

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect Kunnam, Sunguvarchatram, Sriperumbudur-631604



### DEPARTMENT OF INFORMATION TECHNOLOGY B.Tech INFORMATION TECHNOLOGY AUTONOMOUS SYLLABUS REGULATION 2024





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### DEPARTMENT OF INFORMATION TECHNOLOGY 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 application for the betterment of humanity

#### MISSION

M1	To produce competent and disciplined high-quality professionals with the practical skills necessary to excel as innovative professionals and entrepreneurs for the benefit of the society.
M2	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.
M3	To provide excellent infrastructure, serene and stimulating environment that is most conducive to learning.
M4	To strive for productive partnership between the Industry and the Institute for research and development in the emerging fields and creating opportunities for employability.
M5	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 be an excellent centre to impart futuristic and innovative technological education to facilitate the evolution of problem-solving skills along with knowledge application in the field of Information Technology, understanding industrial and global requirements and societal needs for the benefit of humanity.

#### MISSION



	Produce competent and high-quality professional computing graduates in software
<b>M1</b>	development considering global requirements and societal needs thereby maximizing
	employability
	Enhance evolution of professional skills and development of leadership traits among the
M2	students by providing favourable infrastructure and environment to grow into successful
	entrepreneurs.
МЭ	Training in multidisciplinary skills needed by industries, higher educational institutions,
IVIS	research establishments and Entrepreneurship.
MA	Import human values and athical responsibilities in professional activities
1714	impart numan values and curical responsionnes in professional activities.

#### **PROGRAM EDUCATIONAL OBJECTIVES**

	100 000
PEO 1	The graduates will use fundamental knowledge in science, mathematics and
	computing skills for creative and innovative application.
PEO 2	Graduates will be competent and employable by providing excellent infrastructure to
	learn and contribute for the welfare of the society.
PEO 3	Graduates will undertake research and higher education
PEO 4	Graduates will work in multidisciplinary setup and maximize job opportunities.
PEO 5	Graduates grow as professionals with values and integrity.

#### **PROGRAM OUTCOMES**

PO1	<b>Engineering knowledge</b> : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering
	problems reaching substantiated conclusions using first principles of mathematics, natural sciences,
	and engineering sciences
PO3	Design/development of solutions: 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
PO4	Conduct investigations of complex problems: 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.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern
	engineering and IT tools including prediction and modeling to complex engineering activities with
	an understanding of the limitations.
PO6	The engineer and society: 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.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions
	in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable
	development
PO8	<b>Ethics</b> : Apply ethical principles and commit to professional ethics and responsibilities and norms of
DOA	the engineering practice
PO9	Individual Team Work: Function effectively as an individual, and as a member or leader in diverse
DO10	teams, and in multidisciplinary settings.
POIO	<b>Communication:</b> 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
	<b>D</b> uncient management and finance. Demonstrate knowledge and indepetending of the engineering
	and management principles and apply these to one's own work as a member and leader in a team to
PO11	manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for and have the preparation and ability to engage in
1012	independent and life-long learning in the broadest context of technological change
	independent and me-rong rearning in the oroadest context of teenhological change.
PROG	RAM SPECIFIC OUTCOMES
1 10 01	

PSO 1	Students are able to analyse, design, implement and test any software with the programming and testing skills they have acquired.
PSO 2	Students are able to design and develop algorithms for real time problems, scientific and business applications through analytical, logical and problem solving skills.
PSO 3	Students are able to provide security solutions for networks components and data storage and management which will enable them to work efficiently in the industry.



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### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM R2024 (CBCS)

S No	Subject Area			Credi	its per	Seme	ester			Total
5.110	Subject Area	Ι	II	III	IV	V	VI	VII	VIII	Credits
	Humanities and Social Sciences									
1	including Management	1	1	3	0	0	0	0	0	5
	Courses(HSMC)									
2	Basic Science Courses(BSC)	- 9	7	0	0	0	0	0	0	16
2	Engineering Science	4	10	0	0	0	0		0	15
3	Courses(ESC)	5	10	0	0	0	0	0	0	15
4	Professional Core Courses(PCC)	3	3	10	15	5	10	5	0	51
5	Professional Elective	0	0	0	3	6	3	3	6	21
5	Courses(PEC)	0	0	0	5	0	5	5	0	21
6	Open Electives(OE)	0	0	0	0	3	0	3	0	6
7	Employment Enhancement		1	1	1	1	1	7	13	26
/	Courses(EEC)	1		1	1	1	1	/	15	20
	Mandatory Courses(MC) - No	EE,	IC	FV						
8	Cradit	PE&	&	Ev	SS	0	0	0	0	0
	Clouit	HV	LE	Ling	21					
	Total	19	22	14	19	15	16	18	19	140



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#### DEPARTMENT OF INFORMATION TECHNOLOGY CURRICULUM AND SYLLABI FOR SEMESTERS I TO VIII

SEME	STER – I									
S No	Course	Course Title	Catagory	P	eriods		Credits	CIF	SFF	ΤΟΤΑΙ
5.110	Code		Category	L	Т	Р			SEE	IUIAL
1	AIP001	Induction Program		0	0	0				
THEORY		IFRO					·			
2	AMA101	Matrices and Calculus	BS	3	1	0	4	40	60	100
3	APH101	Computational Physics	BS	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	3	0	0	3	40	60	100
7	AMC102	Professional Ethics and Human Values	MC	2	0	0	0	-	-	100
8	AHS101	Language Enhancement	HS	1	0	0	1	40	60	100
PRAC	TICALS			大変に	7	87				
9	APH301	Computational Physics Laboratory	BS	0	0	4	2	60	40	100
10	ACS301	Python Programming Laboratory	ES	0	0	4	2	60	40	100
11	AEEC301	Mini Project /Professional Practices	EEC	0	0	2	1	60	40	100
			Total	18	1	10	> 22			

SNO         Code         Course Title         Category         I         T         P         Credits         CIE         SEE         TOTAL           THEORY         1         AMA102         Discrete Mathematics         BS         3         1         0         4         40         60         100           2         AEC103         Bissics of Electrical and Flectronics Engineering         BS         3         0         0         3         40         60         100           3         AA1101         Introduction to Data Electronics Engineering         ES         3         0         0         3         40         60         100           5         ACS104         Computer Organization Computing         PC         3         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         0         -         -         100           7         AFC302         Electronics Engineering Laboratory         ES         0         0         4         2         60         40         100           8         ACS302         Cloud Computing Laboratory         ES         0	SFME	STFR _ II									
S.No         Code         Course Title         Category $I$ P         Credix         CIE         SEE         TOTAL.           THE         AMA102         Discrete Mathematics         BS         3         1         P <t< th=""><th>SEIVIE</th><th>Course</th><th></th><th></th><th></th><th>Period</th><th>S</th><th></th><th></th><th></th><th></th></t<>	SEIVIE	Course				Period	S				
THEOR         U         U         0         4         40         60         100           2         AEC103         Bissics of Electrical and Electronics Engineering         BS         3         0         0         3         40         60         100           3         AA1101         Introduction to Data Science         ES         3         0         0         3         40         60         100           4         ACS109         Computer Organization         PC         3         0         0         3         40         60         100           6         AMC103         Indim Constitution         MC         2         0         0         0         3         40         60         100           6         AMC103         Indim Constitution         MC         2         0         0         0         4         2         60         40         100           7         AEC302         Electronics Engineering Iaboratory         ES         0         0         0         2         1         60         40         100           9         AHS301         Communication Skills and Technical Writing         BKS         0         0         2         <	S.No	Code	<b>Course Title</b>	Category	L	T	<b>P</b>	Credits	CIE	SEE	TOTAL
1         AMA102         Discrete Mathematics         BR         3         1         0         4         40         60         100           2         AEC103         Basics of Electronics Engineering Science         BR         3         0         0         3         40         60         100           3         AAI101         Introduction to Data Science         ES         3         0         0         3         40         60         100           4         ACS109         Computer Organization         PC         3         0         0         3         40         60         100           5         ACS104         Fundamentals of Cloud Computing         ES         3         0         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         0         3         40         60         40         100           7         AEC302         Electronics Engineering Laboratory         ES         0         0         0         2         1         60         40         100           9         AHS30         Computiation Skills and Technical Writing	THEC	RY					•	•			_
2         AEC103         Basics of Electrical and Electronics Engineering Science         BS         3         0         0         3         40         60         100           3         AAI101         Introduction to Data Science         ES         3         0         0         3         40         60         100           3         ACS109         Computer Organization         PC         3         0         0         3         40         60         100           5         ACS104         Fundamentals of Cloud Computing         ES         3         0         0         3         40         60         100           6         AMC103         India Constitution         MC         2         0         0         3         40         60         100           7         AEC302         Basic Electrical and Electronics Brigineering Laboratory         ES         0         0         4         2         60         40         100           8         ACS302         Communication Skills and Technical Writing India Conclustifying         HS         0         0         2         1         60         40         100           10         AMC301         Yoga and Happy Living Code         MC	1	AMA102	Discrete Mathematics	BS	3	1	0	4	40	60	100
3         AA1101         Introduction to Data Science         ES         3         0         0         3         40         60         100           4         ACS109         Computer Organization Computing         PC         3         0         0         3         40         60         100           5         ACS104         Fundamentals of Cloud Computing         ES         3         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         4         2         60         40         100           7         AEC302         Electroics Engineering Laboratory         ES         0         0         4         2         60         40         100           8         ACS302         Cloud Computer Mining Laboratory         ES         0         0         3         0         0         3         0         0           9         AHS301         Communication Skills and Technical Writing         MC	2	AEC103	Basics of Electrical and Electronics Engineering	BS	3	0	0	3	40	60	100
4         ACS109         Computer Organization         PC         3         0         0         3         40         60         100           5         ACS104         Fundamentals of Cloud Computing         ES         3         0         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         0         -         -         100           PRACTICALS         Basic Electrical and Electronics Engineering Laboratory         ES         0         0         4         22         60         40         100           8         ACS302         Chonunucation Skills and Technical Writing Laboratory         HS         0         0         4         22         60         40         100           9         AHS301         Communication Skills and Technical Writing Professional Practices         HS         0         0         3         00         -         -         100           10         AMC301         Yoga and Happ Living Professional Practices         EEC         0         0         2         11         60         40         100           11         AEC302         Mini Project / Professiona	3	AAI101	Introduction to Data Science	ES	3	0	0	3	40	60	100
5         ACS104         Fundamentals of Cloud Computing         ES         3         0         0         3         40         60         100           6         AMC103         Indian Constitution         MC         2         0         0         0         0         -         -         100           PRACTIALS         Basic Electrical and Electronics Engineering Laboratory         ES         0         0         4         2         60         40         100           8         ACS302         Electronics Engineering Laboratory         ES         0         0         4         2         60         40         100           9         AHS301         Communication Skills and Technical Writing and Technical Writing and Technical Writing         HS         0         0         2         11         60         40         100           10         AMC301         Yoga and Happy Living AMG20         MC         0         0         2         11         60         40         100           11         AEC302         Course Title Code         Category         Periods         Category         I         I         I         I         I         I         I         I         I         I <t< td=""><td>4</td><td>ACS109</td><td>Computer Organization</td><td>PC</td><td>3</td><td>0</td><td>0</td><td>3</td><td>40</td><td>60</td><td>100</td></t<>	4	ACS109	Computer Organization	PC	3	0	0	3	40	60	100
6       AMC103       Indian Constitution       MC       2       0       0       0       -       -       100         PRACTICALS       Basic Electrical and Electronics Engineering Laboratory       Basic Electronics Engineering Laboratory       ES       0       0       4       2       60       40       100         8       ACS302       Cloud Computing Laboratory       ES       0       0       4       2       60       40       100         9       AHIS301       Communication Skills and Technical Writing and Technical Writing Electronics       III       0       0       2       11       60       40       100         10       AMC301       Yoga and Happy Living       MC       0       0       2       11       60       40       100         11       AEEC302       Mini Project / Professional Practices       Total       17       1       15       2       1       60       40       100         SEME       Course Course Course Course Course Course Course Title       Category       Credits       CIE       SEE       TOTAL         1       ACS105       Digenaming Programming Procented Algorithms       Programming Procented Algorithms       0       0       3       40	5	ACS104	Fundamentals of Cloud Computing	ES	3	0	0	3	40	60	100
PRACTICALS         Basic Electronics Engineering Laboratory         ES         0         0         4         2         60         40         100           8         ACS302         Electronics Engineering Laboratory         ES         0         0         4         2         60         40         100           9         AHS301         Communication Skills and Technical Writing and Technical Writing         HS         0         0         3         00         -         -         100           10         AMC301         Yoga and Happy Living         MC         0         0         3         0         -         -         100           11         AEEC302         Mini Project / Project         EEC         0         0         2         1         60         40         100           12         AEC302         Mini Project / Project         EEC         0         0         2         1         60         40         100           14         AEC302         Course Title         Category         Eretions         CIE         SEE         TOTAL           1         ACS105         Object Oriented Programming         PC         3         0         0         3         40	6	AMC103	Indian Constitution	MC	2	0	0	0	-	-	100
AEC302Basic Electrical and Electronics Engineering LaboratoryES $i$ <th< td=""><td>PRAC</td><td>TICALS</td><td></td><td></td><td></td><td>1</td><td></td><td>1</td><td>1</td><td>1</td><td></td></th<>	PRAC	TICALS				1		1	1	1	
8ACS302Cloud Computing LaboratoryES004260401009AHS301Communication Skills and Technical Writing and Technical WritingHS0030010010AMC301Yoga and Happy LivingMC00030010011AEEC302Mini Project / Professional PracticesEEC000211604010010AEEC302Mini Project / Professional PracticesTotal17115222SEMESTER - IIISeme Course TitleCategoryPC3003340601001ACS105Object Oriented ProgrammingPC3003340601002ACS106Data Structures and AlgorithmsPC3003340601003AMB152Entrepreneurship and InnovationPC3003340601004AMC108Entrepreneurship and Engineering and SustainabilityPC0042260401006ACS303Object Oriented Programming LaboratoryPC0042260401006ACS304Object Oriented Programming LaboratoryPC002<	7	AEC302	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	4	2	60	40	100
9AHS301Communication Skills and Technical Writing and Technical WritingHS0021604010010AMC301Yoga and Happy Living Pressonal PracticesMC003010011AEEC302Mini Project / Pressonal PracticesEEC0021604010011AEEC302Mini Project / Pressonal PracticesTotal171152201100SN0Course CodeCourse TitleCategory ProgrammingPre-iverPredictsCreditsRERETOTAL11ACS105Object Oriented ProgrammingPC300340601002ACS106Data Structures and AlgorithmsPC300340601003AMB152Entrepreneurship and InnovationPC300340601004AMC108Environmental Engineering and SustanabilityMC200340601006ACS304Object Oriented Programming LaboratoryPC004260401006ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHIS002106040	8	ACS302	Cloud Computing Laboratory	ES	0	0	4	2	60	40	100
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	9	AHS301	Communication Skills and Technical Writing	HS	0	0	2	1	60	40	100
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	10	AMC301	Yoga and Happy Living	MC	0	0	3	0	-	-	100
Image: constraint of the series of the se	11	AEEC302	Mini Project / Professional Practices	EEC	0	0	2	1	60	40	100
SEMESTER - IIIS.NoCourse CodeCourse TitleCategoryITPCreditsCIESEETOTALIIII - IIIIACS105Object Oriented ProgrammingPC300340601002ACS106Data Structures and AlgorithmsPC3003340601003AMB152Entreprencurship and InnovationPC3003340601004AMC108Entreprencurship and SustainabilityPC3003340601005ACS303Object Oriented Programming LaboratoryPC0003440601006ACS304Object Oriented Programming LaboratoryPC004260401007AHS302Soft Skills IHS0021160401008AEEC303Mini Project /Professional PracticesEEC002116040100				Total	17	1	15	22			
S.NoCourse CodeCourse TitleCategoryPITPPCreditsPBEEPPP<	SEME	STER – III	*.	<u></u>		<u></u>	1.	<b>1</b>			
THEORY           1         ACS105         Object Oriented Programming         PC         3         0         0         3         40         60         100           2         ACS106         Data Structures and Algorithms         PC         3         0         0         3         40         60         100           3         AMB152         Entrepreneurship and Innovation         PC         3         0         0         3         40         60         100           4         AMC108         Environmental Engineering and Sustainability         PC         3         0         0         3         40         60         100           PRACTICALS           5         ACS303         Object Oriented Programming Laboratory         PC         0         0         4         2         60         40         100           6         ACS304         Data Structures and Algorithms Laboratory         PC         0         0         4         2         60         40         100           7         AHS302         Soft Skills I         HS         0         0         2         1         60         40         100           8         AEEC30	S.No	Course Code	Course Title	Category		Perio	ds P	Credits	CIE	SEE	TOTAL
1         ACS105         Object Oriented Programming         PC         3         0         0         3         40         60         100           2         ACS106         Data Structures and Algorithms         PC         3         0         0         3         40         60         100           3         AMB152         Entrepreneurship and Innovation         PC         3         0         0         3         40         60         100           4         AMC108         Environmental Engineering and Sustainability         PC         3         0         0         3         40         60         100           4         AMC108         Environmental Engineering and Sustainability         MC         2         0         0         0         -         -         100           PRACTICALS           5         ACS303         Object Oriented Programming Laboratory         PC         0         0         4         2         60         40         100           6         ACS304         Data Structures and Algorithms Laboratory         PC         0         0         2         0         60         40         100           7         AHS302         Soft Skil	THEC	ORY	V	1	1	1	24		<u> </u>		
2ACS106Data Structures and AlgorithmsPC300340601003AMB152Entrepreneurship and InnovationPC300340601004AMC108Environmental Engineering and SustainabilityMC2000100PRACTICALS5ACS303Object Oriented Programming LaboratoryPC004260401006ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHS002160401008AEEC303Mini Project /Professional PracticesEEC00216040100	1	ACS105	Object Oriented Programming	PC		3 0	0	3	40	60	100
3AMB152Entrepreneurship and InnovationPC300340601004AMC108Environmental Engineering and SustainabilityMC2000100PRACTICALS5ACS303Object Oriented Programming LaboratoryPC004260401006ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHS002060401008AEEC303Mini Project /Professional PracticesEEC00216040100	2	ACS106	Data Structures and Algorithms	PC		3 0	0	3	40	60	100
4AMC108Environmental Engineering and SustainabilityMC2000100PRACTICALS5ACS303Object Oriented Programming LaboratoryPC004260401006ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHS0021060401008AEEC303Mini Project /Professional PracticesEEC0021014	3	AMB152	Entrepreneurship and Innovation	PC		3 0	0	> 3	40	60	100
PRACTICALS         Object Oriented Programming Laboratory         PC         0         0         4         2         60         40         100           5         ACS303         Dbject Oriented Programming Laboratory         PC         0         0         4         2         60         40         100           6         ACS304         Data Structures and Algorithms Laboratory         PC         0         0         4         2         60         40         100           7         AHS302         Soft Skills I         HS         0         0         2         0         60         40         100           8         AEEC303         Mini Project /Professional Practices         EEC         0         0         2         1         60         40         100	4	AMC108	Environmental Engineering and Sustainability	MC	2	2 0	0	0	-	-	100
5ACS303Object Oriented Programming LaboratoryPC004260401006ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHS002060401008AEEC303Mini Project /Professional PracticesEEC0021604010000101101014	PRAC	TICALS									
6ACS304Data Structures and Algorithms LaboratoryPC004260401007AHS302Soft Skills IHS002060401008AEEC303Mini Project /Professional PracticesEEC002160401000011101014110010	5	ACS303	Object Oriented Programming Laboratory	PC	(	) 0	4	2	60	40	100
7       AHS302       Soft Skills I       HS       0       0       2       0       60       40       100         8       AEEC303       Mini Project /Professional Practices       EEC       0       0       2       1       60       40       100         0       0       1       0       10       14       100	6	ACS304	Data Structures and Algorithms Laboratory	PC	(	) 0	4	2	60	40	100
8         AEEC303         Mini Project /Professional Practices         EEC         0         0         2         1         60         40         100	7	AHS302	Soft Skills I	HS	(	) 0	2	0	60	40	100
Total         11         0         10         14	8	AEEC303	Mini Project /Professional Practices	EEC	(	0	2	1	60	40	100
				Tota	<b>u</b> 1	1 0	10	14			

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SEME	SEMESTER – IV												
S No	Course	Course Title	Catagory	Р	eriod	s	Cradita	CIF	SEE	τοται			
5.110	Code		Category	L	Т	Р	Creatts	CIE	SLL	IUIAL			
THEO	RY												
1	ACS107	Operating Systems	PC	3	0	0	3	40	60	100			
2	ACS108	Database Management Systems	PC	3	0	0	3	40	60	100			
3	ACS109	Computer Networks	PC	3	0	0	3	40	60	100			
4		Professional Elective 1	PE	3	0	0	3	40	60	100			
PRAC	TICALS												
5	ACS305	Operating Systems Laboratory	PC	0	0	4	2	60	40	100			
6	ACS306	Database Management Systems Laboratory	PC	0	0	4	2	60	40	100			
7	ACS307	Computer Networks Laboratory	PC	0	0	4	2	60	40	100			
8	AHS303	Soft Skills II	HS	0	0	2	0	60	40	100			
9	AEEC304	Mini Project / Internship/Professional Practices	EEC	0	0	2	1	60	40	100			
			Total	12	0	13	19						

SEME	STER – V		1. 18		1	Y				
S.No	Course Code	Course Title	Category	P	eriod T	S P	Credits	CIE	SEE	TOTAL
THEORY										
1	AIT101	Cryptography and Network Security	PC	3	0	0	> 3	40	60	100
2		Professional Elective 2	PE	-3	0	2	3	40	60	100
3		Professional Elective 3	PE	3	0	0	3	40	60	100
4		Open Elective 1	OE	3	0	0	3	40	60	100
PRAC	TICALS			·		• •				
5	AIT301	Cryptography and Network Security Laboratory	PC	0	0	4	2	60	40	100
6	AEEC305	Mini Project/Professional Practices	EEC	0	0	2	1	60	40	100
			Total	12	0	8	15			

SEMF	STER – VI									
	Course	<b>C T</b> :4		P	eriod	s	C III	CIE	CEE	TOTAL
5.IN0	Code	Course Little	Category	L	Т	Р	Credits	CIE	SEE	IOTAL
THEO	RY	•								•
1	AIT102	Full Stack Web Development	РС	3	0	0	3	40	60	100
2	AIT103	Object Oriented Software Engineering	РС	3	0	0	3	40	60	100
3		Professional Elective 4	PE	3	0	0	3	40	60	100
PRAC	TICALS		-							
4	AIT302	Full Stack Web Development Laboratory	PC	0	0	4	2	60	40	100
5	AIT303	Object Oriented Software Engineering Laboratory	РС	0	0	4	2	60	40	100
6	AEEC306	Mini Project / Professional Practices /Internship	EEC	0	0	2	1	60	40	100
			Total	9	0	8	14			

SEME	STER – VII									
S No	Course	Course Title	Catagory	Р	eriod	8	Credite	CIF	SEE	τοτλι
5.110	Code	Course Thie	Category	L	Т	Р	Creuits	CIE	SEL	IUIAL
THEO	RY									
1	AAI102	Artificial Intelligence & Machine Learning	РС	3	0	0	3	40	60	100
2		Professional Elective 5	PE	3	0	0	3	40	60	100
3		Open Elective 2	OE	3	0	0	3	40	60	100
PRAC	TICALS		- Ols	cip/0*						
4	AAI301	Artificial Intelligence & Machine Learning Laboratory	PC	0	0	-4	2	60	40	100
5	AIT304	Project I	EEC	0	0	12	6	60	40	100
6	AEEC307	Internship/Professional Practices	EEC	0	0	2	1	60	40	100
			Total	9	0	17	18			

SEME	STER – VIII									
S.No	Course	Course Title	Category	P	Period	s	Credits	CIE	SEE	TOTAL
	Code			L	Т	Р				
THEO	DRY									
1		Professional Elective 6	PE	3	0	0	3	40	60	100
2		Professional Elective 7	PE	3	0	0	3	40	60	100
PRAC	TICALS									
3	AIT305	Project II	EEC	0	0	24	12	60	40	100
4	AEEC308	Internship/Professional Practices	EEC	0	0	2	1	60	40	100
			Total	6	0	26	19			







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### **PROFESSIONAL ELECTIVES**

VERTI	CAL - I - D	Pata Science					
~ ~ ~	Course			Periods	1	Total	~
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AIT501	Big Data Analytics	3	0	0	3	3
2	AIT502	Information Security Management	3	0	0	3	3
3	AAI501	Data Visualization	3	0	0	3	3
4	AIT503	Exploratory Data Analysis	3	0	0	3	3
5	AMB118	Business Analytics	3	0	0	3	3
6	AIT504	Information Retrieval System	3	0	0	3	3

#### VERTICAL - II- Full Stack Development for IT

S.No	Course Code	Course Title	L	Periods T	s P	Total Contact Periods	Credits
1	AIT505	Web Application Security	3	0	0	3	3
2	AIT506	Software Testing and Automation	3	0	0	3	3
3	AIT507	DevOps	3	0	0	3	3
4	AIT508	UI and UX Design	3	0	0	3	3
5	AIT509	Cloud Services Management	3	0	0	3	3
6	AIT510	App Development	3	0	0	3	3

VERT	TICAL - III-	· Cloud Computing and Data Cent	ter Tech	nologies			
	Course			Periods		Total	
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AAI106	Data Mining and Warehousing	3	0	0	3	3
2	AIT511	Storage Technologies	3	0	0	3	3
3	AIT512	Software Defined Networks	3	0	0	3	3
4	AIT513	Internet of Things	3	0	0	3	3
5	AIT514	Security and Privacy in Cloud	3	0	0	3	3
6	AIT515	Stream Processing	3	0	0	3	3

VERTIC	CAL - IV- (	Cyber Security and Data Privacy	7				
~ ~ ~ ~	Course			Periods		Total	~
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AIT516	Engineering Secure Software Systems	3	0	0	3	3
2	AIT517	Digital and Mobile Forensics	3	0	0	3	3
3	AIT518	Ethical Hacking	3	0	0	3	3
4	AIT519	Blockchain Technology	3	0	0	3	3
5	AIT520	Social Network Security	3	0	0	3	3
6	AIT521	Cyber Security	3	0	0	3	3

#### VERTICAL - V -Creative Media

<b>G N</b>	Course			Periods		Total	
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AIT522	Multimedia and Animation	-3	0	0	3	3
2	AIT523	Augmented Reality/Virtual Reality	3	0	0	3	3
3	AIT524	Digital Marketing	3	0	0	3	3
4	AIT525	Game Development	3	0	0	3	3
5	AIT526	Visual Effects	3	0	0	3	3
6	AIT527	Computer Vision	3	0	0	3	3

#### VERTICAL - VI- Emerging Technologies

,							
	Course		<b>Max</b>	Periods	121	Total	C III
S.No	Code	Course Litle	L	Т	Р	Contact Periods	Credits
1	AIT528	Quantum Computing	3	0	0	3	3
2	AIT529	Evolutionary Algorithms	3	0	0	3	3
3	AIT530	Brain Computer Interface	3	0	0	3	3
4	AIT531	Data Augmentation and Virtual Reality	3	0	0	3	3
5	AIT532	Nature Language Understanding	3	0	0	3	3
6	AIT533	Computational Neuroscience	3	0	0	3	3

VER	ΓICAL - V	II- Artificial Intelligence and N	lachine	e Learni	ng		
	Course			Period	S	Total	
S.No	Code	Course Title	L	Т	Р	Contact Periods	Credits
1	AIT534	Cognitive Science	3	0	0	3	3
2	AIT535	AI Techniques for Game Development	3	0	0	3	3
3	AIT536	Soft Computing	3	0	0	3	3
4	AIT537	Neural Networks and Deep learning	3	0	0	3	3
5	AIT538	Optimization Techniques	3	0	0	3	3
6	AIT539	Reinforcement learning	3	0	0	3	3



		OPEN EI	LECTIVE							
	Course			Pe	rio	ds		CIE	CEE	TOTAL
<b>5.</b> No	Code	Course 1 itie	Category	L	Т	Р	Credits	CIE	SEE	IUIAL
THE	ORY		1					1	,	
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	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 System	OE	3	0	0	3	40	60	100
21	AAI703	IT in Agricultural System	OE	3	0	0	3	40	60	100

### **OPEN ELECTIVE**



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### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM





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Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604

Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
		1	BS	3	1	0	4
Preamble	<ul> <li>Introduce the matrix t</li> <li>Provide the necessary procedures for solvin in Engineering and Te</li> <li>Familiarize the studer</li> <li>Understand technique problems.</li> <li>Acquaint the studer multiple integrals and</li> </ul>	echniqu basic c g nume echnolog ats with es of ca at with their ap	tes and to explain the oncepts of a few nurically different kingy. differential calculus lculus which are a mathematical too oplications	e na umer nds c s. pplic ls r	ture ical 1 of pro	of the metho oblem the ed in	e matrix. ods and giv ns occurrin Engineerin evaluatin
Unit 1	MATRICES		1				9+3
Matrices - Eigen transformation – Cayl form using orthogona	values and eigenvectors ey Hamilton Theorem (witho l transformation	- Diago out proo	onalization of ma of) - Quadratic form	atrico s - F	es u Reduc	sing ction	orthogona to canonica
Unit 2	SOLUTION OF LINEA EQUATIONS AND EIC PROBLEMS	R SYS GENVA	TEM OF LUE				9+3
Solution of linear syst Gauss Seidel iterative by Power method – Ja	tem of equations - Gauss eline method - Matrix Inversion acobi method.	ninatior by Gau	n method – Pivoting Iss Jordan method -	g - G Eig	auss gen v	Jorda alues	an method of a matri
Unit 3	DIFFERENTIAL CAL	CULUS					9+3
Limit of a function-C Implicit Differentiation one variable	ontinuity-Derivatives-Differ on-Logarithmic Differentiation	entiation on-Appl	n rules (sum, produ ications: Maxima a	nd N	quoti 1inin	ent, on a of	functions c
Definite and Indefinit	te integrals - Substitution ru	le - Teo	chniques of Integra	tion	Inte	orati	on by part
Trigonometric integr fraction, Integration o	als, Trigonometric substitu f irrational functions – Impro	tions, I	integration of ratio	onal	func	tions	by partia
Unit 5	MULTIPLE INTEGRA	LS	-				9+3
	hange of order of integrati	on – D olume o	ouble integrals in f solids –Change o	pola of va	r co riabl	ordin es in	ates – Are double an
Double integrals – C enclosed by plane cu triple integrals – Appl	ications: Moments and centr	es of ma	ass, moment of iner	tıa.		-	

	43rd Edition, 2014.	
2	Erwin Kreyszig ," Advanced Engineering Mathematics ", Jo	ohn Wiley and Sons, 10th
	Edition, New Delhi, 2016	
3	Grewal. B.S., and Grewal. J.S., Numerical methods in E	Engineering and Science,
	Khanna Publishers, 9th Edition, New Delhi, 2001.	
REFERENCE	ES	
1	Ramana. B.V., "Higher Engineering Mathematics ", McC	Graw Hill Education Pvt.
	Ltd, New Delhi, 2018.	
2	N.P. Bali and Manish Goyal, A text book of Engineer	ing Mathematics, Laxmi
	Publications, Reprint, 2008	
COURSEOU	ICOMES:	<b>Bloom's Taxonomy</b>
At the end of	the course, learners will be able to	Level
<u> </u>	Demonstrate the matrix techniques in solving the related	IZ A
CO1	Demonstrate the matrix techniques in solving the related problems in engineering and technology.	K4
CO1 CO2	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equations	K4 K3
CO1 CO2	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equationsApply differential calculus tools in solving various	K4 K3
CO1 CO2 CO3	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equationsApply differential calculus tools in solving various application problems	K4 K3 K3
CO1 CO2 CO3	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equationsApply differential calculus tools in solving various application problemsApply different methods of integration in solving	K4 K3 K3
CO1 CO2 CO3 CO4	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equationsApply differential calculus tools in solving various application problemsApply different methods of integration in solving practical problems.	K4 K3 K3 K3
CO1 CO2 CO3 CO4	Demonstrate the matrix techniques in solving the related problems in engineering and technology.Apply matrix methods to solve system of linear equationsApply differential calculus tools in solving various application problemsApply different methods of integration in solving practical problems.Evaluate multiple integrals to conduct investigations of	K4 K3 K3 K5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-		/	<u>_</u>	1	-	1		1	1	-
CO2	3	2	1	-	-		-0	<u>بر</u>	7.5	1	5 /-		1	1	-
CO3	3	2	3	-	-			<u>(</u> %)		5	_		1	1	-
CO4	3	2	3	-	-	-	- 30				1		-	1	-
CO5	3	2	3	-	-	-	-		-	-	-		1	-	-

APH101 - COMPUTATIONAL PHYSICS													
	150	STO. 2011	N N										
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С						
		1	BS	3	0	0	3						
Preamble	<ul> <li>To instill knowledge charge carriers and</li> <li>The students will at</li> <li>To provide the basic formalism of quantum</li> <li>To acquire the know fundamentals of name</li> </ul>	e on physic device appl cquire know c concepts o um mechan wledge of ba no materials	s of semiconduc lications. wledge on the co of quantum me ics asic sciences req s	ncepts chanic	leterr s of cs and to un	ninati Photo l vari dersta	on of onics ous and the						

	and quantum computing	-
Unit 1	PHOTONICS AND SEMICONDUCTOR DEVICES	5 9
Intrinsic Semico Diode Laser-Hal	nductor- Energy Band DiagramDirect and Indirect Band Gap S l Effect and Devices- Logic Gates-AND,OR, NOT,NAND, E-OI	Semi-Conductors – R,E-NOR Gates.
Introduction to the Coefficients – Po	heory of Laser-Characteristics-Spontaneous and Stimulated Emis opulation Inversion- Applications of Photonics.	ssion-Einstein's
Unit 2	DIFFERENTIAL EQUATIONS IN COMPUTATIONAL PHYSICS	9
Solution of diffe corrector method equation of a ma	rential equations: Taylor series method, Euler method, Runge Ku l. Eigen values and Eigen vectors of matrix: Determinant of a ma trix, eigen values and eigen vectors of a matrix, power method.	atta method, predictor- atrix, characteristic
Unit 3	FUNDAMENTALS OF QUANTUM MECAHNICS	9
and time independent of the second se	endent wave equation)- Physical significance of wave function- 1D, 2D and 3D Boxes-Degeneracy and Non-Degeneracy.	particle in an infinite
Unit 4	INTRODUCTION TO NANO MATERIAL	9
Introduction to Quantum confir quantum dot str	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application	ce of Fermi energy - ell, quantum wire and s of nano materials-
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con quantum bits or	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application the electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING atting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere.
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum compu and classical con quantum bits or	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING nting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con quantum bits or TEXTBOOKS	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING uting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum compu and classical con quantum bits or TEXTBOOKS	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mo Private Limited, New Delhi 2010.	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4 cgraw Hill Education
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum compu and classical con quantum bits or of TEXTBOOKS 1 2	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Differen mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mc Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cer Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 49 cgraw Hill Education ngage Learning India ation Private Limited
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con quantum bits or of TEXTBOOKS 1 2 3	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we ructure - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum de QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mod Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cent Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011.	ce of Fermi energy - ell, quantum wire and s of nano materials- tot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4 cgraw Hill Education ngage Learning India ation Private Limited
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con- quantum bits or of TEXTBOOKS 1 2 3 REFERENCES	nanomaterial -Electron density in bulk material - Size dependent nement - Quantum structures - Density of states in quantum we nucture - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum de QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mo Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cent Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011.	ce of Fermi energy - ell, quantum wire and s of nano materials- lot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4 cgraw Hill Education ngage Learning Indi ation Private Limited
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con- quantum bits or of TEXTBOOKS 1 2 3 REFERENCES 1	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we nucture - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum de QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Differen mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mo Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cen Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011.	ce of Fermi energy - ell, quantum wire and s of nano materials- lot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4 cgraw Hill Education ngage Learning India ation Private Limited
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con quantum bits or of TEXTBOOKS 1 2 3 REFERENCES 1 2	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we nucture - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum de QUANTUM INFORMATION AND COMPUTING tring: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mc Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cet Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011.	ce of Fermi energy - ell, quantum wire and s of nano materials- ot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4 cgraw Hill Education ngage Learning India ation Private Limited cation Private Limited
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con- quantum bits or of TEXTBOOKS 1 2 3 <b>REFERENCES</b> 1 2 3	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we nucture - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum de QUANTUM INFORMATION AND COMPUTING ting: Introduction - Postulates of quantum Mechanics- Different mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mc Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cer Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011. Dattu R Joshi, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2010. A Marikani, "Engineering Physics" PHI Learning Private Limited N Kenneth B. Howell, "Ordinary Differential Equations" CRC I 2023	ce of Fermi energy - ell, quantum wire and s of nano materials- ot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4: cgraw Hill Education ngage Learning India ation Private Limited cation Private Limited cation Private Limited ew Delhi 2010. Press , 21 January
Introduction to Quantum confir quantum dot str Tunneling: sing Unit 5 Quantum comput and classical con- quantum bits or of TEXTBOOKS 1 2 3 REFERENCES 1 2 3 COURSEOUTO	nanomaterial -Electron density in bulk material - Size dependen- nement - Quantum structures - Density of states in quantum we ucture - Band gap of nanomaterial- Properties and Application de electron phenomena and single electron transistor-Quantum d QUANTUM INFORMATION AND COMPUTING tting: Introduction - Postulates of quantum Mechanics- Differer mputation. Quantum system for information processing-quantum qubits - Density matrices- Entanglement-Quantum gates-C-NOT Hitendra K Malik, A K Singh, "Engineering Physics" Tata Mc Private Limited, New Delhi 2010. Vanchna Singh, Sheetal Kumar, "Engineering Physics" Cer Pvt.Ltd. Delhi 2010. V Rajendran, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2011. Dattu R Joshi, "Engineering Physics" Tata Mcgraw Hill Educ New Delhi 2010. A Marikani, "Engineering Physics" PHI Learning Private Limited N Kenneth B. Howell, " Ordinary Differential Equations" CRC I 2023	ce of Fermi energy - ell, quantum wire and s of nano materials- lot laser. 9 nces between quantum n states-Classical bits Gate-Bloch sphere. TOTAL: 4: cgraw Hill Education ngage Learning India ation Private Limited eation Private Limited ew Delhi 2010. Press , 21 January Bloom's Taxonomy

CO1	Understand clearly of semiconductor physics and functioning of semiconductor devices.	K2
CO2	Solution of differential equations to understand the computational physics.	К2
CO3	Understand the basic concepts and principles of quantum mechanics	K2
CO4	Explain the effects of quantum confinement on the electronic structure and corresponding physical and chemical properties of materials	К2
CO5	Apply the quantum mechanical principals and basic concept of quantum computing	К3

CP/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	1	1	1	1	1	1	1	-	-	-
CO2	3	3	2	2	1	1	1	1	1	1	1	1	-	-	1
CO3	3	3	2	2	1	1	1	-1	-1	-1	1	1	-	-	-
CO4	3	3	3	3	1	1	1	1	1	1	1	1	-	-	-
CO5	3	3	3	3	1	1	1	1	1	1	1	1	-	-	-

ACS101 PRINCIPLES OF PROGRAMMING														
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С							
	1     PC     3     0     0     3													
<ul> <li>Be exposed to the basics of computers and number systems.</li> <li>Learn to think logically and write pseudo code or draw flow charts for problems.</li> <li>Be familiar with syntax and programming in C.</li> <li>To develop modular applications in C using functions, pointers and structures</li> </ul>														
Unit 1	INTRODUCTION TO	COMPU	JTERS				9							
Introduction – Char Classification of Con Unit 2	acteristics of Computers – H nputers – Basic Computer of PROBLEM SOLVING SOFTWARE	Evolutio rganizat AND (	n of Computers – ion – Number Sys COMPUTER	Comp stems-	outer Num	Gener iber Co	ations – onversion 9							
Problem formulation Software –Types Evolution - Basic In Application Software I	<ul> <li>Problem Solving - Algoria of Software - Software - Software - Software - HT</li> <li>Packages- Introduction to O</li> </ul>	gorithm Software ML -G ffice Pae	<ul> <li>Flow Charts</li> <li>Developmen</li> <li>etting connected</li> <li>ckages</li> </ul>	– Pse t S l to I	eudoc Steps nterr	code - _ net Ap	Comput Intern oplication							

Unit 3	INTRODUCTION TO C	9
Overview of C – and Data Types	- structure of a C program – compilation and linking process – Operators and Expressions – Managing Input and Out	ses, Constants, Variables
Making – Arrays	Branching and Looping, Handling of Character Strings.	put operators Decision
Unit 4	<b>FUNCTIONS, POINTERS AND STRUCTURES</b>	9
Built-in Function	ns-User-defined Functions – Definitions – Declarations -Cal	l by reference – Call by
value – Structure	s and Unions – Pointers – The Preprocessor – Developing a G	C Program
Unit 5	FILE MANIPULATION	9
Introduction, Ch	naracter Input output in Files, Command Line Arguments, Str	ing Input Output in Files,
High level Disk	I/O Functions, Direct Input Output, Error Handling fur	nctions, File Positioning,
Introduction to P	reprocessor, Macro substitution, File Inclusion.	τοται - 45
TEVTDOOLS		101AL: 45
	Ashalt N. Komthana "Computer Dragrammine" Degreen Ed	Jugatian (India)
1	Asnok.N.Kamunane, Computer Programming, Pearson Ec	iucation (india)
2	Behrouz A.Forouzan and Richard F.Gilberg, "A Structured	Programming Approach
	Using C", II Edition, Brooks-Cole Thomson Learning Publi	cation
REFERENCES	INCLUSION OF THE REAL OF	
1	Pradip Dey, Manas Ghoush, "Programming in C", Oxford U	University Press
2	Byron Gottfried, "Programming with C", 2 <sup>nd</sup> Edition, (1	Indian Adapted Edition),
	TMH publications	
3	Stephen G.Kochan, "Programming in C", Third Edition, Pe	arson Education India.
4	Brian W.Kernighan and Dennis M.Ritchie, "The C P	rogramming Language",
	Pearson Education Inc.	
5	E.Balagurusamy, "Computing fundamentals and C Progra	amming", Tata McGraw-
	Hill Publishing Company Limited.	
COURSEOUTO	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	To enable the student to learn the major components of a	K2
	To demonstrate knowledge on logical thinking and	
CO2	problem solving	K3
CO3	Design and implement applications on C Programming	K3
CO4	Develop and implement modular applications in C using functions, structures and pointers.	K3
CO5	Design applications using sequential and random access file processing.	K3

