Brandy, "Automotive Electronics and Computer System", Pr	entice Hall,2001
3.	William Kimberley," Bosch Automotive Handbook", 6th Edition 2004.	, Robert Bosch GmbH,
4.	Bosch Automotive Electrics and Automotive Electronics Syst Networking and Hybrid Drive, 5th Edition, 2007, ISBN No: 978-3-6	ems and Components, 58-01783-5
REF	ERENCES:	
1.	James D Halderman, "Automotive Electrical and Electronics", Prenti	ce Hall, USA, 2013
2.	Tom Denton, "Automotive Electrical and Electronics Systems," The International.	ird Edition, 2004, SAE
3.	Patranabis.D, "Sensors and Transducers", 2nd Edition, Prentice Hall I	ndia Ltd,2003
4.	William Ribbens, "Understanding Automotive Electronics -An Engir Edition, Elsevier Butterworth-Heinemann Publishers, 2012	eering Perspective," 7th
COU	RSEOUTCOMES:	<b>Bloom's Taxonomy</b>
At th	e end of the course, learners will be able to	Level
CO1	List common types of sensor and actuators used in vehicles	K2

CO4 Un	dersta	and th	e opera	n. ation	of th	e sen	sors,	actu	ators	and e	electro	onic		K2	
	ntrol.	ompor	oturo oo	ntrol	ootuot	tors fo	r vob	iolog						K/	
CO5 De	sign u	empera		miloi	actual		or ven	licies.						Λ4	
CO/P	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO	PO1	PC	)11 I	201	PSO 1	PSO 2
C01	3	2	3	2	-	-	-	1	-	-	-	4	-	1	1
CO2	3	3	3	2	2	-	-	1	_	_	-		-	1	1
CO3	3	3	2	2	2	-	-	1	-	-	-		-	2	2
CO4	3	3	3	3	2	-	_	1	-	-	-		-	3	2
CO5	3	2	3	3	2	-	-	1	-	-	-		-	2	2
									POLO			ma			
				Α.	EC70	2 - Al	PPLI	ED D	DESIC	FN TE	UNK	ING			
						51110		Itun	NULU	Li Y		[			
Program	me&		RF& F	CF			Sen	1.	Cate	gory	L	Т	P		С
Branch			DEC E	CL					0	T	2	•	0		3
									U	E	3	U	U		3
Preamble	:		<ul> <li>T</li> <li>te</li> <li>II</li> <li>D</li> </ul>	his c chniq lustra emon	ourse jues of te cus istrate	aims f desig tomer dev	to p gn thi -cent: elopn	provid nking ric pr nent	le to g for in oduct of N	make nnovat innov Vinim	the tive p ation	stude rodue using usabl	ents et, de g sim e P	Introdu evelopm ple, use rototype	ce tools ent. e cases. es, Outli
Preamble Unit–I	1		<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> <li>D</li> </ul>	his c chniq lustra vemon rincip vescril N TH	ourse jues of te cus istrate les of be syst	aims f desig tomer dev soluti tem th	to p gn thi cent elopn ion co ninkin	provid nking ric pr nent oncept ng prin	le to g for in oduct of N ts & t nciple	make nnovat innov Minim heir ev es as ap	the tive p ation um valuat	stude rodue using usabl ion. l to c	ents et, de g sim e P ompl	Introdu evelopm pple, use rototype lex syste	ce tools ent. e cases. es, Outli ems 9
Preamble Unit–I Exploring	Hun		<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> <li>D</li> <li>DESIG</li> </ul>	his c cchniq lustra emon rincip escrit <b>N TH</b> Desig	ourse lues of te cus istrate les of be syst <b>IINKI</b> n - U	aims f desig tomer dev soluti tem th <b>ING H</b> Inders	to p gn thi elopn ion co ninkin <b>PRIN</b>	provid nking ric pr nent oncept ig prin <b>CIPI</b>	le to g for in oduct of N ts & t nciple LES ie Inn	make nnovat innov Minim heir ev es as ap	the tive p ation um valuat oplied	stude rodue using usabl ion. I to c	ents et, de g sim e P ompl	Introdu evelopm pple, use rototype lex syste	ce tools ent. e cases. es, Outli ems 9 g areas o
Preamble Unit–I Exploring	Hun y, Int	nan-ce erview	<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> <li>D</li> <li>DESIG</li> <li>ntered</li> <li>ring &amp; </li> </ul>	his c chniq lustra eemon rincip eescril <b>N TH</b> Desig empat	ourse lues of strate les of ce syst <b>UNKI</b> m - U thy-bu	aims f desig tomer dev soluti tem th ING H Jnders iilding	to p gn thi c-cent elopn ion co ninkin <b>PRIN</b> standing tech	provid nking ric pr nent oncept ng prin <b>CIPI</b> ng th mique	le to g for in oduct of M ts & t nciple LES ne Inn es, M	make nnovat innov Minim heir ev s as ap ovatio itigate	the tive p ation um valuat opliec n pro valic	stude rodue using usabl ion. l to co ocesse latior	ents et, de g sim e P ompl	Introdu evelopm pple, use rototype lex syste covering c with F	ce tools ent. e cases. es, Outli ems 9 g areas o TIR [Forg
Preamble Unit–I Exploring opportunit nnovatior	Hun y, Int	nan-ce erview	<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> <li>D</li> <li>DESIG</li> <li>ing &amp; c</li> <li>ase studies</li> </ul>	his c cchniq lustra vemon rincip vescrit N TH Desig empat	ourse lues of strate les of De syst <b>IINKI</b> n - U thy-bu	aims f desig tomer dev soluti tem th <b>ING H</b> Juders	to p gn thi elopn ion co ninkin <b>PRIN</b> standing tech	provid nking ric pr nent oncept ng prin <b>CIPI</b> ng th	le to g for in oduct of M ts & t nciple <b>LES</b> ie Inn es, M	make nnovat innov Minim heir ev es as ap ovatio itigate	the tive p ation valuat oplied valuat	stude rodue usabl ion. l to c bcess latior	ents ct, de g sim e P ompl , disa	Introdu evelopm pple, use rototype lex syste covering c with F	ce tools ent. e cases. es, Outli ems 9 g areas of TIR [Forg
Preamble Unit–I Exploring opportunit innovatior Unit–II	Hun y, Int ı rubri	nan-ce erview [c] - C	<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> <li>D</li> <li>DESIG</li> <li>ing &amp; indicated for the set of the set of</li></ul>	his c cchniq lustra pemon rincip pescrit <b>N TH</b> Desig empaties SER-0	ourse jues of istrate les of De syst <b>UNKI</b> n - U thy-bu	aims f desig tomer dev soluti tem th ING H Inders ailding	to p gn thi cent: elopn ion co ninkin PRIN standii g tech	provid nking ric pr nent oncept ng prin <b>CIPI</b> ng th nnique	le to g for in oduct of M ts & t nciple LES ie Inn es, M TION	make nnovat innov Minim heir ev es as ap ovatio itigate	the tive p ation um valuat oplied n pro valid	stude rodue using usabl ion. l to c	ents et, de g sim e P ompl	Introdu evelopm pple, use rototype lex syste covering c with F	ce tools ent. e cases. es, Outli ems 9 g areas o TIR [Forg 9
Preamble Unit–I Exploring opportunit nnovatior Unit–II mportanc	Hun y, Int rubri e of	ic] - C	<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> </ul> DESIG Intered ing & 0 ase stud ENDUS mer-cer	his c chniq lustra emon rincip escrit <b>N TH</b> Desig empat lies <b>SER-</b>	ourse lues of te cus istrate les of oe syst <b>IINKI</b> n - U thy-bu <b>CENT</b> innov	aims f desig tomer dev soluti tem th <b>ING H</b> Juders ailding	to p gn thi elopn ion co ninkin PRIN standin g tech INN( - Pr	provid nking ric pr nent oncept ng prin <b>CIPI</b> ng th nnique <b>DVA</b>	le to g for in oduct of M ts & t nciple LES ne Inn es, M TION	make nnovat innov Minim heir ev es as ap ovatio itigate	the ive p ation um valuat opliec valic	stude rodue using usabl ion. l to c bcess latior	ents et, de g sim e P ompl , dise a risk	Introdu evelopm ple, use rototype lex syste covering c with F	ce tools ent. e cases. es, Outli ems 9 g areas o TIR [Forg 9 scovery
Preamble Unit–I Exploring opportunit nnovatior Unit–II mportanc Understan	Hun y, Int ı rubri e of ding p	nan-ce erview ic] - C	<ul> <li>T</li> <li>T</li> <li>II</li> <li>D</li> <li>D</li> </ul> DESIG ontered ing & for the set of the	his c cchniq lustra eemon rincip eescrit <b>N TH</b> Desig empat lies <b>SER-0</b> ntric	ourse lues of te cus istrate les of oe syst <b>UNKI</b> n - U thy-bu CENT innov e and	aims f desig tomer dev soluti tem th ING H Inders uilding TRIC ation probl	to p gn thi c-cent elopn ion co ninkin <b>PRIN</b> standir g tech <b>INNO</b> - Pr em in	provid nking ric prin nent oncept ng prin <b>CIPI</b> ng th nnique <b>OVA</b> roblem	le to g for in oduct of M ts & t nciple LES le Inn es, M TION m Va nce - (	make nnovat innov Vinim heir ev s as ap ovatio itigate	the ive p ation um valuat oplied valid	stude rodue using usabl ion. l to co bcess lation d C alida	ents ct, de g sim e P ompl , dis a risk	Introdu evelopm ple, use rototype lex syste covering c with F mer Di Target	ce tools eent. e cases. es, Outli ems 9 g areas o TIR [Forg 9 scovery user, Use
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System Thinking, Understanding Systems, Examples and Understandings, Complex Systems.

	Total:45
TEXTB	OOK:
1.	Steve Blank, (2013), The four steps to epiphany: Successful strategies for products that
	win, Wiley.
2.	Steve Blank, (2013), The four steps to epiphany: Successful strategies for products that
	win, Wiley.
3.	Proposition Design: How to Create Products and Services Customers Want, Wiley
4.	Donella H. Meadows, (2015), "Thinking in Systems - A Primer", Sustainability Institute
5.	Tim Brown,(2012) "Change by Design: How Design Thinking Transforms Organizations
	and Inspires Innovation", Harper Business.
REFER	ENCES:
1.	https://www.ideou.com/pages/design-thinking#process
2.	https://blog.forgeforward.in/valuation-risk-versus-validation-risk-in-product-
	innovations49f253ca86 24
3.	https://blog.forgefor ward.in/product-innovation-rubric-adf5ebdfd356 4. https
4.	https://blog.forgefor ward.in/evaluating-product-innovations-e8178e58b86e
5.	https://blog.forgeforward.in/user-guide-for-product-innovation-rubric-857181b253dd
6.	https://blog.forgeforward.in/startup-failure-is-like-true-lie-7812cdfe9b85
COUDS	EQUITCOMES.