CP/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1

CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2

Programme &													
Branch	B.Tech & IT	Sem.	Category	L	T	P	С						
	I	1	ES	3	0	0	3						
<ul> <li>Preamble</li> <li>To understand the basics of algorithmic problem solving.</li> <li>To learn to solve problems using Python conditionals and loops.</li> <li>To define Python functions and use function calls to solve problems.</li> <li>To use Python data structures - lists, tuples, dictionaries to represent complex data.</li> <li>To do input/output with files in Python.</li> </ul>													
Unit 1	BASICS OF PYTHON	N PROGR	AMMING				9						
Overview of program	nming language- Python h	istory-Inte	ractive mode – s	cript	mode	e-Tol	cens:Literal-						
Keyword-Delimiter-I	dentifier-Data types: Intege	er-Floating	g-Complex-Boole	an-Stı	ring-l	nder	tation-Input						
operation-Comments													
Unit 2	CONTROL STRUCT	URE, OPI	ERATORS AND	)			9						
	FUNCTIONS												
<b>G</b>													
Statements: if, if-else	e, nested if, if -elif - Iterati	ve stateme	ents: while, for, l	Vesteo	1 100	ps, e	lse in loops,						
Statements: if, if-else break, continue and	e, nested if, if –elif - Iterati pass statements. Operators	ve stateme s: Arithme	ents: while, for, lettership-	Nesteo Identi	ł looj ty-Bi	ps, e twise	lse in loops, e Functions:						
Statements: if, if-else break, continue and Types, parameters, a	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu	ve stateme s: Arithme ments, ke	ents: while, for, letter- etic-Membership- yword argument	Nesteo Identi s, par	d looj ty-Bi amet	ps, e twise ters	lse in loops, e Functions: with default						
Statements: if, if-else break, continue and Types, parameters, a values, functions with	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu a arbitrary arguments, Scop	ve stateme s: Arithme ments, ke e of variab	ents: while, for, l tic-Membership- yword argument oles: Local and gl	Nestec Identi s, par obal s	l looj ty-Bi camet	ps, e twise ærs , Rec	lse in loops, e Functions: with default ursion						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STR	ve statemo s: Arithme ments, ke e of variab RINGS AN	ents: while, for, lettic-Membership- byword argument bles: Local and glo ND REGULAR	Nesteo Identi s, par obal s	l looj ty-Bi camet cope	ps, e twise ers , Rec	lse in loops, e Functions: with default ursion 9						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STE EXPRESSIONS	ve stateme s: Arithme ments, ke e of variab RINGS AN	ents: while, for, l tic-Membership- yword argument oles: Local and glo ND REGULAR	Nesteo Identi s, par obal s	l looj ty-Bi camet cope	ps, e twise ers , Rec	lse in loops, e Functions: with default ursion 9						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access,	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STE EXPRESSIONS Negative Indices, Slicing,	ve statemo s: Arithme ments, ke e of variab RINGS AN Splitting,	ents: while, for, f etic-Membership- yword argument oles: Local and glo ND REGULAR List Methods, an	Nestec Identi s, par obal s	l looj ty-Bi camet cope	ps, e twise ers , Rec hensi	lse in loops, e Functions: with default ursion 9 ons Tuples:						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STF EXPRESSIONS Negative Indices, Slicing, I Slicing, Operations on tu	ve statemo s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict	ents: while, for, f etic-Membership- yword argument oles: Local and glo ND REGULAR List Methods, an tionary: Create, a	Nestec Identi s, par obal s nd con ndd, tr	l looj ty-Bi camet cope mprel	ps, e twise ers , Rec hensi	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace						
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Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STF EXPRESSIONS Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices,	ve statemo s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu	ents: while, for, for, for, for, for, for, for, for	Nestec Identi s, par obal s nd con nd con ndd, tr s: For expr	l looj ty-Bi cope npre raver matti essio	ps, e twise ers v , Rec hensi sing ing, ( n: N	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STF EXPRESSIONS Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace	ve statemo s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operatio String fu	ents: while, for, for, for, for, for, for, for, for	Nestec Identi s, par obal s nd con ndd, tr s: For expr	l looj ty-Bi cope, mpre raver matti essio	ps, e twise ers , Rec hensi sing ing, ( n: M	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r Unit 4	<ul> <li>e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop</li> <li>COLLECTIONS, STE EXPRESSIONS</li> <li>Negative Indices, Slicing,</li> <li>Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace</li> <li>FILE HANDLING AN</li> </ul>	ve stateme s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu	ents: while, for, f tic-Membership- yword argument oles: Local and glo ND REGULAR List Methods, an tionary: Create, a ons on set. String enctions. Regular	Nestec Identi s, par obal s nd con ndd, tr s: For expr	l looj ty-Bi ramet cope, mprel raver matti essio	ps, e twise ers , Rec hensi sing ing, ( n: M	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the 9						
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Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r Unit 4 Files: Open, Read, T Exceptions, Handling	<ul> <li>e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop</li> <li>COLLECTIONS, STE EXPRESSIONS</li> <li>Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace</li> <li>FILE HANDLING AN Write, Append, Tell, Seel g Exceptions, Raising Exceptions</li> </ul>	ve stateme s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu <b>ND EXCE</b> and Clo eptions, E2	ents: while, for, f tric-Membership- yword argument oles: Local and glo ND REGULAR List Methods, an tionary: Create, a ons on set. String enctions. Regular PTIONS ose. Errors and I acception Chainin	Nestec Identi s, par obal s nd con ndd, tr s: For expr Excep g, Us	l looj ty-Bi camet cope mprel raver matti essio	ps, e twise ers , Rec hensi sing ing, ( n: M : Sy ined	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the 9 ntax Errors, Exceptions,						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r Unit 4 Files: Open, Read, T Exceptions, Handling Defining Clean-Up ac	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STF EXPRESSIONS Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace FILE HANDLING AN Write, Append, Tell, Seel g Exceptions, Raising Exceptions	ve statemo s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu ND EXCE and Clo eptions, Ex	ents: while, for, for, for, for, for, for, for, for	Nestec Identi s, par obal s nd con add, tr s: For expr Excep g, Us	l looj ty-Bi camet cope, mprel raver matti essio	ps, e twise ers , Rec hensi sing ing, ( n: M : Sy ined	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the 9 ntax Errors, Exceptions,						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r Unit 4 Files: Open, Read, T Exceptions, Handling Defining Clean-Up ac Unit 5	<ul> <li>e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STE EXPRESSIONS</li> <li>Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace</li> <li>FILE HANDLING AN Write, Append, Tell, Seel g Exceptions, Raising Exceptions</li> <li>NUMPY, PANDAS, M</li> </ul>	ve statemo : Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu <b>ND EXCE</b> (and Clooptions, E2) <b>IATPLOT</b>	ents: while, for, f stic-Membership- syword argument oles: Local and glo ND REGULAR List Methods, an tionary: Create, a ons on set. String enctions. Regular PTIONS ose. Errors and I acception Chainin, TLIB	Nestec Identi s, par obal s nd con nd con ndd, tr s: For expr Excep g, Use	l looj ty-Bi camet cope, mprel raver matti essio tions erdef	ps, e twise ers , Rec hensi sing ing, ( n: M : Syn ined	lse in loops, e Functions: with default ursion 9 ons Tuples: and replace Comparison, latching the 9 ntax Errors, Exceptions, 9						
Statements: if, if-else break, continue and Types, parameters, a values, functions with Unit 3 List: Create Access, Create, Indexing and values, operations on Slicing, Splitting, St patterns, Search and r Unit 4 Files: Open, Read, Y Exceptions, Handling Defining Clean-Up ac Unit 5 Introduction - Basics	e, nested if, if –elif - Iterati pass statements. Operators arguments: positional argu arbitrary arguments, Scop COLLECTIONS, STF EXPRESSIONS Negative Indices, Slicing, I Slicing, Operations on tu dictionaries. Sets: Create a ripping, Negative indices, replace FILE HANDLING AN Write, Append, Tell, Seel g Exceptions, Raising Exceptions NUMPY, PANDAS, M of NumPy - N-dimensional	ve statemo s: Arithme ments, ke e of variab <b>RINGS AN</b> Splitting, uples. Dict nd operation String fu <b>ND EXCE</b> and Clo eptions, Ex <b>IATPLOT</b> al Array in	ents: while, for, f stic-Membership- yword argument oles: Local and glo ND REGULAR List Methods, an tionary: Create, a ons on set. String anctions. Regular PTIONS ose. Errors and I sception Chainin TLIB n NumPy – Metho	Nestec Identi s, par obal s nd con ndd, tr s: For expr Excep g, Us ods ar	l looj ty-Bi camet cope, mprel raver matti essio	ps, e twise ters , Rec hensi sing ing, ( n: M : Sy ined	lse in loops, e Functions: with default ursion 9 cons Tuples: and replace Comparison, latching the 9 ntax Errors, Exceptions, 9 ties - Basics						

Introduction - Series - Data Frame - Matplotlib - Basics - Figures and Axes - Method subplot() - Axis container

		TOTAL: 45
TEXTBOOKS		
1	Ashok Namdev Kamthane, Amit Ashok Kamthane "Pr	ogramming and Problem
	Solving with Python", 2 <sup>nd</sup> edition, Mc Graw Hill	
2	Dr.R.Nageswara Rao, "Core Python Programming", 3 <sup>rd</sup> edi	tion, Deamtech Publisher
REFERENCES	S	
1	Paul Dietel, Harvey Deitel, "Python for Programmers", Pet	arson
2	Reema Thareja," Problem Solving and programming	g with Python, Oxford
	University Press	
COURSEOUT	COMES:	Bloom's Taxonomy
At the end of th	ne course, learners will be able to	Level
<u>CO1</u>	Develop algorithmic solutions to simple computational	V2
COI	problems.	K.J
CO2	Develop and execute simple Python programs.	К3
	Write simple Python programs using conditionals and	
CO3	loops for solving problems	K2
<u> </u>	Decompose a Python program into functions	V2
	Decompose a Fytholi program into functions.	K3
CO5	Represent compound data using Python lists, tuples,	К3
_	dictionaries etc.	_

CP/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	<b>P</b> O11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	- 46		(Å		1	1	2	2	2	1
CO2	2	3	2	3	2	-	Sug	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	Ascip	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	S	IPE	<u>sum</u>	BAL	UR	1	1	3	2	2

### ESTO. 2011

AN	AC101 - EMPLOYMEN	T ENCH	ANCEMENT SK	<b>ILL</b>	5		
Programme &	B Tech & IT	Sem	Category	Т	т	р	C
Branch	D. I CUI & II	Sem.	Category		I		C
		1	MC	2	0	0	0
Preamble							
Unit 1	<b>RESUME WRITING</b>						6
Resume: Objective; Fo	ormats; Meticulous & Att	tention to	) Detail; Organizi	ng Ir	lforn	natio	n; Highlight
skills; Mistakes to avo	oid; Qualification & Skill	l; SWOT	Analysis; Assign	nmen	t – 1	Draft	Resume &
Corrections							

Unit 2	INTERVIEW SKILLS	6
Types of Interviews;	Preparation - Company, Role, Brush up Concepts, Technical S	trengths; Strengths
& Weakness; Impo	rtance of Grooming; Interview Questions - HR & Techr	nical; Non Verbal
Communication; Ne	gotiation Skills; How to start/end an interview; Group Discuss	ion; Assignment –
Preparation for "Tell	me about yourself", Mock Interviews.	
Unit 3	PROFESSIONAL ETIQUETTES	6
Workplace Etiquette	e - Global & Local; Culture Sensitivity; Gender Sensitivity	y; Communication
Netiquettes – Phone	, Email, Social Media; Avoid Gossip; How to be personable y	et be professional.
Meetings: Types of	meetings; Agenda; Schedule & Participants; Materials req	uired; Minutes of
Meeting.		
Unit 4	PRESENTATION SKILLS	6
What is a Presentation	on; Develop an effective slide; Know your Slides; Know your	Audience; Barriers
in Presentation; Tin	ne Management; Listening to the silent audience; Question &	& Answer session;
Feedback.		
Unit 5	COMMUNICATION AT WORKPLACE	6
Language & Comm	unication; Types of Communication - Internal & External, Fe	ormal & Informal;
Direction of Commu	nication Flow – Downward, Upward, Lateral, Diagonal; Team	work; Emotional
Intelligence	INSTITUTE OF TECHNOLOGY	
TEVEDOOVO		101AL: 30
IEXIBOOKS		1
<u> </u>	oft Skills & Employability Skills" by Sabina Pillai&Agna Ferna	indez
2 "S	oft Skills" by Meenakshi Raman & Shalini Upadhyay	41.1.5
3	Campus Recruitment" by Ramanadhan Ramesh Babu, Israel Batt	u, Akash R
B	utada&Vijaya Lakshmi Krishnan	
REFERENCES		
1 "]	Personality Development & Soft Skills (Old Edition)" by Barun	K Mıtra
2 "S	oft Skills Training: A Workbook to develop Skills for Employr	ment" by Frederick
Н	Wentz	
з "Т	en Soft Skills You Need to Advance Your Career(Andre Keys	Book 9)" by Lisa
Sn	nith	
"(	et Your First Job: A Companion For Getting Your First J	ob – A Guide to
4 Er	nployability Skills & Career Planning" by AJ Balasu	ıbramanian&Dr J
Sa	dakkadulla	

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2

A	AMC10	2 - PROFESSIONAL	ETHICS	S AND HUMAN	VAL	UES		
Programme &	z	P Took & IT	Som	Catagory	I	Т	D	C
Branch		D. I ech & I I	Sem.	Category			r	C
			1	MC	2	0	0	0
		To create an awa	reness or	Engineering Ethi	cs an	d Hu	man	Values.
Preamble		$\succ$ To understand so	ocial resp	onsibility of an en	ginee	r.		
Treamble		<ul><li>To appreciate etl</li></ul>	hical dile	nma while discha	rging	duti	es in	professional
		life.						
Unit 1	E	IUMAN VALUES						2
Morals, Values an	d Ethics	- Integrity - Work Etl	hic – Hor	esty – Courage –l	Empa	thy –	Self	-Confidence
– Character								
Unit 2	E	NGINEERING ETH	ICS					4
Senses of 'Engine	ering Et	hics' - variety of mora	l issued	- types of inquiry	- mo	ral d	lilem	mas - moral
autonomy - Kohlb	erg's the	ory - Gilligan's theory	- consens	sus and controvers	sy - N	lode	ls of	Professional
Roles - theories a	bout rig	ght action - Self-intere	est - cust	oms and religion	- use	es of	ethi	cal theories.
Valuing Time – Co	o-operat	ion – Commitment						
Unit 3	E	NGINEERING AS S	OCIAL I	<b>EXPERIMENTA</b>	TIO	N		3
Engineering as exp	perimen	tation - engineers as re	sponsible	experimenters - o	codes	of et	thics	- a balanced
outlook on law - th	ne challe	enger case study						
Unit 4	S	AFETY, RESPONSI	BILITIE	S AND RIGHTS				3
Safety and risk - a	ssessme	ent of safety and risk -	risk bene	fit analysis and re	ducin	g ris	k - tł	e three mile
island and chernot	yl case	studies		1.1		•		
Unit 5		LOBAL ISSUES						3
Multinational cor	poration	s - Environmental e	thics - c	omputer ethics -	wea	pons	s de	velopment -
engineers as mai	- nagers-c	onsulting engineers-en	ngineers	as expert withe	sses	and	advi	sors -moral
leadership	_							
			Discont				1	TOTAL: 15
TEXTBOOKS								
1	Mike M	lartin and Roland Schi	nzinger, '	"Ethics in Engine	ering'	', M	Gra	w-Hill, New
	York 19	96	nuñb		C			
2	Govinda	arajan M, Natarajan S,	Senthil	Kumar V. S, "En	ginee	ring	Ethio	cs", Prentice
	Hall of	India, New Delhi, 2004	ł		0	C		
REFERENCES								
1	Charles	D. Fleddermann, "En	gineering	Ethics", Pearson	Educ	ation	1 / P	rentice Hall,
	New Je	sey, 2004 (Indian Repr	rint now a	vailable).				
2	Charles	E Harris, Michael S. P	rotchard	and Michael J Ra	bins, '	"Eng	inee	ring Ethics –
	Concep	ts and Cases", Wadswo	orth Thor	npson Leatning, U	United	l Sta	tes, 2	2000 (Indian
	Reprint	now available).						`
3	John R	Boatright, "Ethics and	the Con	duct of Business'	', Pea	rson	Edu	cation, New
	Delhi, 2	003.						
4	Edmund	G Seebauer and Robe	ert L Barr	y, "Fundamentals	of Et	hics	for S	cientists and
	Enginee	ers", Oxford University	Press, O	xford, 2001.				
I_	C	· <b>J</b>	,	e				

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	2	1	-	-	2	-	2	-	1	-
CO2	1	-	1	-	2	-	-	-	2	-	-	-	-	-	-
CO3	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
CO4	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	2	-	-	-	2	-	2	-	1	-	-

	APH301 COMPUTATIONAL PHYSICS LAB				
Programme Branch	& B.Tech & IT Sem. Category	L	Т	Р	C
	1 BS	0	0	4	2
Preamble	<ul> <li>To learn the proper use of various kinds of physic</li> <li>To learn how data can be collected, presented and and concise manner</li> <li>To make the student an active participant in each</li> </ul>	es la d int part	borat erpre	tory e eted in	equipment. n a clear ercises.
LIST OF EXPE	RIMENTS				
1.Torsional pendu irregular objects	ulum - Determination of rigidity modulus of wire and moment o	f ine	ertia c	of reg	ular and
2.Simple harmoni	c oscillations of cantilever				
3. Non-uniform b	ending - Determination of Young's modulus				
4. Uniform bendir	ng - Determination of Young's modulus				
5. Laser- Determ	ination of the wavelength of the laser using grating				
6. Air wedge - De	etermination of thickness of a thin sheet/wire				
7. (a) Optical fib	e -Determination of Numerical Aperture and acceptance ang	le			
(b) Compact d	isc- Determination of width of the groove using laser.				
8.Ultrasonic inter	ferometer – determination of the velocity of sound and compres	sibil	ity of	fliqu	ids
				r	FOTAL:60
COURSEOUTC	COMES:	E	Bloor	n's T	`axonomy
At the end of the	e course, learners will be able to			Le	vel
CO1	Understand the functioning of various physics laboratory equipment.			K	2
CO2	Use graphical models to analyze laboratory data.			Κ	4

Use graphical models to analyze laboratory data.

CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	К2
CO4	Access, process and analyze scientific information.	K4
CO5	Solve problems individually and collaborative.	К3

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
2	r	2	1	1										
3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
-	-	_												
3	3	3	1	1	-	-	-	-	-	-	-	-	-	-
3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
I	PO1 3 3 3 3 3 3	PO1         PO2           3         2           3         3           3         2           3         3           3         3           3         3           3         3           3         2	PO1     PO2     PO3       3     2     3       3     3     3       3     2     3       3     3     2       3     3     2       3     3     2       3     2     3       3     2     3	PO1         PO2         PO3         PO4           3         2         3         1           3         3         3         1           3         2         3         1           3         2         3         1           3         2         3         1           3         3         2         3         1           3         2         3         1         1           3         2         3         1         1           3         2         3         1         1	PO1         PO2         PO3         PO4         PO5           3         2         3         1         1           3         3         3         1         1           3         2         3         1         1           3         2         3         1         1           3         2         3         1         1           3         2         3         1         1           3         2         3         1         1           3         2         3         1         1	PO1         PO2         PO3         PO4         PO5         PO6           3         2         3         1         1         -           3         3         3         1         1         -           3         2         3         1         1         -           3         2         3         1         1         -           3         2         3         1         1         -           3         2         3         1         1         -           3         2         3         1         1         -           3         2         3         1         1         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7           3         2         3         1         1         -         -           3         3         3         1         1         -         -           3         2         3         1         1         -         -           3         2         3         1         1         -         -           3         2         3         1         1         -         -           3         2         3         1         1         -         -           3         2         3         1         1         -         -           3         2         3         1         1         -         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8           3         2         3         1         1         -         -         -           3         3         3         1         1         -         -         -           3         3         3         1         1         -         -         -           3         2         3         1         1         -         -         -           3         2         3         1         1         -         -         -           3         3         2         1         1         -         -         -           3         2         3         1         1         -         -         -           3         2         3         1         1         -         -         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9           3         2         3         1         1         -         -         -         -           3         3         3         1         1         -         -         -         -           3         3         3         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -           3         3         2         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10           3         2         3         1         1         -         -         -         -         -           3         2         3         1         1         -         -         -         -         -           3         3         3         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -           3         3         2         1         1         -         -         -         -           3         2         3         1         1         -         -         -         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11           3         2         3         1         1                3         3         3         1         1                3         3         3         1         1                3         2         3         1         1                3         2         3         1         1                3         3         2         1         1                3         2         3         1         1	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12           3         2         3         1         1         -	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12         PS01           3         2         3         1         1         - <t< td=""><td>PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12         PS01         PS02           3         2         3         1         1         -</td></t<>	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12         PS01         PS02           3         2         3         1         1         -

### IFPPIGOR

Α	CS301 - PYTHON PRO	JGRAMMI	NG LABURA I	OKY			
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
		1	ES	0	0	4	2
Preamble	To understand the	problem so	lving approaches	s.			
	To learn the basic	programmi	ng constructs in	Pytho	n.		
	To practice vario	us computir	ng strategies for	Pyth	on-ba	ased	solutions to
	real world probler	ns.					
	To use Python da	ta structures	- lists, tuples, d	iction	aries		
	Fo do input/outpu	t with files i	n Python.				
LIST OF EXPERIME	NTS	~	0				
1. Identification and sol	ving of simple real life	or scientific	or technical prol	blems	, and	deve	eloping flow
charts for the same. (El	ectricity Billing, Retail	shop billing	, Sin series, wei	ght of	a m	otorb	oike, Weight
of a steel bar, compute	Electrical Current in Thr	ee Phase AG	C Circuit, etc.)	-			-
2. Python programmir	ng using simple staten	nents and e	expressions (exc	hange	e the	e val	ues of two
variables, circulate the	values of n variables, dis	tance betwe	en two points).				
3 Scientific problems	using Conditionals and	d Iterative	loops. (Number	· serie	es, N	lumb	er Patterns,
pyramid pattern)							
4. Implementing real	l-time/technical applica	ations usin	g Lists, Tuple	es. (1	tems	pro	esent in a
library/Components of	a car/ Materials require	ed for const	ruction of a buil	lding	-ope	ratio	ns of list &
tuples)							
5. Implementing real-ti	me/technical application	ns using Set	s, Dictionaries.	(Lang	guage	e, coi	nponents of
an automobile, Element	s of a civil structure, etc	operations	s of Sets & Dicti	onarie	es)		
6. Implementing progra	ms using Functions. (Fa	ctorial, large	est number in a li	ist, are	ea of	shap	e)
7. Implementing progra	ms using Strings. (revers	se, palindror	ne, character cou	unt, re	placi	ing cl	haracters)
8. Implementing progr	ams using written mod	ules and P	ython Standard	Libra	ries	(pano	das, 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.

TOTAL: 60

<b>COURSEOUT</b> At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy 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

CP/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	2	-
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	2	-
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	2	-
CO4	3	2	-	-	1	1	1	-	-	-	.*	2	2	2	-
CO5	3	2	-	-	1	1	1	ц(	ć	1		2	2	2	-

AHS30	1 - COMMUNICATION	SKILLS A	ND TECHNIC	AL V	VRI	ГING					
INT DI MOUNT											
Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С				
Branch	16-1	ESTD. 201	N								
		1	HS	0	0	2	1				
Preamble	<ul> <li>Impart a thorough und communication.</li> <li>Develop the skills nec audience needs.</li> <li>Enhance proficiency i related to technical co</li> <li>Equip students with the communication practice</li> <li>Foster an awareness o communication.</li> </ul>	lerstanding of ressary to taile n using langu mmunication ne ability to u ces. f ethical cons	the principles un or technical comm age techniques ar tilize technologica iderations and glo	derlyi nunica nd unc al tool obal p	ing ef ition lersta s to i erspe	fective to dive nding mprov ctives	e technica erse genres re technica in technic				

COMMUNICATION o snippets of conversational moments from movies and shor g oneself, introducing others, inviting people, and explaining ages that need understanding include inference and critical at ssing phrases and constructing suggestions based on supplie testions and Yes/No Questions - Parts of Speech. Vocabu icles, countable and uncountable nouns.	t documentaries places. nalysis. d information. ılary development:
o snippets of conversational moments from movies and shor oneself, introducing others, inviting people, and explaining ages that need understanding include inference and critical at ssing phrases and constructing suggestions based on supplie testions and Yes/No Questions - Parts of Speech. Vocabu icles, countable and uncountable nouns.	t documentaries places. nalysis. d information. ılary development:
oneself, introducing others, inviting people, and explaining ages that need understanding include inference and critical a ssing phrases and constructing suggestions based on supplie testions and Yes/No Questions - Parts of Speech. Vocabu icles, countable and uncountable nouns.	places. nalysis. d information. ılary development:
ages that need understanding include inference and critical at ssing phrases and constructing suggestions based on supplie testions and Yes/No Questions - Parts of Speech. Vocabu icles, countable and uncountable nouns.	nalysis. d information. ılary development:
ssing phrases and constructing suggestions based on supplie testions and Yes/No Questions - Parts of Speech. Vocabu icles, countable and uncountable nouns.	d information. ılary development:
estions and Yes/No Questions - Parts of Speech. Vocabuicles, countable and uncountable nouns.	lary development:
icles, countable and uncountable nouns.	
AUDIENCE-CENTERED COMMUNICATION	
	12
ening - Talk Shows and Debates.	
ading: Scanning Passages	
urrent issues, happenings, etc.	
, Recommendations, Note Taking, and Paragraph Writing	
is tenses, prepositions and articles	
verbs and one-word substitutes	
LANGUAGE TECHNIQUES AND GENRES IN	12
TECHNICAL COMMUNICATION	
to lectures, podcasts, audio books.	<u> </u>
on of Tables. Charts and Graphs	
alvests on oneself and Narrating incidents	
er Writing, Covering Letter and Memos.	
nses and Discourse Markers	
usage of keywords	
TECHNOLOCICAL TOOLS USED IN	12
COMMUNICATION	12
al videos, webinars on personal branding and networking ar	nd TFD talks
esearch papers or articles Graphic parratives AI tools used	in reading
ng in and conducting mock virtual meetings focusing on	presentation skills
networking events and Elevator Pitch	presentation skins
affing formal messages in social media handles, and Usage o	f AI prompts
Verbs and Adverbs	i Ai pionipis.
ETHICAL AND CLOBAL DEDSDECTIVES IN	12
TECHNICAL COMMUNICATION	12
documentarias and webinars on digital ethics and ovberseour	• • • • •
fundamental ethical principles and case studies	Ity.
rundamental etilical principles and case studies.	n strategies Mool
alabel colleboration	II Strategies Wock
giobal collaboration.	an Dramanala for
y analysis reports on legal and ethical responsibility	es. Proposais for
able communication practices.	
Speech, Idioms and phrases and Loan words	
	TOTAL: 60
tive Technical Communication by M. Ashraf Rizvi (Au	ithor) 2nd Edition
$h_{0,0}$ $h_{1,0}$	
	urrent issues, happenings, etc. , Recommendations, Note Taking, and Paragraph Writing is tenses, prepositions and articles verbs and one-word substitutes LANGUAGE TECHNIQUES AND GENRES IN TECHNICAL COMMUNICATION to lectures, podcasts, audio books. on of Tables, Charts and Graphs ialysis on oneself and Narrating incidents er Writing, Covering Letter and Memos. nses and Discourse Markers usage of keywords TECHNOLOGICAL TOOLS USED IN COMMUNICATION al videos, webinars on personal branding and networking an esearch papers or articles, Graphic narratives, AI tools used ng in and conducting mock virtual meetings, focusing on networking events and Elevator Pitch afting formal messages in social media handles, and Usage o s, Verbs and Adverbs. ETHICAL AND GLOBAL PERSPECTIVES IN TECHNICAL COMMUNICATION documentaries and webinars on digital ethics and cybersecur fundamental ethical principles and case studies. sensitivity and representation ross-cultural communicatio global collaboration. ly analysis reports on legal and ethical responsibiliti nable communication practices. Speech, Idioms and phrases and Loan words trive Technical Communication by M. Ashraf Rizvi (Au

COURSEO	UTCOMES:	Bloom's Taxonomy
	Sundararajan	
4	"A Handbook for Technical Writers and Editors" by ]	M. Ragunathan and M.
	Ramasamy P	
3	English for Englineers and Technologists: A Skill Appro-	ach by Jeyanthi G. and
2	"English for Engineers and Technologisty A Shill Agers	ash" by Isvanthi C and
-	Gerson	
2	"Technical Writing: Process and Product" by Sharon J.	Gerson and Steven M.
1	Technical Communication: A Reader-Centered Approach" b	by Paul V. Anderson
REFEREN	CES	
	Meng Goh, Cambridge.	
4	Teaching Speaking: A Holistic Approach, Book by Anne Bu	urns and Christine Chuen
3	Meenakshi Upadhyay, Arun Sharma – Verbal Ability and R	eading Comprehension.
	Bedford/st. Martin's: Fifth Edition (June 28, 2004)	
2	Sylvan Barnet and Hugo Bedau, 'Critical Thinking	Reading and Writing',
2	Calary Dawat and Harry Dadam (Caldinal Thinks	Dealine and Waitine?

At the end of	f the course, learners will be able to	Level
CO1	To create clear and successful technical publications, use core technical communication concepts.	К2
CO2	Modify technical communication to the requirements and expectations of various audiences.	К2
CO3	Use proper language and genres to effectively communicate technical knowledge.	K2
CO4	Use technology technologies to improve the generation, management, and dissemination of technical material.	К2
CO5	Navigate ethical quandaries and explore global views in technological communication methods.	К2



JEPPIAAR INSTITUTE OF TECHNOLOGY (An Autonomous Institution) Self-Belief | Self Discipline | Self Respect



Kunnam, Sunguvarchatram, Sriperumbudur-631604

### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM

## **SEMESTER II**



	AMA102 DISCRETE MATHEMATICS						
	Sun susanoonak						
Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С
Branch							
		2	BS	3	1	0	4
Preamble	<ul> <li>Extend student's L</li> <li>Acquire basics of s day problems</li> <li>Understand the fu connectivity</li> <li>Gain the concepts properties about the</li> <li>Learn relations, comprehend proble</li> </ul>	ogical and N set theory, f undamental to identify s em Lattice, Bo ems in comp	Mathematical abil unctions and councepts of the C structures of alge polean algebras uter Science.	ity to nting Graph braic and	deal ,appl theo natu: thei	with ly the ory a re, pr ir pr	abstraction em in day to nd Network rove and use roperties to
Unit 1	FOUNDATION OF LO	GIC AND H	PROOFS				9+3

TImit 1		0+2
		9+3
Recurrence relat : application of i	ions: solving recurrence relations, generating functions - Inclu nclusion-exclusion.	ision-Exclusion principle
Unit 3	RELATIONS	9+3
Relations - Equ Lattices -Hasse l	ivalence relations – Functions - Bijections - Binary relations Diagrams – Boolean algebra	and graphs- Posets and
Unit 4	GRAPH THEORY	9+3
Graphs and Gra	ph models- Graph terminology and special types of Graphs –	Matrix representation o
Graphs and Grau	bh isomorphism – connectivity – Eulerian and Hamiltonian Gr	aphs.
Unit 5	ALGEBRAIC STRUCTURE	9+3
Algebraic struct Homomorphism (Definitions and	ures with one binary operation – Semi groups and monoids 's – Normal subgroup and cosets – Lagrange's theorem simple examples only) with two binary operation- Ring, Integ	- Groups – Subgroups – Algebraic structure ral domain and field.
		Total: 6
TEXTBOOKS		
1	J.P.Tremblay., R.Manohar., "Discrete Mathematical Struc Tata MCGRAW Hill 38 <sup>th</sup> edition 2010	tures with Applications
2	Kenneth.H. Rosen "Discrete Mathematics and its Applic	ations" Tata MCGRAV
	Hill Special edition 2010	
3	T.Veerarajan "Discrete Mathematics with Graph Theory MCGRAW Hill 33rd edition 2021	and Cominatorics" Tat
REFERENCES		
1	Bernard Kolman., Robert Busby., Sharon C.Ross "Discrete Pearson Publications 6 <sup>th</sup> edition 2013	Mathematical Structures
2	Varsha H.Patil., Seymour Lipschutz., Mare lars lipson., "Discrete edition 2013	e Mathematics" Revised 3
3	https://home.iitk.ac.in/~arlal/book/mth202.pdf	
4	https://archive.nptel.ac.in/courses/106/103/106103205	
<b>COURSEOUT</b> At the end of th	COMES: e course, learners will be able to	Bloom's Taxonomy Level
C01	Demonstrate the ability to write and evaluate a proof or outline the basic structure and give examples of each proof technique described.	К3
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.	К3
CO4	Develop graph theory tools to map day-to-day applications.	К3
CO5	Expose to the concepts and properties of algebraic structures which provides solutions in design and analysis of algorithms	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	-

AEC103 - BA	SICS OF ELECT	RICAL	AND F	ELECTF	RONICS E	NG	INE	ERIN	١G
			a	<b>a</b> .				D	G
Programme &	B.Tech & I		Sem.	Cat	egory		Т	P	C
Branch				1111					
		mannun	2		BS	3	0	0	3
	This course alastrical and	provides	the for	undation	for underst	tandi	ng v	ariou	s aspects of
Preamble	intricacies of	f semicon	ductor	devices.	this subject	t de	or en lves	into	the heart of
	electrical and	electronic	c system	IS.	j				
Unit 1	ELECTRICAL	CIRCUI	TS						9
DC Circuits: Circuit Co	mponents: Conduc	ctor, Resi	stor, In	ductor, C	apacitor –	Ohn	n's L	aw -	Kirchhoff's
Laws -Independent and	l Dependent Sourc	ces – Sim	ple pro	blems- ]	Nodal Ana	lysis	, Me	esh a	nalysis with
Independent sources of	nly (Steady state)	Introduc	ction to	AC Ci	rcuits and	Para	amet	ers:	Waveforms,
Average value, RMS V	/alue, Instantaneo	us power	r, real j	power, r	eactive por	wer	and	appa	arent power,
power factor – Steady s	tate analysis of RL	C circuit	s (Simp	le proble	ems only)				
Unit 2	ELECTRICAL	MACHI	NES	1.50					9
Construction and Work	ng principle- DC	Separatel	y and S	elf excite	ed Generate	ors,	EMF	equ	ation, Types
and Applications. Wor	king Principle of	f DC m	otors, <sup>7</sup>	Forque 1	Equation, '	Тур	es ai	nd A	pplications.
Construction, Working	g principle and	Applicat	tions of	of Trans	sformer, 7	Thre	e pl	nase	Alternator,
Synchronous motor and	Three Phase Indu	ction Mo	tor						
Unit 3	ANALOG ELE	CTRONI	CS	10					9
Resistor, Inductor an	d Capacitor in	Electron	nic Ci	rcuits-	Semicondu	ictor	M	ateria	als: Silicon
&Germanium – PN Ju	nction Diodes, Ze	ner Diod	e –Cha	racterist	ics Applica	atior	is –	Bipo	lar Junction
Transistor-Biasing, JFI	ET, SCR, MOSFI	ET, IGB	Г – Ту	pes, I-V	<sup>7</sup> Characte	risti	cs a	nd A	applications,
Rectifier and Inverters									
Unit 4	DIGITAL ELEC	CTRONI	CS						9
Review of number syst	ems, binary codes	, error de	tection	and corr	rection cod	es, (	Coml	oinat	ional logic -
representation of logic	representation of logic functions-SOP and POS forms, K-map representations - minimization using K							ion using K	
maps (Simple Problems	only).								
Unit 5	MEASUREMEN	NTS ANI	) INST	RUME	NTATION				9
Functional elements of	an instrument, St	andards a	and cali	bration,	Operating	Prin	ciple	e, typ	bes -Moving

Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.

	TOTAL: 45
TEXTBOOKS	
1	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second
	Edition, McGraw Hill Education, 2020
2	S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson
	Education, Second Edition, 2011
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 Electric Circuits",
	Wiley, 2018.
5	.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements
	& Instrumentation', DhanpatRai and Co, 2015.
REFERENCES	
1	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition,
	McGraw Hill Education, 2019
2	Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2011
3	Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 1th
	edition, 2011
4	Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline
	Series, McGraw Hill.

COURSEOUTO	COMES:	Bloom's Taxonomy
At the end of the	Level	
CO1	Compute the electric circuit parameters for simple	K2
	problems.	
CO2	Explain the working principle and applications of	K2
	electrical machines.	
CO3	Analyze the characteristics of analog electronic devices.	K2
CO4	Explain the basic concepts of digital electronics.	K2
CO5	Explain the operating principles of measuring instruments	К2

#### S ESTO. 2011

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO2	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO3	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO4	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO5	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1

#### AAI101 - INTRODUCTION TO DATA SCIENCE

I I Ugi annite C Dronoh	& B.Tech & IT	Sem.	Category	L	Т	P	С
Dranch		2	ES	3	0	0	3
	To understand the dat	ta science fui	damentals and pr	ocess.	v	U	Ū
	$\succ$ To learn to describe the theorem to be the term of term o	he data for th	e data science pro	cess.			
Preamble	To learn to describe the Dether	he relationsh	ip between data.				
	<ul> <li>To utilize the Python</li> <li>To present and interp</li> </ul>	ret data using	visualization lib	aries i	n Pvt	hon	
TT •/ 1			2				0
Unit I Data Science: Be	INTRODUCTION	ta Data Sc	ianca Process: (	Marvi		Def	9 ining researc
goals Patriavir	a data Data preparation	la - Dala So Exploratora	Data analysis	build	ew – 1 the	mod	lal presentin
findings and bui	lg uata – Data preparation -	Exploratory	Warehousing	- Dunc Rosio	stat	istico	1 description
of Data	iung applications - Data Mil	illig - Data	warehousing –	Dasic	Stat	Istica	
Unit 2	DESCRIBING DATA		_				9
Types of Data -	Types of Variables -Describi	ing Data wi	th Tables and G	raphs	–De	scrib	ing Data wit
Averages - Descr	ribing Variability - Normal D	istributions	and Standard (z)	Score	es	00110	ing Duta tria
Unit 3	DESCRIBING RELA	TIONSHI	PS C				9
Correlation –Sca	atter plots –correlation coeff	icient for a	uantitative data	-com	puta	tiona	l formula fo
correlation coeff	icient – Regression –regressio	on line –lea	st squares regres	sion 1	ine -	- Sta	ndard error o
estimate – interp	retation of r2 –multiple regres	ssion equati	ons –regression	toward	ls th	e mea	an
1			U				
Unit 4	<b>PYTHON LIBRAKIE</b>	S FOR DA	TA WRANGL	ING			9
Unit 4 Basics of Numpy	arrays –aggregations –comp	<b>S FOR DA</b> outations on	TA WRANGL	ING sons, i	mask	cs, Bo	9 oolean logic
Unit 4 Basics of Numpy fancy indexing -	/ arrays –aggregations –comp - structured arrays – Data ma	<b>CS FOR DA</b> outations on anipulation	TA WRANGL arrays –compari with Pandas – d	ING sons, i lata in	mask dexi	cs, Bo ng ai	9 polean logic - nd selection -
Unit 4 Basics of Numpy fancy indexing - operating on dat	arrays –aggregations –comp - structured arrays – Data ma ta – missing data – Hierarc	<b>CS FOR DA</b> outations on anipulation hical index	TA WRANGLI arrays –compari with Pandas – c ing – combinin	ING sons, i lata in g data	mask dexi isets	ks, Bo ng ai –agg	9 oolean logic - nd selection - gregation and
Unit 4 Basics of Numpy fancy indexing – operating on day grouping – pivot	<ul> <li>PYTHON LIBRARIE</li> <li>/ arrays – aggregations – comp</li> <li>- structured arrays – Data mata</li> <li>ta – missing data – Hierarc</li> <li>tables</li> </ul>	<b>CS FOR D</b> A outations on anipulation hical index	TA WRANGLI arrays –compari with Pandas – c ing – combinin	ING sons, i lata in g data	mask dexi isets	ks, Bo ng ai —agg	9 polean logic and selection gregation and
Unit 4 Basics of Numpy fancy indexing – operating on da grouping – pivot Unit 5	<ul> <li>PYTHON LIBRARIE</li> <li>v arrays –aggregations –comp</li> <li>structured arrays – Data mata – missing data – Hierarc</li> <li>tables</li> <li>DATA VISUALIZAT</li> </ul>	S FOR DA utations on anipulation hical index ION	TA WRANGLI arrays –compari with Pandas – c ing – combinin	ING sons, i lata in g data	mask dexi usets	cs, Bo ng an —agg	9 polean logic - nd selection - gregation and 9
Unit 4 Basics of Numpy fancy indexing – operating on da grouping – pivot Unit 5 Importing Matpl	PYTHON LIBRARIE         / arrays – aggregations – comp         - structured arrays – Data mata         ta – missing data – Hierarc         tables         DATA VISUALIZAT         otlib – Line plots – Scatter	25 FOR DA utations on anipulation hical index ION plots – visu	TA WRANGLI arrays –compari with Pandas – c ing – combinin alizing errors –	ING sons, i ata in g data densi	mask dexi usets	cs, Bo ng an –agg nd co	9 polean logic - nd selection - gregation and 9 pontour plots -
Unit 4 Basics of Numpy fancy indexing – operating on da grouping – pivot Unit 5 Importing Matpl Histograms – leg	PYTHON LIBRARIE         arrays –aggregations –comp         structured arrays – Data mata         ta – missing data – Hierarc         tables         DATA VISUALIZAT         otlib – Line plots – Scatter         gends – colors – subplots – t	<b>S FOR DA</b> utations on anipulation hical index <b>ION</b> plots – visu ext and an	TA WRANGLI arrays –compari with Pandas – c ing – combinin nalizing errors – notation – custor	ING sons, a lata in g data densi nizatio	mask dexi usets ty an	cs, Bo ng an –agg nd co three	9 polean logic - nd selection - gregation and 9 pontour plots - e dimensiona
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L		
CO1	Define the data science process	K1
CO2	Understand different types of data description for data science process	К2
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 explore data	К3

CP/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-		2	2	3	2	2	3	1
CO5	2	3	1	2	2	-		-			-	1	3	2	2

# INSTITUTE OF TECHNOLOGY

ACS109 - COMPUTER ORGANIZATION											
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С				
		2	PC	3	0	0	3				
	> To identify the functional units in a digital computer system.										
	> To distinguish between the various ISA styles.										
Preamble	$\succ$ To trace the execution sequence of an instruction through the processor.										
Treamore	> To evaluate different computer systems based on performance metrics.										
	> To understand the fundamentals of memory and I/O systems and their										
	interface with the processor										
Unit 1FUNDAMENTALS OF COMPUTER SYSTEMS9											
Functional Units of a Digital Computer - Operation and Operands of Computer Hardware - Software											
Interface - Translation from a High Level Language to Machine Language - Instruction Set											
Architecture - RISC and CISC Architectures - Addressing Modes - Performance Metrics - Power											
Law – Amdahl's Law.											
Unit 2	Unit 2 ARITHMETIC FOR COMPUTERS						9				
Addition and Subtraction - Fast Adders - Multiplication: Booths Algorithm, Bit Pair Recoding -											
Division: Restoring and Non-Restoring - Floating Point Numbers: Single and Double Precision -											
Arithmetic Operations – ALU Design.											
Unit 3 PROCESSOR							9				
Design Convention of a Processor – Building a MIPS Datapath and designing a Control Unit –											
Execution of a Complete Instruction – Hardwired and Micro programmed Control – Introduction to Multicore – Graphics Processing Units, Cose study: NVIDIA GPU											
Viulticore – Graphics P		0									
Ullit 4	Ma	Jemory Manning									
Types of Memories – Meed for a meraremear memory system –Cache memories– Memory Mapping –											
Improving Cache Performance – Virtual Memory – Memory Management Techniques – Accessing I/O devices – Programmed Input/output – Interrupts – Direct Memory Access.

Unit 5PARALLEL ARCHITECTURE9Exploitation of more ILP –Dynamic Scheduling: Tomasulo's Algorithm –Array Processor- VectorProcessor – Basic Concepts of Pipelining – Pipelined Implementation of Datapath and Control Unit –Hazards – Structural, Data and Control Hazards–Overview of Next Generation Processors.

**TOTAL: 45** 

TEXTBOOKS	
1	David A. Patterson, John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface" Fifth Edition Morgan Kaufmann/Elsevier 2013
	a la
2	Carl Hamacher, Zvonkovranesic, SafwatZaky, NaraigManjikian, "Computer
2	Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.
REFERENCES	
1	William Stallings, "Computer Organization and Architecture – Designing
	forPerformance", Tenth Edition, Pearson Education, 2016.
	John L. Hennessey, David A. Patterson, "Computer Architecture - A
2	QuantitativeApproach", Morgan Kaufmann / Elsevier Publishers, Fourth Edition,
	2007. Institute of technology
2	V.P. Heuring, H.F. Jordan, "Computer Systems Design and Architecture",
3	SecondEdition, Pearson Education, 2004.
4	Douglas E. Comer, "Essentials of Computer Architecture", Sixth Edition, Pearson
4	Education, 2012

COURSEOUT	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Interpret assembly language instructions.	K2
CO2	Design the ALU circuits.	K3
CO3	Implement a control unit as per the functional specification.	К3
CO4	Analyze memory, I/O devices and cache structures for processor.	К3
CO5	Evaluate the performance of computer systems.	К5

ESTD. 2011

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2

#### ACS104 - FUNDAMENTALS OF CLOUD COMPUTING

Branch	&	<b>B.Tech</b>	& IT	Sem	Cate	egory	L	Т	Р	C
				2	ŀ	ES	3	0	0	3
		> To und	erstand th	e princi	iples of	cloud a	rchit	ectu	e, 1	models a
		infrastru	cture.							
		To under	rstand the c	oncepts	of virtuali	zation and	d vir	tual r	nach	ines.
Preamble		To gain 1	knowledge	about vi	rtualizatio	on Infrastr	uctu	re.		
		≻ To exp	olore and	experi	ment w	ith vario	ous	Clo	ud	deploym
		environn	nents.							
		To learn	about the s	ecurity is	ssues in t	ne cloud e	nviro	onme	nt.	
Unit 1		BASIC CON	CEPTS O	F CLOU	D COM	PUTING				9
Network-Based S	System	s- Concepts of	f Distribute	ed Syster	ns. Defin	ition of C	Cloud	l, Co	ncep	ots of Clo
Computing. Clou	id Serv	ice Providers,	NIST Cloud	l Compu	ting, Clo	id Charac	terist	tics		
Unit 2		CLOUD INF	RASTRU	CTURE						9
Cloud Pros and	Cons.	Layered Arch	nitectural D	Design, C	Cloud De	livery Mo	odels	. Cle	oud	Deploym
Models, Architec	ctural D	esign Challen	ges, Cloud S	Storage -	Storage-	as-a-Servi	ce –	Adv	anta	ges of Clo
Storage - Cloud S	Storage	Providers - S3	3.							
Unit 3		VIRTUALIZ	ATION B	ASICS						9
Virtual Machine	and it	s architecture-	-VM primi	tive oper	rations- V	/irtual Inf	rastr	uctu	es-	Data Cen
Virtualization for	or Clo	ud Computing	g–Levels o	of Virtua	alization	Implement	ntatio	on –	V	MM Desi
Requirements, V	virtualiz	zation Support	at the OS	Level,	Physical	versus V	irtua	l Ch	ıster	s. Live V
Migration Steps										
TI 4 A										
Unit 4		BUILDING	CLOUD N	ETWO	RKS	1.26				9
Designing and In	npleme	BUILDING nting a Data C	CLOUD N enter-Based	ETWOI d Cloud 1	RKS Installing	Open Sou	irce (	 Cloue	d ser	9 vice. Virt
Designing and In Box – Eucalypt	npleme tus Pul	<b>BUILDING</b> nting a Data C olic Cloud Pla	CLOUD N enter-Based tforms: Go	ETWOI d Cloud l oogle Ap	<b>RKS</b> Installing op Engine	Open Sou , Amazo	irce ( on W	Cloue Zloue Zeb S	d ser Servi	9 vice. Virt
Designing and In Box – Eucalyp Google Cloud Pla	npleme tus Pul atform.	<b>BUILDING</b> nting a Data C olic Cloud Pla Emerging Clo	CLOUD N enter-Based tforms: Gc oud Softwar	ETWOI d Cloud 1 oogle Ap re Enviro	RKS Installing op Engine nments	Open Sou , Amazo	irce ( on W	Cloue Zloue Zeb S	d ser Servi	9 vice. Virtu ices (AW
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COURSEOUT	COMES:	<b>Bloom's Taxonomy</b>
At the end of th	e course, learners will be able to	Level
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.	К3
CO5	Explain security challenges in the cloud environment.	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	1	-	-	-	2	3	1	2	3	3	3
CO2	2	2	2	3	3	-	ГП		1	2	2	3	1	1	3
CO3	3	3	3	3	3	-	-	-	2	1	1	2	2	1	3
CO4	3	3	1	1	1	-	2110	:	1	3	1	3	2	1	1
CO5	3	2	2	2	3	-	-	-	2	3	2	2	2	3	3
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	AMC103 - INDI	AN CONS	TITUTION				
Programme & Branch	B.Tech & IT	Sem.	Category	L	T	Р	С
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Preamble	<ul> <li>This Course intends t Indian constitution; r Central and State go organization and funct</li> <li>A detailed analysis of course.</li> </ul>	o impart a ights and o overnments tions of loca the function	comprehensive ou huties of the citiz and its relationsh l government. is of the statutory b	tlook zens, iip wi	abour Politi ith ea are i	t the cal In ach o ncorp	nature of the nstitutions o ther and the porated in this
Unit 1							9
Constitutional Assem	bly – Philosophy – Preamb	le – Salient	Features of Indi	an Co	onstit	ution	1
Unit 2							9
Fundamental Rights -	- Directive Principles of Sta	te Policy -	Fundamental Du	aties.			
Unit 3							9
Union Executive – 1	President: Election - Pow	vers and F	unctions - Cou	ncil a	of M	iniste	ers – Prime
Minister: Position and	l Powers – Relationship be	tween Prin	ne Minister and F	resid	ent. S	State	Executive -
Governor: Powers an	d functions - Chief Ministe	er: Position	and Powers – H	Relati	onshi	ip be	tween Chie
Minister and Governo	or.						
TT *4 4							0

Union Legislature: Structure, Powers and Functions – Speaker: Power and Functions – Procedures of Constitutional Amendment – State Legislature: Structure, Powers and Functions.

Unit 59Judiciary – Supreme Court: Powers and Functions – High Court : Powers and Functions – Judicial<br/>Review

TOTAL: 45

TEXTBOOKS	
1	Siwach, J.R, Dynamics of Indian Government and Politics, New Delhi: Sterling,
	1985.
2	Narang, A.S., Indian Government and Politics New Delhi: Gitanjali ,1995
REFERENCES	
1	Thakur, R. The Government and Politics of India : London: Macmillan, 1995.
2	Gupta, D.C, Indian Government and Politic, New Delhi, 1996

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		-	-	-	3	3	3		3	-	2	-	1	-
CO2	2		-	-	-	3	3	3	10105	3	-	2	-	1	-
CO3	2		-	-	-	3	3	3	-	3	-	2	-	1	-
CO4	-	3	-	-	-	3	3	3	-	3	-	2	-	1	-
CO5	1		-	-	-	3	3	3	-	3	-	2	-	1	-

		AHS101	கமிழர்ம	ரப
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Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
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Preamble		Vsciplit					
அலகு I	மொழிமற்றும்இலக்	கியம்					3
இந்திய மொழிக்	குடும்பங்கள்-திரா	പിட െ	மாழிகள்-தமிழ	P é	ௐ௫	செ	⊧ம்மொழி
தமிழ் செவ்விலக்	கியங்கள்-சங்க இல	<u>க்</u> கிய	த்தின் சமயச்	சா	jц	ற்ற	தன்மை
சங்க இலக்கிய	த்தில்பகிர்தல் அற	ம் –	திருக்குறளி	ல்	CL	லா	ாண்மைக்
கருத்துக்கள்-தமி		பகள்,த	மிழகத்தில்		சப	൧൵	ாபௌத்த
சமயங்களின் தா	க்கம்-பக்தி இலக்கிய	பம்,ஆ	தவார்கள் மற் <u>ச</u>	فىرو	நா	யன்	ாமார்கள்-
சிற்றிலக்கியங்க	ர்-தமிழில் நவீன	ଭୁର	<u>க்</u> கியத்தின்	ഖ	ளர்	ச்சி	தமிழ்
இலக்கியவளர்ச்சி	ியில் பாரதியார்	மற்ற	ம் பாரதிதாக	சன்	- -	ஆக	பியாரின்
பங்களிப்பு.						0	·
 அலகு II	மரபு –பாறை ஓவிப	பங்க	ர் முதல் நவீன				3
	ஓவியங்கள் வரை	சுற்ப	க்கலை				
நடுகல் முதல் நவீ	்ன சிற்பங்கள் வரை	ப்ஜ – 1	பொன்சிலைக	எர்-	- ЦĻ	9ங்(	தடியினர்
மற்றும் அவர்கள்	ா தயாரிக்கும் க <u>ை</u>	ഖിത	ளப்பொருட் <mark>க</mark> ள்	, (	பொ	ம்எ	மைகள் –

நவர் சிலை – இசைக்கருவிகள் – மிருதங்கம் , பறை ஸ்வரம் – தமிழர்களின் சமூகபொருளாதார வாழ்வில் <mark>ட்டுப் புறக்கலைகள் மற்றும் 3</mark> ரவிளையாட்டுகள் டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் இழர்களின் திணைக் கோட்பாடுகள் 3 களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் –
ல்வரம் – தமிழர்களின் சமூகபொருளாதார வாழ்வில் <b>ட்டுப் புறக்கலைகள் மற்றும்</b> <b>3</b> விளையாட்டுகள் டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>விழர்களின் திணைக் கோட்பாடுகள்</b> 3 களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க 6 மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் –
<b>ட்டுப் புறக்கலைகள் மற்றும்</b> <b>3</b> <b>விளையாட்டுகள்</b> -ம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>விழர்களின் திணைக் கோட்பாடுகள்</b> <b>3</b> களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க 5 மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் –
<b>ட்டுப் புறக்கலைகள் மற்றும்</b> <b>விளையாட்டுகள்</b> டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>விழர்களின் திணைக் கோட்பாடுகள்</b> <b>3</b> களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் –
<mark>ாவிளையாட்டுகள்</mark> -ம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>நிழர்களின் திணைக் கோட்பாடுகள் 3</b> களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்சு மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் –
_ம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம் சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>நிழர்களின் திணைக் கோட்பாடுகள் 3</b> களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் <b>ிழர்களின் திணைக் கோட்பாடுகள் 3</b> களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
<b>ிழர்களின் திணைக் கோட்பாடுகள் 3</b> பகளும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்ச மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
<b>ிழர்களின் திணைக் கோட்பாடுகள்</b> 2 களும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க 5 மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககா <mark>லத்தில் தமிழகத்தில்</mark> எழுத்தறிவும், கல்வியும் -
பகளும்,விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்சு 9 மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
ை மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
ங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் -
ம் துறைமுகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும்
ந்த நாடுகளில் சோழர்களின் வெற்றி.
திய தேசிய இயக்கம் மற்றும் இந்திய 3
ன்பாட்டிற்குத்
ிழர்களின் பங்களிப்பு
၊ போரில் தமிழர்களின் பங்கு – இந்தியாவின்
ழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் -
தில், சித்த மருத்துவத்தின்பங்கு – கல்வெட்டுகள்
- தமிழ்ப் புத்தகங்களின் அச்சுவரலாறு.
Total: 15
வரலாறு – மக்களும்பண்பாடும் – கே.கே. பிள்ளை
பீடு:தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல்
ள் கழகம்).
ித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
e of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and
in print)
வைகை ந்துக்கரையல் சங்க கால நகர நாகர்கம் ியல்துறைவெளியீடு)
ந்து ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
e of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by
al Institute of Tamil Studies
ibutions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: nal Institute of Tamil Studies.)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	1	-	2	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	AHS101 -HER	ITAGE O	F TAMILS									
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С					
		2	HS	1	0	0	1					
Preamble												
UNIT I	LANGUAGE AND L	ITERATU	RE				3					
Language Families in In	dia - Dravidian Lang	uages – 7	Famil as a Class	sical	Lang	uage	- Classical					
Literature in Tamil – Secu	lar Nature of Sangam	Literature	– Distributive Jus	stice i	n Sai	ıgam	Literature -					
Management Principles in	Thirukural - Tamil Ep	ics and Im	pact of Buddhism	a & Ja	inisn	n in T	amil Land -					
Bakthi Literature Azhwars	and Nayanmars - Forr	ns of mind	or Poetry - Develo	opmen	t of ]	Mode	ern literature					
in Tamil - Contribution of	Bharathiyar and Bhara	thidhasan.										
UNIT II	UNIT IIHERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE3Hero stope to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making -											
Hero stone to modern scul	pture - Bronze icons - 7	Fribes and	their handicrafts -	- Art c	of ten	nple	car making -					
Massive Terracotta sculptu	res, Village deities, Th	niruvalluva	ur Statue at Kanya	ıkuma	ri, M	lakin	g of musical					
instruments - Mridhangan	n, Parai, Veenai, Ya <mark>z</mark> h	n and Nad	haswaram - Role	of T	empl	es in	Social and					
Economic Life of Tamils.												
UNIT III FOLK AND MARTIAL ARTS												
Therukoothu, Karagattam	, VilluPattu, Kaniyan	Koothu, (	Dyillattam, Leath	er pu	ppet	ry, S	Silambattam,					
Valari, Tiger dance - Sport	s and Games of Tamils	s										
UNIT IV	THINAI CONCEPT	OF TAMI	LS				3					
Flora and Fauna of Tamil	s &Aham and Puram	Concept f	rom Tholkappiya	m and	l Sar	igam	Literature -					
Aram Concept of Tamils	- Education and Litera	acy during	Sangam Age - A	Ancie	nt Ci	ties a	and Ports of					
Sangam Age - Export and	Import during Sangam	Age - Ove	erseas Conquest of	f Chol	as							
UNIT V	CONTRIBUTION C NATIONAL MOVE	OF TAMIL MENT AN	S TO INDIAN D INDIAN CULT	URE			3					
Contribution of Tamils to	Indian Freedom Strug	ggle - The	Cultural Influence	ce of	Tami	ls ov	er the other					
parts of India – Self-Respe	ct Movement - Role of	Siddha M	edicine in Indiger	10US S	system	ns of	f Medicine –					
Inscriptions & Manuscript	s – Print History of Tar	nıl Books.					T. (.). 15					
TEVTDOOVS							1 otal: 15					
		•	· ·		n	<u> </u>	0					
்தம	ழகவரலாறு – ப	பக்களுட	பணபாடும	) - (	க.(	க்.	பிளளை					
(ດຄ	ளியீடு:தமிழ்நா	டுபா	டநூல் மற்	றைம்	)	கல்	ഷിധ്പിധல്					
പഞ	<b>ரிகள் கழகம்</b> ).											
2 <b>கன</b>	ரினித்தமிழ் – மு	னைவர்	இல. சுந்தரம்	. (ബി	கட	ன்ப	<b>ிரசுரம்</b> ).					
3 Socia	I Life of Tamils (Dr.)	K.K.Pillay	) A joint publica	tion o	of TN	ITB	& ESC and					
RMR	L – (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) (Published by: International Institute of Tamil Studies
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

### AEC302 - BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С
Branch							
	101	2	ES	0	0	4	2
Preamble	<ul><li>Soldering and tes</li></ul>	ting simple	electronic circuits;				
	Assembling and t	esting simp	le electronic compo	onents	on P	CB.	
	Study of basic ele	ectrical and	digital equipment.				
LIST OF EXPERIME	INTS						
1. Soldering simple elec	etronic circuits and check	king contin	uity.				
2. Assembling and testi	ng electronic component	s on a smal	ll PCB.				
3. Study of electronic co	omponents and equipmer	nt's.					
(a) Resistor Color co	ding using digital multi-r	neter.	1.4				
(b) Assembling elect	ronic components on brea	adboard.					
4. Verification of Logic	Gates	NOV 8					
5. Verification of Half	Adder and Full Adder	74~	1.2				
6. Measurement of elec	trical quantities-voltage of	current, po	wer & power fact	or in l	RLC	circu	it
7. Verification of KVL,	KCL	Discolat					
8. Verification of Theve	enin, Norton, Superpositi	on Theorem	n				
9. Fluorescent lamp wir	ing	DILLO	E.B.				
10. Stair case wiring	SBIN	numb	NUR /				
11. Study of iron box w	viring and working	STD. 201	T DI				
12. Assembly and dism	antle of computer/ laptor	)					
						]	<b>FOTAL: 60</b>

		101111.00
COURSEOUTO	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	К3
CO2	Demonstrate the wiring of various electrical joints in common household electrical wire work.	К3
CO3	Test the working of basic logic gates.	К3
CO4	Understand the working of basic electrical devices	К3

CO5	Apply basic electrical concepts to implement basic electrical circuits.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

	ACS302 CLOUD COMPUTING LABORA	TORY			
Programme &	B.Tech & IT Sem. Category		T	P	С
Branch					
	2 ES	0	0	4	2
	To learn the basics and types of Virtualizat	ion			
Preamble	To understand the Hypervisors and its type	S			
	To Explore the Virtualization Solutions				
I IST OF EVDEDI	F 10 Experiment the virtualization platforms				
LIST OF EAFER	IVIEN IS		1 4 1	lagat	
and storage space	realization in VMW ARE of any equivalent Open Sol	ARF	I. AI	locati	ememory
2. Find a procedure	for the following	III.			
a. Shrij	nk and extend virtual disk				
b. Crea	te. Manage. Configure and schedule snapshots				
c. Crea	te Spanned. Mirrored and Striped volume				
d. Crea	te RAID 5 volume				
3.Desktop Virtualiz	ation using VNC and Chrome Remote Desktop				
4.Create type 2 virt	ualization on ESXI 6.5 server				
5.Create a VLAN in	n CISCO packet tracer				
6.Install KVM in L	inux sette parts				
7.Create Nested Vin	tual Machine(VM under another VM)				
8.Install a C compil	er in the virtual machine created using a virtual box a	nd execu	te Si	mple	Programs
9. Install Google A	op Engine. Create a hello world app and other simple	web app	licati	ons u	ising
python/java.					
10.Find a procedure	e to transfer the files from one virtual machine to anothe	ner virtu	al ma	chin	e
				,	TOTAL: 60
COURSEOUTCO	MES:	Bl	oom	's Ta	xonomy
At the end of the c	ourse, learners will be able to	Le	evel		
CO1 A	analyze the virtualization concepts and Hypervisor			K	4
CO2 A	apply the Virtualization for real-world applications			K	3
CO3 In	nstall & Configure the different VM platforms			K	2

CO4	Experiment with the VM with various software	K4
CO5	Develop and deploy services on the cloud and setup a cloud environment	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	1	-	-	-	2	3	1	2	3	3	3
CO2	2	2	2	3	3	-	-	-	1	2	2	3	1	1	3
CO3	3	3	3	3	3	-	-	-	2	1	1	2	2	1	3
CO4	3	3	1	1	1	-	-	-	1	3	1	3	2	1	1
CO5	3	2	2	2	3	-	-	-	2	3	2	2	2	3	3



### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM

## **SEMESTER III**



	ACS108 DATABASE MAN	NAGE	CMENT SYSTEM	AS			
Programme & Branch	B.Tech & IT S	Т	Р	С			
	A 1210.	3	РС	3	0	0	3
Preamble	<ul> <li>To learn the fundamenta</li> <li>To represent a database a normalization technique.</li> <li>To understand the funda recovery processing</li> <li>To understand the intern indexing techniques whi</li> <li>To have an introductory NOSQL and database se</li> </ul>	Is of a system s menta al sto ch wi know	data models, relat n using ER diagra al concepts of tran rage structures us ll help in physical delage about the E	ional ims an sactio ing di DB o Distrib	alget nd to on, co ffere desig	ora an learn oncur nt file n datab	d SQL rency and e and bases,
Unit 1	RELATIONAL DATABAS	SES					9
rpose of Database	System - Views of data - I	Data	Models – Databa	ase S	yster	n Arc	chitecture

fundamentals – A	Advanced SQL features – Embedded SQL– Dynamic SQL	
Unit 2	DATABASE DESIGN	9
Entity-Relations	hip model - E-R Diagrams - Enhanced-ER Model - ER-	to-Relational Mapping -
Functional Dep	endencies - Non-loss Decomposition - First, Second,	Third Normal Forms,
Dependency Pre	eservation – Boyce/Codd Normal Form – Multi-valued E	Dependencies and Fourth
Normal Form – J	Ioin Dependencies and Fifth Normal Form	0
Unit 3	TRANSACTIONS	9
Transaction Con	cepts – ACID Properties – Schedules – Serializability – Tran	isaction support in SQL –
Need for Concu	irrency – Concurrency control – Two Phase Locking- Time	estamp – Multiversion –
Validation and S	Snapshot isolation– Multiple Granularity locking – Deadlo	ck Handling – Recovery
Concepts – Reco	very based on deferred and immediate update – Shadow pagi	ng – ARIES Algorithm
Unit 4	IMPLEMENTATION TECHNIQUES	9
RAID – File Or Oriented Storage Static Hashing – and join operatio	ganization – Organization of Records in Files – Data diction – Indexing and Hashing –Ordered Indices – B+ tree Index Files Dynamic Hashing – Query Processing Overview – Algorithe ons – Query optimization using Heuristics - Cost Estimation.	onary Storage – Column iles – B tree Index Files – ims for Selection, Sorting
Unit 5	ADVANCED TOPICS	9
Introduction to fundamentals – A	relational databases – Relational Model – Keys – Rel Advanced SQL features – Embedded SQL– Dynamic SQL	ational Algebra – SQL
		TOTAL: 45
TEXTBOOKS		
1	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Da	tabase System
	Concepts", Seventh Edition, McGraw Hill, 2020.	
2	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals	of Database Systems",
	Seventh Edition, Pearson Education, 2017	
REFERENCES		
1	C.J.Date, A.Kannan, S.Swamynathan, "An Introduction Eighth Edition, Pearson Education, 2006.	to Database Systems"
	Priscip/	
COURSEOUT	COMES:	Bloom's Taxonomy
At the end of th	e course, learners will be able to	Level
CO1	Construct SQL Queries using relational algebra	K2
CO2	Design database using ER model and normalize the database	К3
CO3	Construct queries to handle transaction processing and maintain consistency of the database	K2
CO4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database	K4
CO5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	1	-	-	-	2	1	1	1	2	1	3
CO2	3	1	1	1	1	-	-	-	2	3	3	3	3	1	2
CO3	3	2	3	2	1	-	-	-	2	1	1	2	2	3	3
CO4	1	2	3	2	-	-	-	-	3	2	3	3	1	2	3
CO5	1	1	3	3	2	-	-	-	1	3	3	1	2	2	2

Programme &	<b>B.</b> ]	Гесh & IT	Sem.	Category	L	T	P	С			
Branch											
			3	РС	3	0	0	3			
	≻ To	understand the	concepts of	ADTs							
<b>D</b>	> To	design linear d	lata structure	s – lists, stacks, and	queues	5					
Preamble	≻ To	To understand sorting, searching, and hashing algorithms									
	> To	apply Tree and	d Graph struc	tures							
Unit 1	ABSTR	ACT DATA T	YPES					9			
Abstract Data Ty	vpes (ADTs) –	- ADTs and c	classes – int	roduction to OOP	– clas	ses	in P	vthon			
inheritance – nar	nespaces – sh	allow and dee	ep copying.	Introduction to an	alysis	of a	algor	, ithms -			
asymptotic notatio	ons – divide & c	conquer – recur	rsion – analyz	zing recursive algori	thms		C				
Unit 2	LINEAI	R STRUCTUF	RES	1.8				9			
List ADT – array-	based impleme	sed implementations – linked list implementations – singly linked lists – circularly									
linked lists – doub	ly linked lists -	- Stack ADT –	Queue ADT	- double ended que	ues – a	pplic	atior	ıs			
Unit 3	SORTIN	NG AND SEA	RCHING	1.8				9			
Bubble sort – sele	ction sort - ins	ertion sort – m	arga gart	might cont analyzig	of cot	ting	1000				
		ertion bort in	leige sont – t	ulck soft – analysis	01 801	ung	aigoi	ithms -			
linear search – bir	nary search – h	ashing – hash	functions $- c$	collision handling –	load f	actor	s, rel	nashing			
linear search – bir and efficiency	nary search – h	ashing – hash	functions – c	collision handling –	load f	actor	s, rel	nashing			
linear search – bir and efficiency Unit 4	hary search – h	ashing – hash	functions $- c$	collision handling –	load f		s, rel	nashing 9			
linear search – bir and efficiency Unit 4 Tree ADT – Bina	hary search – h TREE S ry Tree ADT –	ashing – hash TRUCTURES tree traversals	functions $- c$ S - binary sea	collision handling –	load fa	eaps	s, rel	nashing 9 ulti-way			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees	hary search – h TREE S ry Tree ADT –	ashing – hash TRUCTURES tree traversals	functions $- c$ S - binary sea	collision handling –	load f	eaps	s, rel	nashing 9 ulti-way			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5	nary search – h TREE S ry Tree ADT – GRAPH	ashing – hash TRUCTURES tree traversals	functions – c S s – binary sea	arch trees – AVL tre	load f		s, rel	9 ulti-way			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rep	nary search – h TREE S Ty Tree ADT – GRAPH presentations o	ashing – hash TRUCTURES tree traversals I STRUCTUR If graph – gra	functions $- c$ S s - binary sea ES ph traversals	arch trees – AVL trees arch trees – AVL trees arch trees – topolog	load fi ces – h	eaps rderi	- mi ng _	9 ulti-way greedy			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn	TREE S TREE S TY Tree ADT – GRAPH presentations of amic programm	ashing – hash <b>TRUCTURES</b> tree traversals <b>ISTRUCTUR</b> f graph – gra ning – shortes	functions – c functions – c S s – binary sea ES ph traversals st paths – n	arch trees – AVL tre s – DAG – topolog ninimum spanning	bison load fi ces – h gical o trees -	eaps rderi - int	ng – rodue	9 ulti-way greedy			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn complexity classes	hary search – h TREE S ry Tree ADT – GRAPH presentations of amic programs s and intractabi	ashing – hash TRUCTURES tree traversals I STRUCTUR of graph – gra ning – shortes lity	Fige solt – C functions – C S s – binary sea ES ph traversals st paths – n	arch trees – AVL tre s – DAG – topolog ninimum spanning	ces – h gical o trees -	eaps rderi - int	ng – rodu	9 ulti-way greedy ction to			
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linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn complexity classes TEXTBOOKS	TREE S TREE S TY Tree ADT – GRAPH presentations of amic programs and intractabi	ashing – hash <b>TRUCTURES</b> tree traversals <b>I STRUCTUR</b> of graph – gra ning – shortes lity	functions – c functions – c S = binary sea ES ph traversals st paths – n	arch trees – AVL tre s – DAG – topolog ninimum spanning	ces – h gical o trees -	eaps rderi - int	ng – roduc	9 ulti-way greedy ction to TAL: 45			
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linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn complexity classes TEXTBOOKS	TREE S TREE S TY Tree ADT – GRAPH presentations of amic programs amic programs and intractabi	ashing – hash <b>TRUCTURES</b> tree traversals <b>I STRUCTUR</b> of graph – gra ning – shortes lity Goodrich, Robel lgorithms in P	functions – c functions – c S s – binary sea ES ph traversals st paths – n erto Tamass ython", An I	anch trees – AVL trees – AVL trees – DAG – topolog ninimum spanning sia, and Michael ndian Adaptation, J	ees – h gical o trees - H. Go	eaps rderi - int	ng – m roduc <b>TOT</b> & Sc	9 ulti-way 9 greedy ction to TAL: 4: , "Data ons Inc.			
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linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn complexity classes TEXTBOOKS 1 REFERENCES	hary search – h TREE S ry Tree ADT – GRAPH presentations of amic programm s and intractabi Michael T. G Structures & A 2021	ashing – hash TRUCTURES tree traversals I STRUCTUR of graph – gra ning – shortes lity Goodrich, Rob- lgorithms in P	functions – c functions – c S = binary sea ES ph traversals st paths – n erto Tamass ython", An I	arch trees – AVL trees – AVL trees – DAG – topolog ninimum spanning	ees – h gical o trees - H. Go	eaps rderi - int	ng – m rodu <b>TOT</b>	9 ulti-wa greed ction to CAL: 4 , "Data ons Inc.			
linear search – bir and efficiency Unit 4 Tree ADT – Binar search trees Unit 5 Graph ADT – rej algorithms – dyn complexity classes TEXTBOOKS 1 REFERENCES	TREE S TY Tree ADT – GRAPH presentations of amic programs amic programs and intractabi Michael T. G Structures & A 2021 Lee, Kent D.	ashing – hash TRUCTURES tree traversals I STRUCTUR of graph – gra ming – shortes lity boodrich, Rob- lgorithms in P , Hubbard, St	Fige soft – C functions – C S S = binary sea ES ph traversals st paths – n erto Tamass ython", An I teve, "Data	arch trees – AVL trees arch trees – AVL trees a – DAG – topolog ninimum spanning sia, and Michael ndian Adaptation, J Structures and Alg	ces – h gical o trees - H. Go ohn W	eaps rderi - int oldwa iley	ng – m ng – roduc TOT asser, & Sc	9 ulti-way 9 greedy ction to CAL: 43 , "Data ons Inc. Python			

2	Rance D. Necaise, "Data Structures and Algori	thms Using Python", John Wiley &							
2	Sons, 2011								
2	Aho, Hopcroft, and Ullman, "Data Structures a	nd Algorithms", Pearson Education,							
3	1983.	1983.							
1	Thomas H. Cormen, Charles E. Leiserson, Ro	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein,							
4	"Introduction to Algorithms", Second Edition, M	cGraw Hill, 2002.							
5	Mark Allen Weiss, "Data Structures and Algorith	nm Analysis in C++", Fourth Edition,							
5	Pearson Education, 2014								
<b>COURSEOU</b>	TCOMES:	Bloom's Taxonomy Level							
At the end of	the course, learners will be able to								
CO1	Explain abstract data types	K2							
$CO^2$	Design, implement, and analyze linear data	K3							
	structures, such as lists, queues, and stacks,	13							
<b>CO</b> 2	Design, implement, and analyze efficient tree	17.2							
003	structures to meet requirements such as	K3							
	Model problems as graph problems and								
CO4	implement efficient graph algorithms to solve	К3							
	them	110							
	Analyze the given scenario and choose								
CO5	appropriate data structures for solving	K3							
	problems								



	AMB152 ENTREPR	ENEUR	SHIP AND INNO	VA	ΓΙΟΙ	N	
Programme & Branch	B.Tech & IT	Sem.	Category	L	T	Р	С
		3	PC	3	0	0	3
Preamble	➢ Entrepreneurs are th	e innov	ators that stimulat	te jo	b gr	owth	n, econon

	<ul> <li>growth and development that allows any country to country the global economy. India, being far more developed and country than some of the third world countries, can entrepreneurial development activities.</li> <li>The purpose of exposing the students to Entrepreneur them to look at entrepreneurship as a viable, lucra career.</li> <li>Entrepreneurs require a foundation in several key ar successful. This course will focus on multiple opportunities and challenges for new ventures, ben entrepreneurship, strategic management and forms of b marketing strategies, venture finance and human resour</li> </ul>	ompete with and in nd forward-looking an provide lead to rship is to motivate ative and preferred reas in order to be topics including: hefits/drawbacks of pusiness ownership, ce management.
Unit 1	INTRODUCTION TO ENTREPRENEURSHIP	9
Meaning, Defini Evolution of 1 Entrepreneurship Entrepreneurship	tion and concept of Enterprise, Entrepreneurship and Entrepreneur Entrepreneurship, Theories of Entrepreneurship. Characteristic o, Concepts of Entrepreneurship, Emerging trends: Internet & E-con o – Nature, Concepts and Sustainability	rship Development, cs and Skills of mmerce, Corporate
Unit 2	ENTREPRENEURIAL COMPETENCY	9
Entrepreneurial	Motivation: Meaning and concept of Motivation, Entrepreneur	ship Development
I Togram. Inceds	and Objectives of EDFs, Phases of EDFs, Evaluation of EDFs. Neg	
Unit 3	GOVERNMENT INITIATIVES	9 geneias for Poliay
Unit 3 Role of Govern Formulation and Financial suppor	GOVERNMENT INITIATIVES           generation         GOVERNMENT INITIATIVES           ment in promoting Entrepreneurship, MSME policy in India, A         1           Implementation: DIC, SISI, EDII, NEDB, Financial Support         1, Sources of Financial support, Development Financial Institutions.	gencies for Policy System: Forms of
Unit 3 Role of Govern Formulation and Financial suppor	GOVERNMENT INITIATIVES         ment in promoting Entrepreneurship, MSME policy in India, A         1 Implementation: DIC, SISI, EDII, NEDB, Financial Support         t, Sources of Financial support, Development Financial Institutions.         INNOVATION & PROJECT MANAGEMENT	gencies for Policy System: Forms of 9
Unit 3         Role of Govern         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin	GOVERNMENT INITIATIVES         ment in promoting Entrepreneurship, MSME policy in India, A         d Implementation: DIC, SISI, EDII, NEDB, Financial Support         t, Sources of Financial support, Development Financial Institutions.         INNOVATION & PROJECT MANAGEMENT         g, Business Design, The Adoption of Innovations, Idea Ma         oncept, Features, Classification of projects, Issues in Project Ma         roject Formulation, Project Design and Network Analysis, Project T         ct Report Preparation, Specimen of a Project Report.         FORMS OF BUSINESS OWNERSHIP         uess Ownership, Issues in selecting forms of ownership, Enviro	9 gencies for Policy System: Forms of 9 magement. Project anagement, Project Evaluation, Project 9 onmental Analysis,
Unit 3         Role of Govern         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepred	GOVERNMENT INITIATIVES         ment in promoting Entrepreneurship, MSME policy in India, A         d Implementation: DIC, SISI, EDII, NEDB, Financial Support         t, Sources of Financial support, Development Financial Institutions.         INNOVATION & PROJECT MANAGEMENT         ag, Business Design, The Adoption of Innovations, Idea Ma         oncept, Features, Classification of projects, Issues in Project Ma         roject Formulation, Project Design and Network Analysis, Project for Report Preparation, Specimen of a Project Report.         FORMS OF BUSINESS OWNERSHIP         tess Ownership, Issues in selecting forms of ownership, Enviro         lems and opportunities, Defining Business Idea, Business Plan, encurship, Family Business.	9         gencies for Policy         System: Forms of         9         magement. Project         anagement, Project         Evaluation, Project         9         onmental Analysis,         Business Process,
Unit 3         Role of Govern         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepret	GOVERNMENT INITIATIVES         ment in promoting Entrepreneurship, MSME policy in India, A         d Implementation: DIC, SISI, EDII, NEDB, Financial Support         t, Sources of Financial support, Development Financial Institutions.         INNOVATION & PROJECT MANAGEMENT         ug, Business Design, The Adoption of Innovations, Idea Ma         oncept, Features, Classification of projects, Issues in Project Ma         roject Formulation, Project Design and Network Analysis, Project         ct Report Preparation, Specimen of a Project Report.         FORMS OF BUSINESS OWNERSHIP         ness Ownership, Issues in selecting forms of ownership, Enviro         lems and opportunities, Defining Business Idea, Business Plan,         neurship, Family Business.	9         gencies for Policy         System: Forms of         9         nagement. Project         anagement, Project         Evaluation, Project         9         onmental Analysis,         Business Process,         TOTAL: 45
Unit 3         Role of Govern         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepret         TEXTBOOKS         1	GOVERNMENT INITIATIVES         imment in promoting Entrepreneurship, MSME policy in India, A         d Implementation: DIC, SISI, EDII, NEDB, Financial Support         t, Sources of Financial support, Development Financial Institutions.         INNOVATION & PROJECT MANAGEMENT         ig, Business Design, The Adoption of Innovations, Idea Ma         oncept, Features, Classification of projects, Issues in Project Ma         roject Formulation, Project Design and Network Analysis, Project for         ct Report Preparation, Specimen of a Project Report.         FORMS OF BUSINESS OWNERSHIP         tess Ownership, Issues in selecting forms of ownership, Environeers and opportunities, Defining Business Idea, Business Plan, encurship, Family Business.         Khanna, S. S., Entrepreneurial Development S. Chand. New Delh	9         gencies for Policy         System: Forms of         9         magement. Project         Evaluation, Project         9         onmental Analysis,         Business Process,         TOTAL: 45
Unit 3         Role of Govern         Formulation and         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepret         TEXTBOOKS         1         2	GOVERNMENT INITIATIVES           ment in promoting Entrepreneurship, MSME policy in India, A           d Implementation: DIC, SISI, EDII, NEDB, Financial Support           t, Sources of Financial support, Development Financial Institutions.           INNOVATION & PROJECT MANAGEMENT           g, Business Design, The Adoption of Innovations, Idea Ma           oncept, Features, Classification of projects, Issues in Project Maroject Formulation, Project Design and Network Analysis, Project           ct Report Preparation, Specimen of a Project Report.           FORMS OF BUSINESS OWNERSHIP           uess Ownership, Issues in selecting forms of ownership, Environelems and opportunities, Defining Business Idea, Business Plan, eneurship, Family Business.           Khanna, S. S., Entrepreneurial Development, S. Chand, New Delh           Kuratko, F. Donald, Richard M. Hodgetts, Entrepreneurship:           Practice, Thomson, 7ed,2020	9         gencies for Policy         System: Forms of         9         anagement. Project         anagement, Project         Evaluation, Project         9         onmental Analysis,         Business Process,         TOTAL: 45         mi.2020         Theory, Process,
Unit 3         Role of Govern         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepret         TEXTBOOKS         1         2         REFERENCES	GOVERNMENT INITIATIVES           ment in promoting Entrepreneurship, MSME policy in India, A           d Implementation: DIC, SISI, EDII, NEDB, Financial Support           t, Sources of Financial support, Development Financial Institutions.           INNOVATION & PROJECT MANAGEMENT           ig, Business Design, The Adoption of Innovations, Idea Ma           oncept, Features, Classification of projects, Issues in Project Ma           roject Formulation, Project Design and Network Analysis, Project           ct Report Preparation, Specimen of a Project Report.           FORMS OF BUSINESS OWNERSHIP           tess Ownership, Issues in selecting forms of ownership, Envirce           lems and opportunities, Defining Business Idea, Business Plan,           eneurship, Family Business.           Khanna, S. S., Entrepreneurial Development, S. Chand, New Delh           Kuratko, F. Donald, Richard M. Hodgetts, Entrepreneurship;           Practice, Thomson, 7ed,2020	9 gencies for Policy System: Forms of 9 magement. Project anagement, Project Evaluation, Project 9 onmental Analysis, Business Process, TOTAL: 45 mi.2020 Theory, Process,
Unit 3         Role of Govern         Formulation and         Formulation and         Financial suppor         Unit 4         Design Thinkin         Management: C         Identification, Pr         Appraisal, Project         Unit 5         Forms of Busin         identifying prob         Women Entrepret         TEXTBOOKS         1         2         REFERENCES         1         1         2	GOVERNMENT INITIATIVES           imment in promoting Entrepreneurship, MSME policy in India, A           d Implementation: DIC, SISI, EDII, NEDB, Financial Support           t, Sources of Financial support, Development Financial Institutions.           INNOVATION & PROJECT MANAGEMENT           ig, Business Design, The Adoption of Innovations, Idea Ma           oncept, Features, Classification of projects, Issues in Project Ma           roject Formulation, Project Design and Network Analysis, Project           ct Report Preparation, Specimen of a Project Report.           FORMS OF BUSINESS OWNERSHIP           tess Ownership, Issues in selecting forms of ownership, Environ           lems and opportunities, Defining Business Idea, Business Plan,           neuership, Family Business.           Khanna, S. S., Entrepreneurial Development, S. Chand, New Delh           Kuratko, F. Donald, Richard M. Hodgetts, Entrepreneurship;           Practice, Thomson, 7ed,2020           Tentepreneurship: Strategies and Resources, 3/E -: Marc Dollin 2017	9         gencies for Policy         System: Forms of         9         magement. Project         anagement. Project         Evaluation, Project         9         onmental Analysis,         Business Process,         TOTAL: 45         ni.2020         Theory, Process,         nger; Prentice Hall,

3	Entrepreneurship in Action, 2/E - Mary Coulter; Prentice H	all, 2021
COURSEOUT	Bloom's Taxonomy	
At the end of the	e course, learners will be able to	Level
CO1	Have the ability to discern distinct entrepreneurial traits.	К3
CO2	Know the parameters to assess opportunities and constraints	К2
CO3	Understand the systematic process to select and screen a business idea	К2
CO4	Design strategies for successful implementation of ideas	К3
CO5	Analyze the way for write a business plan.	K4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-		-		-	-	-	1	1
CO2	-	-	2	-	-	-	-	-		-	-	-	-	2	2
CO3	-	2	-	-	-	- 1	1	F OF T			-	-	-	1	1
CO4	-	3	-	-	-	-	-	-	-	-	-	-	-	1	1
CO5	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1

Programme & Branch	B.Tech & IT	Sem.	Category		T	P	C
		3	BS	3	0	0	0
Preamble	<ul> <li>To introduce the biodiversity and conservation.</li> <li>To impart knowled measures of environ</li> <li>To facilitate the un and nonrenewable preserve them.</li> <li>To familiarize the appreciate the introsustainability, reco credit and the chall</li> <li>To inculcate and e understanding on g sustainable urbaniz</li> </ul>	basic co emphasize dge on the nmental po derstandin resources, e concept terdepende gnize and enges of en mbrace su green mate ation.	oncepts of envir on the biodiv e causes, effects ollution and natura g of global and In causes of their do t of sustainable nce of economi analyze climate on vironmental man stainability practi rials, energy cycl	and and and and al disa dian egrada dev c an chang agem ces a es an	ent, y of contr sters scena ation d sc es, c ent. nd d an	ecos Incorrection The second The	ystems lia and r preven of renev measur goals aspect pt of ca op a bro e the ro
Unit 1	ENVIRONMENT AN	D BIODI	VERSITY				6

flow- ecological succession. Types of biodiversity: genetic, species and ecosystem diversity- values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

Unit 2	ENVIRONMENTAL POLLUTION	6
Causes, Effects and Pre-	eventive measures of Water, Soil, Air and Noise Pollutions	. Solid, Hazardous
and E-Waste managem	nent. Case studies on Occupational Health and Safety M	anagement system
(OHASMS), Environme	ental protection. Environmental protection acts	

-		
Unit 3	RENEWABLE SOURCES OF ENERGY	6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

Unit 4	SUSTAINABI	LITY AND MANAGE	MENT	6
Development, GDP,S	ustainability- co	ncept, needs and chall	enges-economic, so	cial and aspects of
sustainability-from uns	ustainability to	sustainability-millenniu	m development go	als, and protocols-
Sustainable Developme	nt Goals-targets	, indicators and interv	ention areas Clima	te change- Global,
Regional and local envi	ronmental issues	and possible solutions-	case studies. Concep	ot of Carbon Credit,
Carbon Footprint. Envir	onmental manag	ement in industry-A ca	se study.	

Unit 5SUSTAINABILITY PRACTICES6Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment,<br/>Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy<br/>efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles<br/>carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio<br/>economical and technological change.

**TOTAL: 30** 

TEXTBOOKS	
1	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th
	Edition, New Age International Publishers ,2018.
2	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016
3	Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall
5	Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6	Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
REFERENCES	
1	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances
	and Standards', Vol. I and II, Enviro Media. 38 . edition 2010.
2	Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3	Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.

4	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University
	Press, Third Edition, 2015.

COURSEOUT	COMES:	Bloom's Taxonomy
At the end of th	ne course, learners will be able to	Level
CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	К3
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	К3
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	К3
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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
						10	~		$\sim$	87					

Programme & Branch		B.Tech & IT	Sem.	Category	L	Т	Р	С
		75	510.301	РС	0	0	4	2
Preamble		To learn and imp To learn the usag To understand fu databases.	blement import ge of nested an inctions, proce	ant commands i d joint queries. dures and proce	in SQL	z. exter	sions	of
		To understand de To be familiar we development.	esign and impl ith the use of a	ementation of ty front end tool f	pical of or GU	datał I bas	base ap sed app	plicatio
IST OF EXPERIN	MENTS	5						

2. Create a set of tables, add foreign key constraints and incorporate referential integrity.

3. Query the database tables using different 'where' clause conditions and also implement aggregate functions.

4. Query the database tables and explore sub queries and simple join operations.

5. Query the database tables and explore natural, equi and outer joins.

6. Write user defined functions and stored procedures in SQL.

7. Execute complex transactions and realize DCL and TCL commands.

8. Write SQL Triggers for insert, delete, and update operations in a database table.

9. Create View and index for database tables with a large number of records.

10. Create an XML database and validate it using XML schema.

11. Create Document, column and graph based data using NOSQL database tools.

12. Develop a simple GUI based database application and incorporate all the above-mentioned features

13. Case Study using any of the real life database applications from the following list

a) Inventory Management for a EMart Grocery Shop

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

**TOTAL: 60** 

COURSEOUT	COMES:	Bloom's Taxonomy
At the end of the	he course, learners will be able to	Level
CO1	Create databases with different types of key constraints.	K1
CO2	Construct simple and complex SQL queries using DML and DCL commands.	К3
CO3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.	К3
CO4	Create an XML database and validate with meta-data (XML schema).	К3
CO5	Create and manipulate data using NOSQL database.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	3	1	3	2	2	3	2

CO2	2	2	3	2	2	-	-	-	1	2	3	3	2	1	2
CO3	3	3	2	1	1	-	-	-	1	1	1	3	2	3	3
CO4	1	3	3	3	1	-	-	-	1	1	3	2	3	1	3
CO5	3	2	1	1	1	-	-	-	2	2	3	1	3	1	2

ACS	04 DATA STRUCTURES ANI	D AL	GORITHMS LAB	OR	ATC	ORY	
Programme &	B Tech & IT	em	Category	T.	Т	Р	C
Branch	<b>D.TCEIRCETT</b> 5		Category		1	1	C
Dranen		3	РС	0	0	4	2
	To implement ADTs in P	Python	10	U	U	-	
	To design and implement	linear	data structures li	ete	stack	ra an	d queues
Preamble	To design and implement	rohin	and baching algor	ists, iithn	SLACE	.s, an	la queues
	To solve problems using t	troo or	d graph structures	111111	18		
1. Implement sim	le ADTs as Python classes	lice al	ia graph structures				
2 Implement recu	rsive algorithms in Python						
3 Implement List	ADT using Python arrays	_					
4 Linked list impl	ementations of List	_					
5. Implementation	of Stack and Queue ADTs						
6 Applications of	List Stack and Queue ADTs	_					
7 Implementation	of sorting and searching algorithm	10					
7. Implementation	of Linch tables	15	- 16				
0. Trac representation	ion and traversal algorithms	<b>X</b> 4					
10 Implementatio	of Pinary Search Trees	$\sim$					
10. Implementatio	a of Heers	-					
11. Implementatio							
12. Graph represei	tation and Traversal algorithms	-11					
13. Implementatio	n of single source shortest path alg	orithn	1				
14. Implementatio	n of minimum spanning tree algori	thms	NUR />			r	
	MES.	201		τ	Diaar	n'a 7	TOTAL: 00
At the end of the	MIES:				01001	ISI IS	vol
At the end of the	Implement ADTs as Python classe	c					
<u> </u>	Implement AD I's as I ython classe	3				K	.3
	Design, implement, and analyse	linea	r data structures,			V	1
	such as lists, queues, and stacks, ad	ccordi	ng to the needs of			N	4
	Design, implement, and analyse ef	ficien	t tree structures to				
CO3	meet requirements such as sea	rching	g, indexing, and			K	4
	sorting						
CO4	Model problems as graph pro	blems	and implement			K	3
	efficient graph algorithms to solve	them					-

CO5	Analyze the given scenario and choose appropriate data structures for solving problems	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	2	3	1	2	1	2	1
CO2	3	3	2	-	1	-	-	-	2	3	1	2	2	2	1
CO3	2	2	2	1	1	-	-	-	2	3	1	2	1	3	1
CO4	3	1	2	1	1	-	-	-	2	3	1	2	1	3	1
CO5	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-

Programme &	B.Tech & IT Sem. Category L T	P	C
Dranch		2	
<b>D</b>		2	U
Preamble			0
Unit 1	FOUNDATIONS OF COMMUNICATION SKILLS		8
<ul> <li>Introd</li> </ul>	luction to Communication Skills		
o Under	rstanding the Communicative Environment		
• Active	e Listening Skills		
o Effect	tive Speaking Techniques		
o Initiat	ting and Sustaining Conversations		
TI:4 2	A DVANCED COMMUNICATION TECHNIQUES		0
Unit 2	ADVANCED COMMUNICATION TECHNIQUES		0
o Presei	Multimedia in Presentations		
<ul> <li>Using</li> <li>Under</li> </ul>	Multimedia in Presentations		
o Under	Communication and Dynamica		
0 Oloup	Communication and Dynamics		
Unit 3	CRITICAL THINKING AND COMMUNICATION		8
<ul> <li>Introd</li> </ul>	luction to Critical Thinking		
<ul> <li>Analy</li> </ul>	zing Arguments and Information		
<ul> <li>Const</li> </ul>	ructing Clear and Persuasive Arguments		
• Proble	em-Solving and Decision-Making		
o Intera	ctive Exercises and Case Studies		
Unit 4	EMOTIONAL INTELLIGENCE IN		8
	COMMUNICATION		
<ul> <li>Introd</li> </ul>	luction to Emotional Intelligence (EI).		
o Self-A	Awareness and Self-Regulation Empathy and Social Skills		
o Mana	ging Stress and Emotions in Communication.		
o Practi	cal Exercises in EI		

#### COMMUNICATION

- o Motivation and Persuasion Techniques
- o Negotiation Skills
- Leadership Communication
- o 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



### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM

# **SEMESTER IV**



ACS107 OPERATING SYSTEMS													
	200		1										
Programme & Branch	B.Tech & IT	Sem.	Category	Т	P	С							
		4	PC	3	0	0	3						
	To understand the	basics	and functions of op	erati	ng sy	/stem	ıs.						
	To understand processes and threads.												
	> To analyze scheduling algorithms and process synchronization.												
D 11	> To understand the concept of deadlocks.												
Preamble	To analyze variou	s memo	ry management sch	neme	es.								
	> To be familiar with I/O management and file systems.												
	> To be familiar with the basics of virtual machines and Mobile OS like												
	iOS and Android.												
Unit 1	INTRODUCTION						7						
Operating System Ove	rview - Objectives and Fu	nctions	- Evolution of Ope	erati	ng S	ysten	n; Operating						
System Structures - Us	er Operating System Interf	ace - S	stem Calls – Syste	m P	rogra	ams -	Design and						
Implementation - Struc	turing methods.				c		-						
Unit 2	PROCESS MANAGEME	NT					11						
	I												

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms: Threads -Multithread Models - Threading issues; Process Synchronization - The Critical-Section problem - Synchronization hardware - Semaphores - Mutex - Classical problems of synchronization - Monitors; Deadlock -Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

Unit 3	MEMORY MANAGEMENT	10
Main Memory - Swapp	ing - Contiguous Memory Allocation - Paging - Structure	of the Page Table -
Segmentation, Segment	ation with paging; Virtual Memory - Demand Paging - Cop	py on Write - Page
Replacement - Allocatio	on of Frames – Thrashing.	