	COURS	EOUTC	OMES	5:									Blooi	n's Tax	onomy
	At the e	nd of the	e course	e, lear	ners	will b	e able	to						Level	
	CO1	Define d	& test	vario	us hy	pothe	ses to	miti	gate t	he inh	erent 1	risks in	l	K2	
		product	innovat	ions											
	CO2	Design t	he solu	tion c	oncep	ot base	ed on t	the pr	opose	d valu	e by ex	ploring	5	K4	
		alternate	e solutio	ons to	achie	ve val	ue-pri	ce fit.							
	CO3	Develop	skills i	in emp	oathiz	ing, cı	ritical	thinki	ing, ar	nalyzir	ng, stor	ytelling	5	K4	
		& pitchi	ng												
	CO4	Develop	skills i	n stor	ytelli	ng & p	oitchir	ng 🥠	011		12	>		K3	
	CO5	Apply sy	ystem tl	hinkin	g in a	real-	world	scena	rio		$ \neg$			K3	
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	CO/PO	) PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	-	-	-	1	-	-	-	-	1	1
CO2	3	3	3	2	2	-	I	1	I	-	I	-	1	1
CO3	3	3	2	2	2	-	-	1	-	-	-	-	2	2
CO4	3	3	3	3	2	-	-	1	-	-	-	-	3	2
CO5	3	2	3	3	2	-	-	1	_	-	-	-	2	2

#### AEC703 - PROJECT REPORT WRITING

ranch       DECCL       -       OE       3       0         Preamble       > This course aims to provide essentials of project we difference between general writing and technical writing > Assimilate the fundamental features of report we structure of a technical and project report.       Image: Course aims to provide essentials of project we structure of a technical and project report.         Unit-I       Writing Skills – Essential Grammar and Vocabulary – Passive Voice, Reported Signpost words, Cohesive Devices – Paragraph writing - Technical Writing vs. Gen Unit-II         Project Report – Definition, Structure, Types of Reports, Purpose – Intended Audi – Report Writing in STEM fields – Experiment – Statistical Analysis.         Structure of the Project Report: (Part 1) Framing a Title – Content – Acknowledg Details -Abstract – Introduction – Aim of the Study – Background - Writing the result of the Study/Project Significance, Relevance – Determining the feasibil Framework.         Unit-IV       Structure of the Project Report: (Part 2) – Literature Review, Research Design, Collection - Tools and Procedures - Data Analysis - Interpretation - Finding Recommendations – Conclusion – Bibliography.         Unit-V       Image: Project Report – Avoiding Typographical Errors – Bibliography in requiree Spacing – Checking Tables and Illustrations – Presenting a Report Orally – Technical Writing Today (1998) Darla-Je Finance(2012)         2.       Virendra K. Pamecha - Guide to Project Reports, Project Appra Finance(2012)       Bloom's Atthe end of the course, learners will be able to         CO1       Write effective project reports.       CO1       Wr	Т	L   '	L	L	L	L	7	gory	Catego	C		em.	S				FOF	DEO	T		B	ne&B	mm	Prog
Preamble       > This course aims to provide essentials of project wr difference between general writing and technical writi > Assimilate the fundamental features of report w structure of a technical and project report.         Unit-I       Writing Skills – Essential Grammar and Vocabulary – Passive Voice, Reported Signpost words, Cohesive Devices – Paragraph writing - Technical Writing vs. Gen Unit-II         Project Report – Definition, Structure, Types of Reports, Purpose – Intended Audi Report Writing in STEM fields – Experiment – Statistical Analysis.         Unit-III         Structure of the Project Report: (Part 1) Framing a Title – Content – Acknowledg Details -Abstract – Introduction – Aim of the Study – Background - Writing the result Framework.         Unit-IV         Structure of the Project Report: (Part 2) – Literature Review, Research Design, Collection - Tools and Procedures - Data Analysis - Interpretation - Finding Recommendations – Conclusion – Bibliography.         Unit-V         Proof reading a report – Avoiding Typographical Errors – Bibliography in required Spacing – Checking Tables and Illustrations – Presenting a Report Orally – Technic REFERENCES:         1.       Gerson and Gerson - Technical Communication: Process and Proc Prentice Hall(2012)         2.       Virendra K. Pamecha - Guide to Project Reports, Project Appra Finance(2012)         3.       Daniel Riordan - Technical Report Writing Today (1998) Darla-Je (Pechnical Writing for Engineering Professionals (2016) Penwell Publist         CO1       Write effective project reports.       CO1         CO2	0	3	3	3	3	3		E	OE			-					ECE	5EX	1					ancl
structure of a technical and project report.         Unit-I         Writing Skills – Essential Grammar and Vocabulary – Passive Voice, Reported Signpost words, Cohesive Devices – Paragraph writing - Technical Writing vs. Gen Unit-III         Project Report – Definition, Structure, Types of Reports, Purpose – Intended Audi-Report Writing in STEM fields – Experiment – Statistical Analysis.         Unit-III         Project Report – Definition, Structure, Types of Reports, Purpose – Intended Audi-Report Writing in STEM fields – Experiment – Statistical Analysis.         Unit-III         Structure of the Project Report: (Part 1) Framing a Title – Content – Acknowled;         Details -Abstract – Introduction – Aim of the Study – Background - Writing the resolution and the Study – Background - Writing the feasibilitramework.         Unit-IV       Structure of the Project Report: (Part 2) – Literature Review, Research Design, Collection - Tools and Procedures - Data Analysis - Interpretation - Finding Recommendations – Conclusion – Bibliography.         Unit-V       Proof reading a report – Avoiding Typographical Errors – Bibliography in require: Spacing – Checking Tables and Illustrations – Presenting a Report Orally – Technical Structure Hall(2012)         2.       Virendra K. Pamecha - Guide to Project Reports, Project Appra Finance(2012)         3.       Daniel Riordan - Technical Report Writing Today (1998) Darla-Je Finance(2012)         3.       Daniel Riordan - Technical Report Writing Today (1998) Darla-Je Finance(2012)         3. <t< td=""><td>ct writing writing. ort writin</td><td>project v inical wi report</td><td>project inical w report</td><td>project mical w report</td><td>projec hnical repo</td><td>pro pro chnie f re</td><td>of p tech of</td><td>tials of and tures</td><td>ssentia iting a featur</td><td>le es writ tal</td><td>ovic eral nen</td><td>o pro gene ndam</td><td>ns te en fu</td><td>air tw he</td><td>urse ice be late f</td><td>co ren mil</td><td>This diffe Assii</td><td><b>A</b></td><td></td><td></td><td></td><td></td><td>ole</td><td>Prear</td></t<>	ct writing writing. ort writin	project v inical wi report	project inical w report	project mical w report	projec hnical repo	pro pro chnie f re	of p tech of	tials of and tures	ssentia iting a featur	le es writ tal	ovic eral nen	o pro gene ndam	ns te en fu	air tw he	urse ice be late f	co ren mil	This diffe Assii	<b>A</b>					ole	Prear
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Spacing – Checking Tables and Illustrations – Presenting a Report Orally – Technic         REFERENCES:         1.       Gerson and Gerson - Technical Communication: Process and Proce Prentice Hall(2012)         2.       Virendra K. Pamecha - Guide to Project Reports, Project Appra Finance(2012)         3.       Daniel Riordan - Technical Report Writing Today (1998) Darla-Je Technical Writing for Engineering Professionals (2016) Penwell Publish         COURSEOUTCOMES:         At the end of the course, learners will be able to         CO2       Use statistical tools with confidence         CO3       Explain the purpose and intension of the proposed project coherently and with clarity.       CO4         C04       Create writing texts to suit achieve the intended purpose.       CO5	indings	- Find	- Find	- Find	in rec	n -	ation	pretat	nterpr Biblios	- Ir	sis	nalys	A hy.	ata rap	- D bliog	res Bi	cedu on – iding	l Pro	anc Co rt –	s - C	ns re	- Too lation	on - nend / adin	ollec econ J <b>nit</b> -
REFERENCES:         1.       Gerson and Gerson - Technical Communication: Process and Proce Prentice Hall(2012)         2.       Virendra K. Pamecha - Guide to Project Reports, Project Appra Finance(2012)         3.       Daniel Riordan - Technical Report Writing Today (1998) Darla-Je Technical Writing for Engineering Professionals (2016) Penwell Publish         COURSEUTCOMES:         At the end of the course, learners will be able to         CO1       Write effective project reports.         CO2       Use statistical tools with confidence         CO3       Explain the purpose and intension of the proposed project coherently and with clarity.         CO4       Create writing texts to suit achieve the intended purpose.         CO5       Master the art of writing winning proposals and projects.	chnique	– Tech	– Tech	– Tecł	y – Te	y m ly –	rally	ort Ora	Report	g a R	ting	esent	- Pr	ap 15-	ratio	ust	nd Ill	oles a	Гab	ng Ta	cin	hecki	– C	bacin
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CO5 Master the art of writing winning proposals and projects.	]							ose.	purpos	led p	end	e inte	e th	iev	it ach	sui	ts to	ng tex	ritir	e wri	te	Creat	4	CC
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COs										0					3
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CO2	2	2	2	1	1	1	2	1	2	3	2	3	-	-	
CO3	2	2	2	2	2	3	2	2	2	3	2	3	-	-	
CO4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	
CO5	3	2	3	3	3	3	3	3	3	3	3	3	-	-	

#### **ACS701 - SYSTEMS ENGINEERING** Р С Programme **B.E &CSE** L Т Sem. Category &Branch PE 3 0 0 3 To introduce system engineering concepts to design the manufacturing system Preamble for optimum utilization of source for effective functioning. **UNIT I INTRODUCTION** 9 Definitions of Systems Engineering, Systems Engineering Knowledge, Life cycles, Lifecyclephases, logical steps of systems engineering, Frame works for systems engineering. 9 Unit 2 SYSTEMS ENGINEERING PROCESSES Formulation of issues with a case study, Value system design, Functional analysis, Business Process Reengineering, Quality function deployment, System synthesis, Approaches for generation of alternatives. **ANALYSIS OF ALTERNATIVES- I** 9 Unit 3 Cross-impact analysis, Structural modeling tools, System Dynamics models with case studies, Economic models: present value analysis - NPV, Benefits and costs over time, ROI, IRR; Work and Cost breakdown structure. ANALYSIS OF ALTERNATIVES-II 9 Unit 4 Reliability, Availability, Maintainability, and Supportability models; Stochastic networks and Markov models, Queuing network optimization, Time series and Regression models, Evaluation of large scale models. Unit 5 **DECISION ASSESSMENT** 9 Decision assessment types, Five types of decision assessment efforts, Utility theory, Group decision making and Voting approaches, Social welfare function; Systems Engineering methods for Systems Engineering Management. Total: 45 **TEXTBOOKS** 1 Andrew P. Sage, James E. Armstrong Jr. "Introduction to Systems Engineering",

	John Wiley and Sons, Inc,2000.	
COURSEOUT At the end of t	TCOMES: the course, learners will be able to	Bloom's Taxonomy Level
C01	The Student must be able to apply systems engineering principles to make decision for optimization.	K2
CO2	Hence an understanding of the systems engineering discipline and be able to use the core principles and processes for designing effective system.	K2
CO3	Analyze the various method to impact on system engineering	K2
CO4	Decision capabilities identified with various analysis.	К2
CO5	Management the system based on decision results.	K2