Unit 4	STORAGE MANAGEMENT	10

Mass Storage system - Disk Structure - Disk Scheduling and Management; File-System Interface - File concept - Access methods - Directory Structure - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management; I/O Systems - I/O Hardware, Application I/O interface, Kernel I/O subsystem.

7

**TOTAL: 45** 

K2

Unit 5

#### VIRTUAL MACHINES AND MOBILE OS

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.

TENTROOLIC

CO4

Virtualization

TEXTBOOKS										
1	Abraham Silberschatz, Peter Baer Galvin and Greg Ga	igne, "Operating System								
	Concepts", 10th Edition, John Wiley and Sons Inc., 2018.									
2	Andrew S Tanenbaum, "Modern Operating Systems", Pe	earson, 5th Edition, 2022								
	New Delhi.									
REFERENCES	Pacipint									
1	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operat	ing 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, 2016.									
COURSE OUTC	OMES:	Bloom's Taxonomy								
At the end of the	course, learners will be able to	Level								
CO1	Analyze various scheduling algorithms and process synchronization.	K4								
CO2	Explain deadlock prevention and avoidance algorithms.	K2								
CO3	Compare and contrast various memory management schemes.	K2								
<u> </u>	Explain the functionality of file systems, I/O systems, and	K)								

CO5

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
CO3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
CO4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
CO5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-

ACS105 OBJECT ORIENTED PROGRAMMING													
Due que mus e D	D Tash & IT	T	р	C									
Programme & Branch	B. I ech & II Sem. Category L	1	P 0	2									
	To learn the basics of Object Oriented Programmi	U ng	U	3									
Droomblo	To learn the basics of object-offended Hogrammin	ng mbi	am										
Ficalliole	To know the principles of internance and polymon	rio	5111 collo	otions									
Unit 1	INTRODUCTION		conc	0									
Principles of OOP (	lasses – Objects – Data hiding – Data encapsulation	<u></u>	– In	heritance –									
Polymorphism: Definition	on of Classes: Objects – Methods – Access specifiers – St	atic	and	final classes									
and members: Object (	Construction and Destruction – Fundamental programming	g st	ructu	res in Java:									
Streams: Input–Output,	String handling – Examples in Java.	8											
Unit 2	INHERITANCE			9									
Inheritance: Definition -	- Types of inheritance: Single - Multilevel - Multinle - H	iera	rchic	al Subclass									
constructors – Interface	s in Java: Definition - Implementation - Extending inte	rfac	res _	Inheritance									
versus delegation – Inhe	ritance rules – Inner classes – Examples in Java	liac		mineritanee									
Unit 3	POLYMORPHISM AND EXCEPTION HANDLING			9									
Polymorphism: Method	d overloading and overriding Dynamic method di	(spot	tohe	Executions									
Hierarchy – Built-in exc	eptions – Creating own exception: Packages in Java – Exa	spa mpl	es in	Java.									
Unit 4	GENERIC TYPES AND METHODS			9									
Definition and concept	s: Generic classes and generic methods - Generic types	s —	Rest	rictions and									
limitations – Inheritance	rules for generic types – Reflections – Examples in Java.												
Unit 5	GENERIC COLLECTIONS FOR ADTS AND												
	ALGORITHMS			9									
Introduction to collection	ns – Collection Classes and Interfaces: Array list – Linked	list	- 0	ueue – Set –									
Trees: Iterators for col	lections – Man class – Collection algorithms: Sorting –	- Se	earch	ing – User-									
defined algorithms – Ex	amples in Java												
				TOTAL: 45									
TEXTBOOKS													
1 Danny	y Poo, Derek Kiong, Swarnalatha Ashok, "Object-Oriente 2nd Edition Springer Publication 2008	ed P	rogra	amming and									
Java	, 2nd Eanton, Springer Fuorication, 2008.												

-	2		Herber	t Sch	ildt, "	Java:	The	Comp	olete	Refere	nce", 8	8th Ed	ition,	McGrav	w Hill		
			Educati	ion, 20	)11.												
REFER	ENCE	S															
	1		Timoth	y Bud	d, "U1	nderst	anding	g Obje	ct-orie	ented p	rogram	ming w	vith Jav	'a", Upo	lated		
			Edition	, Pear	son Ec	lucatio	on, 20	00.									
	2		C Thon	C Thomas Wu, "An introduction to Object-oriented programming with Java", 4th													
			Edition	Edition, Tata McGraw-Hill Publishing company Ltd., 2006.													
-	3		Cay S	Cay S Horstmann, Gary Cornell, "Core Java Volume – I Fundamentals", 9th													
			Edition	Edition, Prentice Hall, 2013.													
4	1		Paul De	Paul Deitel, Harvey Deitel, "Java SE 8 for programmers", 3rd Edition, Pearson,													
			2015.														
:	5		Steven	Holzn	er, "Ja	ava 2 l	Black	book"	, Drea	ımtech	press, 2	2011.					
COURS	E OU'	ТСС	<b>DMES:</b>										Bloom's	s Taxon	omy		
At the e	nd of t	the c	ourse, le	earner	s will b	oe able	e to						I	Level			
C	D1		Use cla	isses a	nd obj	ects fo	or pro	blem s	solving	g.			К3				
C	02		Develop	o progr	ams us	ing inl	heritan	ce and	interfa	aces				K3			
C	03		Apply t	he con	cepts o	f polyı	norph	ism an	d exce	ption ha	ndling			K3			
C	04		Build ap	oplicati	ons us	ing ge	neric p	rogran	nming					K3			
C	05		Apply	the co	ncepts	of ge	neric o	collect	ions					K3			
		- 1	11 2			0											
CO/PO	PO1	PO	2 PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3		
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-		
CO2	2	2	2	-	-	-		-	-	-	-	-	2	-	-		

CO2	3	2	3	-	-	-	<	-	-	-	10	-	2	-	-
CO3	3	2	3	-	2		-			- 1		-	2	-	I
CO4	3	2	-	-	-	3-1	-		5	1	97-	-	2	-	-
CO5	3	2	-	-	-		Č,	$\sim$	N,	13	-	-	2	-	-
						1.1				10.00					

ACS109 COMPUTER NETWORKS													
Programme & Branch	B.Tech & IT Sem. Category					P	С						
	4 PC 3 0												
	> To understand the pro	tocol la	yering and physica	l leve	el cor	nmun	nication.						
	To analyze the perform	mance o	of a network.										
D 11	> To understand the various components required to build different												
Preamble	networks.												
	$\triangleright$ To learn the functions of network layer and the various routing protocols.												
	$\succ$ To familiarize the functions and protocols of the Transport layer.												
Unit 1	INTRODUCTION AND P	PHYSIC	AL LAYER				9						
Networks - Network Ty	pes – Protocol Layering – T	CP/IP I	Protocol suite – OSI	Mod	lel –	Physic	cal Layer:						
Performance – Transmiss	ion media – Switching – Cire	cuit-swit	ched Networks – Pac	eket S	Switch	ning.							
Unit 2	DATA-LINK LAYER & N	MEDIA	ACCESS				9						
Introduction – Link-L	ayer Addressing – DLC Se	rvices -	- Data-Link Layer	Proto	cols	– HD	DLC- PPP -						
Media Access Control	- Wired LANs: Ethernet -	Wireless	s LANs – Introducti	on –	IEEE	802.1	1, Bluetooth						

	liceting	g Dev	ices.													
	Unit 3	6	1	NETW	ORK	LAYF	E <b>R</b>							9		
Network	Layer	Serv	rices – I	Packet	switch	ning –	Perfor	mance	– IPV	4 Addr	esses –	Forwar	ding of	IP Pack	cets -	
Network	Layer	· Prot	ocols: I	P, ICN	AP v4	– Uni	cast R	outing	Algor	ithms –	Protoc	ols – M	lulticast	ing Bas	ics –	
IP VO AU	Unit 4	1g – 1 I	P VO Pr	TRAN:	SPOR	TLAY	YER							9		
Introduc	tion -	Tre	ansport	Lavet	Prot	ocols		rvices	- Po	rt Nur	nhers _	User	Datag	ram Pro	tocol	
Transmis	ssion C	Contro	ol Proto	col – S	CTP.	00015	- 50	I VICES	- 10	ii ivui		- 0301	Datag		10001	
	Unit 5	;	A	APPLI	CATI	ON L	AYER							9		
WWW a	nd HT	TP –	FTP – I	Email -	-Telne	t–SSE	I – DN	S-SN	IMP.							
														тот	TAL:	
TEXTB	OOKS	5														
1	1	]	Behrouz	z A. Fc	orouzai	1, Data	Comr	nunica	tions a	nd Netv	vorking.	, Fifth I	Edition '	ТМН,20	)13.	
REFER	ENCE	S				,						/		,		
		<u> </u>				-		m	nn	n						
	L	]	Larry L	. Peters	son, B	ruce S.	Davie	c, Com	puter N	letwork	s: A Sy	stems A	pproacl	n, Fifth l	Editic	
,	,		Morgan	Kautn	nann P	ublish	ers Inc	., 2012		057						
4	<u></u>		William	ı Stalli	ngs, D	ata and	d Com	puter (	Comm	inicatio	ns, Ten	th Editi	on, Pear	rson Edu	ucatio	
	3		2013.			-				_						
-	J		Nader I	F. Mir	, Com	puter	and C	ommu	nicatio	n Netw	orks, S	econd	Edition,	Prentic	e Ha	
	4		2014. Vinα_Γ	)ar I ir	Ren	-Huno	Hwa	ng and	Fred	Baker	Comp	iter Ne	tworke	· An Or	hen	
	-		Source	Appro	bach.	McGra	aw Hi	ll Publ	isher.	2011.	compt					
	5		James F	Kuro	se Ke	ith W	Ross	Comp	iter Ne	tworkir	ο Δ.Τ.	n-Dow	n Appro	ach		
	5			. 12010	50, KC		1035,	compt			ig, /1 10	-h-now	птери	au11.		
(	5	]	Featurin	ng the I	nterne	t, Sixtl	h Editi	on, Pea	arson E	ducatio	on, 2013	•				
								<u>_</u>	1	31						
COURS	E OU	ГСO I	MES:		•11								Bloom's	s Taxon	omy	
At the el	na of t	ne co	urse, le	arners	s will	ic low	e to	d ite t	functio	ne in a	Compute	-r	1	Jevel		
CO	D1		network	and th S.	ie Das	ie iayo	-15 all	u 115	anetio	15 111 (		-1		K2		
C	52	]	Evaluat	e the p	erform	ance o	f a net	work.	_	011	>			K3		
	73		Underst	and th	e basi	cs of	how d	lata flo	ows fro	om one	node t	0		к2		
		;	another.	·										<u>π</u> ∠		
<u> </u>	D4	Analyze and design routing algorithms. K4														
CO	5		Design j	protoco	ols for	variou	s func	tions ir	the ne	etwork.	otcos1-			К3		
CO	06		Underst	and the	= work	ing of	variou	s appli	cation	iayer pi	0100015	•	K2			
CO/PO	PO1	POT	PO3	P04	PO5	POG	PO7	POS	POO	PO10	PO11	PO12	PSO1	PSO2	psc	
CU/FU	101	102	103	104	105	100	10/	100	109	2	2	1012	1301	1 502	130	
CO1	2	1	1 4	1		-	-	-		4	4	4		1 1	2	
CO1	3	1	3	1	2	-	-	-	1	2	3	3	2	1	3	

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CO4

CO5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3

Programme & Branch	B.Tech & IT	Sem.	Category	L	T	Р	С
		4	РС	0	0	3	2
	To install window	ws operat	ing systems.				
	To understand the	e basics c	f Unix command	and s	hell	progr	amming.
	<ul><li>To implement va</li></ul>	arious CPI	U scheduling algo	rithm	s.		
	To implement D	eadlock A	voidance and Dea	adloc	k Det	tectio	n
Preamble	Algorithms						
	To implement Pa	age Repla	cement Algorithm	IS			
	To implement va	arious mei	nory allocation m	ethod	ls.		
	To be familiar w	ith File O	rganization and F	ile Al	locat	ion S	trategies.
LIST OF EXPERIME	NTS						
1. Installation of window	ws operating system						
2. Install any guest oper	ating system like Linux u	ising VM	ware.				
	1 1 01 11 0						
3. Illustrate UNIX comr	nands and Shell Program	ming					
4. Process Management	using System Calls : For	k, Exit, G	etpid, Wait, Close				
			1A				
5. Write C programs to	implement the various CI	PU Schedu	aling Algorithms				
6 Illustrate the inter pro	cess communication strat	egy	29				
o.mustrate the mer pro-	cess communication strat	cgy					
7. Implement mutual ex	clusion by Semaphore						
8. Write C programs	to avoid Deadlock usin	g Banker	's Algorithm and	d to	Impl	emer	t Deadloc
Detection Algorithm	C Summer				p -		
9. Write C programs to	implement the following	Memory 2	Allocation Metho	ds			
a. First Fit	b. Worst Fit c. Best Fit						
10. Write C programs to	implement the various P	age Repla	acement Algorithr	ns			
11 Implement the falles	wing File Allocation Stree		a C programs				
a. Sequenti	al b. Indexed c. Linked	iegies usi					
12. Write C programs for	or the implementation of	various di	sk scheduling algo	orithn	15		
r - 8	1						
						]	TOTAL: 4
COURSEOUTCOME	S:			]	Blooi	n's T	axonomy
	~•					-	-

CO1	Define and implement UNIX Commands.	K1
CO2	Compare the performance of various CPU Scheduling Algorithms.	K2
CO3	Compare and contrast various Memory Allocation Methods.	K2
CO4	Define File Organization and File Allocation Strategies.	K1
CO5	Implement various Disk Scheduling Algorithms.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
CO2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
CO3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
CO4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
CO5	2	2	1	1	3	-		n I		_2	2	3	1	3	3

# INSTITUTE OF TECHNOLOGY

ACS303 OBJECT ORIENTED PROGRAMMING LABORATORY										
Programme & Branch		B.Tech & IT	Sei	m.	Category	L	Т	Р	С	
			4	ł	PC	0	0	4	2	
	~	To build softwa applications.	re develo	opm	ent skills using java <sub>I</sub>	orog	ramm	ing f	or real-world	
Preamble	>	To understand inheritance, exc	and app eption ha	ply andl	the concepts of cla ing and file processing	sses g.	, pac	kage	s, interfaces,	
		To develop appl	ications	usir	ng generic programmi	ng a	nd ev	ent h	andling.	
LIST OF EXPERIMENTS										
1.Solve problems by using sequential search, binary search, and quadratic sorting algorithms (selection,										
insertion)										
2. Develop stack and queu	ie data s	tructures using cla	asses and	d ob	jects.					
3. Develop a java applica	tion wit	h an Employee c	lass with	ı En	np_name, Emp_id, A	ddre	ss, M	ail_i	d, Mobile_no	
as members. Inherit the	classes,	Programmer, A	ssistant	Pro	fessor, Associate Pro	ofess	or an	d Pr	ofessor from	
employee class. Add Basi	c Pay (H	BP) as the membe	er of all t	the i	nherited classes with	97%	of B	P as	DA, 10 % of	
BP as HRA, 12% of BP a	as PF, 0.	1% of BP for sta	ff club fi	unds	s. Generate pay slips f	for th	ne em	ploy	ees with their	
gross and net salary.										
4. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method										
named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes										
extends the class Shape. E	Each one	of the classes co	ntains or	nly 1	he method printArea	( ) th	at pri	nts tl	ne area of the	

given shape.

5. Solve the above problem using an interface.

6. Implement exception handling and creation of user defined exceptions.

7.Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

8. Write a program to perform file operations.

9. Develop applications to demonstrate the features of generics classes.

10. Develop applications using JavaFX controls, layouts and menus.

11. Develop a mini project for any application using Java concepts.

		<b>TOTAL: 60</b>
COURSEOUTCO	OMES:	<b>Bloom's Taxonomy</b>
At the end of the	course, learners will be able to	Level
CO1	Design and develop java programs using object oriented programming concepts	К3
CO2	Develop simple applications using object oriented concepts such as package, exceptions	K2
CO3	Implement multithreading, and generics concepts.	К3
CO4	Create GUIs and event driven programming applications for real world problems	К3
CO5	Implement and deploy web applications using Java	K4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2	1	÷.		-	e	1	2	2	2	1	2	3
CO2	2	1	3	1					2	3	3	2	1	3	1
CO3	2	2	1	2	1		١	$\mathcal{T}$	1	2	1	3	2	3	2
CO4	2	2	1	3	-		-		3	1	1	1	2	1	2
CO5	1	3	3	1	3	-		Ascip	1	1	1	1	2	1	2

# SRIPERUMBUDUR

AC	CS307	COMPUT	ER NETWO	RKS LABORAT	ORY					
Programme & Branch	<b>B.</b> T	ech & IT	Sem.	Category	L	Т	Р	С		
			4	PC	0	0	4	2		
	> To	o understand th	e concept of	layering in netwo	rks.					
	> To know the functions of protocols of each layer of TCP/IP protocol suite.									
D 11	> To visualize the end-to-end flow of information.									
Preamble	> To	o learn the fund	ctions of netw	ork layer and the	variou	s rou	ting pr	otocols.		
	To familiarize the functions and protocols of the Transport layer.									
LIST OF EXPERIMENT	ſS									

1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and trace route PDUs using a network protocol analyzer and examine.

2. Write a HTTP web client program to download a web page using TCP sockets.

3.Applications using TCP sockets like: a) Echo client and echo server b) Chat

4. Simulation of DNS using UDP sockets.

5. Use a tool like Wireshark to capture packets and examine the packets.

6. Write a code simulating ARP /RARP protocols.

7. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.

8 Study of TCP/UDP performance using Simulation tool.

9. Simulation of Distance Vector/ Link State Routing algorithm.

10. Simulation of an error correction code (like CRC).

		<b>TOTAL: 60</b>
COURSEOUTO	COMES:	<b>Bloom's Taxonomy</b>
At the end of the	e course, learners will be able to	Level
CO1	Device various protocols using TCP and UDP.	K2
CO2	Compare the performance of different transport layerprotocols.	K2
CO3	Use simulation tools to analyze the performance of various	K3
005	network protocols.	КJ
CO4	Analyze various routing algorithms.	K4
CO5	Implement error correction codes.	K4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	1	1.2	-		1	3	3	3	2	1	3
CO2	3	1	1	2	2	-	1	1.0	3	2	1	1	3	1	2
CO3	3	3	2	1	2	-	-	-	3	3	1	2	2	2	2
CO4	1	2	2	3	2	-	NOF		3	1	3	1	1	2	1
CO5	2	2	1	1	3	21		-	1	2	2	3	1	3	3
						100		10.7		1					

A 110	S202 SOFT SUILS II (S		III A NCEMENT C				
AHS	5303 SOF I SKILLS-II (3	SKILL EN	HANCEMENT C	UUKS	)		
Programme & Branch	B.Tech & IT	Sem.	Category	L	Τ	Р	С
		4	HS	0	0	2	0
Preamble	<ul> <li>To acquaint the s and also to help motivated.</li> <li>The different uni inputs on person skills, attitude, approximation</li> </ul>	tudents w them to o ts are des ality deve opearing a	ith some very releva develop their perso igned in such a mar elopment, social ski nd grooming.	ant an nality nner s ills, et	d nec as w o as t tiquet	essar vell a to giv te, co	y soft skills s to be self e the students ommunication
Unit 1	FOUNDATIONS OF PE	RSONAL	L DEVELOPMEN	Т			8
Attitude and Motivation-S	Significance – Positive and No	egative At	titude Attitude-Adv	vantag	es an	d Dis	advantages of

Motivation- De-mot Self- Respect and Eg Unit 2 Concept of Personal Deterrents to Personal Dimensions of Per Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	ivation-Factors Affecting Motivation in Learning-Self and Id o-Transforming Ego to Self-Respect-Indian Perspective in Person PERSONALITY DEVELOPMENT ity and Personality Development Definition-Determinants of Per onality Development-Types of Personality-Introvert, Extro sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self. MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	Indity-Distinction between nality Development. 8 roonality Development- overt, and Ambivert- 1 Spiritual-Perception- 8 Mapping, and and Types of Leadership. 8						
Self- Respect and Eg Unit 2 Concept of Personal Deterrents to Pers Dimensions of Per Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com	o-Transforming Ego to Self-Respect-Indian Perspective in Person PERSONALITY DEVELOPMENT ity and Personality Development Definition-Determinants of Per onality Development-Types of Personality-Introvert, Extro sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self. MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING in Personal and Professional Life- Principles and their Signif	8         8         sonality Development-         overt, and Ambivert-         1 Spiritual-Perception-         8         7 Mapping, and         and Types of Leadership.         8						
Unit 2 Concept of Personal Deterrents to Personal Dimensions of Per Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	PERSONALITY DEVELOPMENT           ity and Personality Development Definition-Determinants of Personality Development-Types of Personality-Introvert, Extra sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self.           MORAL OF ESTEEM AND LEADERSHIP           Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions,           ETIQUETTE AND GROOMING           e in Personal and Professional Life- Principles and their Signification of the principles and prin	8       rsonality Development-       overt, and Ambivert-       1 Spiritual-Perception-       8       7 Mapping, and       and Types of Leadership.       8						
Concept of Personal Deterrents to Personal Dimensions of Per Concept and Definit <b>Unit 3</b> Esteem-Maslow and 360Degree Assessm <b>Unit 4</b> Etiquette-Importance Sensitivity in Com Etiquette: Managing	ity and Personality Development Definition-Determinants of Per onality Development-Types of Personality-Introvert, Extro sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self. MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	rsonality Development- overt, and Ambivert- 1 Spiritual-Perception- 8 7 Mapping, and and Types of Leadership. 8						
Deterrents to Person Dimensions of Person Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Comp Etiquette: Managing	onality Development-Types of Personality-Introvert, Extra sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self. MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	overt, and Ambivert- 1 Spiritual-Perception- 8 7 Mapping, and and Types of Leadership. 8						
Dimensions of Per Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	sonality-Physical, Intellectual, Emotional, Moral, Social, and on-Perceptual Process-Self. MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	A Spiritual-Perception- 8 Mapping, and and Types of Leadership. 8						
Concept and Definit Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	on-Perceptual Process-Self.  MORAL OF ESTEEM AND LEADERSHIP Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions,  ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	8       Mapping, and       and Types of Leadership.       8						
Unit 3 Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	MORAL OF ESTEEM AND LEADERSHIP           Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency           ent-Cultivating Assertiveness-Leadership: Concept, Dimensions,           ETIQUETTE AND GROOMING           e in Personal and Professional Life- Principles and their Signif	8       / Mapping, and       and Types of Leadership.       8						
Esteem-Maslow and 360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	Eric Erikson's Idea of Self-Esteem- Mind Mapping, Competency ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	Mapping, and and Types of Leadership.						
360Degree Assessm Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	ent-Cultivating Assertiveness-Leadership: Concept, Dimensions, ETIQUETTE AND GROOMING e in Personal and Professional Life- Principles and their Signif	and Types of Leadership.						
Unit 4 Etiquette-Importance Sensitivity in Com Etiquette: Managing	ETIQUETTE AND GROOMING in Personal and Professional Life- Principles and their Signif	8						
Etiquette-Importance Sensitivity in Com Etiquette: Managing	e in Personal and Professional Life- Principles and their Signif							
Sensitivity in Com Etiquette: Managing		icance-Culture and Gender						
Etiquette: Managing	nunication-Conversation Skills and Small Talk-Email and I	Selephone Etiquette-Online						
	Digital Presence and Reputation- Dress Code and Professional A	Appearance.						
Unit 5         EXPERIENTIAL PARADIGM IN PRACTICE         8								
Self Awareness Def	inition and Development- SWOT Analysis-Interpersonal and C	Communication Skills-Self-						
	nence, optimism, compassion, rorgiveness, orandae.	TOTAL: 40						
RECOMMENDED	BOOKS							
1	Atherton, J.B. (2002) Learning and teaching: Teaching from ex Merrill. Carr, A. (2011). Positive Psychology: The Science trength. Routledge.	perience, Columbus. Ohio: of happiness and human						
2	Cornelissen, R. M. M., Misra, G., & Varma, S., (2011). Foundation	tion of Indian Psychology:						
3	Covey, S. R. (2013). The 7 Habits of Highly Effective People: Po Change. Simon & Schuster.	owerful Lessons in Personal						
4	Exeter, D. J. (2001). Learning in the outdoors. London: Outward I	Bound.						
5 5	Salmon, D & Maslow, J., (2007). Yoga Psychology an	d the Transformation of						
6	Consciousness: Seeing through the eyes of infinity. St. Paul, MN. Vohra, S. S. & Kailash. S. (2010). Experiential learning (sec Surbulent Relationships. New Delhi: Icon Publishers	tion III) in Psychology of						
7	Wentz, Frederick H. (2012). Soft Skills Training: A Workbo Employment. Create Space Independent Publishing Platform.	ook to Develop Skills for						
·								
COURSE OUTCO	MES: urse learners will be able to	Bloom's Taxonomy Level						
At the end of the co		20101						
At the end of the co	Appreciate the significance of soft skills and personality							
At the end of the co	suggmentation with reference to their personal as well as their							
At the end of the co	Appreciate the significance of soft skills and personality sugmentation with reference to their personal as well as their professional lives. This course module will enhance the	K2						



# **SEMESTER V**



AIT101 CRYPTOGRAPHY AND NETWORK SECURITY										
		iscip								
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С			
	< and	5	PC	3	0	0	3			
<ul> <li>Preamble</li> <li>To understand Cryptography Theories, Algorithms and Systems.</li> <li>To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.</li> </ul>										
Unit 1	INTRODUCTION						9			
Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography) Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.										
Unit 2	SYMMETRIC CRY	PTO	GRAPHY				9			

<b>M</b> - 41	e ef en en et de la companya en el la companya de la compan	
Mathematics arithmatic E	s of symmetric key cryptography: Algebraic s	tructures - Modular
Einite fields	SVMMETRIC KEV CIPHERS SDES Block	cipher Principles of
DES _ Stren	of DES – Differential and linear cryptanalysis.	- Block cipher design
principles -	- Block cipher mode of operation – Evaluation	criteria for AES –
Advanced E	ncryption Standard - RC4 – Key distribution.	
Unit 3	PUBLIC KEY CRYPTOGRAPHY	9
Mathematics	s of asymmetric key cryptography: Primes –	Primality Testing -
Factorization	n – Euler's totient function, Fermat's and Euler's	Theorem - Chinese
Remainder	Theorem - Exponentiation and logarithm - A	SYMMETRIC KEY
CIPHERS:	RSA cryptosystem - Key distribution - Key n	nanagement – Diffie
Hellman key	y exchange - ElGamal cryptosystem – Elliptic cur	ve arithmetic-Elliptic
curve crypto	graphy.	
Unit 4	MESSAGE AUTHENTICATION AND	9
A .1	INTEGRITY	
Authentication	n requirement – Authentication function – MAC	2 – Hash function –
$rac{}{}$	SS- Entity Authentication: Biometrics Passwords	Challenge Response
protocols- Au	thentication applications - Kerberos, X.509	Chanenge Response
Unit 5	SECURITY PRACTICE AND SYSTEM	9
	SECURITY	
Electronic Ma	ail security – PGP, S/MIME – IP security – Web S	Security - SYSTEM
SECURITY:	Intruders – Malicious software – viruses – Firewalls	
		Total: 45
TEXTBOOKS		
1	William Stallings, Cryptography and Network Secu	rity: Principles and
	Practice, PHI 3rd Edition, 2006.	
REFERENCES		
1	C K Shyamala, N Harini and Dr. T R Padmanabha	in: Cryptography and
	Network Security, Wiley India Pvt.Ltd	
2	BehrouzA.Foruzan, Cryptography and Network Se	ecurity, Tata
	McGraw Hill 2007.	
3	Charlie Kaufman, Radia Perlman, and Mike Speci	ner, Network
	Security: PRIVATE Communication in a PUBLIC	World, Prentice
	Hall, ISBN 0-13-046019-2	
	S Lain. zuit	
COURSE OUT	COMES:	<b>Bloom's Taxonomy</b>
At the end of th	e course, learners will be able to	Level
	Understand the fundamentals of networks	
CO1	security, security architecture, threats and	K2
	vulnerabilities	
CO2	Apply the different cryptographic operations of	K 3
	symmetric cryptographic algorithms	KJ
CO3	Apply the different cryptographic operations of	K 3
	public key cryptography	KJ
CO4	Apply the various Authentication schemes to	K3
CO4	Apply the various Authentication schemes to simulate different applications.	K3

CO5	Understand various Security practices and System security standards	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
CO2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
CO3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
CO4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
CO5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2

Programm Branch	ne & 1	F	B.Tech & IT	Sem.	Category	L	Т	Р	С			
				5	PC	0	0	4	2			
Preamble	•	<ul> <li>To lear</li> <li>To lear</li> <li>To exp</li> <li>To und</li> <li>To lear</li> </ul>	n the fundamen n the key mana lore the networ erstand the app n the real time	ntals of agement k and tr lication security	cryptography. techniques and au ansport layer secu layer security star practices	then rity to dard	ticatio echni s.	on ap ques.	proaches.			
IST OF EXH	PERIME	NTS										
1.	Impler	Implement symmetric key algorithms										
2.	Impler	Implement asymmetric key algorithms and key exchange algorithms										
3.	Impler	Implement digital signature schemes										
4.	Install	Installation of Wire shark, tcpdump and observe data transferred in client-server communication using UDP/TCP and identify the UDP/TCP datagram.										
5.	Check	Check message integrity and confidentiality using SSL										
6.	Experi	ment Eaves	dropping, Dicti	onary a	ttacks, MITM atta	cks						
7.	Experi	ment with S	niff Traffic usi	ng ARI	Poisoning							
8.	Demor	nstrate intru	sion detection s	system u	using any tool.							
9.	Exploi	re network n	nonitoring tool	5								
10.	Study	Study to configure Firewall, VPN										
						1			TOTAL:			
OURSEOUT	FCOMES the cours	8: se, learners	will be able to				Bloo	m's ] Le	Faxonomy evel			
CO1	Classit	fy the encry	ntion technique	S.				K	2			

CO2	Illustrate the key management technique and authentication.	K3
CO3	Evaluate the security techniques applied to network and transport layer	K4
CO4	Discuss the application layer security standards.	K3
CO5	Apply security practices for real time applications	K3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
CO2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
CO3	2	1	2	1	1	-	1	÷.,	2	1	1	3	1	1	1
CO4	3	1	3	1	-	-		-	2	-1	2	1	2	2	2
CO5	3	1	1	2	2	-	sinin	EOFTE	3	-1	2	3	2	1	2



### JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect Kunnam, Sunguvarchatram, Sriperumbudur-631604



### DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM
# JEPPIAAR Institute of technology

**SEMESTER VI** 

### AIT102 FULL STACK WEB DEVELOPMENT

			N							
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С			
		6	PC	3	0	0	3			
	To understand the	various	components of full	l stac	ck de	velop	oment			
Programme & Branch         Preamble         nit 1         ntroduction to big data         lata – web analytics – b         cource technologies – cl         nter and trans firewall a         nit 2         Basics of Node JS – In         Creating a simple Node.         /O – Implementing HT	> To learn Node. is features and applications									
Treamore	To develop applic	ations w	vith MongoDB							
	To understand the	role of	Angular and Expres	ss in	web	appl	ications			
	To develop simple	e web ap	plications with Rea	ict						
Unit 1	BASICS OF FULL STA	ACK					9			
Introduction to big data	a – convergence of key tre	ends – u	nstructured data –	indu	istry	exan	nples of big			
data – web analytics – b	big data applications-big d	ata tech	nologies – introduc	tion	to Ha	adoo	p – open			
source technologies - c	loud and big data – mobile	e busine	ss intelligence - Ci	owo	l sou	rcing	analytics –			
inter and trans firewall a	analytics.									
Unit 2	NODE JS						9			
Basics of Node JS - In	nstallation – Working with	n Node	packages – Using	Nod	e pac	kage	e manager –			
Creating a simple Node	.js application – Using Eve	ents – Li	steners - Timers - C	Callb	acks	– Ha	andling Data			
I/O – Implementing HT	TP services in Node.js.						-			
Unit 3	MONGO DB						9			
	•									

Understanding N	loSQL and MongoDB – Building MongoDB Environment – Use	er accounts – Access
control – Admini	istering databases - Managing collections - Connecting to Mong	oDB from Node.js –
simple application	ns.	
Unit 4	EXPRESS AND ANGULAR	9
Implementing Ex - Typescript - An	press in Node.js - Configuring routes - Using Request and Respondent regular Components - Expressions - Data binding - Built-in directive	ise objects - Angular es
Unit 5	REACT	9
MERN STACK -	- Basic React applications - React Components - React State - Ex	press REST APIs -
Modularization a	nd Webpack - Routing with React Router - Server-side rendering	•
		<b>TOTAL: 45</b>
TEXTBOOKS		
1	MERN STACK – Basic React applications – React Compone	ents – React State –
1	Server-side rendering	with React Router –
	Vasan Subramanian, 'Pro MERN Stack, Full Stack Web App	Development with
2	Mongo, Express, React, and Node', Second Edition, Apress, 201	9.
REFERENCES		
1	Chris Northwood, 'The Full Stack Developer: Your Essential Gu Skills Expected of a Modern Full Stack Web Developer', Apress	ide to the Everyday ; 1st edition, 2018
	Kirupa Chinnathambi, 'Learning React: A Hands-On Guide	to Building Web
2	Applications Using React and Redux', Addison-Wesley Profes	ssional, 2nd edition,
	2018	
3	https://www.tutorialspoint.com/the_full_stack_web_development	/index.asp
4	https://www.coursera.org/specializations/full-stack-react	
5	https://www.udemy.com/course/the-full-stack-web-development/	

COURSEOUTC	COMES:	Bloom's Taxonomy
At the end of the	e course, learners will be able to	Level
CO1	Understand the various stacks available for web application development	K2
CO2	Use Node.js for application development	К3
CO3	Develop applications with MongoDB	К3
CO4	Use the features of Angular and Express	К3
CO5	Develop React applications	К3

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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	1	1	1	1	1	1	-
CO2	3	3	3	3	2	1	-	-	2	-	2	3	2	2	1
CO3	3	3	2	2	2	2	-	-	2	2	2	3	2	2	1
CO4	3	3	2	2	2	1	-	-	1	1	2	2	2	1	1
CO5	3	3	3	3	3	1	-	-	-	-	2	2	2	2	1

Programme & Branch	&	B.Tech & IT	Sem.	Category	L	Т	Р	С
	·		6	РС	3	0	0	3
Preamble		<ul> <li>To understand So</li> <li>To Perform softw</li> <li>To gain knowledge</li> <li>UML.</li> <li>To understand so</li> <li>To work on proje</li> </ul>	ftware En vare requi ge of the S ftware tes ct manag	ngineering Lifec rements analysis System Analysis sting and mainter ement schedulin	ycle M and D nance a g using	lodels esign appro g Dev	s a con ache vOps	cepts usii s
Unit 1	S	OFTWARE PROCES	SS AND	AGILE			_	9
	D	EVELOPMENT						
Introduction to Sc	oftware E	ngineering- Software P	rocess, Po	erspective and Sp	peciali	zed P	roce	ss Model
Introduction to Ag	gility-Ag	le process-Extreme pro	ogrammir	ng-XP Process-C	ase St	udy.		
Unit 2	R	EQUIREMENTS AN	ALYSIS	AND				9
	SI	PECIFICATION						
UML – Use case diagrams – Functi	e Model - ional mod	- Class diagrams – Int Jeling – Data Flow Dia	eraction	diagrams – Acti	vity d	iagra	ms -	- State cl
TImit 2	C	DETWADE DESIGN	grani- Cr	ASE TOOLS.				0
Unit 3 Software design –	- Design p	DETWARE DESIGN	pts – Cou	pling – Cohesion	ı — Fu	nction	nal ii	9 ndepende
Unit 3 Software design – – Design patterns Observer – Proxy User interface des Unit 4	- Design p s – Mode v – Facad sign-Case	DETWARE DESIGN process – Design conce el-view-controller – Pu e – Architectural styles Study DETWARE TESTING	pts – Cou blish-sub s – Layer <b>G AND N</b>	pling – Cohesion scribe – Adapte ed - Client Serv	n – Fun r – Co er - Ti E	nction omma ered	nal in and - Pip	9 ndepende – Strateg pe and fil 9
Unit 3 Software design – – Design patterns Observer – Proxy <u>User interface des</u> <u>Unit 4</u> Testing – Unit te	- Design p s – Mode v – Facad sign-Case Setting – 1	DETWARE DESIGN process – Design conce el-view-controller – Pu e – Architectural styles Study DFTWARE TESTING Black box testing– Wl	pts – Cou blish-sub s – Layer <b>G AND N</b> nite box	apling – Cohesion oscribe – Adapte red - Client Serve MAINTENANCI testing – Integra	n – Fun r – Co er - Ti E ution a	nction omma ered	nal in and - - Pir	9 - Strateg - Strateg be and fil 9 m testing
Unit 3 Software design – – Design patterns Observer – Proxy User interface des Unit 4 Testing – Unit te Regression testing	- Design p s – Mode 7 – Facad sign-Case Setting – 1 g – Debug	DETWARE DESIGN process – Design conce el-view-controller – Pu e – Architectural styles Study DFTWARE TESTING Black box testing– Wl ging - Program analysis	pts – Cou blish-sub s – Layer <b>G AND N</b> nite box s – Symbo	apling – Cohesion oscribe – Adapte red - Client Serve MAINTENANCI testing – Integra olic execution – N	n – Fun r – Co er - Ti E ttion a Model	ered und S Chec	nal in and - Pip yster king	9 - Strateg - Strateg be and fil 9 m testing - Case Stu
Unit 3 Software design – – Design patterns Observer – Proxy <u>User interface des</u> <u>Unit 4</u> Testing – Unit te <u>Regression testing</u> <u>Unit 5</u>	- Design p s – Mode 7 – Facad sign-Case Seting – I g – Debug	DETWARE DESIGN DFTWARE DESIGN Drocess – Design conce el-view-controller – Pu e – Architectural styles Study DFTWARE TESTING Black box testing– Wl ging - Program analysis ROJECT MANAGEM	pts – Cou blish-sub s – Layer G AND M nite box s – Symbo IENT	apling – Cohesion oscribe – Adapte red - Client Serva <b>MAINTENANCI</b> testing – Integra olic execution – N	n – Fun r – Co er - Ti E ttion a Model	nction omma ered und S Chec	nal in and - Pip yster king	9 - Strateg - Strateg be and fil 9 m testing - Case Str 9
Unit 3 Software design – – Design patterns Observer – Proxy User interface des Unit 4 Testing – Unit te Regression testing Unit 5 Software Project Motivation-Cloud Testing-Deploym	- Design p s – Mode 7 – Facad sign-Case sign-Case sting – I g – Debug P Manager 1 as a pla ent- Tool	DETWARE DESIGN DETWARE DESIGN DETWARE DESIGN DETVEW-controller – Pu e – Architectural styles Study DETWARE TESTING Black box testing– Wil ging - Program analysis ROJECT MANAGEM nent- Software Config tform-Operations- Dep s- Case Study	pts – Cou blish-sub s – Layer G AND M nite box s – Symbo IENT uration M bloyment	apling – Cohesion oscribe – Adapte red - Client Serva <b>IAINTENANCI</b> testing – Integra olic execution – M Management - Ph Pipeline:Overal	n – Fun r – Co er - Ti E ttion a Model	nction omma ered und S Chec Sche iitectu	nal in and - Pip yste: king dulin ure I	9 - Strateg be and fil 9 m testing - Case Str 9 mg- DevC Building
Unit 3 Software design – – Design patterns Observer – Proxy <u>User interface des</u> <u>Unit 4</u> Testing – Unit te <u>Regression testing</u> <u>Unit 5</u> Software Project Motivation-Cloud Testing-Deploym	- Design p s – Mode 7 – Facad sign-Case sign-Case sign-Case Seting – I g – Debug P Manager 1 as a pla ent- Tool	DETIMARE DESIGN DETIMARE DESIGN DETIMARE DESIGN DETIMARE DESIGN DETIMARE TESTING DETIMARE TESTING DIACK box testing— WI ging - Program analysis ROJECT MANAGEN nent- Software Config tform-Operations- Dep s- Case Study	pts – Cou blish-sub s – Layer G AND N nite box s – Symbo IENT uration N bloyment	apling – Cohesion oscribe – Adapte red - Client Serve <b>MAINTENANCI</b> testing – Integra olic execution – M Management - Pr Pipeline:Overal	n – Fun r – Co er - Ti E ttion a <u>Model</u> roject I Arch	nction omma ered ind S Chec Sche itectu	nal in and - Pip yster king dulin ure H	9 ndepende – Strateg be and fil 9 m testing - Case Str 9 ng- DevC Building
Unit 3 Software design – – Design patterns Observer – Proxy User interface des <u>Unit 4</u> Testing – Unit te <u>Regression testing</u> <u>Unit 5</u> Software Project Motivation-Cloud Testing-Deploym	- Design p s – Mode 7 – Facad sign-Case sting – 1 g – Debug Manager 1 as a pla ent- Tool	DETIMINE DESIGN DETIMINE DESIGN DETIMINE DESIGN DETIMINE DESIGN DETIMINE DESIGN DETIMINE D	pts – Cou blish-sub s – Layer G AND M nite box s – Symbo IENT uration M bloyment	apling – Cohesion oscribe – Adapte red - Client Serve <b>IAINTENANCI</b> testing – Integra olic execution – N Management - Pr Pipeline:Overal	n – Fur r – Co er - Ti tion a Model roject l Arch	nction omma ered ind S Chec Sche itectu	nal in and - Pip yste: king dulin ure I T	9 ndepende – Strateg be and fil 9 m testing - Case Str 9 ng- DevC Building
Unit 3 Software design – – Design patterns Observer – Proxy User interface des <u>Unit 4</u> Testing – Unit te Regression testing <u>Unit 5</u> Software Project Motivation-Cloud Testing-Deploym <u>TEXTBOOKS</u> 1	- Design p s – Mode 7 – Facad sign-Case esting – I g – Debug Manager 1 as a pla ent- Tool Bernd B UML, P	DETWARE DESIGN DETWARE DESIGN DETWARE DESIGN DETVIEW-controller – Put e – Architectural styles Study DETWARE TESTING Black box testing– Wl ging - Program analysis ROJECT MANAGEN nent- Software Config tform-Operations- Dep s- Case Study ruegge and Allen H. D atterns and Java", Third	pts – Cou blish-sub s – Layer G AND M nite box s – Symbo IENT uration M bloyment utoit, "Ob d Edition,	apling – Cohesion oscribe – Adapte red - Client Serve <b>IAINTENANCI</b> testing – Integra olic execution – N Management - Pr Pipeline:Overal	n – Fun r – Co er - Ti E ttion a <u>Aodel</u> roject l Arch	nction omma ered and S Chec Sche iitectu e Eng 009.	nal in and - Pip yster king dulin ure H T	9 ndepende - Strateg be and fil 9 m testing - Case Str 9 ng- DevC Building - OTAL: - ring: Usir
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Unit 3 Software design – – Design patterns Observer – Proxy User interface des <u>Unit 4</u> Testing – Unit te Regression testing <u>Unit 5</u> Software Project Motivation-Cloud Testing-Deployme TEXTBOOKS 1 2 REFERENCES	- Design p s – Mode 7 – Facad sign-Case esting – 1 g – Debug Manager 1 as a pla ent- Tool Bernd B UML, P Roger S Methodo	DETIMARE DESIGN DETIMARE DESIGN DETIMARE DESIGN DETIMARE DESIGN DETIMARE TESTING Black box testing— Wiging - Program analysis <b>ROJECT MANAGEN</b> ment- Software Config tform-Operations- Dep s- Case Study ruegge and Allen H. D atterns and Java", Third Detimation, Moderney Design - Program analysis Design - Program - Program analysis	pts – Cou blish-sub s – Layer G AND N nite box s – Symbo IENT uration N bloyment utoit, "Ot d Edition, Driented c Graw-H	apling – Cohesion oscribe – Adapte red - Client Serve AAINTENANCI testing – Integra olic execution – N Management - Pr Pipeline:Overal oject-Oriented So , Pearson Educat Software Engin	n – Fun r – Co er - Ti E ttion a Model roject l Arch	ered and S Chec Sche itectu e Eng 009. ; Ar n, 201	nal in and - Pir yste: king dulir ure I T timee timee	9 ndepende – Strateg be and fil 9 m testing - Case Str 9 ng- DevC Building FOTAL: ring: Using gile Unif
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3	Len Bass, Ingo Weber and Liming Zhu, —DevOps: A Software Architect's Perspectivel, Pearson Education, 2016
4	Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.
5	Stephen Schach, Object-Oriented and Classical Software Engineering, 8th ed, McGraw-Hill, 2010.