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO1	PSO2	PSO 3
CO1	2	2	2	1	1	-	/-/	-	3	2	2	2	2	2	2
CO2	2	3	2	1	1	-			3	2	3	2	2	2	2
CO3	2	3	2	2	2	-	-			-	/_	2	2	3	2
CO4	2	-	-	2	3	-	Ro		畲		2	-	2	2	-
CO5	2	2	-	3	3	8 <u>-</u>	1	2	3	2	e 1	3	2	3	-
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	ACS702- GRE	EN COM	IPUTING				
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Programme	B.E & CSE	Sem.	Category	L	Τ	P	С
&Branch	EST	. 201					
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	$\succ$ To learn the fundation	amentals	of Green Computi	ng.		1 1	
Preamble	➢ To analyze the Gr	reen comj	puting Grid Frame	worł	ζ.		
	$\succ$ To understand th	e issues r	elated with Green	com	plian	ce.	
	$\succ$ To study and deve	elop vario	ous case studies.				
UNIT I	FUNDAMENTALS						9
Green IT Fundamental	ls: Business, IT, and the l	Environm	nent – Green com	putii	ng: c	arbor	n foot print,
scoop on power – Gree	n IT Strategies: Drivers, D	imension	s, and Goals – Env	viror	nmen	tally	Responsible
Business: Policies, Prac	ctices, and Metrics.						-

Unit 2	GREEN ASSETS AND MODELING	9
Green Assets: Bu	ildings, Data Centers, Networks, and Devices – Green Busin	ess Process Management:
Modeling, Optin	nization, and Collaboration – Green Enterprise Archit	ecture – Environmental
Intelligence – Gr	een Supply Chains – Green Information Systems: Design and	l Development Models
Unit 3	GRID FRAMEWORK	9
Virtualization o	f IT systems - Role of electric utilities, Telecommutin	g, teleconferencing and
teleporting – M	aterials recycling – Best ways for Green PC – Green Da	ata center – Green Grid
framework.		
Unit 4	GREEN COMPLIANCE	9
Socio-cultural a	spects of Green IT – Green Enterprise Transformat	ion Roadmap – Green
Compliance: Pr	otocols, Standards, and Audits – Emergent Carbon Is	sues: Technologies and
Future		
Unit 5	CASE STUDIES	9
The Environme	ntally Responsible Business Strategies (ERRS) – Case St	udy Scenarios for Trial
Runs – Case St	udies – Applying Green IT Strategies and Application	is to a Home. Hospital.
Packaging Indu	stry and Telecom Sector.	is to a money mospital,
		Total: 45
TEXTBOOKS		
1	Bhuvan Unhelkar, "Green IT Strategies and Application	ons-Using Environmental
	Intelligence", CRC Press, June 2014	C
2	Woody Leonhard, Katherine Murray, "Green Home co	omputing for dummies",
	August 2012.	
REFERENCES		
1	Alin Gales, Michael Schaefer, Mike Ebbers, "Green Da	ata Center: steps for the
	Journey", Shroff/IBM rebook, 2011.	
2	John Lamb, "The Greening of IT", Pearson Education, 2009	9.
3	Jason Harris, "Green Computing and Green IT- Best Pr	actices on regulations &
	industry", Lulu.com, 2008	
4	.Carlspeshocky, "Empowering Green Initiatives with IT", J	ohn Wiley & Sons, 2010.
	5. Wu Chun Feng (editor), "Green computing: Large Scale	energy efficiency", CRC
	Press	
	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Acquire knowledge to adopt green computing practices to	K2
	minimize negative impacts on the environment	
CO2	Enhance the skill in energy saying practices in their use	К?
	of hardware	112

CO3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.	K2
CO4	Understand the ways to minimize equipment disposal requirements.	K2
CO5	Discuss briefly about the use cases in various applications.	K2

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO1	PSO2	PSO 3
CO1		2						2		2			2	2	
CO2		2		2	2	2							3	2	
CO3				2		2	ΓΠ			1 D			3	2	3
CO4	3	2			2	J	LF	2	2	2	2		3	2	3
CO5		2	3	2		INS	1	: UF II	:CHNU	LUGY		1		2	

	AC5703 - FINI	ECH REG	ULATION					
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&Branch	B.E & CSE	Sem.	Category	L	I	P	C	
	afo ga		OE	3	0	0	3	
	To learn about Laws	s and Regul	ation					
Preamble	To acquire the know	vledge of R	egulations of Fi	ntech	firm	and	their role i	
	Market							
UNIT I	INTRODUCTION						9	
The Role of the Reg	ulators, Equal Treatment	and Comp	petition, Need for	or a re	egula	tory	assessmer	
of Fintech. India 1	Regulations. The Risks	to Conside	m Dogtoch on	d Gu	nTo	oh 1		
of Finteen, India Regulations, The Risks to Consider, Regteen and SupTeen, The rise of								
TechFins, Regulator	v sandboxes, compliance	and whistl	e blowing	lu Su	pre	cii, i	The rise of	
TechFins, Regulator Unit 2	ry sandboxes, compliance	and whistl	e blowing	u su			The rise (	
TechFins, Regulator Unit 2	ry sandboxes, compliance	and whistl REGULAT	e blowing ION			<b>CII</b> , 1	The rise (	
TechFins, Regulator Unit 2 The technology, mark	ry sandboxes, compliance INNOVATION AND F ket and the law, Regulation	and whistl REGULAT	e blowing ION vation in Bankin	g and	Fina	ince,	<b>9</b> Regulation	
TechFins, Regulator Unit 2 The technology, mark of Fintech Firms ar	ry sandboxes, compliance INNOVATION AND H ket and the law, Regulation ad their role in Market-B	and whistl REGULAT and Innov ased Chair	e blowing ION vation in Bankin as, Current Reg	g and ulator	Fina Ty A	ince,	9 Regulation ach, Fintec	
TechFins, Regulator Unit 2 The technology, marl of Fintech Firms an Innovations in Bar	ry sandboxes, compliance INNOVATION AND F ket and the law, Regulation ind their role in Market-B hking, Asset Managemer	and whistl REGULAT and Innov ased Chair at, Insuran	e blowing ION vation in Bankin as, Current Reg ce, Pensions a	g and ulaton	Fina Ty A	ince, pproa	9 Regulation ach, Fintec e Schemer	
TechFins, Regulator Unit 2 The technology, marl of Fintech Firms an Innovations in Bar Patentability of FinTe	y sandboxes, compliance INNOVATION AND H ket and the law, Regulation ad their role in Market-B hking, Asset Management ech inventions.	and whistle REGULAT and Innov ased Chair at, Insuran	e blowing ION vation in Bankin as, Current Reg ce, Pensions a	g and ulator	Fina Ty A	ince, pproa	9 Regulation ach, Fintec e Scheme	
TechFins, Regulator Unit 2 The technology, mark of Fintech Firms an Innovations in Bar Patentability of FinTe Unit 3	ry sandboxes, compliance INNOVATION AND H ket and the law, Regulation ad their role in Market-B aking, Asset Managemer ech inventions. CROWDFUNDING A	and whistl REGULAT n and Innov ased Chair nt, Insuran	e blowing ION vation in Bankin is, Current Reg ce, Pensions a	g and ulator and	Fina Ty A Healt	ince, pproa	9 Regulation ach, Fintec e Scheme 9	
TechFins, Regulator Unit 2 The technology, marl of Fintech Firms an Innovations in Bar Patentability of FinTe Unit 3 Types of crowd fundi	ry sandboxes, compliance INNOVATION AND F ket and the law, Regulation ad their role in Market-B nking, Asset Managemer ech inventions. CROWDFUNDING A ing, The Jobs Act, Regulation	and whistle REGULAT and Innov ased Chair at, Insuran	e blowing ION vation in Bankin as, Current Reg ce, Pensions a CALASSETS unding, Regulatio	g and ulator and 1 on A+	Fina Ty Agent Healt	unce, pproa hcare	9 Regulation ach, Fintec e Scheme 9 ion D crow	
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TechFins, Regulator Unit 2 The technology, marl of Fintech Firms an Innovations in Bar Patentability of FinTe Unit 3 Types of crowd fundi funding, Intrastate o Stablecoins, Digital A	y sandboxes, compliance INNOVATION AND F ket and the law, Regulation ad their role in Market-B nking, Asset Managemer ech inventions. CROWDFUNDING A ing, The Jobs Act, Regulation fferings, Digital Assets – Asset Forks, Initial Coin Of	and whistle REGULAT n and Innov ased Chair nt, Insuran ND DIGIT on crowd fu Three use fferings, Re	e blowing ION vation in Bankin as, Current Reg ce, Pensions a CALASSETS anding, Regulations s of Digital As gulatory Framew	g and ulator and 1 on A+ sets, 1	Fina Fina y A Healt , Reg A we	gulatiorld	9 Regulation ach, Fintec e Scheme 9 ion D crow of Altcoin l and Crypt	

Assets, Central	Bank Digital Currencies	
Unit 4	MARKETPLACE LENDING AND MOBILE PAYMENTS	9
Online Lending Credit Opportun Considerations, Card Act, Elect Secrecy Act, Sta	Business Models, Payday Loans, Consumer Protection Laws, I nity Act, Contract Formation and the E-Sign Act, Military Lendin Mobile Devices, Payment Cards and the Law, Truth in Lending tronic Fund Transfer Act and Regulation E, Fair Credit Reporti ate Money Transmitter Laws.	Debt Collection, Equal g Act, Securities Laws Act and Regulation Z, ng Act, Federal Bank
Unit 5	ANTI-MONEY LAUNDERING AND CYBERSECURITY	9
Reporting requ BSA, Virtual of Act of 2015, Co	uirements under the Bank Secrecy Act, Patriot Act, Panal currencies and the Bank Secrecy Act, Cybersecurity Framewontractual and Self Regulatory obligations	ies for violating the vorks, Cybersecurity
		Total: 45
REFERENCE	S	
1	JelenaMadir, FinTech – Law and Regulation, Edward Elgar Pub	lishing Limited, 2019
2	ValerioLemma, FintechRegulation:ExploringNewChallMarketsUnion, PalgraveMacmillan, 202020202020	enges of the Capital
3	Chris Brummer, Fintech Law in a Nutshell, West Academic Pub	lishing, 2020
4	Bernardo Nicoletti, The Future of Fintech, Integrating Finance Financial Services, Springer Nature, 2017	ce and Technology in
5	Kevin C. Taylor, FinTech Law: A Guide to Technology Law in Industry, BNA Books, 2014	the Financial Services
6	Lee Reiners, FinTech Law and Policy, 2018	
COURSEOUT At the end of th	COMES: he course, learners will be able to	oom's Taxonomy evel
CO1	Understand the role that financial regulation plays in key FinTech developments such as mobile payments, crowdfunding, crypto assets, private digital currencies, and decentralized finance.	K2
CO2	Know the role that law and technology play in facilitating international transactions such as syndicated lending and international bond issues.	K2
CO3	Be able to critically engage with the major theoretical legal debates surrounding international financing,	K2

	financial markets and financial technology.	
CO4	Be able to deal with policy arguments on international financing, financial markets and financial technology law	К2
CO5	Demonstrate ability to apply critical and contextual approaches to the developing legal issues emanating from international financing, regulation of financial markets and financial technology.	K2