		v
At the end of the c	ourse, learners will be able to	Level
CO1 CO1	Compare various Software Development Lifecycle Aodels	K2
CO2 E a	Evaluate project management approaches as well as cost nd schedule estimation strategies.	K4
CO3 P	erform formal analysis on specifications.	K3
CO4 L	Jse UML diagrams for analysis and design.	К3
CO5 A p	Architect and design using architectural styles and design atterns, and test the system.	K4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	<7	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1		-		2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	- <sub>20</sub>		2	2	3	2	2	3	1
CO5	2	3	1	2	2	1	1	Į.d.	$\sim$	14	-	1	3	2	2
								Viscip	0.0						



AIT	302 FULL STACK WEB	B DEVEL	<b>LOPMENT LABO</b>	)RA	TOR	RY	
			-				
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
		6	PC	0	0	4	2
Preamble	<ul> <li>To develop full a interface, busines</li> <li>To design and dev</li> <li>To develop the requirements.</li> <li>To implement the</li> <li>To integrate the u</li> </ul>	stack app s logic an velop user function e database user interfa	blications with cle ad data storage. r interface screens halities as web according to the f ace with the function	for a comp funct	nders a give ponet tional lities	stand en sc nts a l requ and o	ling of user enario. as per the nirements. data storage

LIST OF EXP	ERIMENTS	
The Instructor c	an choose the technology stack to develop the following full s	tack experiments – based
on the Full Stac	k Web Development Theory Course	
1	Develop a portfolio website for yourself which gives de potential recruiter.	etails about yourself for a
2	Create a web application to manage the TO-DO list of use and manage their to-do items	ers, where users can login
3	Create a simple micro blogging application (like twitter) their content which can be viewed by people who follow th	that allows people to posem
4	Create a food delivery website where users can order restaurant listed in the website	food from a particular
5	Develop a classifieds web application to buy and sell used j	products
6	Develop a leave management system for an organization different types of leaves such as casual leave and medical the available number of days	on where users can apply leave. They also can view
7	Develop a simple dashboard for project management where tasks are available. New tasks can be added and the status changed among Pending, InProgress or Completed	e the statuses of various of existing tasks can be
8	Develop an online survey application where a collection	of questions is available
	and users are asked to answer any random 5 questions	
		101AL: 60
COURSEOUT	COMES:	Bloom's Taxonomy
At the end of t	he course, learners will be able to	Level
CO1	Design full stack applications with clear understanding of user interface, business logic and data storage.	К3
CO2	Design and develop user interface screens.	К3
CO3	Implement the functional requirements using appropriate tool	K3
CO4	Design and develop database based on the requirements	К3
CO5	Integrate all the necessary components of the application	K3

E 10: 2011

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	-	-	-	2	2	3	2	3	3	2
CO2	2	2	2	3	3	-	-	-	3	2	2	2	1	2	3
CO3	2	3	2	2	3	-	-	-	2	2	2	1	2	3	1
CO4	2	2	2	2	3	-	-	-	3	2	2	1	2	2	2
CO5	2	2	3	2	1	-	-	-	1	2	2	1	2	2	3

Programme & Bra	anch	В.	Tech & IT	Sem.	Category	L	Т	P	С
				6	РС	0	0	4	2
LIST OF EXPERI	MENTS	5							
1	Identify	v a software	system that n	eeds to be	developed.				
2 1	Docume	ent the Softw	are Requirer	nents Spec	ification (SRS) f	or the	identi	ified s	ystem.
3 1	dentify	use cases ar	nd develop th	e Use Case	model.				
4 ]	Identify	the concept	ual classes an	nd develop	a Domain Model	and a	lso de	erive a	Class
5 1	Diagran Using th	trom that.	scenarios fir	nd the inter	action between o	biects	and r	enrese	ent them
1	using U	ML Sequend	ce and Collab	oration Di	agrams	ojeets	ana i	epies	
6 1	Draw re	levant State	Chart and Ac	ctivity Dia	grams for the san	ne syst	em		
7 ]	mpleme	ent the syste	m as per the	detailed de	sign				
8	Fest the	software sy	stem for all tl	he scenaric	s identified as pe	er the ı	isecas	se diag	gram
9 1	Improve	the reusabi	lity and main	tainability	of the software s	ystem	by ap	plying	2
10	mplem	ent the modi	fied system a	and test it f	or various scenar	ios.			
SUGGESTED DO	MAINS	FOR MIN	I PROJECT						
1	Passport	automation	system.	ā	1.5				
2	Book ba	nk							
3	Exam re	gistration			0				
4 5	Stock m	aintenance s	system.						
5 (	Online c	ourse reserv	vation system	RUMBU	DUR				
6	Airline/	Railway rese	ervation syste	m. 2011	X				
7 5	Softwar	e personnel	management	system					
8	Credit c	ard processi	ng						
9 6	e-book 1	nanagement	system						
10 1	Recruitr	nent system							
11 1	Foreign	trading system	em						
	a 6								

13	BPO management system	
14	Library management system	
15	Student information system	
	1	COTAL:60

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2





JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect Kunnam, Sunguvarchatram, Sriperumbudur-631604



## DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM

# **SEMESTER VII**



Branch	z B.Tech & I	T Sem.	Category		T	Р	С
2141101		7	РС	3	0	0	3
	Understand the	e importance, pri	nciples and searc	h metł	nods	of A	[
	Provide knowl	edge on predicat	e logic and Prolo	g.			
Preamble	Learn techniqu	les for reasoning	under uncertaint	y			
	Introduce Mac	hine Learning ar	nd supervised lear	ning a	algor	ithm	S
	Study about as	sembling and ur	supervised learni	ng alg	orith	ms	
Unit 1	INTELLIGENT	AGENT AND	UNINFORMED				9
	SEARCH						
Introduction - Fou	indations of AI - Histor	y of AI - The s	tate of the art - R	isks a	nd B	enef	its of AI -
Intelligent Agent	s - Nature of Environ	ment - Structur	re of Agent - Pr	oblem	n Sol	ving	Agents -
FormulatingProb	ems-UninformedSearch	-BreadthFirstSe	arch-Dijkstra'salg	orithn	norur	nfori	n- cost
search-Depth Firs	st Search-Depth Limited	Search					0
Unit 2	TECHNIQUES		SLAKUN				9
Informed Secret (	TECHNIQUES	anithm Advance	rial Comp and So	mah C	lama	thaa	<b>14</b> 7 7
-Optimal decision	is in game-Min Max	Search algorith	n-Alpha-beta pri	ining_	Cons	train	ty t
Satisfaction Prob	lems (CSP) - Examples	- Map Coloring	- Job Scheduling	$\frac{1}{2} - Ba$	cktra	cking	<u>y</u>
Search for CSP	······	e	2	5		2	Ð
Unit 3	PROBABILIST	IC REASONIN	G				9
Acting under unce	ertainty-Bayesian infere	nce–naïve bayes	models- Probabi	listic	reaso	ning	-Bayesian
networks-exact i	nference in BN –approx	imate inference	in BN – causal ne	twork	s.	U	·
Unit 4	SUPERVISED I	EARNING					9
Introduction to m	achine learning– Linea an linear regression, gra	ar Regression N adient descent. I	Iodels: Least sq Linear Classificat	uares, ion M	sing odels	;le & s: Dis	t multiple
function –Probab Naive Bayes,Max	ilistic discriminative mo cimummarginclassifier-	odel - Logistic r Supportvectorm	egression, Probab achine,DecisionT	ilistic ree,Ra	gene indor	ratıv nfore	e model – ests.
function –Probab Naive Bayes,Max Unit 5	ilistic discriminative mo cimummarginclassifier- ENSEMBLE TE	odel - Logistic r Supportvectorm CCHNIQUES A	egression, Probab achine,DecisionT ND UNSUPERV	ilistic ree,Ra <b>ISED</b>	gene indor	nfore	e model – ests. 9
function –Probab Naive Bayes,Maz Unit 5	ilistic discriminative mo cimummarginclassifier- ENSEMBLE TE LEARNING	odel - Logistic r Supportvectorm CHNIQUES A	egression, Probab achine,DecisionT ND UNSUPERV	ilistic ree,Ra /ISED	gene indor	erativ nfore	e model – ests. 9
function –Probab Naive Bayes,Maz Unit 5	ilistic discriminative mo cimummarginclassifier– ENSEMBLE TE LEARNING ole learners: Model com	odel - Logistic r Supportvectorm CCHNIQUES A	egression, Probab achine,DecisionT ND UNSUPERV es, Voting, Enser	ilistic ree,Ra 7 <b>ISED</b> nble 1	gene indor	nfore	e model – ests. 9 - bagging
function –Probab Naive Bayes,Maz Unit 5 Combining multip boosting, stackin	ilistic discriminative mo <u>cimummarginclassifier</u> <b>ENSEMBLE TF</b> <b>LEARNING</b> ole learners: Model com g, Unsupervised learni	odel - Logistic r Supportvectorm CCHNIQUES A bination schem ng: K-means, I	egression, Probab achine,DecisionT ND UNSUPERV es, Voting, Enser nstance Based L	ilistic ree,Ra <b>ISED</b> nble I earnin	gene indor	nfore	e model – ests. 9 - bagging, Gaussian
function –Probab Naive Bayes,Maz Unit 5 Combining multip boosting, stackin mixture models a	ilistic discriminative mo imummarginclassifier- ENSEMBLE TE LEARNING Dele learners: Model com .g, Unsupervised learni nd Expectation maximiz	odel - Logistic r Supportvectorm CCHNIQUES A bination schem ng: K-means, I zation.	egression, Probab achine,DecisionT ND UNSUPERV es, Voting, Enser nstance Based L	ilistic ree,Ra ( <b>ISED</b> ) mble 1 earnin	gene indor	nfore ning	e model – ests. 9 - bagging, Gaussian
function –Probab Naive Bayes,Maz Unit 5 Combining multip boosting, stackin mixture models a	ilistic discriminative mo cimummarginclassifier- ENSEMBLE TE LEARNING ole learners: Model com g, Unsupervised learni nd Expectation maximiz	odel - Logistic r Supportvectorm CCHNIQUES A abination schem ng: K-means, I zation.	egression, Probab achine,DecisionT <b>ND UNSUPERV</b> es, Voting, Enser nstance Based L	ilistic ree,Ra <b>TSED</b> nble 1 earnin	gene indor Learr ag: K	nfore ning - NN,	e model – ests. 9 - bagging, Gaussian FOTAL:
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	2006.
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7	Charu C. Aggarwal, "Data Classification Algorithms and Applications", CRC Press,
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8	Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, "Foundations of Machine
	Learning", MIT Press, 2012.
9	Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press,
	2016
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COURSEOUT	Bloom's Taxonomy	
At the end of th	Level	
CO1	Use appropriate search algorithms for problem solving	K2
CO2	Apply reasoning under uncertainty	К3
CO3	Build supervised learning models	K2
CO4	Build ensembling and unsupervised models	K2
CO5	Build deep learning neural network models	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
CO2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
CO3	2	1	2	1	1	-	_	-	2	1	1	3	1	1	1
CO4	3	1	3	1	-	-	rn	ni	2	1	2	1	2	2	2
CO5	3	1	1	2	2	-		r.	3	1	2	3	2	1	2
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AAI301 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATORY										
Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С			
Branch	24									
		7	PC	0	0	4	2			
	Study about uninform	ned and Her	uristic search tec	hniqu	es					
	Learn techniques for reasoning under uncertainty									
Preamble	Introduce Machine Lo	earning and	supervised lear	ning a	algor	ithms				
	Study about assembli	ng and unsu	upervised learnin	ng alg	orith	ms				
	Learn the basics of de	eep learning	using neural ne	twork	s.					
LIST OF EXPERIME	ENTS	Unempol	URA							
1. Implementation of U	Ininformed search algorith	nms (BFS, I	OFS)							
2. Implementation of Informed search algorithms (A*, memory-bounded A*)										
3. Implement naïve Bayes models										

4. Implement Dayesian Networks	4. Imp	lement	<b>Bayesia</b>	an Networks	5
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5. Build Regression models

6. Build decision trees and random forests

7. Build SVM models

8. Implement ensembling techniques

9. Implement clustering algorithms

10. Implement EM for Bayesian networks

11. Build simple NN models12. Build deep learning NN models

		TOTAL: 60
COURSEOUT	Bloom's Taxonomy	
At the end of th	e course, learners will be able to	Level
CO1	Use appropriate search algorithms for problem solving	K2
CO2	Apply reasoning under uncertainty	K3
CO3	Build supervised learning models	K2
CO4	Build assembling and unsupervised models	K2
CO5	Build deep learning neural network models	K3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
CO2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
CO3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
CO4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
CO5	3	1	1	2	2	-			- 3 -	- 1	2	3	2	1	2





JEPPIAAR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution) Self-Belief | Self Discipline | Self Respect Kunnam, Sunguvarchatram, Sriperumbudur-631604



## DEPARTMENT OF INFORMATION TECHNOLOGY AUTONOMOUS CURRICULUM & SYLLABUS R2024 CHOICE BASED CREDIT SYSTEM

# **PROFESSIONAL ELECTIVE - 1**



Programme &	k I	B.Tech & IT	Sem.	Category	L	Т	Р	С
Branch								
				PE	3	0	0	3
		To understand b	ig data.					
		To learn and use	NoSQL b	oig data managem	ent.			
Preamble		To learn map rec	duce analy	tics using Hadoo	p and	relat	ed to	ols.
Treamore		$\succ$ To work with matrix	ap reduce	applications				
		To understand th Analytics	ne usage of	f Hadoop related	tools	for B	ig D	ata
Unit 1		UNDERSTANDING I	BIG DAT.	A				9
Introduction to big data – web analyti source technologic inter and trans fire	g data - ics – bi es – clo ewall a	- convergence of key tre g data applications– big oud and big data – mobil nalytics.	nds – unst data techr le business	ructured data – in nologies – introdu s intelligence – C	dustr iction rowd	y exa to Ha sourc	mple adoo ing a	es of big p – open analytics –
Unit 2		NOSQL DATA MANA	AGEMEN	Τ				9
– graph databases replication – const clients.	– sche istency	- Cassandra – Cassandr	erialized vi a data moo	ews – distributio del – Cassandra e	n moc xamp	lels – les –	mas Cass	sandra
Unit 3		MAP REDUCE APPL	ICATION	NS				9
MapReduce work	flows -	- unit tests with MRUnit	: – test data	a and local tests -	anato	my o	of M	apReduce
job run – classic N	Aap-ree	luce – YARN – failures	in classic	Map-reduce and	YAR	N — je	ob sc	heduling -
shuffle and sort –	task ex	ecution – MapReduce ty	ypes – inp	ut formats – outp	ut fori	nats.		
Unit 4		BASICS OF HADOOI	P					9
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of Hadoop distribu – data integrity – o integration. Unit 5 Hbase – data mod pig data model – H formats – HiveQL TEXTBOOKS 1 2 3 REFERENCES 1 2 3 4	el and Pig Lat data d Micha Emerg Wiley Eric S Sadala E. Cap Lars C Eben I	e system (HDFS) – HDI ession – serialization – A HADOOP RELATED implementations – Hbas in – developing and testi efinition – HiveQL data el Minelli, Michelle Ch ;ing Business Intelliger , 2013. ammer, "Hadoop Operat ige, Pramod J. "NoSQL priolo, D. Wampler, and George, "HBase: The De Hewitt, "Cassandra: The fates "Programming Pic	TOOLS re clients – ing Pig La manipula ambers, an nce and tions", O'R distilled", J. Rutherg finitive Gu	Hadoop streamin, ts – Java interfact based data struct Hbase examples tin scripts. Hive - tion – HiveQL qu nd AmbigaDhiraj Analytic Trends Reilley, 2012. 2013. glen, "Programmi tide", O'Reilley, 2 e Guide", O'Reilley, 2	g – Ha e – da ures - – pra – data leries. , "Big for ng Hi 2011. ey, 20	doop ta flo Cass xis. type g Dat Toda ve", 0	p pip w – andr Pig – s and a, Bi y's	es – desig Hadoop I/ a – Hadoo 9 Grunt – I file TOTAL: g Analytic Businesse
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At the end of the	Level	
CO1	Describe big data and use cases from selected business domains.	K1
CO2	Explain NoSQL big data management.	K2
CO3	Install, configure, and run Hadoop and HDFS.	K2
CO4	Perform map-reduce analytics using Hadoop.	K2
CO5	Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	-	2	2	3	1	1	3	3
CO2	3	3	2	3	2	-	-	-	2	2	3	3	2	3	2
CO3	3	3	3	2	3	-	-	-	2	2	1	2	2	3	3
CO4	2	3	3	3	3	-	-	-	2	2	3	2	3	3	2
CO5	3	3	3	3	3	-	-	-	3	1	3	2	3	2	3

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	C			
			PE	3	0	0	3			
	To understand	the basics of I	nformation Secur	ity						
Preamble	> To know the legal, ethical and professional issues in Information Security									
Treamore	> To equip the students' knowledge on digital signature, email security and									
web security										
Unit 1	INTRODUCTION						9			
History, What is Informat	tion Security?, Critical Ch	aracteristics o	f Information, NS	STISS	C Sec	urity I	Model,			
Components of an Inform The Security SDLC .	nation System, Securing th	e Component	s, Balancing Secu	rity ar	nd Ac	cess,	Гhe SDLC,			
Unit ?	SECURITY INVESTIGATION 9									
Unit 2	SECURITY INVESTI	GATION					9			
Need for Security, Busine	ess Needs, Threats, Attack	<b>GATION</b> s, Legal, Ethi	cal and Professior	nal Issu	1es - 1	An Ov	y verview of			
Need for Security, Busine Computer Security - Acce and Hybrid policies .	ess Needs, Threats, Attack	GATION s, Legal, Ethi -Security poli	cal and Professior cies, Confidential	nal Issu lity pol	ies - A licies,	An Ov Integ	y verview of rity policie			
Need for Security, Busine Computer Security - Acce and Hybrid policies . Unit 3	DIGITAL SIGNATUR	s, Legal, Ethi -Security poli	cal and Professior cies, Confidential THENTICATION	nal Issu lity pol	ies - A	An Ov Integ	y verview of rity policie			
Need for Security, Busine Computer Security - Acce and Hybrid policies . Unit 3 Digital Signature and Au Digital Signature Standa X.509 Directory Services	SECURITY INVESTI ess Needs, Threats, Attack ess Control Matrix, Policy DIGITAL SIGNATUR thentication Schemes: Di rds-Authentication: Over	s, Legal, Ethi -Security poli RE AND AUT gital signature view- Requir	cal and Professior cies, Confidential THENTICATION e-Digital Signatur ements Protocols	nal Issu lity pol N e Sche s - Ap	emes a plicat	An Ov Integ and th	yerview of rity policie 9 leir Variant - Kerberos			
Need for Security, Busine Computer Security - Acce and Hybrid policies . Unit 3 Digital Signature and Au Digital Signature Standa X.509 Directory Services Unit 4	SECURITY INVESTI-         ess Needs, Threats, Attack         ess Control Matrix, Policy         DIGITAL SIGNATUR         thentication Schemes: Dig         rds-Authentication: Over         .         E-MAIL AND IP SEC	s, Legal, Ethi -Security poli <b>RE AND AUT</b> gital signature view- Requir	cal and Profession cies, Confidential THENTICATION e-Digital Signatur ements Protocols	nal Issu lity pol N e Sche s - Ap	emes applicat	An Ov Integ and the	yerview of rity policie 9 heir Varian - Kerberos 9			
Need for Security, Busine Computer Security - Acce and Hybrid policies . Unit 3 Digital Signature and Au Digital Signature Standa X.509 Directory Services Unit 4 E-mail and IP Security: management- Trust Mode Security association - Key	SECORITY INVESTI-         ess Needs, Threats, Attack         ess Control Matrix, Policy         DIGITAL SIGNATUR         thentication Schemes: Dig         rds-Authentication: Over         .         E-MAIL AND IP SEC         Electronic mail security:         el-S/MIME.IP Security:         y management.	s, Legal, Ethi -Security poli <b>RE AND AUT</b> gital signature view- Requir <b>URITY</b> Email Archi Overview- Ar	cal and Profession cies, Confidential THENTICATION e-Digital Signatur ements Protocols tecture -PGP – O chitecture - ESP,	nal Issu lity pol e Sche s - Ap Operati AH P	emes a plicat	An Ov Integ and the ions Description	yerview of rity policie 9 eir Variant - Kerberos 9 iptions- Ko Sec Modes			
Need for Security, Busine Computer Security - Acce and Hybrid policies . Unit 3 Digital Signature and Au Digital Signature Standa X.509 Directory Services Unit 4 E-mail and IP Security: management- Trust Mode Security association - Key Unit 5	SECORITY INVESTI-         ess Needs, Threats, Attack         ess Control Matrix, Policy         DIGITAL SIGNATUR         thentication Schemes: Dig         urds-Authentication: Over         .         E-MAIL AND IP SEC         Electronic mail security:         el- S/MIME.IP Security:         y management.         WEB SECURITY	s, Legal, Ethi -Security poli <b>RE AND AUT</b> gital signature view- Requir <b>URITY</b> Email Archi Overview- Ar	cal and Profession cies, Confidential THENTICATION e-Digital Signatur ements Protocols tecture -PGP – C chitecture - ESP,	nal Issu lity pol e Sche - Ap Operati AH P	emes applicat	An Ov Integ and th ions Descr ols IP	y verview of rity policie 9 eir Variant - Kerberos 9 iptions- Ko Sec Modes 9			

Transport Level Security. Secure Electronic Transaction- Entities DS Verification-SET processing

g.	
-	TOTAL:45

	TOTAL:45
TEXTBOOKS	
1	Michael E Whitman and Herbert J Mattord, "Principles of Information Security, Course Technology, 6th Edition, 2017.
2	Stallings William. Cryptography and Network Security: Principles and Practice,
	Seventh Edition, Pearson Education, 2017.
REFERENCES	•
1	Harold F. Tipton, Micki Krause Nozaki,, "Information Security Management Handbook, Volume 6, 6th Edition, 2016.
2	Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", McGraw-Hill, Seventh Edition, 2012.
3	Matt Bishop, "Computer Security Art and Science, Addison Wesley Reprint Edition, 2015.
4	Behrouz A Forouzan, Debdeep Mukhopadhyay, Cryptography And network security, 3rd Edition, . McGraw-Hill Education, 2015.

COURSEOUTCOMES:Bloom's TaxonomyAt the end of the course, learners will be able toLevel					
CO1	Understand the basics of data and information security.	К2			
CO2	Understand the legal, ethical and professional issues in information.	K2			
CO3	Understand the various authentication schemes to simulate different applications.	K2			
CO4	Understand various security practices and system security standards.	К2			
CO5	Understand the Web security protocols for E-Commerce applications.	К2			

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-183		0F 150	1	3	1	2	3	1	1
CO2	1	3	3	3	2	-	-	-	1	2	2	2	1	2	2
CO3	2	3	3	3	1	-	-	-	1	3	1	2	1	2	1
CO4	3	3	1	1	1	-	-	-	3	1	1	3	2	3	3
CO5	3	2	2	3	2	-	-	-	1	2	1	2	2	2	1
					t			R		li	t				

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С
			PE	3	0	0	3
							· 1

	To gain skill in designing real time interactive info	ormation visualization				
	system.	0				
Unit 1	INTRODUCTION	9				
Context of data – Purpose, visua Presentation, Ser Series - Connec	visualization – Definition, Methodology, Visualization design alization function and tone, visualization design options – D ven stages of data visualization, widgets, data visualization ctions and Correlations - Scatterplot Maps - Trees, Hierar	objectives. Key Factors ata representation, Data tools. Mapping - Time chies, and Recursion -				
Networks and G	raphs	<b>c</b>				
Unit 2	VISUALIZATION TECHNIQUES FOR TIME-SERIE TREES & GRAPHS	8, 9				
Mapping - Time charts, Scatter r Recursion - Netw for graphs- Info	e series - Connections and correlations – Indicator-Area cl maps - Tree maps, Space filling and non-space filling me works and Graphs-Displaying Arbitrary Graphs-node link grap graphics	hart-Pivot table- Scatter ethods- Hierarchies and bh-Matrix representation				
Unit 3	TEXT AND DOCUMENT VISUALIZATION	9				
Acquiring data, -Where to Find Data, Tools for Acquiring Data from the Internet, Locating Files for Use with Processing, Loading Text Data, Dealing with Files and Folders, Listing Files in a Folder ,Asynchronous Image Downloads, Web Techniques, Parsing data - Levels of Effort, Tools for Gathering Clues, Text Markup Languages, Regular Expressions, Grammars and BNF Notation, Compressed Data, Vectors and Geometry, Binary Data Formats, Advanced Detective Work.Unit 4INTERACTIVE DATA VISUALIZATION9Drawing with dataScalesAxesUndatesTransition and MotionInteractivity						
Geomapping – Exporting, Framework – D3.js, Tableau Dashboards						
Unit 5	SECURITY IN DATA VISUALIZATION	9				
Port scan visualization - Vulnerability assessment and exploitation - Firewall log visualization - Intrusion detection log visualization -Attacking and defending visualization systems – Creating secured visualization system						
visualization syst	tem					
visualization syst	tem	TOTAL:45				
visualization system TEXTBOOKS	Robert Spence, "Information Visualization An Introduction" Education, 2014.	TOTAL:45 <sup>2</sup> , Third Edition, Pearson				
visualization system TEXTBOOKS 1 2	Robert Spence, "Information Visualization An Introduction" Education, 2014. Colin Ware, "Information Visualization Perception for I Margon Kaufmann Publishers, 2012.	TOTAL:45 ", Third Edition, Pearson Design", Third edition,				
visualization system TEXTBOOKS 1 2 3	tem         Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera         Pearson Education, 2006.	TOTAL:45 ", Third Edition, Pearson Design", Third edition, ction", Second Edition,				
visualization system TEXTBOOKS 1 2 3 REFERENCES	tem Robert Spence, "Information Visualization An Introduction" Education, 2014. Colin Ware, "Information Visualization Perception for 1 Margon Kaufmann Publishers, 2012. Robert Spence, "Information Visualization Design for Intera Pearson Education, 2006.	TOTAL:45 ", Third Edition, Pearson Design", Third edition, ction", Second Edition,				
visualization system TEXTBOOKS 1 2 3 REFERENCES 1	tem         Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for I         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera         Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The Visualization". Morgan Kaufmann Publishers, 2003.	TOTAL:45 ", Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information				
visualization system TEXTBOOKS 1 2 3 REFERENCES 1 2	tem         Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera         Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.         Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.	TOTAL:45         ', Third Edition, Pearson         Design'', Third edition,         ction'', Second Edition,         Craft of Information         ohics, Abstraction and				
visualization system TEXTBOOKS 1 2 3 REFERENCES 1 2 3 3	<ul> <li>Robert Spence, "Information Visualization An Introduction" Education, 2014.</li> <li>Colin Ware, "Information Visualization Perception for 1 Margon Kaufmann Publishers, 2012.</li> <li>Robert Spence, "Information Visualization Design for Intera Pearson Education, 2006.</li> <li>Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.</li> <li>Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.</li> <li>Matthew O. Ward, George Grinstein, Daniel Keim, "Interact Foundation, Techniques and Applications", Second Edition, 2015.</li> </ul>	TOTAL:45 ", Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information phics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press,				
visualization system TEXTBOOKS 1 2 3 REFERENCES 1 2 3 4	<ul> <li>Robert Spence, "Information Visualization An Introduction" Education, 2014.</li> <li>Colin Ware, "Information Visualization Perception for 1 Margon Kaufmann Publishers, 2012.</li> <li>Robert Spence, "Information Visualization Design for Intera Pearson Education, 2006.</li> <li>Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.</li> <li>Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.</li> <li>Matthew O. Ward, George Grinstein, Daniel Keim, "Interact Foundation, Techniques and Applications", Second Edition, 2015.</li> <li>Joerg Osarek, "Virtual Reality Analytics", Gordon's Arcade,</li> </ul>	TOTAL:45 ", Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information phics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press, 2016.				
visualization system TEXTBOOKS 1 2 3 REFERENCES 1 2 3 4 COURSEOUTCO	tem          Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.         Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.         Matthew O. Ward, George Grinstein, Daniel Keim, "Interact Foundation, Techniques and Applications", Second Edition, 2015.         Joerg Osarek, "Virtual Reality Analytics", Gordon's Arcade,         OMES:	TOTAL:45 7, Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information phics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press, 2016. Bloom's Taxonomy				
visualization system         TEXTBOOKS         1         2         3         REFERENCES         1         2         3         4         COURSEOUTCO         At the end of the	tem          Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.         Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.         Matthew O. Ward, George Grinstein, Daniel Keim, "Interact Foundation, Techniques and Applications", Second Edition, 2015.         Joerg Osarek, "Virtual Reality Analytics", Gordon's Arcade,         OMES:         course, learners will be able to	TOTAL:45 7, Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information ohics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press, 2016. Bloom's Taxonomy Level				
visualization system         TEXTBOOKS         1         2         3         REFERENCES         1         2         3         4         COURSEOUTCO         At the end of the         CO1	tem         Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera         Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The Visualization", Morgan Kaufmann Publishers, 2003.         Thomas strothotte, "Computational Visualization: Grap Interactivity", Springer, 1998.         Matthew O. Ward, George Grinstein, Daniel Keim, "Interact Foundation, Techniques and Applications", Second Edition, 2015.         Joerg Osarek, "Virtual Reality Analytics", Gordon's Arcade,         OMES:         course, learners will be able to         Apply mathematics and basic science knowledge for designing information visualizing System.	TOTAL:45 7, Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information ohics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press, 2016. Bloom's Taxonomy Level K2				
visualization system         TEXTBOOKS         1         2         3         REFERENCES         1         2         3         4         COURSEOUTCO         At the end of the         CO1         CO2	tem         Robert Spence, "Information Visualization An Introduction"         Education, 2014.         Colin Ware, "Information Visualization Perception for 1         Margon Kaufmann Publishers, 2012.         Robert Spence, "Information Visualization Design for Intera         Pearson Education, 2006.         Benjamin B. Bederson and Ben shneiderman, "The         Visualization", Morgan Kaufmann Publishers, 2003.         Thomas strothotte, "Computational Visualization: Grap         Interactivity", Springer, 1998.         Matthew O. Ward, George Grinstein, Daniel Keim, "Interact         Foundation, Techniques and Applications", Second Edition, 2015.         Joerg Osarek, "Virtual Reality Analytics", Gordon's Arcade,         OMES:         course, learners will be able to         Apply mathematics and basic science knowledge for designing information visualizing System.         Collect data ethically and solve engineering problem in	TOTAL:45 7, Third Edition, Pearson Design", Third edition, ction", Second Edition, Craft of Information ohics, Abstraction and ive Data Visualization: A. K. Peters/CRC Press, 2016. Bloom's Taxonomy Level K2 K3				

	visualizing the information.	
CO3	Implement algorithms and techniques for interactive information visualization.	К2
CO4	Conduct experiments by applying various modern visualization tool and solve the space layout problem.	К3
CO5	Analyze and design system to visualize multidisciplinary multivariate Data individually or in teams.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	3		-	-	-	2	3	3	3	2	2	2
CO2	2	2	2	1	1	-	-	-	3	2	3	1	3	1	3
CO3	2	1	2	1	1	-	-	-	3	2	1	2	2	2	1
CO4	2	2	2	1	-	-	-	-	1	2	1	3	1	3	2
CO5	3	1	1	2	1	-	-	-	3	2	1	2	2	2	3

AIT503 EXPLORATORY DATA ANALYSIS										
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С			
			PE	3	0	0	3			
	To outline an over	rview of ex	ploratory data ana	alysis.						
	To implement data visualization using Matplotlib.									
Preamble	> To perform univariate data exploration and analysis.									
Treamble	To apply bivariate data exploration and analysis.									
	To use Data exploration and visualization techniques for multivariate and									
	time series data.									
Unit 1	EXPLORATORY DATA ANALYSIS 9									
EDA fundamentals - Und	lerstanding data science – S	Significance	e of EDA – Maki	ng sen	se of	data -	- Comparin			
EDA with classical and Ba	ayesian analysis – Software	tools for E	DA - Visual Aids	for EI	DA- D	)ata tra	insformatio			
techniques-merging datab	ase, reshaping and pivoting,	Transform	ation techniques.							
Unit 2	EDA USING PYTHON						9			
Data Manipulation using	Pandas – Pandas Objects	– Data Ir	dexing and Sele	ction -	– Op	erating	g on Data			
Handling Missing Data -	- Hierarchical Indexing – (	Combining	datasets – Conca	it, App	end,	Merge	e and Join			
Aggregation and grouping	g – Pivot Tables – Vectorize	d String Op	erations.				0			
Unit 3	UNIVARIATE ANALYS	515					9			
Introduction to Single var	riable: Distribution Variabl	es - Numer	ical Summaries of	of Lev	el ano	d Spre	ad - Scalin			
and Standardizing - Inequ	ality.					1				
	BIVARIATE ANALYSIS 9									
Unit 4		•								
Unit 4 Relationship between Tw	o Variables - Percentage T	<b>s</b> ables - Ana	lysing Continger	ncy Ta	bles -	Hand	ling Severa			
Unit 4 Relationship between Tw Batches - Scatterplots and	o Variables - Percentage T Resistant Lines.	ables - Ana	lysing Continger	ncy Ta	bles -	Hand	ling Sever			
Unit 4 Relationship between Tw Batches - Scatterplots and Unit 5	o Variables - Percentage T Resistant Lines. MULTIVARIATE AND	ables - Ana TIME SEI	lysing Continger	ncy Ta	bles -	Hand	ling Severa			
Unit 4 Relationship between Tw Batches - Scatterplots and Unit 5 Introducing a Third Var	o Variables - Percentage T Resistant Lines. MULTIVARIATE AND iable - Causal Explanation	ables - Ana TIME SEI ns - Three	lysing Continger RIES ANALYSIS -Variable Contin	ncy Ta S gency	bles -	Hand es and	ling Severa 9 1 Beyond			
Unit 4 Relationship between Tw Batches - Scatterplots and Unit 5 Introducing a Third Var Fundamentals of TSA – C	o Variables - Percentage T Resistant Lines. MULTIVARIATE AND iable - Causal Explanation tharacteristics of time series	ables - Ana TIME SEI ns - Three data – Data	lysing Continger RIES ANALYSIS -Variable Contin a Cleaning – Time	ncy Ta S gency e-based	bles - Tabl	Hand es and exing –	ling Severa 9 1 Beyond Visualizin			
Unit 4 Relationship between Tw Batches - Scatterplots and Unit 5 Introducing a Third Var Fundamentals of TSA – C – Grouping – Resampling	o Variables - Percentage T Resistant Lines. MULTIVARIATE AND iable - Causal Explanation characteristics of time series	ables - Ana TIME SEI ns - Three data – Data	Ilysing Continger RIES ANALYSIS Variable Contin Cleaning – Time	ncy Ta S gency e-based	bles - Tabl d inde	Hand es and exing –	ling Severa 9 1 Beyond Visualizin			

TEXTBOOKS	
1	Suresh Kumar Mukhiya, Usman Ahmed, "Hands-On Exploratory Data Analysis with Python", Packt Publishing, 2020. (Unit 1).
2	Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", Oreilly, 1st Edition, 2016. (Unit 2).
3	Catherine Marsh, Jane Elliott, "Exploring Data: An Introduction to Data Analysis for Social Scientists", Wiley Publications, 2nd Edition, 2008. (Unit 3,4,5).
REFERENCES	
1	Eric Pimpler, Data Visualization and Exploration with R, GeoSpatial Training service, 2017.
2	Claus O. Wilke, "Fundamentals of Data Visualization", O'reilly publications, 2019.
3	Matthew O. Ward, Georges Grinstein, Daniel Keim, "Interactive Data Visualization: Foundations, Techniques, and Applications", 2nd Edition, CRC press, 2015.

COURSEOUTCO At the end of the	COURSEOUTCOMES: At the end of the course, learners will be able to					
CO1	Understand the fundamentals of exploratory data analysis.	K2				
CO2	Implement the data visualization using Matplotlib.	К3				
CO3	Perform univariate data exploration and analysis.	К3				
CO4	Apply bivariate data exploration and analysis.	К3				
CO5	Use Data exploration and visualization techniques for multivariate and time series data.	К3				

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	-	-	-	2	2	3	2	3	3	2
CO2	2	2	2	3	3	- 1		010	3	2	2	2	1	2	3
CO3	2	3	2	2	3	- 3			2	2	2	1	2	3	1
CO4	2	2	2	2	3	-	-	-	3	2	2	1	2	2	2
CO5	2	2	3	2	1	-	-	-	1	2	2	1	2	2	3

AVIDITO DUSINESS ANALY IICS									
Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С		
Diancii			PE	3	0	0	3		
Preamble	<ul> <li>To understand</li> <li>To comprehen</li> <li>To understand</li> <li>To model the s</li> <li>To apply analy</li> </ul>	the Analytic d the process various type supply chain trics for diffe	cs Life Cycle. s of acquiring B es of analytics for management fo erent functions of	usines or Bus or Ana of a bu	s Int iness lytics sines	elligen Forec s.	ce asting		
Unit 1	INTRODUCTION T	<b>O BUSINE</b>	SS ANALYTIC	2			9		

Definition – Dat	ata Science – Analytics Life Cycle – Types of Analytics – Bu a Collection – Data Preparation – Hypothesis Generation – M	lodeling – Validation and						
$\frac{1}{1}$	BUSINESS INTELLIGENCE	Q						
Data Warehouse	es and Data Mart - Knowledge Management -Types of Dec	isions - Decision Making						
Process - Decisio	on Support Systems – Business Intelligence –OLAP – Analyt	ic functions.						
Unit 3	BUSINESS FORECASTING	9						
Introduction to H	Business Forecasting and Predictive analytics - Logic and Dat	a Driven Models – Data						
Mining and Pred	lictive Analysis Modelling –Machine Learning for Predictive	analytics.						
Unit 4	HR & SUPPLY CHAIN ANALYTICS	9						
Human Resource	es - Planning and Recruitment - Training and Development -	Supply chain network -						
Planning Deman	d, Inventory and Supply – Logistics – Analytics applications	in HR & Supply Chain -						
Applying HR An	nalytics to make a prediction of the demand for hourly employ	yees for a year.						
Unit 5	MARKETING & SALES ANALYTICS	9						
Marketing Strat Analytics applic marketing and sa	tegy- Marketing Mix-Customer Behaviour –selling Proce cations in Marketing and Sales - predictive analytics for ales.	ess – Sales Planning – customers' behaviour ir						
		TOTAL:45						
TEXTBOOKS		2017						
1	R. Evans James, Business Analytics, 2nd Edition, Pearson,	, 2017.						
2	R N Prasad, Seema Acharya, Fundamentals of Business Analytics, 2nd Edition, Wiley, 2016.							
3	Philip Kotler and Kevin Keller, Marketing Management, 15th edition, PHI, 2016.							
4	VSP RAO, Human Resource Management, 3rd Edition, Excel Books, 2010							
5 Mahadevan B, "Operations Management -Theory and Practice", 3rd Edition, Pearson Education, 2018.								
REFERENCES								
1	Checkland, P. (1999) Systems Thinking, Systems Practice.	Chichester: John Wiley.						
2	Cadle, J., Paul, D. and Turner, P. (2014) Business Analysis Tools for Success. Swindon: BCS.	Techniques: 99 Essential						
COURSEOUT	COMES:	Bloom's Taxonomy						
At the end of th	e course, learners will be able to	Level						
CO1	Explain the real world business problems and model with analytical solutions.	К2						
CO2	Identify the business processes for extracting Business Intelligence.	К2						
CO3	Apply predictive analytics for business fore-casting.	К3						
CO4	Apply analytics for supply chain and logistics management.	К3						
CO5	Use analytics for marketing and sales.	К3						
	SRIPERUMBUDUR	1						

#### w.e.f.2024-2025

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	1	1	-	-	-	1	2	1	1	3	2	1
CO2	3	3	3	2	3	-	-	-	1	2	2	2	3	1	2
CO3	2	2	3	3	2	-	-	-	3	1	1	3	3	1	2
CO4	2	1	1	2	2	-	-	-	3	3	2	1	1	3	1
CO5	2	3	2	3	2	-	-	-	3	3	1	3	3	1	1

#### AIT504 INFORMATION RETRIEVAL SYSTEM

Programme & Bra	nch	B.Tech & IT	Sem.	Category	L	Т	P	С			
			_	DE		0	0	•			
		> <b>T</b> 1 1 1		PE	3	0	0	3			
		To understand th modeling	e basics of	information retriev	al wit	h per	inenc	e to			
D 11		<ul> <li>To understand va</li> </ul>	arious com	ponents of IR syste	m						
Preamble		<ul> <li>To understand w</li> <li>To understand m</li> </ul>	achine lear	ming techniques for	r text o	lassit	icatio	n and			
		clustering		0 1							
		To explore vario	us IR appli	cations.							
Unit 1		INTRODUCTION ANI	D MODEL	ING				9			
Basic Concepts: Ret characterization of I Retrieval Evaluation	rieval j R mod 1: Perfo	process – Architecture – E els – Classical IR models rmance evaluation.	Boolean reti – Alternati	rieval; IR Models: ' ve algebraic model	Taxon s – Mo	omy a odels	and for B1	rowsing –			
Unit 2		INDEXING AND QUE	RYING					9			
Indexing: Inverted	indices	– Suffix trees – Suffix	arrays – C	ompression; Query	ving: (	Query	lang	uages; Quer			
Operations: Relevance feedback and query expansion – Automatic local and global analysis.											
Unit 3	Unit 3 SEARCHING							9			
Searching: Sequential searching – Pattern matching: Searching the Web: Characterizing the Web – Search											
engines – Browsing	– Sear	ching using hyperlinks.	0,	C		U					
Unit 4		CLASSIFICATION AN	D CLUST	ERING				9			
Text Classification:	Naive	Bayes; Vector Space Clas	sification:	Rocchio – k-Neard	est Nei	ghbo	ur; Fla	at Clustering			
K-Means - Model-	based of	clustering – Hierarchical	clustering	- Matrix decom-	positi	ons a	nd lat	ent semanti			
indexing.											
Unit 5		APPLICATIONS		14				9			
XML Retrieval - N	lultime	dia IR – Parallel and Dis	stributed II	R – Digital Librari	es – S	ocial	Medi	a Retrieval -			
Content-based Imag	e Retri	eval – Online Public Acce	ess Catalog	s (OPACs).							
			6.	13				TOTAL:45			
TEXTBOOKS		Sec.									
1	Ricard	o Baeza Yates, Berthier R	Ribeiro Net	o, "Modern Inform	nation	Retrie	eval: 7	The Concept			
	and Te	chnology behind Search",	ACM Pres	ss Books, 2nd Editi	on, 20	11.					
2	Christo Inform	opher D Manning, Prabhal ation Retrieval", Cambrid	kar Raghav Ige Univers	an, Hinrich Schutz aity Press, 1st South	e, "Int 1 Asiaı	roduc 1 Edit	tion to tion, 2	o 008.			
REFERENCES		T EST	10. 2011	J.C.							
1	Stefan	Buttcher, Charles L A	Clarke, (	Gordon V Corma	ck, "I	nforn	nation	Retrieval -			
	Implen	nenting and Evaluating So	earch Engi	nes", The MIT Pre	ess, Ca	mbrio	lge, N	lassachusett			
12											

	London, England, 2010.
2	Cheng Xiang Zhai, Sean Massung, "Text Data Management and Analysis: A Practical
	Introduction to Information Retrieval and Text Mining", ACM Books, 2016.
3	Reza Zafarani, Mohammad Ali Abbasi, Huan Liu, "Social Media Mining: An Introduction",
	1st Edition, Cambridge University Press, 2014.
4	Vipin Tyagi, "Content-Based Image Retrieval: Ideas, Influences, and Current Trends", 1st
	Edition, Springer, 2017.
5	Marcia J Bates, "Understanding Information Retrieval Systems: Management, Types, and
	Standards", CRC Press, 2012.

<b>COURSEOUTCO</b> At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level					
CO1	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.						
CO2	CO2 Construct the basic components of an IR system namely indexing and querying						
CO3	Explain the searching techniques for IR and Web.	К2					
CO4	Apply machine learning techniques to text classification and clustering for efficient In- formation Retrieval.	K3					
CO5	Develop an IR application by applying best practices with proper documentation in teams.	K4					

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	3	2	-	-	-	3	2	1	2	3	3	2
CO2	2	2	2	3	3	-	-	-	1	2	2	3	3	3	2
CO3	2	1	1	3	2	-		] - [	1	2	1	1	1	3	3
CO4	3	3	3	3	2	-185	IIITETTE	OF TEO	1	1	1	1	2	1	3
CO5	1	3	2	2	2	-	-	-	1	1	3	1	2	3	2



## **PROFESSIONAL ELECTIVE 2**

	AIT505 WEB	APPLICATI	ON SECURITY						
Programme & Bran	nch B.Tech & IT	Sem.	Category	L	T	P	С		
			DE		0	0	2		
				3		U	3		
	To understand th	he fundamenta	ls of web application	on se	curit	У	2 1		
	To focus on wid	le aspects of se	cure development	and c	leplo	ymer	nt of web		
Preamble	applications								
	To learn how to	build secure A	PIs						
	To learn the basics of vulnerability assessment and penetration testing								
	To get an insigh	t about Hackir	g techniques and	Tools					
Unit 1	FUNDAMENTA	LS OF WEB	APPLICATION				9		
	SECURITY								
The history of Sot Security, Authentic Management-Input	tware Security-Recogni cation and Authorizatio Validation	zing Web Ap n, Secure Soc	plication Security ket layer, Transp	Thre ort la	ats, yer s	Web Secui	Application rity, Session		
Unit 2	SECURE DEVEI	LOPMENT A	ND DEPLOYME	NT			9		
Web Applications Security - Security Testing, Security Incident Response Planning, The Microsoft Security Development Lifecycle (SDL), OWASP Comprehensive Lightweight Application Security									
Unit 3	SECURE APLDEVELOPMENT 9								
with Security Cont service APIs: API Network Connection Unit 4	rols, Rate Limiting for A Keys, OAuth2, Securing Incoming I VULNERABILIT	Availability, En uring Microse Requests. FY ASSESSM	cryption, Audit lo rvice APIs: Serv ENT AND	ice N	g, Seo Aesh,	curin Loc	g service-to king Down		
	PENETRATION	TESTING							
Vulnerability Asso	essment Lifecycle, Vul	Inerability As	sessment Tools:	Clou	d-bas	sed	vulnerability		
scanners, Host-bas	ed vulnerability scanne	rs, Network-b	ased vulnerability	v scai	nners	, Dat	abase-based		
vulnerability scann	ers, Types of Penetration	n Tests: Extern	al Testing, Web A	pplic	ation	Test	ing, Interna		
Penetration Testing	, SSID or Wireless Test	ing, Mobile Aj	plication Testing.						
Unit 5	HACKING TECH	HNIQUES AN	D TOOLS	-+1	Lingti		y nd Cassian		
Management, Cros Failure to Restrict	g, Injection, Cross-Sit s-Site Request Forgery, URL Access, Tools: Con	Security Miscondo, OpenVA	SS), Broken Abonfiguration, Insec S, Nexpose, Nikt	uthen cure ( o, Bu	Crypto Crypto Crypto	on a ograp ite, e	hic Storage		
	1.0		1.0				TOTAL:45		
TEXTBOOKS			<u> </u>		~				
1 <sup>2</sup>	Andrew Hoffman, Web A Modern Web Application	Application Sens, First Editio	curity: Exploitation, 2020, O'Reilly	n and Medi	Cou a, Inc	ntern :.	neasures for		
2	Bryan Sullivan, Vincent The McGraw-Hill Comp	Liu, Web App anies.	lication Security:	A Beg	ginne	rs Gu	ide, 2012,		
3 1	Neil Madden, API Securi	ity in Action, 2	020, Manning Pul	olicat	ions	Co., 1	NY, USA.		
REFERENCES		roin coll	<				_		
		15							

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1	Michael Cross, Developer's Guide to Web Application Security, 2007, Syngress
1	Publishing, Inc.
2	Ravi Das and Greg Johnson, Testing and Securing Web Applications, 2021, Taylor
2	& Francis Group, LLC.
3	Prabath Siriwardena, Advanced API Security, 2020, Apress Media LLC, USA.
4	Malcom McDonald, Web Security for Developers, 2020, No Starch Press, Inc.
	Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, and Terron
5	Williams Grey Hat Hacking: The Ethical Hacker's Handbook, Third Edition, 2011,
	The McGraw-Hill Companies.

COURSEOUTCO At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Understanding the basic concepts of web application security and the need for it	K2
CO2	Be acquainted with the process for secure development and deployment of web applications	K2
CO3	Acquire the skill to design and develop Secure Web Applications that use Secure APIs	К3
CO4	Be able to get the importance of carrying out vulnerability assessment and penetration testing	К3
CO5	Acquire the skill to think like a hacker and to use hackers tool sets	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	1	-	-	-	2	-	3	-
CO2	-	-	-	-	2	1		1	-	-	-	2	-	2	-
CO3	1	2	3	1	3	115	TITUTE	DE TEO	100	-	-	3	2	-	-
CO4	2	1	3	1	2	1	-	-	-	-	-	2	2	-	-
CO5	2	3	2	1	1	1	-	1	-	-	-	2	3	-	-

		Yaxa					
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
			PE	3	0	0	3
Preamble	<ul> <li>To understand the ba</li> <li>To learn how to do t</li> <li>To build test cases a</li> <li>To focus on wide as testing</li> <li>To get an insight aboat automation</li> </ul>	asics of softw he testing ar nd execute the pects of testion out test autor	vare testing d planning effe hem ng and understa nation and the t	ctively anding cools u	mult sed f	tiple fa	cets of

Why do we test Sof V-model of Softwa Failures, Errors and Testing: Unit Testin Unit 2 The Goal of Test F Strategy, Resource Metrics and Statistic Unit 3 Test Objective Ident Modeling a Test De Testing, Path Testi Effectiveness, Mode Reporting, Bug Life Unit 4 Performance Testin Testing, Configurati Security testing, Test Unit 5 Automated Software Driver and Web Elev Understanding Web Methods to Test, Test	ftware?, Black-Box Testing and White-Box Testing, Softare Testing, Program Correctness and Verification, F         are Testing, Program Correctness and Verification, F         d Faults (Defects), Software Testing Principles, Prograg, Integration Testing, System Testing.         TEST PLANNING         Planning, High Level Expectations, Intergroup Responsible Requirements, Tester Assignments, Test Schedule, Testes.         TEST DESIGN AND EXECUTION         tification, Test Design Factors, Requirement identification esign Process, Modeling Test Results, Boundary Value T ng, Data Flow Testing, Test Design Preparedness Meel-Driven Test Design, Test Procedures, Test Case Organic Cycle.         ADVANCED TESTING CONCEPTS         g: Load Testing, Stress Testing, Volume Testing, Failition Testing, Compatibility Testing, Usability Testing, Testing in the Agile Environment, Testing Web and Mobile A         TEST AUTOMATION AND TOOLS         e Testing, Automate Testing of Web Applications, Sements, Locating Web Elements, Actions on Web Elements, Oriver Events, Testing: Understanding Testing.xml, A st Reports.	tware Testing Life Cycle, Reliability versus Safety, m Inspections, Stages of 9 bilities, Test Phases, Test st Cases, Bug Reporting, 9 n, Testable Requirements, esting, Equivalence Class etrics, Test Case Design ization and Tracking, Bug 9 -Over Testing, Recovery esting the Documentation, Applications. 9 lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
Unit 2Unit 2The Goal of Test FStrategy, ResourceMetrics and StatisticUnit 3Test Objective IdentModeling a Test DeTesting, Path TestiEffectiveness, ModeReporting, Bug LifeUnit 4Performance TestinTesting, ConfiguratiSecurity testing, TestingUnit 5Automated SoftwardDriver and Web EleUnderstanding WebMethods to Test, Test	TEST PLANNING           Planning, High Level Expectations, Intergroup Responsib           Requirements, Tester Assignments, Test Schedule, Tester           rest           TEST DESIGN AND EXECUTION           tification, Test Design Factors, Requirement identification           resign Process, Modeling Test Results, Boundary Value T           ng, Data Flow Testing, Test Design Preparedness Model-Driven Test Design, Test Procedures, Test Case Organic Cycle.           ADVANCED TESTING CONCEPTS           g: Load Testing, Stress Testing, Volume Testing, Failion Testing, Compatibility Testing, Usability Testing, Testing in the Agile Environment, Testing Web and Mobile A           TEST AUTOMATION AND TOOLS           e Testing, Automate Testing of Web Applications, Sements, Locating Web Elements, Actions on Web Elements           o Driver Events, Testing: Understanding Testing.xml, A           st Reports.	9         polities, Test Phases, Test         st Cases, Bug Reporting,         9         n, Testable Requirements,         esting, Equivalence Class         etrics, Test Case Design         ization and Tracking, Bug         9         -Over Testing, Recovery         esting the Documentation,         Applications.         9         lenium: Introducing Web         ts, Different Web Drivers,         dding Classes, Packages,
The Goal of Test F Strategy, Resource Metrics and Statistic Unit 3 Test Objective Ident Modeling a Test De Testing, Path Testi Effectiveness, Mode Reporting, Bug Life Unit 4 Performance Testin Testing, Configurati Security testing, Tes Unit 5 Automated Softward Driver and Web Elect Understanding Web Methods to Test, Test	Planning, High Level Expectations, Intergroup Responsible Requirements, Tester Assignments, Test Schedule, Testers.         TEST DESIGN AND EXECUTION         tification, Test Design Factors, Requirement identification esign Process, Modeling Test Results, Boundary Value T         ng, Data Flow Testing, Test Design Preparedness Model-Driven Test Design, Test Procedures, Test Case Organic Cycle.         ADVANCED TESTING CONCEPTS         g: Load Testing, Stress Testing, Volume Testing, Failition Testing, Compatibility Testing, Usability Testing, Testing in the Agile Environment, Testing Web and Mobile A         TEST AUTOMATION AND TOOLS         e Testing, Automate Testing of Web Applications, Sements, Locating Web Elements, Actions on Web Elements         o Driver Events, Testing: Understanding Testing.xml, A st Reports.	pilities, Test Phases, Test st Cases, Bug Reporting, 9 n, Testable Requirements, esting, Equivalence Class etrics, Test Case Design ization and Tracking, Bug 9 -Over Testing, Recovery esting the Documentation, Applications. 9 lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
Strategy, Resource Metrics and Statistic Unit 3 Test Objective Ident Modeling a Test De Testing, Path Testi Effectiveness, Mode Reporting, Bug Life Unit 4 Performance Testin Testing, Configurati Security testing, Test Unit 5 Automated Softward Driver and Web Ele Understanding Web Methods to Test, Test	Requirements, Tester Assignments, Test Schedule, Testes         TEST DESIGN AND EXECUTION         tification, Test Design Factors, Requirement identification         esign Process, Modeling Test Results, Boundary Value T         ng, Data Flow Testing, Test Design Preparedness Meel-Driven Test Design, Test Procedures, Test Case Organic Cycle.         ADVANCED TESTING CONCEPTS         g: Load Testing, Stress Testing, Volume Testing, Fail         ion Testing, Compatibility Testing, Usability Testing, Test         sting in the Agile Environment, Testing Web and Mobile A         TEST AUTOMATION AND TOOLS         e Testing, Automate Testing of Web Applications, Set         ments, Locating Web Elements, Actions on Web Elements         o Driver Events, Testing: Understanding Testing.xml, A         st Reports.	st Cases, Bug Reporting, 9 n, Testable Requirements, esting, Equivalence Class etrics, Test Case Design ization and Tracking, Bug 9 -Over Testing, Recovery esting the Documentation, Applications. 9 lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
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Unit 4 Performance Testin Testing, Configurati Security testing, Tes Unit 5 Automated Softward Driver and Web Eler Understanding Web Methods to Test, Test	ADVANCED TESTING CONCEPTS           g: Load Testing, Stress Testing, Volume Testing, Fail           ion Testing, Compatibility Testing, Usability Testing, Testing in the Agile Environment, Testing Web and Mobile A           TEST AUTOMATION AND TOOLS           e Testing, Automate Testing of Web Applications, Sements, Locating Web Elements, Actions on Web Elements           o Driver Events, Testing: Understanding Testing.xml, A           st Reports.	9 -Over Testing, Recovery esting the Documentation, Applications. 9 lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
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Security testing, Test         Unit 5         Automated Softward         Driver and Web Elex         Understanding Web         Methods to Test, Test	ting in the Agile Environment, Testing Web and Mobile A         TEST AUTOMATION AND TOOLS         e Testing, Automate Testing of Web Applications, Sements, Locating Web Elements, Actions on Web Elements         o Driver Events, Testing: Understanding Testing.xml, A         st Reports.	Applications. 9 lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
Automated Softward Driver and Web Elec Understanding Web Methods to Test, Test	e Testing, Automate Testing of Web Applications, Se ments, Locating Web Elements, Actions on Web Element o Driver Events, Testing: Understanding Testing.xml, A st Reports.	lenium: Introducing Web ts, Different Web Drivers, dding Classes, Packages,
Driver and Web Ele Understanding Web Methods to Test, Tes	ments, Locating Web Elements, Actions on Web Element Driver Events, Testing: Understanding Testing.xml, A st Reports.	ts, Different Web Drivers, dding Classes, Packages,
TEXTBOOKS		101AL:45
1 Y	ogesh Singh, "Software Testing", Cambridge University I	Press, 2012
2 Ui Ed	nmesh Gundecha, Satya Avasarala, "Selenium WebDriver 3 Pr dition 2018	actical Guide" - Second
REFERENCES	I F F F F F F F F F F F F F F F F F F F	
1 G Ed	lenford J. Myers, Corey Sandler, Tom Badgett, The Art dition, 2012, John Wiley & Sons, Inc.	of Software Testing, 3rd
2 R	on Patton, Software testing, 2nd Edition, 2006, Sams Pub	lishing
3 Pa 20	aul C. Jorgensen, Software Testing: A Craftsman's A 014, Taylor & Francis Group.	pproach, Fourth Edition,
4 C:	arl Cocchiaro, Selenium Framework Design in Data-Dri ublishing.	iven Testing, 2018, Packt
5 EI	Ifriede Dustin, Thom Garrett, Bernie Gaurf, Implement esting, 2009, Pearson Education, Inc.	ting Automated Software
6 Sa	atya Avasarala, Selenium WebDriver Practical Guide, 201	14, Packt Publishing.
COURSEOUTCOM	ES:	Bloom's Taxonomy
At the end of the cou	rse, learners will be able to the second	Level
CO1 U ne	nderstand the basic concepts of software testing and the eed for software testing	К2
CO2 D te	esign Test planning and different activities involved in st planning	K4
CO3 D de	esign effective test cases that can uncover critical effects in the application	К4
	17	<u> </u>

CO4	Carry out advanced types of testing	К3
CO5	Automate the software testing using Selenium and TestNG	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	2	-	-	-	1	1	3	2	3	2	3
CO2	2	3	1	1	1	-	-	-	2	2	1	2	1	2	3
CO3	2	2	1	3	1	-	-	-	1	3	1	2	2	3	2
CO4	2	1	3	2	1	-	-	-	1	1	1	2	3	1	2
CO5	2	2	1	3	1	-	-	-	1	3	2	1	2	1	3

AIT507 DEVOPS													
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С						
	1		PE	3	0	0	3						
	To introduce DevOps	termin	ology, definition &	cone	cepts								
> To understand the different Version control tools like Git, Mercurial													
Preamble       > To understand the concepts of Continuous Integration/ Continuous Testing         / Continuous Deployment)													
<ul> <li>To understand Configuration management using Ansible</li> </ul>													
<ul> <li>Illustrate the benefits and drive the adoption of cloud-based Devops tools</li> </ul>													
to solve real world problems													
Unit 1	Unit 1INTRODUCTION TO DEVOPS9												
Devops Essentials - Intr	roduction To AWS, GCP, A	Azure -	Version control sys	tems	s: Git	and	Github.						
Unit 2	COMPILE AND BUILI	D USIN	G MAVEN &				9						
	GRADLE	<b>.</b> .											
Introduction, Installation	on of Maven, POM files,	Maven	Build lifecycle, Bu	uild	phase	es(co	mpile build,						
test, package) Maven P	rofiles, Maven repositories	s(local,	central, global),May	ven	plugi	ns, N	laven create						
and build Artificats, De	pendency management, Ins	stallatio	n of Gradle, Unders	stand	l buil	d usi	ng Gradle						
Unit 3	CONTINUOUS INTEG	RATIO	ON USING JENKI	NS			9						
Install & Configure Jen Jenkins job, Introductio	kins, Jenkins Architecture n to Plugins, Adding Plugi	Overvie ns to Je	w, Creating a Jenki nkins, Commonly u	ns J ised	ob, C plugi	Config Ins (C	guring a Bit Plugin,						
Parameter Plugin, HTM	IL Publisher, Copy Artifac	t and Ex	tended choice para	mete	ers). (	Confi	guring						
Jenkins to work with ja	va, Git and Maven, Creatin	ig a Jen	kins Build and Jenk	ins v	vorks	space	0						
Unit 4	ANSIBLE	ANAGI	EVIENT USING				У						
10													

Ansible Introduction, Installation, Ansible master/slave configuration, YAML basics, Ansible modules, Ansible Inventory files, Ansible playbooks, Ansible Roles, adhoc commands in ansible 9

Unit 5 **BUILDING DEVOPS PIPELINES USING AZURE** 

Create Github Account, Create Repository, Create Azure Organization, Create a new pipeline, Build a sample code, Modify azure-pipelines.yaml file TOTAL:45

#### TEXTBOOKS

TENTBOOKS	
1	Roberto Vormittag, "A Practical Guide to Git and GitHub for Windows Users: From Beginner to Expert in Easy Step-By-Step Exercises", Second Edition, Kindle Edition, 2016
2	Jason Cannon, "Linux for Beginners: An Introduction to the Linux Operating System and Command Line", Kindle Edition, 2014.
REFERENCES	
1	Hands-On Azure Devops: Cicd Implementation For Mobile, Hybrid, And Web Applications Using Azure Devops And Microsoft Azure: CICD Implementation for DevOps and Microsoft Azure (English Edition) Paperback – 1 January 2020
2	Jeff Geerling, "Ansible for DevOps: Server and configuration management for humans", First Edition, 2015.
3	David Johnson, "Ansible for DevOps: Everything You Need to Know to Use Ansible for DevOps", Second Edition, 2016.
4	Mariot Tsitoara, "Ansible 6. Beginning Git and GitHub: A Comprehensive Guide to Version Control, Project Management, and Teamwork for the New Developer", Second Edition, 2019.
5	https://www.jenkins.io/user-handbook.pdf
6	https://maven.apache.org/guides/getting-started/

COURSEOUTCO At the end of the	OMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Understand different actions performed through Version control tools like Git.	К2
CO2	Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle.	К3
CO3	Ability to Perform Automated Continuous Deployment	К3
CO4	Ability to do configuration management using Ansible	К3
CO5	Understand to leverage Cloud-based DevOps tools using Azure DevOps	К2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	_	-	-	-	-	2	2	2
CO2	3	3	3	2	3	ell	PEB			52	-	-	2	2	2
CO3	3	3	3	2	3	-	TET	1 20		1 c	2 -	-	2	2	2
CO4	3	3	3	2	3	~	L.a.	-	-	1	-	-	2	2	2
CO5	3	3	3	2	3	-	-	-	-	-	-	-	2	2	2

	AIT508 UI AI	ND UX	DESIGN				
Programme & Bran	ch R Tech & IT	Sem	Category	I.	Т	Р	C
		Sem.	Category			-	C
			PE	3	0	0	3
	To provide a sound kit	nowledg	ge in UI & UX				
	$\succ$ To understand the need	ed for U	I and UX				
Preamble	$\succ$ To understand the var	ious Re	search Methods us	ed in	Des	ign	
	To explore the variou	s Tools	used in UI & UX			-	
	<ul> <li>Creating a wireframe</li> </ul>	and pro	totype				
Unit 1	FOUNDATIONS OF D	ESIGN	• •				9
UI vs. UX Design Brainstorming and C	- Core Stages of Design Game storming - Observationa	Thinkin l Empat	g - Divergent an hy.	d Co	onver	gent	Thinking -
Unit 2	FOUNDATIONS OF U	DESI	GN				9
Visual and UI Princ - Style Guides.	iples - UI Elements and Patter	ns - Int	eraction Behaviors	and	Prine	ciples	s – Branding
Unit 3	FOUNDATIONS OF U	X DESI	GN				9
Experience - Defini Design - Tools and Goals.	ng the UX Design Process a Method used for Research -	nd its l User l	Methodology - Res Needs and its Goa	searc ls - ]	h in Knov	User v abo	Experience out Business
Unit 4	WIREFRAMING, PRO	ΤΟΤΥ	PING AND TEST	ING			9
- Building a Proto Interaction Patterns Synthesizing Test Fi Unit 5	type - Building High-Fidelit - Conducting Usability Te indings - Prototype Iteration. RESEARCH, DESIGNI	sponsive cy Moc sts - C <b>NG, IE</b>	EDesign – wireira kups - Designing ther Evaluative U EATING, &	Effi Jser	cient Rese	eating tly wearch	y wirenows rith Tools - Methods - 9
	INFORMATION ARCI	HITEC'	ΓURE				
Identifying and Wri Personas - Solution Mapping - Informati	ting Problem Statements - Id Ideation - Creating User Sto on Architecture.	entifyir ories - (	g Appropriate Res Creating Scenarios	searc - Fl	h Me low ]	ethod Diagr	s - Creating cams - Flow
TEXTBOOKS							TOTAL:45
1 Jo	el Marsh, "UX for Beginners'	', O'Re	11y, 2022				
2 Jc Se	on Yablonski, "Laws of UX us ervices" O'Reilly 2021	ing Psy	chology to Design	Bette	er Pro	oduct	&
REFERENCES			12				
1 Je E	nifer Tidwell, Charles Brewer dition , O'Reilly 2020	, Aynne	Valencia, "Desigr	ning	Inter	face"	3 rd
2 St	eve Schoger, Adam Wathan "	Refacto	ring UI", 2018				
3 St &	eve Krug, "Don't Make Me Tl Mobile", Third Edition, 2015	hink, Re	evisited: A Commo	nsen	se Aj	pproa	ich to Web
4 ht	tps://www.nngroup.com/articl	es/	Min 2				
5 ht	tps://www.interaction-design.	org/liter	ature				
			and the second s				

COURSEOUTCO At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Build UI for user Applications	К3
CO2	Evaluate UX design of any product or application	К5
CO3	Demonstrate UX Skills in product development	К3
CO4	Implement Sketching principles	К3
CO5	Create Wireframe and Prototype	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	-	-	-	3	3	2	1	3	3	1
CO2	2	3	1	3	2	-	-	-	1	2	2	2	1	2	2
CO3	1	3	3	2	2	-	-	-	2	3	1	2	1	3	3
CO4	1	2	3	3	1	-	-	-	3	2	1	3	3	3	3
CO5	1	2	3	2	1	-	-	-	2	1	1	1	3	2	2

Programme & Branch	B.Tech & IT	Sem.	Category	L	T	Р	С		
			PE	3	0	0	3		
	Introduce Cloud Se	rvice Mar	agement terminolo	gy, o	defin	ition	& concepts		
	Compare and con service management	trast clou it	d service manage	men	t wi	th tr	aditional I		
Preamble	Identify strategies to reduce risk and eliminate issues associated w adoption of cloud services								
	<ul> <li>Select appropriate structures for designing, deploying and running cloud based services in a business environment</li> </ul>								
	Illustrate the benefits and drive the adoption of cloud-based services to solve real world problems								
Unit 1	CLOUD SERVICE M	[ANAGE]	MENT				9		
	FUNDAMENTALS								
Cloud Ecosystem, T	he Essential Character	istics, Ba	asics of Informat	ion	Tecl	hnolo	ogy Servic		
Management and Clou	d Service Management,	Service	Perspectives, Clou	d So	ervice	e Mo	odels, Clou		
Service Deployment M	odels.								
Unit 2	<b>CLOUD SERVICES</b>	STRATE	GY				9		
Cloud Strategy Fundam Adoption, Risk Manage	nentals, Cloud Strategy M ement, IT Capacity and U pagement, Cloud Service	Ianageme Itilization,	nt Framework, Clou Demand and Capa	ud P city	olicy mate	, Key hing	Driver for , Demand		
Unit 3	CLOUD SERVICE M	ANAGE	MENT				9		
							-		
Cloud Service Deferen	ce Model, Cloud Service	e LifeCyc	le, Basics of Cloud	1 Se	rvice	Des	ign, Dealin		
Cloud Service Referen							-		

Planning, Cloud	l Service Deployment and Migration, Cloud Marketplace,	Cloud Service Operations
Unit 4	CLOUD SERVICE ECONOMICS	9
Pricing models	for Cloud Services, Freemium, Pay Per Reservation, Pay per	r User. Subscription based
Charging, Procu	rement of Cloud-based Services, Capex vs Opex Shift, Clou	d service Charging, Cloud
Cost Models.		8 8,
Unit 5	CLOUD SERVICE GOVERNANCE & VALUE	9
IT Governance	Definition, Cloud Governance Definition, Cloud Govern	nance Framework, Cloud
Governance St	ructure, Cloud Governance Considerations, Cloud Servi	ice Model Risk Matrix,
Understanding V	Value of Cloud Services, Measuring the value of Cloud Serv	vices, Balanced Scorecard,
Total Cost of Ov	wnership	
		TOTAL:45
TEXTBOOKS		
1	Cloud Service Management and Governance: Smart Servic Era by Enamul Hague, Enel Publications	e Management in Cloud
2	Cloud Computing: Concepts, Technology & Architecture b	oy Thomas Erl, Ricardo
2	Puttini, Zaigham Mohammad 2013	
3	Cloud Computing Design Patterns by Thomas Erl, Robert	Cope, Amin Naserpour
REFERENCES		
1	Economics of Cloud Computing by Praveen Ayyappa,	LAP Lambert Academic
I	Publishing	
	Mastering Cloud Computing Foundations and Applications	s Programming Raikumar
2	Buyya, Christian Vechhiola, S. Thamarai Selvi	8 6 J
COURSEOUTC	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	Explain the foundations of distributed systems	K2
CO2	Solve synchronization and state consistency problems	К3
CO3	Use resource sharing techniques in distributed systems	К3
CO4	Apply working model of consensus and reliability of distributed systems	К3

CO4	distributed systems	K3
CO5	Explain the fundamentals of cloud computing	K2

										ST 37 4					
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
							1.1	.D., 1	1.10	10 A					
CO1	3	3	1	1	1	1.00	1.0	<u> </u>	2	1	3	2	2	1	3
							1. A.	1.00			_				
CO2	3	1	2	3	2	-	$\sim 0$		1	2	3	1	2	2	2
	-	-	_	-	_					_	-	-	_	_	_
CO3	1	1	3	1	3	-	-	_	3	3	1	1	3	2	1
		_	-	_	-						-	-	•		-
CO4	1	1	1	2	3	-11		_	2	3	3	1	1	1	1
	-	-	-	_		1.5	C PRO	CALLER OF COMPANY				-	-	-	-
CO5	1	3	3	2	2		-	-	1	3	1	2	1	3	2
200	1			_	_	100	- E S T I	1.20			1	-	1	5	-

Programme & Bra	nch	B.Tech & IT	Sem.	Р	С							
	I			PE	3	0	0	3				
		To learn development	nt of nativ	ve applications with	n bas	ic G	UI C	omponents				
Draambla		To develop cross-pla	atform ap	plications with ever	nt ha	ndlii	ıg					
Preamble		To develop application	ions with	location and data s	torag	ge ca	pabil	ities				
		To develop web app	lications	with database acces	SS							
Unit 1	]	FUNDAMENTALS OF MOBILE & WEB9										
	APPLICATION DEVELOPMENT											
Basics of Web and What is Progressiv	Mobil e Web	e application developme App, Responsive Web	ent, Nativ design.	e App, Hybrid App	o, Cr	oss-p	olatfo	orm App,				
Unit 2	]	NATIVE APP DEVEL	OPMEN	T USING JAVA				9				
Native Web App,	Benefi	ts of Native App, Scen	arios to c	reate Native App,	Тоо	ls fo	r cre	ating Nativ				
App, Cons of Nati	ve App	o, Popular Native App I	Developm	ent Frameworks, Ja	ava d	& Ko	otlin	for Androi				
Swift & Objective-	-C for i	OS, Basics of React Na	tive, Nati	ve Components, JS	X, S	state,	Prop	)S				
Unit 3	]	HYBRID APP DEVEI	OPMEN	Τ			9					
Hybrid Web App,	Benefi	ts of Hybrid App, Crite	ria for cre	eating Native App,	Тоо	ls fo	r crea	ating Hybr				
App, Cons of Hybr	rid App	o, Popular Hybrid App I	Developm	ent Frameworks, Io	onic,	Apa	che (	Cordova.				
Unit 4		CROSS-PLATFORM	APP DEV	VELOPMENT US	SINC	Ĵ		9				
App, Tools for crea Development Fra Components, JSX, Unit 5	ating C mewor State,	ross-platform App, Cor rks, Flutter, Xamarin, <u>Props</u> <b>NON-FUNCTIONAL</b>	React-N	s-platform App, PC Native, Basics of CTERISTICS OF	f R	eact	Nat	ive, Nativ				
Comparison of d	ifferen	FRAMEWORKS										
capabilities. Time 1	to Mar	ket. Maintainability. Ea	Build Pe	erformance, App elopment, UI/UX.	Perf Reus	orma sabili	ince, tv	Debuggin				
capabilities, Time	to Mar	ket, Maintainability, Ea	Build Pe se of Dev	erformance, App elopment, UI/UX, I	Perf Reus	sabili	ty	Debuggir				
capabilities, Time	to Mar	ket, Maintainability, Ea	Build Pe se of Dev	erformance, App elopment, UI/UX, I	Perf Reus	sabili	ty	Debuggir TOTAL:4				
TEXTBOOKS	to Mar Head F	ket, Maintainability, Ea	Build Pe se of Dev ent, Dawr	erformance, App elopment, UI/UX, n Griffiths, O'Reill	Perf Reus y, 1s	t edi	ty tion	Debuggin				
TEXTBOOKS 1 2	to Mar Head F Apache	ket, Maintainability, Ea First Android Developm Cordova in Action, Ra	Build Pe se of Dev ent, Dawr ymond K	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin	Perf Reus y, 1s g. 2(	t edi	ty tion	Debuggir				
capabilities, Time     TEXTBOOKS     1     2	to Mar Head F Apache Full St	ket, Maintainability, Ea First Android Developm c Cordova in Action, Ra ack React Native: Creat	Build Pe se of Dev ent, Dawr ymond K e beautifu	erformance, App elopment, UI/UX, T n Griffiths, O'Reill . Camden, Mannin Il mobile apps with	Perf Reus y, 1s g. 20 Java	t edir 015	ty tion pt an	Debuggir TOTAL:4				
capabilities, Time     TEXTBOOKS     1   1     2   1     3   1	to Mar Head F Apache Full St Native	First Android Developme Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, 1	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh	Perf Reus y, 1s g. 20 Java	t edir 15 15 aScri aker	tion tion pt an	Debuggir TOTAL:4 d React vin Abbott,				
TEXTBOOKS       1     1       2     1       3     1	to Mar Head F Apache Full Sta FullSta	First Android Developm Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, I ck publishing	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh	Perf Reus y, 1s g. 20 Java	t edir 115 aScri 126	tion tion tion pt an , Dev	Debuggin TOTAL:4 d React vin Abbott,				
TEXTBOOKS   1   2   3   1   2	to Mar Head F Apache Full Sta FullSta	First Android Developm e Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, I ck publishing	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein	erformance, App elopment, UI/UX, T n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh	Perf Reus y, 1s g. 20 Java	t edi 015 aScri aker	ty tion pt an , Dev	Debuggin TOTAL:4 d React vin Abbott,				
TEXTBOOKS   1   2   3   1   3   1   1   1   1   1   1   1   1   1   1   1	to Mar Head F Apacho Full Sta FullSta Androi	First Android Developm Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, I ack publishing	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh	Perf Reus y, 1s g. 20 Java aoem	t edit 15 15 aScri aker shing	tion tion pt an , Dev	Debuggin TOTAL:4 d React vin Abbott, d Edition				
TEXTBOOKS   1   2   3   1   2   3   1   2   1   2	to Mar Head F Apache Full St Native Androi	First Android Developm Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, I ack publishing d Programming for Beg Mobile Development b	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein ginners, Jo y Shaun I	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin I mobile apps with Djirdeh, Sophia Sh ohn Horton, Packt H Lewis, Mike Dunn	Perf Reus y, 1s g. 20 Java toem	t edi 15 aScri aScri aker	tion tion pt an , Dev	Debuggii TOTAL:4 d React vin Abbott, d Edition				
TEXTBOOKS   1   2   3   3   1   2   3   1   2   3   1   2   1   2   1   2   1   2   1   2   1   2   1   2   1   2   3	to Mar Head F Apacho Full Sta Native Androi Native Buildir	First Android Developm e Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, 1 ack publishing d Programming for Beg Mobile Development b 1g Cross-Platform Mob	Build Pe se of Deve ent, Dawr ymond K e beautifu Houssein ginners, Jc y Shaun I vile and V	erformance, App elopment, UI/UX, T n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh ohn Horton, Packt H Lewis, Mike Dunn Veb Apps for Eng	Perf Reus y, 1s g. 20 Java ocem	t edit 15 aScri aScri aker shing	tion pt an , Dev g, 2nd	Debuggin TOTAL:4 d React vin Abbott, d Edition				
TEXTBOOKS   1   2   3   1   2   3   1   2   3   1   2   3   1   2   1   2   1   2   1   2   1   2   1   2   3	to Mar Head F Apacho Full Sta Native Androi Native Buildir Active	First Android Developm e Cordova in Action, Ra ack React Native: Creat , Anthony Accomazzo, I ack publishing d Programming for Beg Mobile Development b ng Cross-Platform Mob Learning Approach, Pa	Build Pe se of Dev ent, Dawr ymond K e beautifu Houssein iinners, Jo y Shaun I iile and V wan Ling	erformance, App elopment, UI/UX, n Griffiths, O'Reill . Camden, Mannin Il mobile apps with Djirdeh, Sophia Sh ohn Horton, Packt F Lewis, Mike Dunn Veb Apps for Eng ras, Matt Triff, Ruc	Perf Reus y, 1s g. 20 Java aoem Publi inee	t edit 15 aScri aScri aker shing rs ar	tion pt an , Dev g, 2nd ad Sc as	Debuggii TOTAL:4 d React vin Abbott, d Edition				

w.e.f.2024-2025

5	React Native Cookbook, Daniel Ward, Packt Publishing, 2	nd Edition				
COURSEOUT At the end of t	COURSEOUTCOMES: At the end of the course, learners will be able to					
CO1	Develop Native applications with GUI Components.	K3				
CO2	Develop hybrid applications with basic event handling.	K3				
CO3	Implement cross-platform applications with location and data storage capabilities.	К3				
CO4	Implement cross platform applications with basic GUI and event handling.	К3				
CO5	Develop web applications with cloud database access	К3				

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	3	-	-	-	1	1	2	1	2	3	3
CO2	2	1	3	2	2	-	-	-	3	2	2	3	3	2	1
CO3	2	2	2	1	2	-	-	-	1	1	1	1	1	1	2
CO4	1	3	1	1	3	-	-	-	1	1	3	2	1	3	1
CO5	1	1	3	1	3	-	-	-	1	1	2	1	3	2	1



## **PROFESSIONAL ELECTIVE 3**

Programme & Rra	nch	B.Tech & IT	Sem	Category	L	Т	Р	С
	inen	Dirten & II	Sem.	PE	3	0	0	3
		> To understand Da	ta Wareho	use concepts. Are	chitect	ure.	Busir	ness Analysi
		and Tools.					2	
		<ul> <li>To understand Data</li> </ul>	a Preproces	ssing and Data Vis	ualiza	tion 1	echni	iques.
Preamble		<ul> <li>To study algorithm</li> </ul>	s for findir	ng Hidden and Inte	restin	g nat	terns	in Data
		<ul> <li>To understand</li> </ul>	and annl	v various Clas	sifica	tion	and	Clusterin
		techniques	und uppi	y various club	511100	<i>i</i> tion	unu	Clusterin
TT *4 1	DA	TA WADEHOUSING	DUGINE	CO ANAT VOIO A	NID			0
Unit I		TA WAKERUUSING	, DUSINE	55 ANAL I 515 A SSINC	ND			9
Dagia Canaanta - F	UN Note Would	-LINE ANALY HCAI		Dete Warehouse	Der	1		1.: to a transa fr
Basic Concepts – L	Darallal	DDMS Vendere Mult	Building a	Data warehouse	– Dai Data J	abase	e Arc	Salaria f
Parallel Processing	- Parallel	DBMS vendors – Muli	idimensior	iai Dala Model –	Data	ware		On anotion of
Jecision Support -	Concept	Hierarchies - Character	ristics of C	JLAP Systems –	1 yp10	car O	LAP	Operations
ULAP and ULIP.	TNI			DIC				0
Unit 2		RODUCTION TO D	ATA MIN	ING	<u>.</u>			<u> </u>
ntroduction to Dat	a Mining S	Systems – Knowledge	Discovery	Process – Data N	lining	Tecl	nniqu	es – Issues
Applications- Data	Objects a	nd Attribute Types -	Statistical	Description of I	Data -	Dat	a Pre	processing
Cleaning - Integrati	on - Redu	ction - Transformation	and Discre	etization - Data V	Isualiz	zation	-Da	ata Similarit
and Dissimilarity M	easures.			~~~				
Unit 3	FR	EQUENT PATTERN	ANALYS	IS				9
Mining Frequent P	atterns - A	ssociations and Correl	ations – N	fining Methods-	Patter	n Eva	aluati	on Method
Pattern Mining in	Multilevel	- Multi Dimensional	Space –	Constraint Based	Free	luent	Patte	ern Mining
Classification Using	Frequent	Patterns.						
Unit 4	CL	ASSIFICATION AND	<b>CLUSTE</b>	RING				9
Decision Tree Indu	iction – E	Bayesian Classification	– Rule E	Based Classification	on –	Class	ificat	ion by Bac
propagation – Supp	ort Vector	Machines – Lazy Lea	rners – M	odel Evaluation a	nd Se	lectic	on - T	Techniques t
improve Classificat	tion Accu	racy - Clustering Tec	hniques –	Cluster Analysi	s - F	Partiti	oning	g Methods
Hierarchical Metho	ds – Densi	ty Based Methods – Gr	id Based N	Iethods – Evaluati	on of	Clus	tering	g – Clusterin
High Dimensional I	Data - Clust	tering with Constraints	- Outlier A	nalysis - Outlier D	etecti	on M	ethod	s.
High Dimensional I Unit 5	Data - Clust DA	tering with Constraints TA ANALYSIS TOO	- Outlier A L	nalysis - Outlier D	etecti	on M	ethod	s. 9
High Dimensional I Unit 5 Datasets – Introduc	Data - Clust DA tion, Iris p	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast	- Outlier A L cancer data	nalysis - Outlier D ibase, Auto Impor	etecti ts Da	on M tabas	ethod e - In	s. 9 troduction t
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer	Data - Clust DA tion, Iris p – Getting	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the	- Outlier A L cancer data Explorer -	nalysis - Outlier D ubase, Auto Impor Learning algorith	etecti ts Da ms -	on M tabas Clust	ethod e - In ering	s. 9 atroduction t algorithms
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L	Data - Clust DA tion, Iris p – Getting earners.	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the	- Outlier A L cancer data Explorer -	nalysis - Outlier D ıbase, Auto Impor Learning algorith	etecti ts Da ms -	on M tabas Clust	ethod e - In ering	s. 9 troduction t algorithms
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L	Data - Clust DA tion, Iris p – Getting earners.	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the	- Outlier A L cancer data Explorer -	nalysis - Outlier D abase, Auto Impor Learning algorith	etecti ts Da ms -	on M tabas Clust	ethod e - In ering	s. 9 atroduction 1 algorithms TOTAL: 4
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS	Data - Cluss DA tion, Iris p – Getting earners.	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the	- Outlier A L cancer data Explorer -	nalysis - Outlier D ıbase, Auto Impor Learning algorith	etecti ts Da ms -	on M tabas Clust	ethod e - In ering	s. 9 atroduction t algorithms TOTAL: 4
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1	Data - Clust DA tion, Iris p – Getting earners. Jiawei Har	TA ANALYSIS TOO TA ANALYSIS TOO lants database, Breast started, Exploring the n and Micheline Kambe	- Outlier A L cancer data Explorer - r, "Data M	nalysis - Outlier D abase, Auto Impor Learning algorith	etecti ts Da ms -	on M tabas Clust	ethod e - In ering es", 1	s. 9 atroduction 1 algorithms TOTAL: 4
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1	Data - Cluss Data - Cluss tion, Iris p – Getting earners. Jiawei Har Elsevier, 2	TA ANALYSIS TOO lants database, Breast started, Exploring the n and Micheline Kambe 012.	- Outlier A L cancer data Explorer - r, "Data M	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an	etecti ts Da ms - d Tec	on M tabas Clust	ethod e - In rering es", 7	s. 9 attroduction t algorithms TOTAL: 4 Third Edition
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2	Data - Clusi DA tion, Iris p – Getting earners. Jiawei Har Elsevier, 2 Alex Bers	TA ANALYSIS TOO TA ANALYSIS TOO lants database, Breast started, Exploring the and Micheline Kambe 012. on and Stephen J.Sm	- Outlier A L cancer data Explorer - r, "Data M ith, "Data	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da	etecti rts Da ms - d Tec ata M	on M tabas Clust hniqu	ethod e - In ering es", 7	s. 9 atroduction f algorithms TOTAL: 4 Third Edition DLAP", Tat
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2 REFERENCES	Data - Cluss Data - Cluss tion, Iris p – Getting earners. Jiawei Hat Elsevier, 2 Alex Bers McGraw –	TA ANALYSIS TOO TA ANALYSIS TOO lants database, Breast started, Exploring the and Micheline Kambe 012. on and Stephen J.Sm Hill Edition, 35 <sup>th</sup> Repri	- Outlier A L cancer data Explorer - r, "Data M ith, "Data int 2016.	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da	etecti rts Da ms - d Tech ata M	on M tabas Clust hniqu	ethod e - In ering es", 7	s. 9 atroduction t algorithms TOTAL: 4 Third Edition DLAP", Tat
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2 REFERENCES 1	Data - Cluss Data - Cluss Ition, Iris p – Getting earners. Jiawei Har Elsevier, 2 Alex Bers McGraw –	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the n and Micheline Kambe 012. on and Stephen J.Sm Hill Edition, 35 <sup>th</sup> Repring	- Outlier A L cancer data Explorer - r, "Data M ith, "Data int 2016.	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da	etecti ts Da ms - d Tec ata M	on M tabas Clust hniqu	ethod e - In ering es", 1	s. 9 attroduction t algorithms TOTAL: 4 Third Edition DLAP", Tat
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2 REFERENCES 1	Data - Clusi Data - Clusi DA tion, Iris p – Getting earners. Jiawei Har Elsevier, 2 Alex Bers McGraw – K.P. Soma Eastern Fo	TA ANALYSIS TOO TA ANALYSIS TOO lants database, Breast started, Exploring the n and Micheline Kambe 012. on and Stephen J.Sm Hill Edition, 35 <sup>th</sup> Repri- n, Shyam Diwakar and onomy Edition Prentic	- Outlier A L cancer data Explorer - r, "Data M ith, "Data M int 2016. V. Ajay, " e Hall of It	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da Insight into Data	etecti rts Da ms - d Tec ata M	on M tabas Clust hniqu ining g The	ethod e - In eering es", 7 c & (	s. 9 atroduction t algorithms TOTAL: 4 Third Edition DLAP", Tat
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2 REFERENCES 1 2	Data - Clusi Data - Clusi DA tion, Iris p – Getting earners. Jiawei Har Elsevier, 2 Alex Bers McGraw – K.P. Soma Eastern Ec Ian H.Wi	TA ANALYSIS TOO TA ANALYSIS TOO lants database, Breast started, Exploring the and Micheline Kambe 012. on and Stephen J.Sm Hill Edition, 35 <sup>th</sup> Repring n, Shyam Diwakar and onomy Edition, Prentic tten and Eibe Frank	- Outlier A L cancer data Explorer - r, "Data M ith, "Data int 2016. V. Ajay, " e Hall of In "Data Mir	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da Insight into Data adia, 2006.	etecti ts Da ms - d Tec ata M Minin	on M tabas Clust hniqu g The	ethod e - In ering es", 7 c & ( eory a arnin	s. 9 attroduction t algorithms TOTAL: 4 Third Edition DLAP", Tat and Practice
High Dimensional I Unit 5 Datasets – Introduc WEKA - Explorer Association–Rule L TEXTBOOKS 1 2 REFERENCES 1 2	Data - Clust Data - Clust DA tion, Iris p – Getting earners. Jiawei Har Elsevier, 2 Alex Bers McGraw – K.P. Soma Eastern Ec Ian H.Wi Techniou	tering with Constraints <b>TA ANALYSIS TOO</b> lants database, Breast started, Exploring the mand Micheline Kamber 012. on and Stephen J.Sm Hill Edition, 35 <sup>th</sup> Repri- n, Shyam Diwakar and onomy Edition, Prentic tten and Eibe Frank, es", Elsevier, Second	- Outlier A L cancer data Explorer - r, "Data M ith, "Data M int 2016. V. Ajay, " e Hall of In "Data Mir Edition. 2	nalysis - Outlier D abase, Auto Impor Learning algorith ining Concepts an Warehousing, Da Insight into Data adia, 2006. ning: Practical M 005.	etecti rts Da ms - d Tec ata M Minin fachir	on M tabas Clust hniqu g Tho ne Le	ethod e - In eering es", 7 c & ( eory a arnin	s. 9 atroduction 1 algorithms TOTAL: 4 Third Edition DLAP", Tat and Practice ag Tools an

	Cambridge University Press, 2019.							
4	Pranjali Deshpande, Soudamini Patil, "Data Warehousing and I	Data Mining", First Edition,						
	Technical Publications, 2020.	-						
5	Dr. B. Shadaksharappa, Mr. P. Ramkumar, Dr. T. N. Prabakar, "Data Warehousing and Data							
	Mining", First Edition, Book Rivers, 2022.							
COURSE OUTC	OMES:	Bloom's Taxonomy						
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.	K2						
CO2	Recognize and identify suitable Pre-processing and Visualization techniques for Data Analysis.	K2						
CO3	Apply frequent Pattern and Association Rule Mining techniques for Data Analysis.	К3						
CO4	Apply appropriate Classification techniques for Data Analysis.	К3						
CO5	Apply appropriate Clustering techniques for Data Analysis.	К3						

	DO1	DOD	DO2	DO4	DO5	DO6	DO1	DOS	DOO	<b>DO10</b>	DO11	DO12	DSO1	DCO2	DCO2
CO/PO	POI	PO2	POS	PO4	POS	PU0	POI	PUð	P09	POID	POIT	POIZ	PS01	PS02	PS05
CO1	2	3	3	2	2	1	1	-	2	2	2	2	3	3	2
CO2	3	3	3	2	2	2	1	-	2	2	2	3	3	2	3
CO3	3	3	3	3	2	1	1	-	2	2	2	3	3	3	3
CO4	3	3	3	3	2	2	1	-	2	3	3	3	2	2	3
CO5	3	2	3	2	3	2	1	-	2	2	2	3	2	3	3