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PC	<b>)</b> 11	PO12	PSO1	PSO2	PSO 3
CO1		2						2		2				2	2	
CO2		2		2	2	2	ŀΡ	μ	Hŀ	IK				3	2	
CO3				2		2	TITIT		сни	INCV				3	2	3
CO4	3	2			2		mor	2	2	2		2		3	2	3
CO5		2	3	2			-1						1		2	

	AMB701-CORPOR	ATE GO	VERNANCE							
Programme&	MBA	Sem.	Category	L	Т	Р	C			
Branch	S S									
	OEC 3 0 (									
	> To uno	lerstand	the concepts,	need	and	im	portance	of		
	Corporate Governance	e.								
	> To under	rstand the	relationship be	tween	Busi	ness,				
	government and Socie	ety.								
Preamble	> To provi	ide the lea	rners with diffe	rent or	gani	zatio	n structu	res.		
	> To provi	ide the lea	rners to integra	te with	busi	iness	and			
	society.									
	> To form	ulate and	execute the plan	ns at va	ariou	s leve	els of			
	management.									
Unit 1	CORPORATE GOVER	NANCE					9			
Corporate governance	e: The concept, need and	importan	ce of corporate	e gove	rnan	ce, T	he role a	and		
purpose of the corpo	oration, separation of ow	nership a	and control, b	enefits	of	goo	d corpor	rate		
governance. OECD (	Organization for econom	nic co-op	eration and d	evelor	men	t) o	n corpoi	rate		
governance. Theoretica	l basis for corporate gove	ernance. e	environmental (	Concer	ms a	nd C	orporatio	ons.		
environmental preserva	tion-role of stakeholders.	sustainabl	e development.	indust	rial	pollu	tion. role	e of		
corporate in environm	ental management waste	managen	pent pollution	contro	ol an	d en	vironme.	ntal		
audit	entar management, waste	managen	ponution	Contro	/1 ull					
Unit 2	BUSINESS, GOVERNM	IENT AN	ND SOCIETY				9			

An introductio	n to Business, Government, and Society: The Conr	lect between Business,					
Government, an	nd Society, Importance of BGS relationship in manager	ment, models of BGS					
relationships-Ma	rket capitalism model, dominance model, countervailin	g forcer's model and					
stakeholder mode	el.						
Unit 3	BUSINESS STRUCTURES	Q					
Business structu	res. Meaning and nature of husiness structures types nature	advantages limitations					
and applicability	v of $z$ single ownership partnerships private limited cou	manies public limited					
companies co-or	perative societies	inpunies, public innited					
Unit 4	BUSINESS ETHICS AND CSR	9					
Business Ethics	and Corporate Social Responsibility: Meaning of bus	iness ethics, need and					
nurnose, import	tance, approaches to business ethics, roots of unethical be	havior, ethical decision					
making some u	inethical issues, benefits from managing ethics at work	nlace. Nature of CSR.					
arguments for a	nd against CSR, models of CSR, best practices of CSR-Inc	lian examples.					
Unit 5	BOARD OF DIRECTORS	9					
Roleof Board of	² Directors in Corporate Governance. Corporate board of 1	Management, structure					
and composition	of the board. Types of board and directors. Size of theboa	rd.Powers of the board					
of directors.	responsibilities functions of the board, code of	conduct for board					
members.traini	ngfor the board of directors, effectiveness of theboard men	obers, effectiveness and					
powers of the bo	hard.						
Pomore or one of		Total: 45					
<b>REFERENCE F</b>	BOOK						
1	Corporate Governance: Principles, policies and Practices	by Fernando A.c. Pub:					
-	Pearson, 2014.						
2	Business and Government by Francis Cherunilam, Pub:	Himalayan Publishing					
	House.						
3	Corporate Governance, Ethics & Social Responsibility by	Balachandran C.H. Pub:					
	PHI Pvt Ltd. 2015.	,,,					
	Discipline						
4	Business Ethics and Corporate Governance: Ghosh B.N., TM	ЛН, 2015					
COURSE OUT	COMES:	<b>Bloom's Taxonomy</b>					
At	the end of the course, learners will be able to	Level					
CO1	Understand to connect between the corporate, ethics and	K1					
	society.						
		170					
CO2	Decide about the appropriateness of various business	<b>K</b> 2					
	structures.	172					
CO3	Understand the need for and importance of corporate	К3					
	governance with reference to Environment protection						
CO4	Make the students to understand the essence of business	K4					
and how business could be mutually beneficial to the							
<b>-</b>	businessman and the society.						
CO5	Decide on the role and functions of Board of Directors in	K5					
	an Organization.						

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1		1			1	1	2	1	1	2	2	2
CO2	3	2	1	1	1	1		1	2	2	1	1	1	2	2
CO3	3	2	1	1	1	1	2	1	2	2	1	1	2	1	2
CO4	3	2	1	1	1		2	1	2	2	1	1	2	2	2
CO5	3	2	1	1		1	2	1	2	2	1	1	2	1	1

#### AMB702- DIGITAL MARKETING

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Programme&	ME	BA	Sem.	Cate	gory	L	Т	Р	С
Branch									
		ILUL			E	3	0	0	3
	$\succ$	To understa	nd the c	concepts of	Digital Ma	ırke	eting	5.	
	To understand the Online Advertising and SEO.								
Preamble	$\succ$	To analyse th	ne Socia	al media ar	d email Ma	arke	eting	<b>z</b> .	
1 iounioio	$\triangleright$	To evaluate	the cond	cepts of em	ail marketi	ng.			
	$\triangleright$	To formulate	e mobile	e marketing	g and e-mar	ket	ing	strate	egies.
Unit 1 OVERVIEW OF DIGITAL MARKETING								9	
Digital marketing	overview and	meaning- ber	nefits –	platform	& strateg	ies-	• co	mpa	ring digital
with traditional marketing- latest digital marketing trends- case studies of digital market							marketing		

trends. Content Marketing, Handling Traffic.

Unit 2ONLINE ADVERTISING AND SEO9Internet and Search Engine Basics, online Advertising, Importance of online Advertising, Types of<br/>online Marketing and advertising Methods. Importance of Search Engines, How the search engine<br/>works, Understanding the SERP, Using Search Operators, Search Engine Algorithms.

# Unit 3SOCIAL MEDIA AND EMAIL MARKETING9What is Social Media, SMM Vs. SMO, Benefits of using SMM, Social Media Strategy, and Impact of<br/>Social Media on SEO. Marketing strategy, Benefits, Promotional tools for- Facebook, YouTube,<br/>Twitter, Google, Linkedn.Email Marketing- Email Marketing concept, Importance, Popular Email<br/>Marketing Softwares, Email Marketing Goals and strategies, Types of Email marketing compaigns,<br/>Creating an Email Campaign, What is Newsletter, Design a Newsletter. Micro Blogging.

Unit 4	E COMMERC	<b>E</b>					9
<b>Ecommerce Busi</b>	iness Planning, e	Commerc	e Website,	<b>Product Plac</b>	ements, Pr	oduct	Grouping,
Promoting eCom	merce Website,	Remarket	ing Produc	cts: Re-Marke	ting Flow, 1	Email,	Facebook
<b>Re-Marketing.</b>	Understanding	Coupon	System,	Appointing	Affiliates	for	Products,
Cross/Up/Down S	Selling, Introduct	ion to pay	ment gatev	vay- Applicatio	on and Docu	umenta	ation.
Unit 5	MOBILE MA	RKETING	G AND REN	MARKETING	-		9
Overview of the l	B2B and B2C Mo	bile Mark	eting, Mob	oile Sites, Apps	(Applicatio	ons) an	d Widgets

and their relevant to marketing, opportunities and pitfalls of Mobile Marketing, user interfaces and architectures. Trends in Mobile social media, Mobile Commerce, Mobile Payments and Billing, integration of mobile marketing into marketing plan.

		Total: 45
REFERE	NCE BOOK	
1	Digital Marketing: Strategy, Implementation & Practice, Dave Chadwick, 2019	Chaffey & Fiona Ellis-
2	Convert!: Designing Websites For Traffic and Conversions, Ben Hu	unt, 2020
3	The Social Media Bible: Tactics, Tools, & Strategies for Busine 2018	ess Success, Lon Safko,
4	Digital Marketing: Strategies for Online Success, Godfrey Parkin, 2	2015
5	Understanding Digital Marketing: Marketing Strategies for Generation, <u>Damian Ryan</u> , 2018	Engaging the Digital
COURSE	OUTCOMES:	<b>Bloom's Taxonomy</b>
	At the end of the course, learners will be able to	Level
CO1	Understand how and why to use digital marketing for multiple goals within a larger marketing and/or media strategy.	K1
CO2	Understand the major digital marketing channels - online advertising: Digital display, video, mobile, search engine, email and social media.	K2
CO3	Learn to develop, evaluate, and execute a comprehensive digital marketing strategy and plan.	К3
CO4	Explore the concepts of Remarketing strategies	K4
CO5	Develop various payment and billing gateways in digital marketing.	K5

							Self	Disci	oline	50					
CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1		1	2		1	2	2	17	1	2	2	1
CO2	3	2	1	1 <	1	1	1	1	2	-2/	1	1	1	2	2
CO3	3	2	1	1	1	1	2	1	2	2	1	1	2	2	2
CO4	3	2	1	1	1		1	1	1	2		1	2	2	2
CO5	3	2	1	1		1	2	1	2	2	1	1	2	2	1

AMB703- RURAL MARKETING								
Programme&	MBA	Sem.	Category	L	Т	Р	С	
Branch								
			OE	3	0	0	3	

Preamble         > To understand the types of Agricultural products for marketing.           Preamble         > To evaluate the strategies to satisfy rural consumers.           Unit 1         INTRODUCTION TO RURAL MARKETING         9           Concept- Nature- Scope- Significance of Rural Marketing.         9           Concept- Nature- scope- Significance of Rural Marketing- Factors contributing to Growth of rural markets - Components and classification of Rural markets- Rural Market VS Urban Market - ural marketing.         9           Unit 2         AGRICULTURAL MARKETING         9           Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions         9           Unit 3         ISSUES IN RURAL MARKETING         9           Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG - Marketing of consumer durables- The role of Advertisng.         9           Unit 4         RURAL MARKETING AND MARKETING REGULATION         9           Regulated Market - APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control - Inspection of AGMARK - India Standers and Grade Specifications- Food products order (FPO) 1955 - Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).         9           Unit 5         INSTIT			To understand the concepts of Rural Ma	rketing		
Preamble       > To analyse the issues in Rural Marketing.         > To evaluate the Rural Marketing Regulations.       > To formulate the strategies to satisfy rural consumers.         Unit 1       INTRODUCTION TO RURAL MARKETING       9         Concept- Nature-Scope-Significance of Rural Marketing-Factors contributing to Growth of rural markets - Components and classification of Rural markets- Rural Market VS Urban Market-e-crural marketing.       9         Unit 2       AGRICULTURAL MARKETING       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions       9         Unit 3       ISSUES IN RURAL MARKETING       9         Rural Consumer behaviour-features. Factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG -Marketing of consumer durables- The role of Advertising.       9         Unit 4       RURAL MARKETING AND MARKETING REGULATION       9         Regulated Market - FPO 1955 - Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).       9         Unit 5       INSTITUIONAL SUPPORT TO RURAL MARKETING       9         Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority         2       R			> To understand the types of Agricultural p	roducts for n	narketing.	
>       To evaluate the Rural Marketing Regulations.         >       To formulate the strategies to satisfy rural consumers.         Unit 1       INTRODUCTION TO RURAL MARKETING       9         Concept- Nature- Scope- Significance of Rural Marketing- Factors contributing to Growth of rural markets - Components and classification of Rural markets- Rural Market VS Urban Market- e-rural marketing.       9         Unit 2       AGRICULTURAL MARKETING       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels -Methods of Sales - Market functions       9         Unit 3       ISSUES IN RURAL MARKETING       9         Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG – Fast growing FMCG -Marketing of consumer durables- The role of Advertising.       9         Unit 4       RURAL MARKETING AND MARKETINO REGULATION       9         Regulated Market- APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control -Inspection of AGMARK - Indian Standers and Grade Specifications- Food Products order (FPO) 1955 -Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).       9         Unit 5       INSTITUIONAL SUPPORT TO RURAL MARKETING       9         Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation	Pream	nhle	To analyse the issues in Rural Marketing		-	
≻         To formulate the strategies to satisfy rural consumers.           Unit 1         INTRODUCTION TO RURAL MARKETING         9           Concept- Nature- Scope- Significance of Rural Marketing- Factors contributing to Growth of rural markets -Components and classification of Rural markets- Rural Market VS Urban Market -Currula markets.         Market -Currula markets         Virban Market- Rural Market VS Urban Market To Components and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions         9           Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions         9           Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG -Marketing of consumer durables. The role of Advertising.         9           Unit 4         RURAL MARKETING AND MARKETING REGULATION         9           Regulated Market- APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control - Inspection of AGMARK - Indian Standers and Grade Specifications- Food Products order (FPO) 1955 - Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).         9           Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority         9           Commu	Troui	libite	To evaluate the Rural Marketing Regulat	ions.		
Unit 1       INTRODUCTION TO RURAL MARKETING       9         Concept- Nature- Scope- Significance of Rural Marketing- Factors contributing to Growth of rural markets - Components and classification of Rural markets- Rural Market VS Urban Market - erural marketing.       Unit 2       AGRICULTURAL MARKETING       9         Unit 2       AGRICULTURAL MARKETING       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels -Methods of Sales - Market functions       9         Unit 3       ISSUES IN RURAL MARKETING       9         Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG -MarketIng G consumer durables- The role of Advertising.       9         Unit 4       RURAL MARKETING AND MARKETING REGULATION       9         Regulated Market- APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control -Inspection of AGMARK - Indian Standers and Grade Specifications- Food Products order (FPO) 1955 -Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).       9         Unit 5       INSTITUIONAL SUPPORT TO RURAL MARKETING       9         Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority (APEDA)       9         1 <t< td=""><td></td><td></td><td>To formulate the strategies to satisfy rura</td><td>l consumers.</td><th></th></t<>			To formulate the strategies to satisfy rura	l consumers.		
Concept- Nature- Scope- Significance of Rural Marketing- Factors contributing to Growth of rural markets - Components and classification of Rural markets- Rural Market VS Urban Market - c.rural marketing.         Unit 2       AGRICULTURAL MARKETING       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets-Marketing channels - Methods of Sales - Market functions       9         Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG – Fast growing FMCG - Marketing of consumer durables- The role of Advertising.       9         Rural Consumer behaviour- features-factors influencing- Lifestyle of rural consumer - FMCG quality control -Inspection of AGMARK - Indian Standers and Grade Specifications- Food Products order (FPO) 1955 – Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).       9         Unit 5       INSTITUIONAL SUPPORT TO RURAL MARKETING       9         Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority (APEDA)       7         1       Badi R.V. Badi N.V.Rural MarketingHimalaya Publishing House - 2010       2         2       Rural Marketing- GopalaswamyVikas Publishing House,	Unit	t 1	INTRODUCTION TO RURAL MARKETING		9	
rural markets -Components and classification of Rural markets- Rural Market VS Urban Market - erural marketing. Unit 2 AGRICULTURAL MARKETING 9 Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets- Marketing channels - Methods of Sales - Market functions Unit 3 ISSUES IN RURAL MARKETING 9 Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG - Marketing of consumer durables- The role of Advertising. Unit 4 RURAL MARKETING AND MARKETING REGULATION 9 Regulated Market - APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control - Inspection of AGMARK - Indian Standers and Grade Specifications- Food Products order (FPO) 1955 - Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS). Unit 5 INSTITUIONAL SUPPORT TO RURAL MARKETING 9 Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority (APEDA) Total: 45 REFERENCE BOOK 1 Badi R.V. Badi N.V.Rural MarketingHimalaya Publishing House - 2010 2 Rural Marketing- GopalaswamyVikas Publishing House, 2020. 3 Kashyp Pradeep, Rant Siddhartha The Rural Marketing.Biztantra, 2015. 4 Mishra and Puri Development Issues of Indian EconomyHimalaya Publishing House, 2018 COURSE OUTCOMES: Bloom's Taxonomy At the end of the course, learners will be able to Level CO1 Understand the nature of Rural Consumer Behaviour K2 CO3 Analyse the nature of marketing rural products K3 CO4 Identify the problems and issues in Rural Marketing K4 CO5 Formulate the marketing strategies to satisfy the rural consumers.	Concept-	Nature-	Scope- Significance of Rural Marketing- Factors con	tributing to	Growth of	
Market- e.rural marketing.       AGRICULTURAL MARKETING       9         Concept-Nature and Types of Agriculture produce- concept and types of Agricultural Markets         Marketing channetsMethods of Sales - Market functions       9         Unit 3       ISSUES IN RURAL MARKETING       9         Rural Consumer behaviour- features- factors influencing- Lifestyle of rural consumer - FMCG sector in Rural India- concept and classification of consumer goods- Marketing Channels for FMCG - Fast growing FMCG - Marketing of consumer durables. The role of Advertising.         Unit 4       RURAL MARKETING AND MARKETING REGULATION       9         Regulated Market - APMC Act 1963- Model bill Standardization and Grading - Inspection of quality control -Inspection of AGMARK - Indian Standers and Grade Specifications - Food Products order (FPO) 1955 - Consumer Protection Act 1986. The National Council for State Marketing Boards (NCOSAMB) State Trading corporation (STC), Public Distribution System (PDS).       9         Unit 5       INSTITUIONAL SUPPORT TO RURAL MARKETING       9         Commission on Agriculture Costs and Prices (CACP), National Agriculture Co-operative Marketing Federation (NAFED), Agriculture and Processed Food Exports Development Authority       7         (APEDA)       Total: 45         REFERENCE BOOK       Total: 45         1       Badi R.V. Badi N.V.Rural MarketingHimalaya Publishing House - 2010       2         2       Rural Varketing- GopalaswamyVikas Publishing House, 2020.       3 <t< td=""><td>rural ma</td><td>rkets -C</td><td>omponents and classification of Rural markets- Ru</td><td>ral Market</td><th>VS Urban</th></t<>	rural ma	rkets -C	omponents and classification of Rural markets- Ru	ral Market	VS Urban	
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At the end of the course, learners will be able toLevelCO1Understand the concepts of Rural MarketingK1CO2Understand the nature of Rural Consumer BehaviourK2CO3Analyse the nature of marketing rural productsK3CO4Identify the problems and issues in Rural MarketingK4CO5Formulate the marketing strategies to satisfy the ruralK5consumers	COURSE	OUTCO	OMES:	Bloom's T	'axonomy	
CO1Understand the concepts of Rural MarketingK1CO2Understand the nature of Rural Consumer BehaviourK2CO3Analyse the nature of marketing rural productsK3CO4Identify the problems and issues in Rural MarketingK4CO5Formulate the marketing strategies to satisfy the ruralK5consumers		At the	and of the course, learners will be able to	Le	axonomy	
CO2Understand the nature of Rural Consumer BehaviourK2CO3Analyse the nature of marketing rural productsK3CO4Identify the problems and issues in Rural MarketingK4CO5Formulate the marketing strategies to satisfy the rural consumers.K5	CO1		chu of the course, karners will be able to		vel	
CO3Analyse the nature of marketing rural productsK3CO4Identify the problems and issues in Rural MarketingK4CO5Formulate the marketing strategies to satisfy the rural consumers.K5		Underst	and the concepts of Rural Marketing	K	vel	
CO4Identify the problems and issues in Rural MarketingK4CO5Formulate the marketing strategies to satisfy the rural consumers.K5	CO2	Underst Underst	and the nature of Rural Consumer Behaviour	K	vel 1 2	
CO5 Formulate the marketing strategies to satisfy the rural K5 consumers.	CO2 CO3	Underst Underst Analyse	and the nature of Rural Consumer Behaviour e the nature of marketing rural products	K K K	vel           1           2           3	
consumers.	CO2 CO3 CO4	Underst Underst Analyse Identify	and the concepts of Rural Marketing and the nature of Rural Consumer Behaviour the nature of marketing rural products the problems and issues in Rural Marketing	К	vel       1       2       3       4	
	CO2 CO3 CO4 CO5	Underst Underst Analyse Identify Formul	and the concepts of Rural Marketing and the nature of Rural Consumer Behaviour the nature of marketing rural products the problems and issues in Rural Marketing ate the marketing strategies to satisfy the rural	K	vel       1       2       3       4       5	

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1		1		1	1	2	2	1	1	1	2	2
CO2	3	2	1	1	1	1		1	1	2	1	1	2	2	1
CO3	3	2	1	1	1	1	2	1	2	1	1	1	2	2	2
CO4	3	2	1	1	1		2	1	2	2	1	1	2	2	1
CO5	3	2	1	1		1	2	1	2	2	2	1	1	2	2

	A11/01-NE	IWUKKING	ESSENTIALS						
Programme &Branch	B.Tech&IT	Sem.	Category	L	Т	Р	С		
	INST	ITUTE OF TECHN	OLOGY OE	3	0	0	3		
Preamble       > Understand the division of network functionalities into layers.         Preamble       > Be familiar with the components required to build different types of networks         > Be exposed to the required functionality at each layer         > Learn the flow control and congestion control algorithms.         > Learn the Classifythevarioussoftcomputingframeworks         UNIT I       FUNDAMENTALS & LINK LAYER									
Building a network – Network software – Pe control	Requirements – erformance ; Link	Layering an a layer Servic	d protocols – Ir es – Framing – F	ntern Error	et A Det	rchi ectio	tecture – n – Flow		
Unit 2	MEDIA ACCESS	5 & INTERNI	ETWORKING				9		
Media access control – bridging – Basic Intern	Ethernet (802.3) – etworking (IP, CII	- Wireless LA DR, ARP, DH	Ns – 802.11 – Blu CP, ICMP)	etool	h – \$	Swite	ching and		
Unit 3	ROUTING						9		
Routing (RIP, OSPF, m addresses – multicast re	netrics) – Switch ba outing (DVMRP, P	asics – Global PIM), Unicast	Internet (Areas, I Routing Algorithr	BGP, ns	IPv	5), M	lulticast –		
Unit 4	TRANSPORT LA	AYER 201					9		
Overview of Transport Flow control – Retran RED) – QoS – Applicat	layer – UDP – Re smission – TCP ( ion requirements	liable byte str Congestion co	ream (TCP) – Cor ontrol – Congestie	nnect on av	ion r voida	nana ince	egement – (DECbit,		
Unit 5	APPLICATION	LAYER					9		
Traditional applications - – SNMP, Telnet –SSH	Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP, Telnet –SSH								
							Total: 45		
TEXTBOOKS									