AIT511	<b>STORAGE TECHNOLOGIES</b>

Programme &	B.Tech & IT	Sem.	Category	L	Τ	Р	С			
Branch										
			PE	3	0	0	3			
	Characterize the t	function	alities of logical and	l ph	ysica	l con	ponents of			
	storage.									
Preamble	Describe various storage networking technologies.									
	Identify different storage virtualization technologies.									
	Discuss the different backup and recovery strategies.									
	Understand comm	non stor	age management ac	tivit	ies aı	nd so	lutions.			
Unit 1	STORAGE SYSTEMS	~					9			
Introduction to Informa	tion Storage: Digital data	and its t	ypes, Information st	torag	ge, K	ey cł	aracteristics			
of data center and Ev	volution of computing pl	atforms.	Information Lifec	cycle	e Ma	nage	ment. Third			
Platform Technologies	: Cloud computing and it	s essent	ial characteristics,	Clou	id se	rvice	s and cloud			
deployment models, Ba	ig data analytics, Social r	etworki	ng and mobile com	nputi	ng, (	Chara	acteristics of			
third platform infrast	ructure and Imperatives	for th	ird platform trans	sfori	natic	on. I	Data Center			
Environment: Building	g blocks of a data center	, Comp	ute systems and co	omp	ute v	virtua	lization and			

Software-defined data center.								
Unit 2	INTELLIGENT STORAGE SYSTEMS AND RAI	D	5					
Components of an intelligent storage system, Components, addressing, and performance of hard disk								
drives and solid-state drives, RAID, Types of intelligent storage systems, Scale-up and scale-out								
storage Architecture.								
Unit 3	Unit 3 STORAGE NETWORKING TECHNOLOGIES AND							
	VIRTUALIZATION							
Block-Based Sto	rage System, File-Based Storage System, Object-Based and	l Unifie	ed Storage. Fibre					
Channel SAN:	Software-defined networking, FC SAN components and	archite	ecture, FC SAN					
topologies, link	aggregation, and zoning, Virtualization in FC SAN enviror	nment.	Internet Protocol					
SAN: iSCSI pro-	cocol, network components, and connectivity, Link aggregat	ion, sw	itch aggregation,					
and VLAN, FCI	protocol,							
connectivity, and	configuration. Fibre Channel over Ethernet SAN: Component	nts of F	CoE SAN, FCoE					
SAN connectivity	y, Converged Enhanced Ethernet, FCoE architecture.							
Unit 4	BACKUP, ARCHIVE AND REPLICATION		12					
Introduction to	Business Continuity, Backup architecture, Backup targe	ets and	methods, Data					
deduplication, C	loud-based and mobile device backup, Data archive, Uses	s of re	plication and its					
characteristics, C	ompute based, storage-based, and network-based replication,	Data m	igration, Disaster					
Recovery as a Se	rvice (DRaaS).		-					
Unit 5	SECURING STORAGE INFRASTRUCTURE		6					
Information secu	rity goals- Storage security domains- Threats to a storage	infrast	ructure, Security					
controls to prote	ct a storage infrastructure- Governance, risk, and compliance	e- Stora	age infrastructure					
management fund	ctions- Storage infrastructure management processes.		C					
			TOTAL: 45					
TEXTBOOKS								
1	EMC Corporation, Information Storage and Management, W	/ilev. Ir	dia					
	Jon Tate, Pall Beck, Hector Hugo Ibarra, Shanmuganatha	n Kum	aravel and Libor					
2	Miklas Introduction to Storage Area Networks, Ninth Ed	ition. I	BM - Redbooks					
2	December 2017	inion, i						
3	Ulf Troppens Rainer Erkens Wolfgang Mueller Friedt Dainer Wolafka Nils							
5	Haustein Storage Networks Explained Second Edition Wil	ev 200	9					
	Thustein ,storage retworks Explained, second Edition, with	<b>cy</b> , 200						
COURSEOUT	COMES	Rloo	m's Taxonomy					
At the and of the	Level							
	course learners will be able to		AVA					
At the end of the	e course, learners will be able to		Level					
CO1	Demonstrate the fundamentals of information storage management and various models of Cloud infrastructure		K2					
CO1	Demonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deployment		K2					
CO1	Demonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deployment Illustrate the usage of advanced intelligent storage		K2					
CO1 CO2	Demonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deployment Illustrate the usage of advanced intelligent storage systems and RAID.		K2 K2					
CO1 CO2	course, learners will be able toDemonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deploymentIllustrate the usage of advanced intelligent storage systems and RAID.Interpret various storage networking architectures - SAN,		K2 K2 K2					
CO1 CO2 CO3	course, learners will be able toDemonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deploymentIllustrate the usage of advanced intelligent storage systems and RAID.Interpret various storage networking architectures - SAN, including storage subsystems and virtualization.		K2 K2 K2 K2					
CO1 CO2 CO3	course, learners will be able toDemonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deploymentIllustrate the usage of advanced intelligent storage systems and RAID.Interpret various storage networking architectures - SAN, including storage subsystems and virtualization.Examine the different role in providing disaster recovery		K2 K2 K2 K2					
CO1 CO2 CO3 CO4	course, learners will be able toDemonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deploymentIllustrate the usage of advanced intelligent storage systems and RAID.Interpret various storage networking architectures - SAN, including storage subsystems and virtualization.Examine the different role in providing disaster recovery and remote replication technologies.		K2       K2       K2       K2       K2					
CO1 CO2 CO3 CO4	e course, learners will be able toDemonstrate the fundamentals of information storage management and various models of Cloud infrastructure services and deploymentIllustrate the usage of advanced intelligent storage systems and RAID.Interpret various storage networking architectures - SAN, including storage subsystems and virtualization.Examine the different role in providing disaster recovery and remote replication technologies.Infer the security needs and security measures to be		Level K2 K2 K2 K2 K2					

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	3	3	-	-	-	1	1	1	3	1	2	1
CO2	3	1	2	3	3	-	-	-	3	2	3	2	2	3	1
CO3	1	1	3	2	2	-	-	-	3	1	1	2	2	3	3
CO4	3	2	1	2	2	-	-	-	1	1	3	1	3	2	1
CO5	1	3	2	1	2	-	-	-	1	2	3	1	3	2	1

	AIT512 SOFTWARK	E DEFI	NED NETWORKS							
	D Tack 9 IT	C	Cate	т	T	n	C			
rrogramme & Branch	B. I ech & II	sem.	Category DF			r A				
				3	U	U	3			
	To understand the need for SDN and its data plane operations.									
Proemble To understand the functions of control plane.										
Fleamble	<ul> <li>To comprehend the migration of networking functions to SDN environment</li> </ul>									
	To explore various techniques of network function virtualization.									
Unit 1	To comprehend the concepts behind network virtualization.									
Evolving Network Degu	irements The SDN Approach		architecture SDN	Data	Dlana	Cor	y strol plane			
and Application Plane	irements – The SDN Approach	II = SDIV	architecture - SDN	Data	Tanc	, COL	ittoi piane			
and Application Plane.										
Data Plane functions an	d protocols - OpenFLow Proto	col - El	w Table - Control F	Plane	Func	unctions Southbound				
Interface Northbound Ir	terface – SDN Controllers - R	vii One	nDavlight ONOS - I	Distri	buted	Con	trollers			
Unit 3	Unit 3 SDN APPLICATIONS									
SDN Application Plane	Architecture – Network Servic	es Abst	action Laver – Traff	ic En	pinee	neering _				
Measurement and Monit	coring – Security – Data Center	r Networ	king.		5					
Unit 4	NETWORK FUNCTION	VIRTU	ALIZATION				9			
Network Virtualization -	- Virtual LANs – OpenFlow V	tual LANs – OpenFlow VLAN Support - NFV Concepts – Benefits and								
Requirements – Referen	ce Architecture.		11 1							
Unit 5	NFV FUNCTIONALITY						9			
NFV Infrastructure - Vi	rtualized Network Functions -	- NFV M	Ianagement and Orcl	hestra	tion -	– NF	V Use cases –			
SDN and NFV.										
							TOTAL: 45			
TEXTBOOKS		63.8								
1 Wil	/illiam Stallings, "Foundations of Modern Networking: SDN, NFV, QoE, IoT and Cloud",									
Pear	Pearson Education, 1st Edition, 2015.									
REFERENCES										
1 Ken	Ken Gray, Thomas D. Nadeau, "Network Function Virtualization", Morgan Kauffman,									
2010	2016.									
2 Tho:	mas D Nadeau, Ken Gray, "SE	JN: Soft	ware Defined Netwo	rks",	O'Re	ally N	Media, 2013.			
3 Fei J	Fei Hu, "Network Innovation through OpenFlow and SDN: Principles and Design", 1st									
Edit	Edition, CRC Press, 2014.									
4 Paul	Goransson, Chuck Black I im	othy Cu	iver. "Software Defi	ned N	etwo	rks: /	F			
	,	5								
	Comprehensive Approach", 2nd Edition, Morgan Kaufmann Press, 2016.									
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5	swald Coker, Siamak Azodolmolky, "Software-Defined Networking with OpenFlow", 2nd									
	Edition, O'Reilly Media, 2017.									
COURSE OUTCOMES: Bloom's Taxonomy										

At the end of th	e course, learners will be able to	Level
CO1	Describe the motivation behind SDN.	K2
CO2	Identify the functions of the data plane and control plane.	K2
CO3	Design and develop network applications using SDN.	K2
CO4	Orchestrate network services using NFV.	K2
CO5	Explain various use cases of SDN and NFV.	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	3	3	-	-	-	1	1	1	3	1	2	1
CO2	3	1	2	3	3	-	-	-	3	2	3	2	2	3	1
CO3	1	1	3	2	2	-	-	-	3	1	1	2	2	3	3
CO4	3	2	1	2	2	-	-	-	1	1	3	1	3	2	1
CO5	1	3	2	1	2	-	-	-	1	2	3	1	3	2	1

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С			
	1		PE	3	0	0	3			
	To understand Sm	art Object	s, IoT Architecture	s and ]	loT p	rotoco	ols.			
	To build simple Io	T Systems	s using Arduino an	d Rasp	berry	Pi.				
Preamble	To understand Da	ta Analytic	s and Cloud in the	conte	xt of	loT.				
To develop IoT infrastructure for popular applications.										
INSTITUTE OF TECHNOLOGY										
Unit 1	FUNDAMENTALS OF	INTERNE	T OF THINGS				9			
Evolution of Internet of	Things - Enabling Technol	logies – Io	oT Architectures:	oneM2	2M -	IoT V	World Forum			
(IoTWF) and Alternative	IoT models – Simplified Ic	T Archited	cture and Core IoT	Func	tional	Stacl	k - Fog, Edge			
and Cloud in IoT – Fu	nctional Blocks of an IoT	Ecosyster	m – Sensors - A	ctuator	s - S	Smart	Objects and			
Connecting Smart Object	s.									
Unit 2	IOT PROTOCOLS						9			
IoT Access Technologies	s - Physical and MAC Lay	ers - Topo	ology and Security	of IE	EE 8	02.15	5.4,802.15.4g			
802.15.4e, 1901.2a, 802	.11ah and LoRaWAN - 1	Network I	Layer - IP Versio	ns - (	Const	raine	d Nodes and			
Constrained Networks – (	Optimizing IP for IoT - From	n 6LoWPA	AN to 6Lo - Routir	ng Ove	er Lov	v Pov	ver and Lossy			
Networks – Application	Transport Methods - Super	visory Co	ntrol and Data Ac	quisiti	on –	Appl	ication Laye			
Protocols - CoAP and MC	QTT.									
Unit 3	DESIGN AND DEVELO	<b>PMENT</b>					9			
Design Methodology - Er	nbedded Computing Logic	- Microcon	ntroller – System o	n Chip	os - Io	T Sys	stem Building			
Blocks - Arduino - Board	Details – IDE Programmin	g - Raspbe	erry Pi - Interfaces	and R	aspbe	erry P	i with Pythor			
Programming.										
Unit 4	IOT PHYSICAL SERVI	ERS CLO	UD				9			
Dhygical convers and a	loud - XaaS, M2M , W	AMP- Au	utoBahn for IoT	– Xi	vely	Clou	d for IoT -			
Flysical servers and c										
Django – Designing a F	RESTful Web API –Goog	le cloud fe	or IoT.							

Unit 5	APPLICATIONS	9
Retail, Health c	are, Transportation, Agriculture and environmental, Smart	city, Government and
military, Smart h	ome.	
		TOTAL: 45
TEXTBOOKS		
	David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton	and Jerome Henry, "IoT
1	Fundamentals: Networking Technologies, Protocols and Use Cases	s for Internet of Things",
	Cisco Press, 2017.	
2	Rajkamal,"Internet of Things: Architecture, Design Principles And	d Applications", McGraw
	Hill HigherEducation,2017.	
	Olivier Hersent, David Boswarthick, Omar Elloumi, -The In	ternet of Things - Key
3	Applications and Protocols <sup>II</sup> , Wiley, 2012.	
REFERENCES		
	Vijay Madisetti and ArshdeepBahga, -Internet of T	hings (A Hands-on-
1	Approach) <sup>  </sup> ,1st Edition,VPT, 2014.	
	Francis daCosta, -Rethinking the Internet of Things: A	Scalable Approach to
2	ConnectingEverything <sup>I</sup> , 1st Edition, Apress Publications, 2013	3.
COURSE OUTCO	OMES:	<b>Bloom's Taxonomy</b>
At the end of the o	course, learners will be able to	Level
CO1	Interpret the concept of IoT, its Components and its architecture.	K2
CO2	Learn the design methods of various protocol.	K3
CO3	Build the design methodology for a IoT system using Raspberry.	K3
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.	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	2	1	-	-	-	-	-	2	3	2	2	2
CO2	2	3	1	2	1	-	-	-	-	-	2	3	2	2	2
CO3	3	2	3	-	3	-	-	-	-	-	2	1	3	3	3
CO4	2	3	2	3	2	-	-	-	-	-	1	1	3	3	3
CO5	2	3	3	3	2	2	2	2	1	2	1	2	3	3	3



		AIT514 SECURITY AN	ND PRI	VACY IN CLOUD				
Programme & Br	anch	B.Tech & IT	Sem.	Category	L	Т	P	С
				PE	3	0	0	3
		To Introduce Cloud	Compu	ting terminology, def	initio	on & (	conce	pts.
		To understand the s	ecurity of	lesign and architectu	al co	onside	eratio	ns for Cloud.
Preamble		To understand the I	dentity,	Access control in Clo	oud.			
		To follow best prace	tices for	Cloud security using	vari	ous d	esign	patterns.
		To be able to monit	or and a	udit cloud application	ns fo	r secu	rity.	
Unit 1		FUNDAMENTALS OF C	LOUD	SECURITY CONCI	EPT	5		9
Overview of clo	oud se	curity- Security Services	- Con	fidentiality, Integr	ity,	Auth	entic	ation, Non-
repudiation, Acce	ess Coi	ntrol - Basic of cryptograp	ny - Co	nventional and publ	lic-k	ey cr	yptog	graphy, hash
functions, authent	tication	n, and digital signatures.						
Unit 2		SECURITY DESIGN A	ND AR	CHITECTURE F	OR			9
		CLOUD	~					
Security design p	rincip	les for Cloud Computing -	Comp	ehensive data prote	ectio	n - E	nd-to	b-end access
control - Commo	on atta	ck vectors and threats - N	Vetwork	and Storage - Se	cure	Isola	ation	Strategies -
Virtualization str	ategies	s - Inter-tenant network s	egment	ation strategies – I	Jata	Prot	ectio	n strategies:
Data retention, o	deletio	n and archiving procedu	ires for	tenant data, Enc	rypt	10n,	Data	Redaction,
Tokenization, Ob	fuscat	ion, PKI and Key.						0
Unit 3		ACCESS CONTROL A	ND ID	ENTITY				9
A , 1		MANAGEMENT					.1	·· · · 1
Access control r	equire	ments for Cloud infrastr		- User Identificat	ion	- At	ithen	tication and
Authorization - F	Koles-l	based Access Control - M	lulti-fac	tor authentication	- S11	ngle	Sign	on, Identity
Federation - Iden	tity pr	oviders and service consu	mers -	Storage and networ	'k ac	cess	cont	rol options -
OS Hardening and	d mini	mization - Verified and me	easured	boot - Intruder Dete	ectic	n and	a pre	vention.
Unit 4	D .	CLOUD SECURITY D	ESIGN	PATTERNS	<u>C1</u>	1 1		9
Introduction to	Desigi	n Patterns, Cloud burstin	ng, Ge	Secure	Clo	ud I	nterf	aces, Cloud
Resource Access	Contro	ol, Secure On-Premise Inte	rnet Ac	cess, Secure Extern		loud.		
Unit 5		MONITORING, AUDI	TING A	ND MANAGEMI	ENI			9
Proactive activity	/ mon	itoring - Incident Respon	ise, Mo	nitoring for unaut	hori	zed a	acces	s, malicious
traffic, abuse of s	system	privileges - Events and a	lerts - A	Auditing – Record	gene	eratio	n, Ro	eporting and
Management, Ta	amper	-proofing audit logs, Q		of Services, Sec	cure	Ma	nage	ment, User
management, Idei	ntity m	lanagement, Security Infor	mation	and Event Manager	nen	•		TOTAL 45
TEVTROOKS								101AL: 45
1	Rai K	umar Buyya . James Brobero	, Andrze	i Goscinski, —Cloud	1 Co	mputi	ng. W	/ilev 2013.
	Dave	shacklefordVirtualization	Securit	V SVRFY a wilay D	rand	2012	0, 1	
2	Dave		Cl					011
3	Wathe	er, Kumaraswamy and Latif,	-Cloud	Security and Privacy	/II, O	KEIL	LY 20	J11.
REFERENCES	16.1		1 01				<u>C1</u>	1.0
1	Mark Found Tham	C. Chu-Carroll —Code in t lations and Applications P araiSelvi	he Clou rogramr	dI,CRC Press, 20111 ning RajkumarBuyy	Mast a, C	ering Christ	Clou ian V	d Computing Vechhiola, S.
COURSE OUTCO	OMES	STATE	2011	~/2		Bloo	m's T	axonomy
	ourse	learners will be able to					Le	vel
At the end of the c	our se,							

w.e.f.2024-2025

CO2	Explain the security challenges in the cloud.	K1
CO3	Define cloud policy and Identity and Access Management.	K1
CO4	Understand various risks and audit and monitoring mechanisms in the cloud.	K2
CO5	Define the various architectural and design considerations for security in the cloud.	K1

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	2	-	-	-	1	1	1	3	3	1	2
CO2	1	3	2	3	1	-	-	-	2	2	3	2	3	1	2
CO3	3	2	2	3	2	-	-	-	3	1	1	2	2	3	1
CO4	2	1	2	3	3	-	-	-	3	2	3	3	1	1	2
CO5	1	3	3	1	1	-	-	-	2	3	3	2	2	3	2

	AIT515 STRE	EAM PR	OCESSING				
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С
0			PE	3	0	0	3
	Introduce Data Pr	ocessing	terminology, def	finitio	n & 0	conce	pts.
	<ul> <li>Define different t</li> </ul>	ypes of I	Data Processing.				
	$\blacktriangleright$ Explain the conce	epts of R	eal-time Data pro	cessin	g.		
Preamble	<ul> <li>Select appropriate</li> </ul>	e structu	res for designing	and 1	unni	ng re	al-time dat
	services in a busin	ness env	ironment.			0	
	Illustrate the bene	efits and	drive the adoptic	on of 1	eal-t	ime d	lata service
	to solve real work	d proble	ms.				
Unit 1	FOUNDATIONS OF D	ATA SY	STEMS				9
Introduction to Data Pr	ocessing, Stages of Data r	processin	g, Data Analytics	s, Bat	ch Pı	ocess	sing, Strear
processing, Data Migra	ntion, Transactional Data p	rocessin	g, Data Mining, I	Data I	Mana	igeme	ent Strategy
Storage, Processing, Int	tegration, Analytics, Benef	its of Da	ta as a Service, C	haller	iges .		
Unit 2	<b>REAL-TIME DATA PI</b>	ROCES	SING				9
Introduction to Big data	a, Big data infrastructure, I	Real-tim	e Analytics, Near	real-t	ime	soluti	on, Lambd
architecture, Kappa An	rchitecture, Stream Proces	sing,Un	derstanding Data	Strea	ms,	Mess	age Broker
Stream Processor, Batc	h & Real-time ETL tools, S	Streamin	g Data Storage .				
Unit 3	DATA MODELS AND	QUERY	<b>LANGUAGES</b>				9
Relational Model, Docu	ument Model, Key-Value I	Pairs, No	SQL, Object-Rela	ationa	1 Mis	smate	h, Many-to
One and Many-to-Man	ny Relationships, Network	data m	odels, Schema Fl	lexibil	ity,	Struc	tured Quer
Language, Data Local	lity for Queries, Declara	tive Qu	eries, Graph Da	ta m	odels	, Cy	pher Quer
Language, Graph Queri	ies in SQL, The Semantic V	Web, CC	DASYL, SPARQ	)L			
Unit 4	EVENT PROCESSING	WITH	APACHE KAFI	KA			9
Apache Kafka, Kafka a	s Event Streaming platform	n, Events	s, Producers, Con	sumer	s, To	pics,	Partitions,
		32					

API Unit 5	AI 15, AU	min A	DI Dro	ducar	ADI	Consi	imor /		fka Str	anne A	DIK	fka Cor	nnect
Unit 5		IIIII A	F1, FIC	ducer	AFI,	Const	IIIICI F	чг I, <b>К</b> а	iika Su	eams P	лг1, <b>к</b> а		meet
STREAMING Structured Streaming, Basic Concepts, Handling Event-time and Late Data, Fa							G USII	NG SP.	ARK			9	
Structured Strea	 ming, Ba	sic Co	ncepts	, Han	dling ]	Event-	time a	and Lat	e Data,	Fault-t	tolerant	t Semar	ntics.
Exactly-once Se	mantics,	Creati	ng Stre	eamin	g Data	asets, S	Schem	a Infer	ence, P	artition	ning of	Stream	ing
datasets, Operati	ions on S <sup>.</sup>	treami	ng Da	ta, Sel	ectior	n, Agg	regatio	on, Pro	jection,	, Water	markin	g, Win	dow
operations, Type	es of Tim	e wind	lows, J	oin O	perati	ons, D	edupl	ication	•				
												ТОТ	AL: 45
TEXTBOOKS	Streami	ing Sve	tome. '	The W	hat W	There	When	and Ho	wofly	arge Sci	ale Date	Droces	sing by
1	TelenA	1.: 1			nat, v	viicic,		20 . 11-	w 01 La	arge-sea	ale Data	1 FIOCES	sing 0
-	I yler A	kidau,	Slava		′ак, Ке	euven I	ax, 0	Reilly	oublicat	10n.			
2	Designi	ing Dat	a-Inter	Isive A	pplica	tions b	y Mar	tın Klep	pmann,	O'Re1	ly Medi	a.	
2	Practica	Practical Real-time Data Processing and Analytics : Distributed Con									Comput	ing and	l Even
3	Process	ing usi	ng Apa	iche Sj	park, F	link, S	torm a	nd Kafl	a, Pack	t Publis	hing.		
REFERENCES													
1	https://s	spark.aj	pache.c	org/doo	es/lates	st/strea	ming-p	program	ming-g	uide.htn	nl.		
2	Kafka.a	ipache.	org.							T	<u>, , , , , , , , , , , , , , , , , , , </u>	T	
COURSE OUIC At the end of the	COMES:	earner	s will b	e able	to	to Eloom's Taxonomy							
	Underst	tand th	e appli	cabilit	y and	utility	of dif	ferent s	treamin	g		vo	
COI	algorith	algorithms.								K2			
CO2	Describ	ing and	apply	curre	nt res	earch	trends	in dat	a-strear	n		K3	
CO3	Analyze	e the s	uitabili	ty of	stream	minin	ng algo	orithms	for dat	a		K3	
	stream s	systems	S.	atura auro		anin a	avatan			4		KJ	
CO4	applicat	tions.	build	stream	proce	essing	system	is, serv	ices and	a		К3	
CO5	Solve r	problem	ns in 1	eal-wo	orld ap	oplicati	ons th	nat proc	ess dat	a		К3	
	streams	•		- ís	in the	OF THO							
	O2 PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO/PO   POI   P	3 7	3	1	-	-	-	2	3	1	2	1	3	3
CO/PO         PO1         P           CO1         3	5 2	2	2	-	-	-	3	2	2	3	1	2	1
CO/PO         PO1         P           CO1         3            CO2         2	J         Z           1         1						2	2	1	1	2	2	1
CO/PO         PO1         P           CO1         3	1         1           1         2	3	3	· · .	/ - <u>/</u>	-			1			2	
CO/PO         PO1         P           CO1         3	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	3	3	÷	Ę		3	3	1	1	1	2	1

## **PROFESSIONAL ELECTIVE 4**

## AIT516 ENGINEERING SECURE SOFTWARE SYSTEMS

Programme & Bra	nch	B.Tech & IT	Sem.	Category	L	Т	P	С
	I			PE	3	0	0	3
	$\checkmark$	Know the imp	ortance and n	eed for software sec	curity.	•		
		Know about va	arious attacks					
Preamble		Learn about se	cure software	e design.				
		Understand ris	k managemer	nt in secure software	e devel	lopm	ent.	
		Know the wor	king of tools	related to software s	securit	y.		
Unit 1	NEEI	D OF SOFTWA	RE SECURI	TY AND LOW-LI	EVEL	-		9
	ATTA	ACKS						
Software Assurance Benefits of Detectin	and Softwa g Software S	re Security - Th Security - Propert	rreats to soft ties of Secure	ware security - Sou Software – Memor	urces o ry- Ba	of so sed A	ftware Attack	e insecurity - s: Low-Level
Attacks Against Hea	p and Stack	- Defense Agains	st Memory-Ba	ased Attacks				0
Unit 2		RE SOFTWAR	RE DESIGN		D			9
prioritization- Isolat	ing The Effe	secure software	- SQUARE Executable (	process Model -	Requi	reme	nts el	Specification
Languages – Vulner	ability Tren	ds – Buffer Ove	erflow – Cod	e Injection - Sessio	n Hija	. I Ickins	g. Sec	cure Design -
Threat Modeling and	l Security De	esign Principles		5	5		5	0
Unit 3	SECU	J <b>RITY RISK M</b>	ANAGEME	NT				9
Risk Management L	ife Cycle – F	Risk Profiling – R	lisk Exposure	Factors – Risk Eva	luation	n and		
Mitigation – Risk As	ssessment Te	chniques – Threa	at and Vulner $C$	ability Management	t			0
Unit 4	Testing C		U una Caftaviana	Davalanment Life (	Trala	Diale		9
and Scoping - Enum Attacks – Post Explo Unit 5 Governance and se	heration – Re bitation – By SECU courity - Ac	emote Exploitation passing Firewalls J <b>RE PROJECT</b> lopting an enter	on – Web Ap s and Avoidin <b>MANAGEN</b> rprise softwa	pplication Exploitati g Detection - Tools IENT rre security framew	ion - E for Pe work	Explo enetra	its an ation 7 curity	d Client Side Testing 9 and project
management - Matur	rity of Practic	ce						TOTAL: 45
TEXTBOOKS								101111.45
1	Julia H. Alle	en, "Software Sec	curity Engine	ering", Pearson Edu	cation	, 200	8	
2	Evan Wheel Management	ler, "Security R Program from th	Risk Manage ne Ground Up	ment: Building ar ", First edition, Syr	n Info ngress	rmati Publi	ion S shing	ecurity Risk , 2011
3	Chris Wysop Security Tes Professional,	oal, Lucas Nelso ting: Identifying 2006	n, Dino Dai Software See	Zovi, and Elfriede curity Flaws (Syma	Dustin ntec P	ı, "Tl ress)'	ne Ar ", Ad	t of Software dison-Wesley
REFERENCES	,			18				
1	Robert C. S Addison-We	eacord, "Secure sley Professional	Coding in C , 2005.	and C++ (SEI Seri	es in S	Softw	vare E	ingineering)",
2	Jon Erickson	, "Hacking: The	Art of Exploi	tation", 2nd Edition	, No S	tarch	Press	s, 2008.
3	Mike Shema Problems", F	, "Hacking Web First edition, Syng	o Apps: Dete gress Publishi	cting and Preventing, 2012	ng We	eb Aj	pplica	tion Security
4	Bryan Sulliv Edition, McC	an and Vincent I Graw Hill, 2012	Liu, "Web A	pplication Security,	A Be	ginne	er's G	uide", Kindle
5	Lee Allen, " Security Gui	Advanced Penetride (Open Source	ration Testing e: Communi	g for Highly-Secure ty Experience Dist	d Envi illed)"	ronm , Kin	ents: Idle E	The Ultimate Edition, Packt
·	•		34					

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w.e.	1.2	02	4-	20	23	,

	Publishing,2012
6	Jason Grembi, "Developing Secure Software"

COURSEOUTC At the end of the	OMES: course, learners will be able to	Bloom's Taxonomy Level
COI	Identify various vulnerabilities related to memory attacks.	K2
CO2	Apply security principles in software development.	K2
CO3	Evaluate the extent of risks.	K2
CO4	Involve selection of testing techniques related to software security in the testing phase of software development.	K2
CO5	Use tools for securing software.	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	3	2	-	-	-	2	1	2	2	2	2	1
CO2	2	2	2	3	3	-	-	-	2	1	2	2	1	2	1
CO3	1	2	2	2	1	-	-	-	1	1	2	1	2	2	1
CO4	2	3	2	2	2	-	-	-	2	1	2	2	2	2	1
CO5	2	1	2	2	3	-	-	-	2	1	1	2	2	1	2

AIT517 DIGITAL AND MOBILE FORENSICS													
	ICD												
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С						
	INSTITUTE	OF TECHNILLOS	PE	3	0	0	3						
	To understand basic di	gital forensic	s and technique	s.									
	To understand digital of	> To understand digital crime and investigation.											
Preamble	> To understand how to be prepared for digital forensic readiness.												
	> To understand and use forensics tools for iOS devices.												
> To understand and use forensics tools for Android devices.													
Unit 1	INTRODUCTION TO DIGITAL FORENSICS 9												
Forensic Science - Digital Forensics - Digital Evidence - The Digital Forensics Process - Introduction - The													
Identification Phase - Th	e Collection Phase – The Ex	amination Ph	ase – The Anal	ysis P	hase	– The	Presentation						
Phase													
Unit 2	DIGITAL CRIME AND	INVESTIGA	TION				9						
Digital Crime – Substar	ntive Criminal Law – Gene	eral Conditio	ns – Offenses	– Inv	restig	ation	Methods for						
Collecting Digital Eviden	ce – International Cooperation	on to Collect	Digital Evidenc	e									
Unit 3	DIGITAL FORENSIC R	EADINESS					9						
Introduction – Law Enfor	rcement versus Enterprise D	igital Forensi	c Readiness – 1	Ratior	ale f	or Dig	gital Forensic						
Readiness – Frameworks,	, Standards and Methodologi	es – Enterpris	se Digital Foren	isic Re	eadine	ess - 0	Challenges in						
Digital Forensics	5 000	0000	12										
Unit 4	iOS FORENSICS	0.2011 1	2 C				9						
Mobile Hardware and Op	erating Systems - iOS Funda	mentals – Jai	lbreaking – File	Syste	em – ]	Hardv	vare – iPhone						
Security – iOS Forensics	– Procedures and Processes -	– Tools – Oxy	gen Forensics -	– Mob	ılEdi	t - iC	loud						
35													

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Unit 5	ANDROID FORENSICS	9
Android basics - Key Co	odes - ADB - Rooting Android - Boot Process - File Systems	- Security - Tools -
Android Forensics - Foren	nsic Procedures - ADB - Android Only Tools - Dual Use Tools -	- Oxygen Forensics -
MobilEdit – Android App	Decompiling	

	TOTAL: 45
TEXTBOOKS	
1	Andre Arnes, "Digital Forensics", Wiley, 2018.
2	Chuck Easttom, "An In-depth Guide to Mobile Device Forensics", First Edition, CRC Press, 2022.
REFERENCES	
1	Vacca, J, Computer Forensics, Computer Crime Scene Investigation, 2nd Ed, Charles River
	Media, 2005, ISBN: 1-58450-389

COURSEOUTCO At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level			
CO1	Have knowledge on digital forensics.	K2			
CO2	Know about digital crime and investigations.	К2			
CO3	Be forensic ready.	K2			
CO4	Investigate, identify and extract digital evidence from iOS devices.	K2			
CO5	Investigate, identify and extract digital evidence from Android devices	K2			

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	2	1	-	-	-	1	1	3	3	1	3	1
CO2	3	3	3	3	3	-	-	-	2	2	1	2	1	3	1
CO3	3	3	2	3	1	-	-	-	3	2	1	1	3	2	3
CO4	3	1	2	2	3	-	60	DiC	1	3	3	2	1	3	3
CO5	1	3	2	3	2			-	2	3	2	3	1	2	1

AIT518 ETHICAL HACKING												
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С					
	12 100		PE	3	0	0	3					
	To understand the bas	ics of co	mputer based vulne	rabilit	ies.							
	> To explore different foot printing, reconnaissance and scanning methods.											
Preamble	> To expose the enumeration and vulnerability analysis methods.											
Treamore	> To understand hacking options available in Web and wireless applications.											
	> To explore the options for network protection.											
	To practice tools to perform to practice tools to perform to pe	erform et	hical hacking to exp	pose tl	ne vu	Inerat	oilities					
Unit 1	INTRODUCTION	. 2011	- A				9					
Ethical Hacking Overvie	w - Role of Security and P	enetratio	n Testers Penetr	ation-	Testi	ng M	ethodologies-					
Laws of the Land - Overv	view of TCP/IP- The Application	tion Laye	er - The Transport I	Layer -	· The	Intern	net Layer - IP					
Addressing Network a	Addressing Network and Computer Attacks - Malware - Protecting Against Malware Attacks Intruder											
		36										

Attacks - Address	ing Physical Security	
Unit 2	FOOT PRINTING, RECONNAISSANCE AND	9
	SCANNING NETWORKS	
Footprinting Cond	cepts - Footprinting through Search Engines, Web Services, Socia	l Networking Sites, Website
Email - Competit	tive Intelligence - Footprinting through Social Engineering - Fo	ootprinting Tools - Network
Scanning Concept	ts - Port-Scanning Tools - Scanning Techniques - Scanning Beyon	d IDS and Firewall
Unit 3	ENUMERATION AND VULNERABILITY ANALY	SIS 9
Enumeration Cor	ncepts - NetBIOS Enumeration – SNMP, LDAP, NTP, SMT	P and DNS Enumeration -
Vulnerability Ass	essment Concepts - Desktop and Server OS Vulnerabilities - W	indows OS Vulnerabilities -
Tools for Identify	ing Vulnerabilities in Windows- Linux OS Vulnerabilities- Vulner	rabilities of Embedded Oss
Unit 4	SYSTEM HACKING	9
Hacking Web Ser	vers - Web Application Components- Vulnerabilities - Tools for V	Veb Attackers and Security
Testers Hacking V	Vireless Networks - Components of a Wireless Network – Wardriv	ving- Wireless Hacking -
Tools of the Trade		
Unit 5	NETWORK PROTECTION SYSTEMS	9
Access Control Li	sts Cisco Adaptive Security Appliance Firewall - Configuration	and Risk Analysis Tools for
Firewalls and Rou	iters - Intrusion Detection and Prevention Systems - Network- Bas	sed and Host-Based IDSs and
IPSs - Web Filteri	ng - Security Incident Response Teams – Honeypots.	
		TOTAL: 45
TEXTBOOKS		
1	Michael T. Simpson, Kent Backman, and James E. Corley, Har	nds-On Ethical Hacking and
1	Network Defense, Course Technology, Delmar Cengage Learni	ng, 2010.
2	The Basics of Hacking and Penetration Testing - Patrick Engeb	retson, SYNGRESS,
2	Elsevier, 2013.	, , ,
2	The Web Application Hacker's Handbook: Finding and Exploit	ing Security Flaws, Dafydd
3	Stuttard and Marcus Pinto, 2011.	
REFERENCES		
1	Black Hat Python: Python Programming for Hackers and Penter	sters, Justin Seitz, 2014.
		) ) -
COURSEOUTC	OMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	To express knowledge on basics of computer based	K2
	vulnerabilities	
$CO^{2}$	To gain understanding on different foot printing,	K)
	reconnaissance and scanning methods.	182
CO2	To demonstrate the enumeration and vulnerability analysis	V.)
	methods	K2
	Te este la sul des este la la sul des este deste des este des este deste des este des este des este des este de	
CO4	10 gain knowledge on hacking options available in Web and	K2
	wireless applications.	
CO5	To acquire knowledge on the options for notwork protection	КJ
	To acquire knowledge on the options for network protection.	KZ

									100 C 100						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	1	-		Se III	1	2	2	1	1	2	3
CO2	1	2	1	2	1		arb	1. La r	2	2	1	1	1	2	2
CO3	2	2	3	3	1	SE	ren		1	2	1	2	2	3	1
CO4	2	1	1	2	1	5	EST	D. 20	1	3	3	3	3	2	1
CO5	2	3	1	1	2	-	-	-	2	1	1	1	1	1	3

Programme & Bra	nch	B	B.TECH&	IT	Sem.	Category	L	Т	Р	С	
						PE	3	0	0	3	
Preamble		<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	understand explore di expose the understand explore th	I the basic fferent foo e enumera I hacking e options	es of con ot printin tion and options for netwo	nputer based vulne og, reconnaissance vulnerability anal available in Web a ork protection.	rabilitie and sca /sis me nd wire	es. Inning thods. eless a	g metl pplic	nods. ations.	
Unit 1			practice to	ols to per	form eth	ical hacking to exp	ose the	vuln	erabil	ities	
Digital Money to Privacy- : Block ch chain-Basic consen	Distri hain Ai isus me	ibuted l rchitectu chanisn	Ledgers -l are and De	Design P sign-Basi	rimitives c crypto	: Protocols, Secu primitives: Hash,	irity, C Signati	Conser ure Ha	nsus, ash cl	Permiss hain to I	sior 310
Unit 2		CONSI	ENSUS PI	ROTOCO	DLS					9	
Requirements for th protocols: Permissio	ne cons	ensus p ock cha	rotocols-P ins-Desigr	roof of W goals-Co	/ork (Po onsensus	W)-Scalability asp protocols for Perr	nissione	Bloc Bloc	k cha ock cł	ain conso ains	ens
Decomposing the a	Consent		PROPERTY PRO	ledger fo	bric com	nonents Chain as	de Deci		d Im	y nlement	atio
Hyper ledger Fabric	c II:-Be	evond C	thain code:	fabric SI	OK and F	Front End-Hvner le	dger co	gn an mpos	er to	pienienta ol.	at10
Unit 4		BLOC	K CHAIN	INFSS					200	9	
chain in trade/su management/discou	upply unting.	chain:	Provenan	ce of g	oods, v	isibility, trade/su	pply o	chain	fina	nce, in	voi
Unit 5	Ĭ	<b>PLOC</b>	K CHAIN	FOP CO	WEDN	MENT				0	
Unit 5 Block chain for C	Govern	BLOC ment: I	<b>K CHAIN</b> Digital ide	FOR GO	<b>OVERN</b> I d record	MENT Is and other kind	ls of r	ecord	keer	9 Ding bet	we
Unit 5 Block chain for C government entities and Security on Blo	Govern s, publ ock cha	BLOC ment: I lic distri- ain.	K CHAIN Digital ide	FOR GO ntity, lan stem / soo	<b>DVERN</b> d record cial welf	MENT ls and other kind are systems: Bloc	ls of r k chain	ecord Cryp	keep otogra	9 ping bet uphy: Pr TOTA	we iva
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CO5	To understand the consensus and hyper ledger fabric in block chain technology	K2
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	-	-	-	1	-	-	2	3	3	1
CO2	3	3	3	3	1	-	-	-	2	-	-	2	3	3	1
CO3	3	3	3	3	2	-	-	-	3	-	-	2	3	3	3
CO4	3	2	3	2	3	-	-	-	3	-	-	2	3	2	3
CO5	3	3	2	2	1	-	-	-	1	-	-	2	3	3	

Programme & Branch	B.Tech & IT	Sem.	Category	L	T	P	С
			PE	3	0	0	3
	To develop semantic	web related	simple application	ıs			
	To explain Privacy and Privacy	d Security 1	ssues in Social Ne	etwork1	ng		
Preamble	For the second secon	traction and	I mining of social	netwoi	KS	4:	
	$\sim$ 10 discuss the predict	ion of nume	in benavior in soci	ty mon	muni	ines	feorial
	networks	s control, r	Ilvacy and Securi	ty man	agen		i social
Unit 1	FUNDAMENTALS OF	SOCIAL N	ETWORKING				9
Introduction to Semantic	Web, Limitations of curren	nt Web, Dev	velopment of Sen	nantic	Web,	Eme	rgence of t
Social Web, Social Netwo	ork analysis, Development	of Social N	etwork Analysis,	Кеу сс	oncep	ts and	l measures
network analysis, Historic	cal overview of privacy and	l security, N	/lajor paradigms,	for un	dersta	nding	g privacy an
security		ממום					
Unit 2	SECURITY ISSUES IN	SOCIAL N	NETWORKS				9
The evolution of privacy	and security concerns with	networked	technologies, Co	ntextua	ıl infl	uence	es on priva
attitudes and behaviors, A	nonymity in a networked w	orld					
Unit 3	EXTRACTION AND N	IINING IN	SOCIAL				9
Unit 3	EXTRACTION AND M NETWORKING DATA	IINING IN	SOCIAL				9
Unit 3 Extracting evolution of W	EXTRACTION AND M NETWORKING DATA eb Community from a Serie	IINING IN	SOCIAL rchive, Detecting				9
Unit 3 Extracting evolution of W communities in social m	EXTRACTION AND M NETWORKING DATA teb Community from a Serie etworks, Definition of com	IINING IN s of Web A munity, Ev	SOCIAL rchive, Detecting aluating commun	ities, N	Aetho	ods fo	9 r commun
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TEXTBOOKS		
1	Peter Mika, Social Networks and the Semantic Web, First Edition	on, Springer 2007.
2	BorkoFurht, Handbook of Social Network Technologies and Springer, 2010.	Application, First Edition,
3	Learning Neo4j 3.x – Second Edition By Jérôme Baton, Rik Var	Bruggen, Packt publishing
REFERENCES	·	
1	Easley D. Kleinberg J., Networks, Crowds, and Markets -	Reasoning about a Highly
	Connected World, Cambridge University Press, 2010.	
2	Jackson, Matthew O., Social and Economic Networks, Princeton	n University Press, 2008.
3	GuandongXu , Yanchun Zhang and Lin Li, Web Mining	and Social Networking -
	Techniques and applications, First Edition, Springer, 2011.	
4	Dion Goh and Schubert Foo, Social information Retrieval Syste	ms: Emerging Technologies
	and Applications for Searching the Web Effectively, IGI Global	Snippet, 2008.
5	Max Chevalier, Christine Julien and Chantal Soulé-Dupuy,	, Collaborative and Social
	Information Retrieval and Access: Techniques for Improved	user Modeling , IGI Global
	Snippet, 2009.	
6	John G. Breslin, Alexander Passant and Stefan Decker, T	he Social Semantic Webl,
	Springer, 2009.	
COURSEOUTCO	MES:	Bloom's Taxonomy
At the end of the c	ourse, learners will be able to	Level
CO1	Develop semantic web related simple applications	K2
CO2	Address Privacy and Security issues in Social Networking	K2
CO3	Explain the data extraction and mining of social networks	K2
CO4	Discuss the prediction of human behavior in social communities	K2
CO5	Describe the applications of social networks	К2

## INSTITUTE OF TECHNOLOGY

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	3	2	-	-	-	3	2	1	2	3	3	2
CO2	2	2	2	3	3	-	-	-	1	2	2	3	3	3	2
CO3	2	1	1	3	2	-	-	-	1	2	1	1	1	3	3
CO4	3	3	3	3	2	-	A	Ê	1	1	1	1	2	1	3
CO5	1	3	2	2	2		-	SY.	1	1	3	1	2	3	3



Programme & Bra	anch	<b>B.</b> 7	Fech & IT	Sem.	Category	L	Т	P	С
<u> </u>	I				PE	3	0	0	3
		≻ To l	learn cyberci	rime and cyber l	aw.				
		> Τοι	understand th	he cyber attacks	and tools for mitig	gating	them	l <b>.</b>	
		> To i	understand in	nformation gath	erino				
Preamble		> To 1	loom horreto	dataat a aykan a					
				detect a cyber a	mack.				
		▶ Tol	learn how to	prevent a cyber	attack				
Unit 1	I	TROD	UCTION						9
Cyber Security – Hi	istory of I	nternet	– Impact of I	Internet – CIA	Triad; Reason for C	yber	Crim	e - Ne	eed for
Cyber Security – Hi	istory of (	Cyber C	rime; Cybero	criminals – Clas	sification of Cyber	crime	s – A	Glob	al
Perspective on Cybe	er Crimes	; Cyber	$\frac{1}{2}$ Laws – The	Indian IT Act –	Cybercrime and F	unish	ment		0
Unit 2	Attack	TTACE Chroate	and Vulnero	bilitias: Scope	SUKES	Saar	1rity	Brand	y h Types
Malicious Attacks	– Malicio	ous Soft	tware – Con	nmon Attack V	ectors – Social er	- Sect	ring	Attac	k – Types k – Wirele
Network Attack – W	Veb Appl	ication A	Attack – Atta	ack Tools – Cou	ntermeasures.	-			
Unit 3	R	ECON	NAISSANC	E					9
Harvester – Whois -	– Netcrafi	E – Host	– Extracting	g Information fro	om DNS – Extracti	ng Inf	forma	tion f	rom E-mai
Servers – Social En Scanning – Scannin	gineering g Method	Reconn	- Ping Sweer	r Techniques – N	Iman Command Sy	x Scan vitche	ining es – S	$\frac{1}{2}$ And $\frac{1}{2}$	Stealth –
		101059			map command b	vitenc	5 5	111	Stearth
AMAS - NULL - I	DLE – FI	N Scans	s – Banner G	Brabbing and OS	Finger printing T	echnic	ques.		
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Unit 4 Host -Based Intrus	DLE – FI	N Scans NTRUS ction –	s – Banner G ION DETE Network -	Grabbing and OS CTION Based Intrusion	Finger printing To Detection – Dis	tribute	ques. ed or	· Hyb	9 rid Intrusi
Unit 4 Host -Based Intrus Detection – Intrusio	DLE – FI	N Scans VTRUS ction – on Exch VTRUS	s – Banner G ION DETEG Network -I nange Forma	Grabbing and OS CTION Based Intrusion t – Honeypots –	Finger printing T Detection – Dis Example System	echnic tribute Snort.	ed or	Hyb	9 rid Intrusio
Unit 4 Host -Based Intrus Detection – Intrusio Unit 5	DLE – FI	N Scans VTRUS ction – on Exch VTRUS on System	s – Banner G ION DETEC Network -I nange Forma ION PREVI	Grabbing and OS CTION Based Intrusion t – Honeypots – ENTION for Eirewalls	E Finger printing To Detection – Dis Example System	echnic tribute Snort.	ed or	· Hyb	9 rid Intrusio 9
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w.e.f.2024-2025

CO2	Classify various types of attacks and learn the tools to launch the attacks	K2
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	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	-	1	-	-	-	-	1	-	2	2	2
CO2	1	3	1	3	2	1	-	-	-	-	-	-	2	2	1
CO3	2	1	1	1	-	1	-	-	-	-	1	-	2	2	2
CO4	3	3	2	2	2	1	-	-	-	-	-	-	2	2	3
CO5	3	2	1	1	1	1	-	1	-	-	1	-	2	2	2



## **PROFESSIONAL ELECTIVE 5**

		AIT522 MULTIMEI	DIA AN	D ANIMATION					
Duoguommo & Dr	anah	D Took & IT	Sam	Catagory	Т	т	D	C	
Programme & Br	ranch	B. Tech & TI	Sem.	Category		I	r	C	
				РЕ	3	0	0	3	
		$\succ$ To grasp the fundame	ental kn	owledge of Multime	dia	elem	ents	and systems	
	To get familiar with Multimedia file formats and standards								
Preamble	reamble > To learn the process of Authoring multimedia presentations								
		<ul> <li>To learn the techniques of animation in 2D and 3D and for the mobile U</li> </ul>							
	<ul> <li>To explore different popular applications of multimedia</li> </ul>								
Unit 1		INTRODUCTION TO M	ULTIM	EDIA				9	
Definitions, Ele	ments,	Multimedia Hardware	and S	oftware, Distribut	ed	mult	imed	ia systems, Multimodia	
metadata- Multin	nty, si nedia d	latabases- Hypermedia- Mi	iltimedi	a Learning	, co	mpu	.mg.	Multimedia	
Unit 2	iouiu u	MULTIMEDIA FILE FO	RMATS	S AND STANDARD	S			9	
File formats – Te	ext, Im	age file formats, Graphic	and ani	mation file formats	, Di	gital	audi	o and Video	
file formats, Colo	or in in	nage and video, Color Mod	els. Mu	ltimedia data and fi	le fo	rmat	s for	the web.	
Unit 3		MULTIMEDIA AUTHOR	RING					9	
Authoring metap	hors, 7	Tools Features and Types:	Card a	nd Page Based Too	ls, I	con a	nd C	Object Based	
Tools, Time Bas	sed To	ols, Cross Platform Auth	oring 7	Tools, Editing Tool	ls, F	ainti	ng a	nd Drawing	
Tools, 3D Model	ling an	d Animation Tools, Imag	e Editin	ig Tools, audio Edi	ting	Tool	ls, D	igital Movie	
Tools, Creating II	nteract	ANIMATION	earning,	simulations.				9	
Principles of anir	nation	staging, squash and stretc	h. timir	ng, onion skinning, s	seco	ndar	vact	ion. 2D. 2. ½	
D, and 3D anima	tion, A	Animation techniques: Key	frame,	Morphing, Inverse	Kine	emati	cs, H	Hand Drawn,	
Character riggin	g, vec	tor animation, stop moti	on, mo	otion graphics, , F	luid	Sim	ulati	on, skeletal	
animation, skinni	ng Vir	tual Reality, Augmented R	eality.					0	
Unit 5 Multimadia Dia	data a	MULTIMEDIA APPLICA	ATIONS	nhonog gymysillon		\ malt	tion	9 Multimadia	
Cloud Computin	o Mu	ltimedia streaming cloud	, smart media	on demand secur	itv	and f	oren	sics Online	
social networking	g, mult	imedia ontology, Content l	based re	trieval from digital	libra	ries.	0101	sies, onnie	
				ž –				TOTAL:45	
TEXTBOOKS									
1	Ze-Ni	an Li, Mark S. Drew, Jiangel	1000000000000000000000000000000000000	, Fundamentals of Mu	ıltin	edia'	', Thi	rd Edition,	
REFERENCES	Spring	ger rexts in Computer Science	.e, 2021						
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	Geral	d Friedland, Ramesh Jain, "M	Iultimed	ia Computing", Camb	oridg	e Un	iversi	ty Press,	
2	2018.								
2	Prabh	at K.Andleigh, Kiran Thakra	ar, "Mul	timedia System Desi	gn",	Pear	son F	Education, 1st	
	Editic	on, 2015.	IMBU	DUD 2					
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	Natur	e, 1st Edition, 2021.			1	D 11.			
5	Mark   2002	Gaimbruno, "3D Graph	ics and	Animation", Seco	nd .	Editio	on, I	New Kiders,	
L	2002		43						
			15						

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	mobile with React Native", Packt Publishing, 2022.