<b></b>	1	
1	Larry L. Peterson, Bruce S. Davie, "Computer Network	s: A Systems Approach",
	Fifth Edition, Morgan Kaufmann Publishers, 2011.	
2	Behrouz A. Forouzan, Data Communications and Networ	king. Fifth Edition TMH.
	2013.	
REFERENCES		
1	James F. Kurose, Keith W. Ross, "Computer Networking	– A Top-Down Approach
	Featuring the Internet", Fifth Edition, Pearson Education, 2	009
2	Nader. F. Mir, "Computer and Communication Network	s", Pearson Prentice Hall
	Publishers, 2010	
3	Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Compu	iter Networks: An Open
	Source Approach", McGraw Hill Publisher, 2011	1
4	Behrouz A. Forouzan, "Data communication and Network	ing", Fourth Edition, Tata
	McGraw – Hill, 2011.	
COURSEOUTC	OMES:	
At the end of the	course, learners will be able to	Bloom's Taxonomy
		Level
CO1	Identify the components required to build different types	к?
01	of networks	IX2
	Choose the required functionality at each layer for given	
CO2	application	K3
CO3	Identify solution for each functionality a	K1
	t each layer	
	Trace the flow of information from one node to another	W2
CO4	node in the network.	K2
	Design protocols for various functions in the network and	
C05	understand the working of various application layer	кэ
	protocols	112

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	1	3	3	3	2	2	1	-	1			
CO2	3	3	2	-	-	-	1	-	-	-	-				
CO3	3	3	2	-	1	-	1	1	-	1	-	1			
CO4	3	3	2	-	-	-	1	1	-	1	-	-			
CO5	3	3	2	-	1	-	2	2	-	1	-	1			

AIT702 -SOFTCOMPUTINGMETHODOLOGIES

e &Branch	B.Tech& IT	Sem.	Category	L	T	P	C
			OE	3	0	0	3
Preamble	<ul> <li>Classifythevarious</li> <li>Befamiliarwiththeo</li> <li>Learnmathematical</li> <li>Beexposed to neuro</li> </ul>	softcomputingfr designofneuraln lbackgroundford -fuzzyhybridsys	ameworks networks,fuzzylog optimizedgeneticp	gicandfuz programr prions	zzy s ning	yste	ems
UNIT I	INTRODUCTIONTOSO	FTCOMPUTI	NG				9
Artificial No Basic Mode Sets- Fuzzy Classical R Algorithm-I Techniques	s - Important Technologie Sets - Crisp Relations And elation, Fuzzy Relations, ntroduction - Biological B – Genetic Basic Concepts.	on, Characteris es - Application d Fuzzy Relation Tolerance A lackground - 7	ns. Fuzzy Logic: ions: Cartesian l and Equivalence Fraditional Opti	Introd Product Relat	al N uctio Of 1 ions. n Ar	on - Rela Gud S	Orks Crisp tion enetic Search
Unit 2	NEURALNETWORKS						9
Memory Ne Maps, LVQ Unit 3	work – Unsupervised Lea – CP Networks, ARTNetwo FUZZYLOGIC	ork.	ks: Kononen Sei	II-Organ			9
Membershij Assignment: Measures: 1 Fuzziness - F	<ul> <li>Functions: Features,</li> <li>Defuzzification: Lambd</li> <li>Fuzzy Arithmetic - Exter</li> <li>uzzy Integrals - Fuzzy Ru</li> </ul>	Fuzzification, la Cuts - Meth sion Principle le Base And Ap	Methods Of hods - Fuzzy A e - Fuzzy Meas pproximate Reas	Memberithmeti sures - soning :	ershi ic A Mea Tru	p nd Isur th V	Value Fuzzy es Of
And Table Aggregation Fuzzy Expendent Unit 4	s, Fuzzy Propositions, Of Fuzzy Rules, Fuzzy <u>t System- FuzzyDecisionM</u> GENETIC ALGORITHM	Formation C Reasoning-Fu laking 1	Of Rules-Decom uzzy Inference S	Systems	Ove	of ] crvie	Values Rules, ew Of 9
Aggregation Fuzzy Exper Unit 4 Genetic Alg Mutation –	s, Fuzzy Propositions, Of Fuzzy Rules, Fuzzy t System- FuzzyDecisionM GENETIC ALGORITHM orithm- Operators – End Classification Of Gnetic A	Formation C Reasoning-Fu laking A coding Scheme lgorithms- Gen	Of Rules-Decom uzzy Inference S e – Fitness Eva netic Programm	luation ing –Ad	Ove	of ] ervie	Values Rules, ew Of 9 over - In GA
And Table Aggregation Fuzzy Exper Unit 4 Genetic Alg Mutation – Unit 5	s, Fuzzy Propositions, Of Fuzzy Rules, Fuzzy <u>t System- FuzzyDecisionM</u> GENETIC ALGORITHM orithm- Operators – End Classification Of Gnetic A HYBRIDSOFTCOMPUT S	Formation C Reasoning-Fu [aking 4 coding Scheme lgorithms- Gen TINGTECHNI	Of Rules-Decom azzy Inference S e – Fitness Eva netic Programm QUES&APPLIC	luation ing –Ad	Ove	of ] ervie cosse ces ]	Values Rules, ew Of 9 over - In GA 9

Total: 45

TEXTB	OOKS	
1	S.N.SivanandamandS.N.Deepa,"PrinciplesofSoftComputing",Wile	ey IndiaPvt.Ltd,2011
2	J.S.R.Jang, C.T.SunandE.Mizutani, "Neuro-FuzzyandSoftComputing	ç",PHI
REFER	ENCES	
1	S.RajasekaranandG.A.VijayalakshmiPai,"NeuralNetworks,FuzzyL andGeneticAlgorithm:Synthesis&Applications",Prentice-HallofInd	ogic dia Pvt.Ltd.,2006.
2	GeorgeJ.Klir,UteSt.Clair,BoYuan,"FuzzySetTheory:Foundationsar Applications"PrenticeHall,1997.	nd
3	David E. Goldberg, "Genetic Algorithm in Search MachineLearning"PearsonEducationIndia,2013.	Optimization and
4	James A. Freeman, David M. Skapura, "Neural Networks Algo and Programming Techniques, Pearson Education India, 1991.	rithms, Applications,
COURS	EOUTCOMES:	
At the en	nd of the course, learners will be able to	Bloom's Taxonomy Level
CO1	Applyvarioussoftcomputingconceptsforpracticalapplications	K2
CO2	Chooseanddesignsuitableneuralnetworkforrealtimeproblems	K2
CO3	Usefuzzyrulesandreasoningtodevelopdecisionmakingandexpert system	К2
CO4	Explaintheimportanceofoptimizationtechniquesandgeneticprogra mming	К2
CO5	Review the various hybrid soft computing techniques and apply in real timeproblems	K2

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	<b>PO</b> 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	2	2	-	2	-	-	-	-	2	2	1	2	2
CO2	3	2	3	2	-	2	-	-	-	-	2	2	3	2	2
CO3	3	2	3	2	-	2	-	-	-	-	2	2	2	1	2
CO4	3	3	3	2	3	2	-	-	-	-	2	2	2	3	1
CO5	2	3	3	3	3	2	-	-	-	-	2	2	1	2	2

#### AIT703 -KNOWLEDGEENGINEERING

	B. lech& II	Sem.	Category	L	Т	Р	С
e & Branch							
			OE	3	0	0	3
	> To understand the l	basics of K	nowledge Engineeri	ng.			
	> To discuss methode	ologies and	modeling for Agen	t Desig	n and I	Develo	pment.
Preamble	> To design and deve	lop ontolo	gies.	-			-
	> To apply reasoning	with ontol	ogies and rules.				
	> To understand learn	ning and ru	le learning				
UNIT I	<b>REASONING UNDE</b>	R UNCER	TAINTY				9
ntroduction - Subjective - Uncertaint Reasoning-K	– Abductive reasoning Bayesian view – Belief y methods - Evidence-b nowledge Engineering.	g – Probab Functions based reaso	ilistic reasoning: E – Baconian Probal oning – Intelligent J	numera bility – Agent -	ative P Fuzzy - Mixe	robab Proba d-Init	ilities ability iative
Unit 2	METHODOLOGY A	ND MODI	ELING				9
Unit 3	ONTOLOGIES – DES	SIGN ANI	DEVELOPMEN'	'			9
Concepts an Features – R	d Instances – Generaliz epresentation – Transi	ation Hier tivity – Inl	rarchies – Object F neritance – Concep	eatures ts as Fe	s – Def eature	ining Value	es —
Concepts an Features – R Ontology Ma Design and	d Instances – Generaliz epresentation – Transit atching. Development Methode	ation Hier tivity – Inl ologies –	rarchies – Object F neritance – Concep Steps in Ontology	eatures ts as Fe Devel	s – Def eature opmei	ining Value nt – I	es – Domain
Concepts an Features – R Ontology Ma Design and Understandi Unit 4	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH	ation Hier tivity – Inl ologies – tion – Moo ONTOLO	archies – Object F neritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES	eatures ts as Fo Devel logy Sp S	opmen ecifica	ining Value nt – I ntion.	es – Domain 9
Concepts an Features – R Ontology Ma Design and <u>Understandi</u> Unit 4 Production S Synthesis ru Ontology Ma Knowledge.	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear	ation Hier tivity – Inl ologies – tion – Moc ONTOLO ONTOLO Complex O ngine – Ev rned Know	rarchies – Object F neritance – Concep Steps in Ontology Ielling-based Ontol GIES AND RULE Ontology-based Con idence-based hypo vledge – Reasoning	eatures ts as Fo Devel logy Sp S cepts – thesis a with P	opmer eature ecifica - Redu nalysi artiall	ining Value nt – I ntion. ction a s – Ru y Lean	es – Domain 9 and ile and rned
Concepts an Features – R Ontology Ma Design and <u>Understandi</u> Unit 4 Production S Synthesis ru Ontology Ma Knowledge. Unit 5	d Instances – Generaliz epresentation – Transit atching. Development Methodo ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear	ation Hier tivity – Inl ologies – tion – Moc ONTOLO Complex O ngine – Ev ned Know LE LEAR	archies – Object F neritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES Ontology-based Con idence-based hypo vledge – Reasoning	eatures ts as Fo Devel logy Sp S cepts - thesis a with P	opmer eature opmer ecifica - Redu analysi artiall	ining Value nt – I ntion. ction a s – Ru y Lean	es – Domain 9 and ile and rned 9
Concepts an Features – R Ontology Ma Design and <u>Understandi</u> Unit 4 Production S Synthesis ru Ontology Ma Knowledge. Unit 5 Machine Lear lefinition of a Refinement –	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear LEARNING AND RU rning – Concepts – Gene Generalization. Modellin Overview – Rule Gener	ation Hier tivity – Inl ologies – tion – Moo ONTOLO Complex O ngine – Ev rned Know LE LEAR ralization a g, Learning ation and A	rarchies – Object F neritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES ontology-based Con idence-based hypo yledge – Reasoning NING and Specialization R g and Problem Solvi Analysis – Hypothes	eatures ts as Fo Devel logy Sp S s cepts – thesis a with P ules – 7 ng – Ru is Learn	s – Def eature opmer ecifica - Redu nalysi artiall Types - ule lea	ining Value nt – I ntion. ction a s – Ru y Lean - Form rning a	es – Domain 9 and ile and rned 9 al al
Concepts an Features – R Ontology Ma Design and Understandi Unit 4 Production S Synthesis ru Ontology Ma Knowledge. Unit 5 Machine Lead definition of C Refinement –	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear LEARNING AND RU rning – Concepts – Gene Generalization. Modellin Overview – Rule Gener	ation Hier tivity – Inl ologies – tion – Moo ONTOLO Complex O ngine – Ev med Know LE LEAR ralization a g, Learning ation and A	rarchies – Object F neritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES Ontology-based Con idence-based hypo yledge – Reasoning NING and Specialization R g and Problem Solvi Analysis – Hypothes	eatures ts as Fo Devel logy Sp S cepts – thesis a with P ules – 7 ng – Ru is Learn	s – Def eature opmen ecifica - Redu nalysi artiall Gypes - ule lean ning	ining Value nt – I ntion. ction a s – Ru y Lean - Form rning a	es – Domain 9 and ile and rned 9 al al and Total: 4
Concepts an Features – R Ontology Ma Design and <u>Understandi</u> Unit 4 Production S Synthesis ru Ontology Ma Knowledge. Unit 5 Machine Lead definition of C Refinement –	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear LEARNING AND RU rning – Concepts – Gene Generalization. Modellin Overview – Rule Gener	ation Hier tivity – Inl ologies – tion – Moo ONTOLO Complex O ngine – Ev med Know LE LEAR ralization a g, Learning ation and A	rarchies – Object F neritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES ontology-based Con idence-based hypo yledge – Reasoning NING and Specialization R g and Problem Solvi Analysis – Hypothes	eatures ts as Fo Devel logy Sp S acepts – thesis a with P ules – 7 ng – Ru is Learn	s – Def eature opmen ecifica - Redu nalysi artiall fypes - ule lea: ning	ining Value nt – I ntion. cction a s – Ru y Lean - Form rning a	es – Domain 9 and ile and rned 9 al and Total: 4
Concepts an Features – R Ontology Ma Design and Understandi Unit 4 Production S Synthesis rui Ontology Ma Knowledge. Unit 5 Machine Lead definition of C Refinement – TEXTBOOH 1 Ghec Build Press	d Instances – Generaliz epresentation – Transit atching. Development Methode ng and Concept Elicitat REASONING WITH System Architecture – C les and the Inference En atching – Partially Lear LEARNING AND RU rning – Concepts – Gene Generalization. Modellin Overview – Rule Gener System Tecuci, Dorin Marching ing Cognitive Assistan , First Edition, 2016. (Un	ation Hier tivity – Inl ologies – tion – Moo ONTOLO Complex O ngine – Ev med Know LE LEAR ralization a g, Learning ation and A cu, Mihai I ts for Evi nit 1 – Cha	rarchies – Object F heritance – Concep Steps in Ontology lelling-based Ontol GIES AND RULES ontology-based Con- idence-based hypo yledge – Reasoning NING and Specialization R g and Problem Solvi Analysis – Hypothes Boicu, David A. Scl idence-based Reaso pter 1 / Unit 2 – Ch	eatures ts as Fo Devel logy Sp S acepts – thesis a with P ules – 7 ng – Ru is Learn num, K oning, 0 apter 3,	s – Def eature opmen ecifica - Redu nalysi artiall fypes - ule lea ning nowled Cambr 4 / Un	ining Value nt – I ntion. ction a s – Ru y Lean - Form rning a dge En idge I idge I	es – Domain 9 and and and rned 9 al and Total: -

	Chapter 8, 9)								
2	JiaweiHanandMichelineKamber, "DataMiningConcepts	sandTechniques",ThirdEdition,							
	Elsevier,2012.								
REFE	RENCES								
1	Ronald J. Brachman, Hector J. Levesque: Knowledge H	Representation and Reasoning,							
	Morgan Kaufmann, 2004.								
2	Ela Kumar, Knowledge Engineering, I K International Pub	lisher House, 2018.							
3	Behrouz A. Forouzan, "Data communication and Netw	orking", Fourth Edition, Tata							
	McGraw – Hill, 2011.								
4	Jay Liebowitz, Knowledge Management Learning from	Knowledge Engineering, 1st							
	Edition,2001								
COUR	SEOUTCOMES:								
At the	end of the course, learners will be able to	Bloom's Taxonomy Level							
CO1	Understandthebasics of KnowledgeEngineering.	K2							
$CO^2$	ApplymethodologiesandmodellingforAgent	КЗ							
	DesignandDevelopment.								
CO3	Designanddevelopontologies.	К3							
CO4	Applyreasoning withontologiesandrules.	K3							
CO5	Understandlearningandrulelearning.	K2							

	-				*^							*			
CO/	Ю	$\mathbf{PO}_{2}$	DO 3	PO	PO	PO	PO 7	DO 8		PO	PO	PO	DSO 1	DSO 2	DSO 3
PO	1	FU2	103	4	5	6	FO /	108	109	10	11	12	1301	F30 2	1303
CO1	3	1	1	1	1	1			1	2	1	2	1	1	1
CO2	3	2	3	2	2	2	-	<u>а</u> л	2	1	2	1	3	3	1
CO3	2	2	3	2	2		Ser.		3	2	2	2	3	2	3
CO4	2	2	3	1	1	-		Piscip	2	2	2	2	2	1	1
CO5	2	2	2	1	1	-	-	-	2	1	1	1	2	1	1

	ACB701 - BUSINESS R	ESEAR	CH METHOD	S			
Programme &Branch	B.TECH& CSBS	Sem.	Category	L	Т	Р	С
Prerequisites			OE	3	0	0	3
Preamble	To make the students of methodology in business research and to prepare scie	tourisn enquiry entific bu	n understand th y, develop ana isiness reports.	he prin alytical	nciples skills	of sci of bi	entific 1siness
UNITI	INTRODUCTION						9
Business Researc Exploratory and c series Research – characteristics – R	h – Definition and Significance causal Research – Theoretical and - Research questions / Problems Research in an evolutionaryperspect	<ul> <li>the r</li> <li>empirica</li> <li>Resea</li> <li>ive – the</li> </ul>	esearch process al Research –Cr archobjectives – a role of theory i	s – Ty oss–Se - Rese n resea	ypes of ectional arch hypurch.	Resear and tin pothes	ch – me – ses –
UNITII	RESEARCH DESIGN AND ME	ASURE	MENT				9

Research design – Definition – types of research design – exploratory and causalresearchdesign – Descriptive and experimental design – different types of experimental design – Validity of findings – internal and external validity – Variables in Research – Measurement and scaling – Different scales – Construction of instrument – Validity and Reliability of instrument. DATA COLLECTION UNITIII 9 Types of data – Primary Vs Secondary data – Methods of primary data collection –Survey Vs Observation – Experiments – Construction of questionnaire and instrument – Types of Validity – Sampling plan – Sample size – determinants optimal sample size –sampling techniques – Sampling methods DATA PREPARATION AND ANALYSIS UNITIV 9 Data Preparation – editing – Coding – Data entry – Validity of data – Qualitative VsQuantitative data analyses – Applications of Bivariate and Multivariate statisticaltechniques, Factor analysis, Discriminant analysis, Cluster analysis, Multiple regressionand Correlation, Multidimensional scaling - Conjoint Analysis - Application of statisticalsoftware for data analysis. REPORT DESIGN, WRITING AND ETHICS IN BUSINESS 9 UNITV RESEARCH Research report – Types – Contents of report – need for executive summary – chapterization – contents of chapter – report writing – the role of audience – readability – comprehension – tone – final proof – report format – title of the report – ethics in research– Ethics in research Subjectivity and Objectivity in research. **Total:45Periods TEXTBOOK:** Donald R. Cooper, Pamela S. Schindler and J K Sharma, Business Research methods, 11th 1. Edition, Tata Mc Graw Hill, New Delhi, 2012. **REFERENCES:** Alan Bryman and Emma Bell, Business Research methods, 3rd Edition, Oxford 1. University Press, New Delhi, 2011. Uma Sekaran and Roger Bougie, Research methods for Business, 5th Edition, WileyIndia, 2. New Delhi, 2012. William G Zikmund, Barry J Babin, Jon C.Carr. AtanuAdhikari.Mitch Griffin. 3 BusinessResearch methods, A South Asian Perspective, 8th Edition, Cengage Learning, NewDelhi, 2012. 4 Panneerselvam. R, Research Methodology, 2nd Edition, PHI Learning, 2014. **COURSEOUTCOMES:** Bloom'sTaxonom Uponsuccessfulcompletion of the course the student will be able to V Level CO1 Understand and appreciate the scientific inquiry K2 CO2 K3 Undertake a systematic outlook towards business situations for the purpose of objective decision making. CO3 Ability to conduct a scientific inquiry to solve organizational problems K3 CO4 Analyze data and find solutions to the problems. K3 CO5 Prepare research reports K4

PSO	SO 2	PS	PSO 1	PO 12	PO 11	PO 10	PO 9	PO 8	PO7	PO 6	PO 5	PO	PO 3	PO 2	PO 1	CO/ PO
			3	2	11	10			2	2	2	2	2	3	2	CO1
			3	2					2	2	3	2	2	2	2	CO2
			3	2					2	2	2	2	2	3	2	CO3
			3	$\frac{2}{2}$				2	2		3	2	2	3	2	CO4
			3	2				3	2		2	2	2	3		CO5
T			LS	IOOI	ING 7	TEST	TION '	MAT	AUTO	<b>'02 -</b> A	ACB7	1		ſ		
С	Р	Т	L	7	tegory	Ca	Sem.	S	5	CSBS	CH&	B.TEO			nme h	rogran Branc
3	0	0	3		OE						_				isites	rerequ
		g	planning per	test j	ng and nium ing Cu	e testin n g selen G ion us	oftware then g usin TestN tomat	s of sc execut testin using test au	basic s and e nation esting about	nd the t cases autor the to sight a	derstan ild test cus on comate can int	To und To bui To foc To aut To get			le	reamb
9	ING	ANNI	ST PLA	D TE	G AN	STIN	E TE	WAR	SOFT	TO	TION	DUC	NTRO	Ι		NITI
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ТЕХ	KTBOOK:
1.	Yogesh Singh, "Software Testing", Cambridge University Press, 2012
2.	Unmesh Gundecha, Satya Avasarala, "Selenium WebDriver 3 Practical Guide" - Second Edition 2018
REF	FERENCES:
1.	Glenford J. Myers, Corey Sandler, Tom Badgett, The Art of Software Testing, 3rd Edition, 2012, John Wiley & Sons, Inc.
2.	Ron Patton, Software testing, 2nd Edition, 2006, Sams Publishing
3	Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Fourth Edition, 2014, Taylor & Francis Group.
4	Carl Cocchiaro, Selenium Framework Design in Data-Driven Testing, 2018, Packt Publishing

COUF Upons	RSEOUTCOMES: successfulcompletion ofthecoursethestudentwillbeableto	Bloom'sTaxonom y
		Level
CO1	Understand the basic concepts of software testing and test planning. Understand	K2
CO2	Design effective test cases that can uncover critical defects in the application.	К3
CO3	Automate the software testing using Selenium Apply	К3
CO4	Automate the software testing using TestNG Apply	К3
CO5	Automate the software testing using Cucumber	К3

CO/	PO	DO 2	DO 2	PO	PO	PO			DOD	PO	PO	PO			
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CO3	2	3	3	3	3								2	3	
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	ACB703 - SOCIAL	NETWOR	K ANALYSIS				
Programme &Branch	B.TECH& CSBS	Sem.	Category	L	Т	Р	С
Prerequisites		-	OE	3	0	0	3
Preamble	<ul> <li>To understand the conc</li> <li>To learn knowledge rep</li> <li>To understand human b</li> <li>To learn visualization o</li> </ul>	ept of seman presentation u ehaviour in s f social netw	tic web and rel using ontology. social web and vorks.	ated ap	plication commu	ns. nities.	
UNITI	INTRODUCTION						9
Introduction to	Semantic Web: Limitations of	current We	eb - Developn	nent of	Semar	ntic W	/eb -

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web -Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis -Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic
discussion networks, Blogs and online communities - Web-based networks -Applications of Social Network Analysis.

#### UNITII MODELLING, AGGREGATING AND KNOWLEDGE 9 REPRESENTATION

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation -Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations

## UNITIII EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

9

Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detectingcommunities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.

#### UNITIV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

Understanding and predicting human behaviour for social communities - User data management -Inference and Distribution - Enabling new human experiences - Reality mining - Context -Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNITY VISUALIZATION AND APPLICATIONS OF SOCIAL NET
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9

9

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

**Total:45Periods** 

#### TEXTBOOK:

 Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007.
 Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

#### **REFERENCES:**

1	GuandongXu, Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques
1.	and applications", First Edition, Springer, 2011.
2	Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies
4.	and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3	Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social
5	Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global
	Snippet, 2009.
4	John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer,
4.	2009

COUR Upons	RSEOUTCOMES: uccessfulcompletion of the course the student will be able to	Bloom'sTaxonom y Level
CO1	Develop semantic web related applications.	K4

CO2	Represent knowledge using ontology.	К3
CO3	Predict human behaviour in social web and related communities.	K4
CO4	Visualize social networks.	K3

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	2	2	2									2	
CO2	3	2	2	1	1									3	
CO3	2	3	3	3	3								2	3	
CO4	2	1	2	3	2								1	2	
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**Preamble** distribution system.

#### UNIT I SOURCES OF WATER

Public water supply system – Planning, Objectives, Design period, Population forecasting; Water demand – Sources of water and their characteristics, Surface and Groundwater – Impounding Reservoir – Development and selection of source – Source Water quality – Characterization – Significance – Drinking Water quality standards.

#### UNIT II CONVEYANCE FROM THE SOURCE

Water supply – intake structures – Functions; Pipes and conduits for water – Pipe materials – Hydraulics of flow in pipes – Transmission main design – Laying, jointing and testing of pipes – appurtenances – Types and capacity of pumps – Selection of pumps and pipe materials.

### UNIT III WATER TREATMENT

Objectives – Unit operations and processes – Principles, functions, and design of water treatment plant units, aerators of flash mixers, Coagulation and flocculation – sand filters - Disinfection – Construction, Operation and Maintenance aspects

# UNIT IVADVANCED WATER TREATMENT9Water softening – Desalination- R.O. Plant – demineralization – Adsorption - Ion exchange–

Membrane Systems - Iron and Manganese removal - Defluoridation - Construction and Operation and Maintenance aspects.

#### UNIT V WATER DISTRIBUTION AND SUPPLY

Requirements of water distribution – Components – Selection of pipe material – Service reservoirs -Functions – Network design – Economics - Computer applications – Appurtenances – Leak detection -Principles of design of water supply in buildings – House service connection – Fixtures and fittings, systems of plumbing and types of plumbing.

**Total:45Periods** 

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TEXT	BOOK:									
1.	Garg. S.K., "Water Supply Engineering", Khanna Publishers, Delhi, Se	ptember 2008.								
2.	Punmia B.C, Arun K.Jain, Ashok K.Jain, "Water supply Engineering" Lakshmi publication private limited, New Delhi, 2016									
3.	Rangwala "Water Supply and Sanitary Engineering", February 2022 Supply and Sanitary Engineering", Dhanpat Rai and sons, 2018	2 4. Birdie.G.S., "Water								
REFE	RENCES:									
1.	Fair. G.M., Geyer.J.C., "Water Supply and Wastewater Disposal", John	Wiley and Sons, 1954.								
2.	Babbit.H.E, and Donald.J.J, "Water Supply Engineering", McGraw Hi	ll book Co, 1984.								
3	Steel. E.W.et al., "Water Supply Engineering", Mc Graw Hill Internation	onal book Co, 1984.								
4	Duggal. K.N., "Elememts of public Health Engineering", S.Chand and 1998.	Company Ltd, New Delhi,								
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COUR Upon s	REOUTCOMES: successful completion of the course the student will be able to	Bloom'sTaxonomy Level								
CO1	An understanding of water quality criteria and standards, and their relation to public health	К2								
CO2	The ability to design the water conveyance system 247	К3								
CO3	The knowledge in various unit operations and processes in water treatment	К3								
CO4	An ability to understand the various systems for advanced water treatment	К3								

CO5 An insight into the structure of drinking water distribution system

CO/ PO	PO 1	PO 2	PO 3	PO 4 <	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	2	2	2	2	2	i D. 2	2011			2	3		
CO2	2	2	2	2	3	2	2				7	2	3		
CO3	2	3	2	2	2	2	2					2	3		
CO4	2	3	2	2	3		2					2	3		
CO5		3	2	2	2		2	3				2	3		

K4

AAI702 - GEOGRAPHICAL INFORMATION SYSTEM											
Programme &Branch	B.TECH& AIDS	Sem.	Category	L	Т	Р	С				
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UNIT	I	FUNDAMENTALS OF GIS		9
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UNIT	II	SPATIAL DATA MODELS		9
Databa logical - Vecto	se Structure and physic or Data Stru	es – Relational, Object Oriented – Entities – ER diagram - d al models - spatial data models – Raster Data Structures – R ctures - Raster vs Vector Models- TIN and GRID data model	ata models - concep aster Data Compres s.	tual, sion
UNIT	III	DATA INPUT AND TOPOLOGY		9
Scanne Digitiz connec Data lin	er - Raster er – Datum tivity and on nking – Lin	Data Input – Raster Data File Formats – Georeferencing Projection and reprojection -Coordinate Transformation – containment – Topological Consistency – Non topological king External Databases – GPS Data Integration	 Vector Data Inp Topology - Adjace file formats - Attri 	ut – ency, bute
UNIT	IV	DATA QUALITY AND STANDARDS		9
Data c accurac Data Ir	quality - B cy, thematic nfrastructur	asic aspects - completeness, logical consistency, positio accuracy and lineage – Metadata – GIS Standards –Interope	nal accuracy, temp erability - OGC - Sp	oral atial
UNIT [·]	V	DATA MANAGEMENT AND OUTPUT		Q
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CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	2	2	2									2	
CO2	3	2	2	1	1									3	
CO3	2	3	3	3	3								2	3	
CO4	2	1	2	3	2								1	2	
CO5	2	2	1	2	1								2	2	

	AAI703 -IT IN AGRI	CULTUF	RAL SYSTEM				
Programme &Branch	B.TECH& AIDS	Sem.	Category	L	Т	Р	С
Prerequisites			OE	3	0	0	3
Preamble	 To introduce the students computers play a major rol To also expose the stu environmental control syst prediction models 	to areas le. idents to tems, agr	of agricultural IT applicatio icultural system	syste ns in s man	ms in w precisio agement	hich I' on far and we	T and ming, eather
UNIT I	PRECISION FARMING						9
Precision agricult	ure and agricultural management	– Groun	d based sensors	s, Ren	note sens	ing, C	GPS,
GIS and mapping	software, Yield mapping systems,	Crop pro	duction modelin	ıg.			
UNIT II	ENVIRONMENT CONTROL S	SYSTEM	S				9
Artificial light sys	stems, management of crop growth	h in <mark>gr</mark> eer	nhouses, simulat	ion of	CO2 co	nsump	tion
in greenhouses, o	n-line measurement of plant grow	th in the	greenhouse, mo	odels (of plant j	produc	tion
and expert system	s in horticulture.		X				
UNIT III	AGRICULTURAL SYSTEMS N	MANAG.	EMENT				9
growth and field scheduling, Artific	a operations, Optimizing the us cial intelligence and decision support	se of re	sources, Linea	r prog	gramming	g, Pro	oject
UNIT IV	WEATHER PREDICTION MO	DELS					9
Importance of cli climate system, C systems approach	mate variability and seasonal fo lobal climatic models and their p to applying seasonal climate forec	recasting otential f asts.	, Understanding or seasonal clin	g and nate fo	predictin precasting	ig woi g, Gen	rld's eral
UNIT V	E-GOVERNANCE IN AGRICU	JLTURA	L SYSTEMS				9
Expert systems, business systems Rural developmer	decision support systems, Agric & applications, Technology enha at and information society	cultural a inced lear	and biological rning systems a	datab and so	ases, e-c lutions, c	comme eLearn	erce, iing,
					Tota	l:45 P	eriods
TEXTBOOK:							
1. National F Press, Can	tesearch Council, "Precision Agric ada, 1997.	culture in	the 21st Centu	ıry", N	lational A	Acader	nies
2. H. Krug, I Control an	Liebig, H.P. "International Sympos d Farm Management in Protected (sium on I Cultivatio	Models for Plan on", 1989.	t Grov	vth, Envi	ronme	ental
REFERENCES:							
Peart, R.NYork, 2004	I., and Shoup, W. D., "Agricultur 4.	ral Syste	ms Managemen	it", M	arcel Del	ker, 1	New

2. Hammer, G.L., Nicholls, N., and Mitchell, C., "Applications of Seasonal Climate", Springer, Germany, 2000.

COU Upon	RSEOUTCOMES: successfulcompletion ofthecoursethestudentwillbeableto	Bloom'sTaxonomy Level
CO1	The students shall be able to understand the applications of IT in remote sensing applications such as Drones etc	K1
CO2	The students will be able to get a clear understanding of how a greenhouse can be automated and its advantages.	К2
CO3	The students will be able to apply IT principles and concepts for management of field operations	K4
CO4	The students will get an understanding about weather models, their inputs and applications.	K1
CO5	The students will get an understanding of how IT can be used for e- governance in agriculture	K4

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	2	2	2								1	1	1
CO2	3	2	2	1	1								1	1	1
CO3	2	3	3	3	3								2	2	2
CO4	2	1	2	3	2								2	2	2
CO5	2	2	1	2	1								3	3	3