COURSEOUTC	OMES:	<b>Bloom's Taxonomy</b>
At the end of the	course, learners will be able to	Level
CO1	Get the bigger picture of the context of Multimedia and its applications	К3
CO2	Use the different types of media elements of different formats on content pages	К3
CO3	Author 2D and 3D creative and interactive presentations for different target multimedia applications.	K3
CO4	Use different standard animation techniques for 2D, 21/2 D, 3D applications	К3
CO5	Understand the complexity of multimedia applications in the context of cloud, security, bigdata streaming, social networking, CBIR etc.,	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	-	-	-	3	2	1	2	3	2	3
CO2	3	3	3	3	3	-	-	-	3	3	2	2	3	2	3
CO3	3	3	3	3	3	-	-	-	3	3	2	3	3	2	3
CO4	3	3	3	3	3	2	C D I	nin	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2		1	3	3	3	3	3	3	3

## AIT523 AUGMENTED REALITY /VIRTUAL REALITY

Programme &	B.Tech & IT	Sem.	Category	L	Т	P	С
Branch							
			PE	3	0	0	3
Preamble	<ul> <li>To impart the fundam</li> <li>To know the internals development of AR/V</li> <li>To learn about the gra</li> <li>To gain knowledge al</li> <li>To know the technology</li> </ul>	aental aspects s of the hardw /R enabled ap aphical proce cout AR/VR ogies involved	and principles of vare and software of oplications. ssing units and the application develo d in the developme	AR/VR compone ir archite pment. ent of AF	technolo ents invo ectures. R/VR ba	ogies. olved ir used app	n the
Unit 1	INTRODUCTION	5 ESTD. 2					9

Introduct Hybrid S Reality – Trackers Gesture I Displays	ion to Virtual Reality and Augmented Reality – Definition – Int pace-Three I's of Virtual Reality – Virtual Reality Vs 3D Computer Components of VR System – Introduction to AR-AR Technologies – Types of Trackers – Navigation and Manipulation Interfaces – nput Devices – Output Devices – Graphics Display – Human Visua – Large Volume Displays – Sound Displays – Human Auditory Syst	roduction to Trajectories and Graphics – Benefits of Virtual - Input Devices – 3D Position Gesture Interfaces – Types of al System – Personal Graphics rem.
Unit	2 VR MODELING	9
Modeling	y – Geometric Modeling – Virtual Object Shape – Object Visu	al Appearance – Kinematics
Modeling	r – Transformation Matrices – Object Position – Transformation Inv	variants –Object Hierarchies –
Viewing	the 3D World – Physical Modeling – Collision Detection – S	Surface Deformation – Force
Computa	tion – Force Smoothing and Mapping – Behavior Modeling – Model	Management
Unit	3 VR PROGRAMMING	9
VR Progr ToolKit a	ramming – Toolkits and Scene Graphs – World ToolKit – Java 3D – and Java 3D	Comparison of World
Unit	4 APPLICATIONS	9
Human F Medical Applicati Visualiza	actors in VR – Methodology and Terminology – VR Health and Sa Applications of VR – Education, Arts and Entertainment – Military ons of VR – VR Applications in Manufacturing – Applications of tion – VR in Business – VR in Entertainment – VR in Education.	fety Issues – VR and Society- VR Applications – Emerging VR in Robotics – Information
Introduct	ion to Augmented Reality-Computer vision for AR-Interaction	-Modelling and Annotation-
Navigatio	on-Wearable devices	-wodening and Annotation-
		ΤΟΤΑΙ.45
TEXTRO	OKS	IUIAL:45
ТЕЛТЬС	Charles Palmer John Williamson "Virtual Reality Bluenri	nts: Create compelling VR
1	experiences for mobile", Packt Publisher, 2018	
2	Wesley, 2016	iciples & Practice", Addison
3	John Vince, "Introduction to Virtual Reality", Springer-Verlag, 200	04.
4	William R. Sherman, Alan B. Craig: Understanding Virtual Rea Design", Morgan Kaufmann, 2003	ality – Interface, Application,
REFERE	NCES	
1	George Mather, Foundations of Sensation and Perception:Psychology	ogy Press; 2 edition, 2009.
2	The VR Book: HumanCentered Design for Virtual Reality, by Jase	on Jerald
3	Learning Virtual Reality by Tony Parisi, O' Reilly	
4	Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second E 3/2006.	dition.Wiley-IEEE Press, 200
5	Alan B. Craig, Understanding Augmented Reality, Concepts and A nn, 2013.	pplications, Morgan Kaufma
COURSE At the end	OUTCOMES: d of the course, learners will be able to	Bloom's Taxonomy Level
CO1	Understand the basic concepts of AR and VR	К2
CO2	Understand the tools and technologies related to AR/VR	K2
	45	

Jeppiaar Ins	stitute of Technology, Sriperumbudur	w.e.f.2024-2025
CO3	Know the working principle of AR/VR related Sensor devices	K1
CO4	Design of various models using modeling techniques	К3
CO5	Develop AR/VR applications in different domains	К3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
CO2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
CO3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
CO4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
CO5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

	AIT524 DIGIT	AL M	ARKETING									
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С					
			PE	3	0	0	3					
<ul> <li>Preamble</li> <li>The primary objective of this module is to examine and explore the role and importance of digital marketing in today's rapidly changing business environment.</li> <li>It also focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured.</li> </ul>												
Unit 1	INTRODUCTION TO	ONLIN	E MARKET				9					
Online Market space- Website - Planning and	Digital Marketing Strateg Creation - Content Market	y- Con ing.	ponents - Opportu	nitie	es foi	r bui	lding Brand					
Unit 2	SEARCH ENGINE OP	<b>FIMIS</b>	ATION				9					
Search Engine optimis Techniques - Off-Page components- PPC adver	ation - Keyword Strategy e Techniques. Search Eng rtising -Display Advertisen	y- SEO gine Ma nent	Strategy - SEO s arketing- How Sea	succ rch	ess f Engi	factor ne v	rs -On-Page vorks- SEM					
Unit 3	E- MAIL MARKETING	Ĵ	10				9					
E- Mail Marketing - Ty Email with Social Me Mobile Marketing- Mo Mobile Apps, Mobile C	ppes of E- Mail Marketing dia and Mobile- Measuri bile Inventory/channels- I commerce, SMS Campaign	- Emai ng and locatior s-Profil	l Automation - Lead maximizing email based; Context ba ing and targeting	d Ge l cai ised;	enera mpai Cou	tion gn e ipons	- Integrating ffectiveness. and offers,					
Unit 4	SOCIAL MEDIA MAR	KETIN	G				9					
Social Media Marketin and buzz. Successful /b relationships - Creating	g - Social Media Channel enchmark Social media car Loyalty drivers - Influence	s- Leve npaigns er Mark	raging Social medi 5. Engagement Mark eting.	a fo cetin	r bra g- B	nd co uildii	onversations 1g Customer					
Unit 5	DIGITAL TRANSFOR	MATIO	DN				9					
	·	46										

Digital Transformation & Channel Attribution- Analytics- Ad-words, Email, Mobile, Social Media, Web Analytics - Changing your strategy based on analysis- Recent trends in Digital marketing.

	TOTAL:45
TEXTBOOKS	
1	Fundamentals of Digital Marketing by Puneet Singh Bhatia;Publisher: Pearson Education, First edition (July 2017);ISBN-10: 933258737X;ISBN-13: 978-9332587373.
2	Digital Marketing by Vandana Ahuja ;Publisher: Oxford University Press (April 2015). ISBN-10: 0199455449
3	Marketing 4.0: Moving from Traditional to Digital by Philip Kotler;Publisher: Wiley; 1st edition ( April 2017); ISBN10: 9788126566938;ISBN 13: 9788126566938;ASIN: 8126566930.
REFERENCES	
1	Ryan, D. (2014). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited
2	Barker, Barker, Bormann and Neher(2017), Social Media Marketing: A Strategic Approach, 2E South-Western ,Cengage Learning.
3	Pulizzi, J Beginner's Guide to Digital Marketing, Mcgraw Hill Education

COURSEOUTC At the end of the	COMES: e course, learners will be able to	Bloom's Taxonomy Level
CO1	To examine and explore the role and importance of digital marketing in today's rapidly changing business environment.	K2
CO2	To focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured.	К2
CO3	To know the key elements of a digital marketing strategy.	K2
CO4	To study how the effectiveness of a digital marketing campaign can be measured.	K2
CO5	To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.	К2

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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
					1.00										
CO1	3	3	2	1	3	-			1	2	3	3	3	3	3
001			-		5		1.1	1. State 1.			5				
CO2	2	2	2	1	3			17 Y .	1	2	3	3	3	3	3
002	-	-	-		5		122			- T. I					
CO3	1	1	1	2	2	10. Th			1	2	1	1	3	2	1
005	1	-	1	-	-	1 Sec. 1	1. C	84			1	-		-	-
CO4	3	2	2	3	1	1.1			1	3	2	3	2	3	2
001		-	-		1		186			5	-		-		-
CO5	2	3	1	3	3	_		5.00	2	3	1	2	1	2	1
005	2	5	1	5	5				2	5	1	-	1	-	1



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Trogramme & Dra	nch	B.Tech & IT	Sem.	Category	L	Т	Р	C
				PE	3	0	0	3
		To know the b $$	asics of 2D an	d 3D graphics for g	ame	deve	lopm	nent.
D 11		$\blacktriangleright$ To know the s	tages of game	development.				
Preamble		To understand	the basics of a	game engine.				
		To survey the	gaming develo	pment environmen	t and	tool	kits.	
TT		To learn and d	evelop simple	games using Pygar	ne er	IV1r01	nmer	nt o
		3D GRAPHICS I	COR GAME I	DESIGN	<u> </u>			9 
Genres of Games,	Basic	s of 2D and 3D G $Color N$	raphics for Ga	me Avatar, Game	Com	pone	nts –	-2D and $3$
Controller Based A	- Proj	tion	iodels – illuli	ination and Shau		oders	<b>5</b> – 1	Ammation
Unit 2		GAME DESIGN	PRINCIPLES	5				9
Character Develor	ment	Storyboard Deve	elopment for (		)esig	<u> </u>	Scrir	t Narratio
Game Balancing,	Cor	e Mechanics, Pri	inciples of L	evel Design –	Prop	osals		Writing f
Preproduction, Pro	ductio	on and Post – Produ	uction.	U	1			U
Unit 3		GAME ENGINE	DESIGN					9
Rendering Concer		Software Renderin	a _ Hardware	Rendering _ Sna	tial	Sorti	ησ Δ	loorithms
Algorithms for Ga	me Er	igine– Collision De	etection – Gam	e Logic – Game A	[ – Pa	ath fi	nding	g.
Unit 4		<b>OVERVIEW OF</b>	GAMING PI	LATFORMS AND	)			9
		FRAMEWORKS	5					
Pygame Game dev player and Multi-P	velopi Player	<b>FRAMEWORKS</b> nent – Unity – Un games.	nity Scripts –N	Mobile Gaming, G	ame	Studi	o, U	nity Sing
Pygame Game dev player and Multi-P Unit 5	velopi layer	FRAMEWORKS nent – Unity – Un games. GAME DEVELO	nity Scripts –N	Mobile Gaming, G	ame	Studi	io, U	nity Sing
Pygame Game dev player and Multi-P Unit 5 Developing 2D an Programming – I Development – De Puzzle Games.	velopr layer nd 3D ncorp evice	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam	nity Scripts – <b>PMENT USI</b> using Pygam d sound – A ne – Overview	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T	ame on – Gam Tile F	Studi 2D a e Ph Based	and 3 ysics arca	9 3D Graphi algorithr ade Games
Pygame Game dev player and Multi-P Unit 5 Developing 2D an Programming – I Development – De Puzzle Games.	velopr layer nd 3D ncorp evice	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam	nity Scripts – <b>PMENT USI</b> using Pygam d sound – A ne – Overview	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T	ame on – Gam Tile E	Studi 2D a e Ph Based	and a ysics arca	9 3D Graphi algorithr ade Games TOTAL:
Pygame Game dev player and Multi-P Unit 5 Developing 2D an Programming – I Development – De Puzzle Games.	velopn layer nd 3D ncorp evice	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam	nity Scripts – <b>PMENT USI</b> using Pygam d sound – A ne – Overview	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T	ame on – Gam Tile E	Studi 2D a e Ph Based	and 3 ysics arca	9 3D Graphi algorithr ade Games TOTAL:4
Pygame Game dev player and Multi-P Unit 5 Developing 2D an Programming – I: Development – De Puzzle Games. TEXTBOOKS 1	velopi layer nd 3D ncorp evice	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygan	Dement USI Using Pygam 1 sound – A 1 sound – A 1 sound – A 1 sound – A 1 sound – A	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T Millington and Jo	ame on – Gam Tile E	Studi 2D a e Ph Based	and 3 ysics arca	9 3D Graphi algorithr ade Games TOTAL:4 9)
Pygame Game developing and Multi-P         Unit 5         Developing 2D an         Programming – In         Development – De         Puzzle Games.         TEXTBOOKS         1       2	velopn layer nd 3D ncorp evice 1 Artific Mathe (2011	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam	DPMENT USI Using Pygam d sound – A ne – Overview	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G	ame On – Gam Tile E hn Fu	Studi 2D a e Ph Based inge	and a ysics arca (200 y Eric	9 3D Graphi algorithr ade Games TOTAL:4 9) c Lengyel
Pygame Game developing and Multi-P         Unit 5         Developing 2D an         Programming – In         Development – Development	Artific (2011) Game 2012)	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete	DPMENT USI using Pygam d sound – A ne – Overview Games by Iar ne Programmin by Mike McSl	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G	ame on – Gam File E hn Fu raph	Studi 2D a e Ph Based ics by n (Fc	and 3 ysics arca (200 y Erio	9 3D Graphi algorithr ade Games TOTAL:4 9) c Lengyel Edition,
Pygame Game developing and Multi-P         Unit 5         Developing 2D an         Programming – In         Development – Development	Artific Mathe (2011) Game	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete	Dement USI Using Pygam Sound – A Sound – A Sou	Mobile Gaming, G <b>NG PYGAME</b> e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G	ame on – Gam Tile E hn Fu raph	Studi 2D a e Ph Based ics by n (Fc	and 3 ysics arca (200 y Erio	9 3D Graphi algorithr ade Games TOTAL:4 9) c Lengyel Edition,
Pygame Game developing and Multi-P         Unit 5         Developing 2D an         Programming – In         Development – Devevelopment – Development – Development – Development – Development	velopn layer d 3D ncorp evice Artific Mathe (2011) Game 2012) Sanjay	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete	DPMENT USI using Pygam d sound – A ne – Overview Games by Iar ne Programmin by Mike McSl e Programmin dison Wesley,	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G g Algorithms and 2013.	ame On – Game Tile E hn Fu raph rahan	Studi 2D a e Ph Based ics by n (Fc	and 3 ysics arca (200 y Erio ourth ues:	9 3D Graphi 3 algorithr ade Games TOTAL:4 9) c Lengyel Edition, A Platfor
Pygame Game devolayer and Multi-P Unit 5 Developing 2D an Programming – If Development – De Puzzle Games. I 2 3 <b>REFERENCES</b>	velopn layer nd 3D ncorp evice Artific Mathe (2011) Game 2012) Sanjay Agnos	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete y Madhav, "Game stic Approach", Ad AcGugan, "Beginn e to Professional",	DPMENT USI using Pygam d sound – A ne – Overview Games by Iar ne Programmin by Mike McSI e Programmin dison Wesley, ing Game Dev Apress, 2007.	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G g Algorithms and 2013. elopment with Pyth	ame on – Gam Tile E hn Fu raph raph Tec	Studi 2D a e Ph Based inge ics by n (Fo	and 3 ysics arca (200 y Erio ourth ues:	9 3D Graphi algorithme ade Games TOTAL:4 9) c Lengyel Edition, A Platforme he: From
Pygame Game devolution         Unit 5         Developing 2D an         Programming – In         Development – Development – Development         Puzzle Games.         TEXTBOOKS         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         3	velopn layer d 3D ncorp evice Artific Mathe (2011) Game 2012) Sanjay Agnos Will N Novic Paul C	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete y Madhav, "Game stic Approach", Ad AcGugan, "Beginn e to Professional", Craven, "Python Ar	DPMENT USI using Pygam d sound – A ne – Overview Games by Iar ne Programmin by Mike McSi e Programmin dison Wesley, ing Game Dev Apress, 2007.	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G g Algorithms and 2013. elopment with Pytl Apress Publishers	ame on – Game File F hn Fu raph: rahan Tec	Studi 2D a e Ph Based ics by n (Fc chniq nd Py	(200 (200 (200 verification) verification ve	9 3D Graphi algorithmade Games TOTAL: 9) c Lengyel Edition, A Platforme: From
Pygame Game developlayer and Multi-P         Unit 5         Developing 2D an         Programming – If         Development – Development – Development         Puzzle Games.         1       2         3       2         1       2         3       2         1       2         3       2         1       2         3       1         2       1         3       1         3       1	velopn layer d 3D ncorp evice Artific Mathe (2011) Game 2012) Sanjay Agnos Will N Novic Paul C David	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete y Madhav, "Game stic Approach", Ad AcGugan, "Beginn e to Professional", Craven, "Python Ar H, Eberly, "3D G	DPMENT USI using Pygam d sound – A ne – Overview Games by Iar ne Programmin by Mike McSl e Programmin dison Wesley, ing Game Dev Apress, 2007. cade games", Game Engine	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T a Millington and Jo ng and Computer G haffry and David G g Algorithms and 2013. elopment with Pyth Apress Publishers, Design: A Practic:	ame on – Gam Tile F hn Fu raph rahan Tec non a 2016	Studi 2D a e Ph Based inge ics by n (Fo chniq nd Py	and 3 ysics arca (200 y Erio ourth ues: ygam	9 3D Graphi algorithmade Games TOTAL: 9) c Lengyel Edition, A Platfor he: From
Pygame Game developing and Multi-P         Unit 5         Developing 2D an         Programming – In         Development – Development – Development         Puzzle Games.         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         3         2         3         4	velopn layer d 3D ncorp evice l Artific Mathe (2011) Game 2012) Sanjay Agnos Will M Novic Paul C David	FRAMEWORKS nent – Unity – Un games. GAME DEVELC interactive games orating music and Handling in Pygam cial Intelligence for ematics for 3D Gam Coding Complete y Madhav, "Game stic Approach", Ad AcGugan, "Beginn e to Professional", Craven, "Python Ar H. Eberly, "3D C uter Graphics" Sec	DPMENT USI using Pygam d sound – A be – Overview Games by Iar ne Programmin by Mike McSi e Programmin dison Wesley, ing Game Dev Apress, 2007. cade games", J Game Engine cond Edition	Mobile Gaming, G NG PYGAME e – Avatar Creations – of Isometric and T Millington and Jo ng and Computer G haffry and David G g Algorithms and 2013. elopment with Pytl Apress Publishers, Design: A Practice CRC Press 2006	ame on – Gamo Tile F hn Fu raph: rahan Tec non a 2016 al Ap	Studi 2D a e Ph Based ics by n (Fc chniq nd Py oproa	(200 (200 (200 (200 verification) verification verificati	9 3D Graphi ade Games TOTAL: 9) c Lengyel Edition, A Platfor ne: From 0 Real-Tir

2011.

COURSEOUTCO At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Explain the concepts of 2D and 3d Graphics	K1
CO2	Design game design documents.	К3
CO3	Implementation of gaming engines.	К2
CO4	Survey gaming environments and frameworks.	K2
CO5	Implement a simple game in Pygame	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	-	-	2	2	2
CO2	1	2	2	1	2	-	-	-	-	-	-	-	2	2	1
CO3	1	1	1	2	1	-	-	-	-	-	-	-	2	2	2
CO4	3	3	1	3	3	-	-	-	-	-	-	-	2	2	3
CO5	3	3	2	1	3	-	-	-	-	-	-	-	2	2	3

AIT526 VISUAL EFFECTS									
Programme & Branch	B.Tech & IT Sem. Category L	Г Р	C						
	PE 3 (	0 0	3						
<ul> <li>Preamble</li> <li>To get a basic idea on animation principles and techniques</li> <li>To get exposure to CGI, color and light elements of VFX</li> <li>To have a better understanding of basic special effects techniques</li> <li>To have a knowledge of state of the art VFX techniques</li> <li>To become familiar with popular compositing techniques</li> </ul>									
Unit 1	ANIMATION BASICS		9						
VFX production pipelin limited animation, Roto paths.	escoping, stop motion, object animation, pixilation, rigging, s	cs, Ful shape k	l animation, teys, motion						
Unit 2	CGI, COLOR, LIGHT		9						
CGI – virtual worlds, P color - Color spaces, co image based lights, PBI	hotorealism, physical realism, function realism, 3D Modeling lor depth, Color grading, color effects, HDRI, Light – Area a R lights, photometric light, BRDF shading model	g and l and me	Rendering: esh lights,						
Unit 3	SPECIAL EFFECTS		9						
Special Effects – props, scaled models, animatronics, pyrotechniques, Schüfftan process, Particle effects – wind, rain, fog, fire									
Unit 4	VISUAL EFFECTS TECHNIQUES		9						
	49								

Motion Capture, Matt Painting, Rigging, Front Projection.Rotoscoping, Match Moving – Tracking,
camera reconstruction, planar tracking, Calibration, Point Cloud Projection, Ground plane
determination, 3D Match Moving

Unit 5COMPOSITING9Compositing – chroma key, blue screen/green screen, background projection, alpha compositing, deep<br/>image compositing, multiple exposure, matting, VFX tools - Blender, Natron, GIMP.

## TOTAL:45

TEXTBOOKS	
1	Chris Roda, Real Time Visual Effects for the Technical Artist, CRC Press, 1st Edition, 2022.
2	Steve Wright, Digital Compositing for film and video, Routledge, 4th Edition, 2017.
3	John Gress, Digital Visual Effects and Compositing, New Riders Press, 1st Edition, 2014.
REFERENCES	
1	Jon Gress, "Digital Visual Effects and Compositing", New Riders Press, 1st Edition, 2014.
2	Robin Brinkman, The Art and Science of Digital Compositing: Techniques for Visual Effects, Animation and Motion Graphics", Morgan Kauffman, 2008.
3	Luiz Velho, Bruno Madeira, "Introduction to Visual Effects A Computational Approach", Routledge, 2023.
4	Jasmine Katatikarn, Michael Tanzillo, "Lighting for Animation: The art of visual story telling, Routledge, 1st Edition, 2016.
5	Eran Dinur, "The Complete guide to Photorealism, for Visual Effects, Visualization
6	https://www.blender.org/features/vfx/

COURSEOUTCO	COURSEOUTCOMES:								
At the end of the	Level								
CO1	To implement animation in 2D / 3D following the principles and techniques	К3							
CO2	To use CGI, color and light elements in VFX applications	К3							
CO3	To create special effects using any of the state of the art tools	К3							
CO4	To apply popular visual effects techniques using advanced tools	К3							
CO5	To use compositing tools for creating VFX for a variety of applications	К3							

						10 C									
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	-		seipw	1	2	1	1	3	3	2
CO2	1	3	3	2	1		in		3	2	2	2	1	1	1
CO3	2	3	3	2	1	SR	ren	umb	1	2	1	2	2	2	2
CO4	3	3	2	2	3	5	EST	020	3	3	2	2	2	3	1
CO5	1	2	1	1	2	-	-	-	1	3	2	3	2	3	1

		AIT527 CO	MPUTE	R VISION					
Programme & E	Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С	
				PE	3	0	0	3	
<ul> <li>Preamble</li> <li>To understand the fundamental concepts related to Image formation and processing.</li> <li>To learn feature detection, matching and detection</li> <li>To become familiar with feature based alignment and motion estimation</li> <li>To develop skills on 3D reconstruction</li> <li>To understand image based rendering and recognition</li> </ul>									
Unit 1		INTRODUCTION TO PROCESSING	IMAGE	FORMATION .	AND			9	
Computer Visio digital camera - Pyramids and w	n - Geo Point o avelets	metric primitives and trar perators - Linear filtering - Geometric transformation	nsformatio - More n ons - Glol	ons - Photometric eighborhood oper oal optimization.	image ators	e forr - Fou	natio rier t	n - The ransforms -	
Unit 2		FEATURE DETECTI SEGMENTATION	ON, MA'	<b>FCHING AND</b>				9	
Points and patch mode finding - 1 Unit 3	nes - Ed Normali	ges - Lines - Segmentatio zed cuts - Graph cuts and FEATURE-BASED A	n - Active energy-b	e contours - Split a based methods	and m	lerge	- Me	an shift and	
0		ESTIMATION			•			2	
Two-frame structure from motion - Factorization - Bundle adjustment - Constrained structure and motion - Translational alignment - Parametric motion - Spline-based motion - Optical flow - Layered motion.         Unit 4       3D RECONSTRUCTION       9         Shape from X - Active range finding - Surface representations - Point-based representations									
Volumetric repr	resentati	ons - Model-based recons	struction -	Recovering textu	ire ma	ips ai	nd all	resentations pedosos.	
Volumetric repr Unit 5	resentati	ons - Model-based recons	struction -	AND	ire ma	aps an	nd all	resentations bedosos.	
Volumetric repr Unit 5 View interpolati based rendering Context and sce	ion Lay -Object ne unde	ons - Model-based recons <b>IMAGE-BASED REN</b> <b>RECOGNITION</b> ered depth images - Light detection - Face recognit erstanding- Recognition da	Struction - DERING fields an ion - Insta atabases a	AND d Lumigraphs - En ance recognition - and test sets	nviron Categ	aps an	t mat recog	esentations bedosos. 9 tes - Video gnition -	
Volumetric repr Unit 5 View interpolati based rendering Context and sce	ion Lay -Object ne unde	ons - Model-based recons <b>IMAGE-BASED REN</b> <b>RECOGNITION</b> ered depth images - Light detection - Face recognit erstanding- Recognition da	struction - DERING fields an ion - Insta atabases a	AND d Lumigraphs - En ance recognition - and test sets	nviron Cates	nmen gory :	t mat	resentations bedosos. 9 ttes - Video gnition - TOTAL:45	
Volumetric repr Unit 5 View interpolati based rendering Context and scent TEXTBOOKS	ion Lay -Object ne unde Richa	ons - Model-based recons IMAGE-BASED REN RECOGNITION ered depth images - Light detection - Face recognit erstanding- Recognition de ard Szeliski, "Computer V omputer Science, Second	struction - DERING fields an ion - Insta atabases a Vision: Al Edition, 2	AND d Lumigraphs - Erance recognition - and test sets gorithms and App 022.	nviron Categ	nmen gory :	t mat recog	resentations bedosos. 9 ttes - Video gnition - TOTAL:45 nger- Texts	
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Volumetric repr Unit 5 View interpolati based rendering Context and sce TEXTBOOKS 1 2 REFERENCES	esentati ion Lay -Object ne unde Richa in Co Seco	ons - Model-based recons IMAGE-BASED REN RECOGNITION ered depth images - Light detection - Face recognit erstanding- Recognition da ard Szeliski, "Computer V omputer Science, Second puter Vision: A Modern A nd Edition, 2015.	struction - DERING fields an ion - Insta atabases a /ision: Al Edition, 2 Approach,	AND d Lumigraphs - Erance recognition - and test sets gorithms and App 022. D. A. Forsyth, J.	nviron Cateş blicati	nmen gory : ons",	t mat recog	resentations bedosos. 9 ttes - Video gnition - TOTAL:45 nger- Texts Education	
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COURSEOUTC At the end of the	Bloom's Taxonomy Level			
CO1	To understand basic knowledge, theories and methods in image processing and computer vision.	K1		
CO2	To implement basic and some advanced image processing techniques in OpenCV.	K2		
CO3	To apply 2D a feature-based based image alignment, segmentation and motion estimations.	К3		
CO4	To apply 3D image reconstruction techniques	K3		
CO5	To design and develop innovative image processing and computer vision applications.	K2		

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	-	-	-	2	1	3	2	2	1	1
CO2	3	3	3	2	3	-	1	-	2	1	2	2	3	1	2
CO3	3	3	2	2	3	-	-	-	1	1	2	2	3	2	2
CO4	2	3	3	2	3	-	-	-	2	1	2	3	2	2	3
CO5	2	3	3	2	2	2	-	-	3	1	2	3	3	3	3



# **PROFESSIONAL ELECTIVE 6**

	nch	B.Tee	ch & IT	Sem.	Category	L	Т	Р	С
	•				PE	3	0	0	3
Preamble		<ul> <li>To 1</li> <li>To s</li> <li>Scie</li> <li>To g</li> <li>quant</li> <li>To 1</li> </ul>	earn the fun study the det nce. gain knowle ntum compu earn the bas	damental con tails of quantu dge about the tation. tics of quantur	cepts behind quant im mechanics and basic hardware an n information and	tum co its rela d mat the th	omput ation hemat	to Co tical r	mputer nodels of d it.
Unit 1	QI	UANTUN	I COMPUT	FING BASIC	CONCEPTS				9
Complex Numbers - Mechanics – Quantu Unit 2	Linear A m Bits - I	lgebra - N Represent HANTUN	Aatrices and ations of Qu	Operators - C <u>bits – Superp</u>	Blobal Perspectives ositions.	s Post	ulates	of Q	uantum
Universal logic gates correction.	s - Basic s	single qub	it gates - M	ultiple qubit g	ates - Circuit deve	lopme	ent - (	Quant	um error
Unit 3	QI	UANTUN	1 ALGORI	THMS					9
Quantum parallelism applications - Quant	n - Deutsc um Searc	h's algori h Algorith	thm - The E ims: Grover	Deutsch–Jozsa 's Algorithm	algorithm - Quant	um Fo	ourier	trans	form and i
Unit 4			I INFURM	ATION THE		lost:			<b>9</b>
coding theorem - Cla	Shannon assical inf	s noiseles	over noisy	quantum chan	- Schumacher's q nels.	uantui	m noi	seless	channel
Unit 5	Q	JANTUN	1 CRYPTO	GRAPHY					9
									TOTAL:
1 IEXTBOOKS	. Parag K	Lala, Mc	Graw Hill H	Education, "Q	uantum Computing	g, A B	Beginr	ners In	ntroduction
1 2	. Parag K First editi Michael A	Lala, Mc on (1 Nov A. Nielsen	Graw Hill I vember 2020 , Issac L. Cl	Education, "Q )). huang, "Quan	uantum Computing tum Computation	g, A E and Q	Beginr uantu	ners In m Inf	ntroduction
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1         1           2         1           3         1           REFERENCES         1	. Parag K First editi Michael A Tenth Edi Chris Ber for Everyo Scott Aaro 2013.	Lala, Mc on (1 Nov A. Nielsen tion, Cam nhardt, Tl one".	Graw Hill I vember 2020 , Issac L. Ch abridge Univ ne MIT Pres	Education, "Q )). huang, "Quan versity Press, ss; Reprint edi mputing Since	uantum Computing tum Computation a 2010. tion (8 September e Democritus", Car	g, A B and Q 2020) mbrid	Beginr uantu , "Qu ge Un	mers In m Inf antum	ntroduction formation" n Computi
I         I           2         I           3         I           REFERENCES         I           2         I	. Parag K First editi Michael A Tenth Edi Chris Ber for Everyo Scott Aaro 2013. N. Davio Universit	Lala, Mc on (1 Nov A. Nielsen tion, Cam nhardt, Tl one". onson, "Q d Mermity Press,	Graw Hill H vember 2020 , Issac L. Ch abridge Univ ne MIT Pres Quantum Con in, "Quant 2007.	Education, "Q )). huang, "Quan versity Press, ss; Reprint edi mputing Since um Comput	uantum Computing tum Computation = 2010. tion (8 September e Democritus", Car er Science: An	g, A B and Q 2020) mbridg	Beginr uantu , "Qu ge Un	mers In m Inf antum iversi	ntroduction formation" n Computi ity Press, Cambrid
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1       1         2       1         3       1         3       1         REFERENCES       1         1       2         2       1         1       2         2       1         1       2         2       1         2       1	. Parag K First editi Michael A Tenth Edi Chris Ber for Everyo Scott Aaro 2013. N. David Universit <b>MES:</b> <b>Durse, lea</b> Understar	Lala, Mc on (1 Nov A. Nielsen tion, Carr nhardt, Tl one". onson, "Q d Mermi ty Press, rners will nd the bas	Graw Hill I yember 2020 , Issac L. Ch bridge Univ- ne MIT Press Quantum Con- in, "Quant 2007. I be able to ics of quant kground of	Education, "Q )). huang, "Quan versity Press, 2 ss; Reprint edi mputing Since um Comput um computing Quantum Mee	uantum Computing tum Computation a 2010. tion (8 September e Democritus", Car er Science: An g.	g, A B and Q 2020) mbridg	Beginr uantu o, "Qu ge Un oducti	mers In m Inf antum iversion", m's T Lev K	ntroduction formation" n Computi ity Press, Cambrid faxonomy vel 1 1
I         I           2         I           3         I           REFERENCES         I           1         I           2         I           COURSE OUTCO         I           At the end of the co         COI           CO2         I           CO3         I	. Parag K First editi Michael A Tenth Edi Chris Ber for Everyo Scott Aara 2013. N. Davio Universit <b>MES:</b> <b>Durse, lea</b> Understar Understar Analyze t	Lala, Mc on (1 Nov A. Nielsen tion, Carr nhardt, Tl one". onson, "Q d Mermity ty Press, rners will nd the bas nd the bac he compu	Graw Hill I vember 2020 , Issac L. Ch bridge Univ ne MIT Pres puantum Con in, "Quant 2007. I be able to ics of quant kground of tation mode	Education, "Q )). huang, "Quan versity Press, ss; Reprint edi mputing Since um Comput um computing Quantum Mee els.	uantum Computing tum Computation a 2010. tion (8 September e Democritus", Can er Science: An g. chanics.	g, A B and Q 2020) mbridg	Beginr uantu , "Qu ge Un oducti	mers In m Inf antur iversi ion", m's T Lev K K	ntroduction formation" n Computi ity Press, Cambrid faxonomy vel 1 1 3
TEXTBOOKS           1         1           2         1           3         1           REFERENCES         1           1         2           2         1	. Parag K First editi Michael A Tenth Edi Chris Ber for Everyo Scott Aara 2013. N. David Universit <b>MES:</b> Understar Understar Analyze t Model the and frame	Lala, Mc on (1 Nov A. Nielsen tion, Carr nhardt, Tl onson, "Q d Mermity ty Press, rners will nd the bas nd the bas he compute circuits works.	Graw Hill H vember 2020 , Issac L. Ch bridge Univ ne MIT Pres puantum Con in, "Quant 2007. I be able to ics of quant kground of tation mode using quan	Education, "Q )). huang, "Quan versity Press, ss; Reprint edi mputing Since um Comput um computing Quantum Med els.	uantum Computing tum Computation a 2010. tion (8 September e Democritus", Can er Science: An g. chanics.	g, A B and Q 2020) mbridg Intro	Beginr uantu , "Qu ge Un oducti	mers In m Inf antur iversi ion", m's T Lev K K K	ntroduction formation" n Computi ity Press, Cambric faxonomy vel 1 1 3 2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	2	-	-	-	2	3	2
CO2	3	2	2	2	-	-	-	-	2	-	-	-	2	3	1
CO3	3	3	3	3	2	-	-	-	3	-	-	-	3	2	2
CO4	3	3	3	3	3	-	-	-	3	-	-	-	1	3	2
CO5	3	3	2	3	-	-	-	-	2	-	-	-	1	3	3

## AIT529 EVOLUTIONARY ALGORITHMS

Programme & Bi	anch	B.Tech & IT	Sem.	Ca	tegory	L	Т	P	С
					PE	3	0	0	3
Preamble		• To learn basic tec	hniques	used in	evolutional	ry alg	gorit	hms.	
Unit 1		<b>MODELS OF EVOLUTI</b>	ON ANI	) GENE	ТІС				9
		ALGORITHM							
Models of evolut	ion- ba	sic approaches and notion	s- Popul	ation- re	ecombinatio	on- fi	itnes	s eva	luation-
Genetic algorithm	ns- solı	ution encoding in a chrome	osome- l	basic op	erators of s	elect	ion-	muta	tion-
crossover.									
Unit 2		EVOLUTIONARY COM	PUTAT	ION					9
Selection- object	ive fun	ction- dynamic vs. static-	roulette-	wheel so	election- to	urna	ment	s- eli	tism-
Schema theorem-	- buildi	ng block hypotheses- imp	licit para	allelism.					
Unit 3		PROBABILISTIC MODI	ELS						9
Quantum parallelis	sm - De	utsch's algorithm - The Deu	tsch–Jozs	sa algorit	hm - Quantu	ım Fo	ouriei	r trans	storm and its
applications - Quai	ntum Se	earch Algorithms: Grover's A	Algorithn	1.					0
Unit 4	له له مه ح	MACHINE LEARNING			intownal way			N	9 Californi va
Dittachine learning	g and d	ata mining- evolution of	expert s	ystems-	internal rep	prese	ntati	on- N	menigan vs.
Filisourg approac		CLASSIFIER SVSTEMS	DE TECHNI	UDSY 1					0
Classifier system	a if th	CLASSIFIER STSTEMS	gonithm	O loom	ing madu	ation		0100	,
Classifier system	s, 11-ui	en rules, bucket brigade al	gomm	, Q-leall	iiig, produ	ction	i sysi	ems.	
TEXTBOOKS				-					101AL, 45
1	Mitch	ell. M.: Introduction to ge	enetic als	orithms	MIT Pres	s. 19	96		
2	Goldb	erg. D.: Genetic algorithms	in search	optimiza	ation and ma	chine	e lear	ning.	Addison-
	Wesle	ey, 1989.		- 1				8,	
3	Holla	nd, J.: Adaptation in natural	and artifi	cial syste	ems, MIT Pr	ess, 1	992	(2nd )	ed).
4	Holla	nd, J.: Hidden order, Addison	n-Wesley	, 1995.	21				
REFERENCES	1			18	7				
1	Introd	luction to Evolutionary Co	omputing	g by Age	oston E. Eil	ben a	and J	.E. S1	mith
	(Seco	nd Edition, 2015)	~	9					
2	Gene	tic Programming: On the	e Progra	mming	of Comput	ters	by N	leans	of Natural
	Selec	tion by John R. Koza (199	)2)						
		PIDER	IMRI	Run	2				
<b>COURSE OUTC</b>	OMES:	2 Jun run					Bloo	m's T	axonomy
At the end of the	course,	learners will be able to	0. 2011	Z				Le	vel
To know the history of models of evolution and genetic								1	
	algorithm.						.1		
L			54						
			51						

CO2	To understand the concepts of evolutionary computation.	K2
CO3	To gain knowledge on probabilistic models.	K1
CO4	To understand the concepts of machine learning.	K2
CO5	To gain insight on classifier system.	K1

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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

i i ogi annine & Di an	ich	B.Tech & IT	Sem.	Category		T	P	C		
				PE	3	0	0	3		
Preamble		To learn basis	ic techniques	used in evolution	nary al	gorit	hms.			
Unit 1	Ι	NTRODUCTION T	TO BCI					9		
Introduction - Brain -Invasive BCI -Par Hardware, EEG, EC	structu tially oG, M	nre and function, Bra Invasive BCI - Non EG, fMRI.	in Computer in Invasive B	Interface Types - S CI, Structure of	ynchro BCI Sy	nous /stem	and A , BC	Asynchron I Monitor		
Unit 2	E	BRAIN ACTIVATIO	ON					9		
Brain activation pat	terns -	Spikes, Oscillatory	potential and	ERD, slow cortica	l poten	tials,	Mov	ement rela		
potentials-Mu rhyth	ms, m	otor imagery, Stimu	lus related po	otentials - Visual	Evoked	Pote	entials	s - P300		
Auditory Evoked Po	tentials	s, Potentials related to	o cognitive tas	sks.				0		
Unit 3	1	EATURE EXTRA	CTION MET	HODS		_		9		
Data Processing – S	pike so	orting, Frequency do	main analysis	, Wavelet analysis,	Time (	doma	in and	alysis, Spa		
Feature Extraction	Dhase	synchronization and	, independent	Component Anal	ysis (ic	A), I	Artilla	cts reducti		
Feature Extraction - Phase synchronization and coherence.							9			
Unit 4	N	ACHINE LEARN	ING METHO	DDS FOR BCI				9		
Unit 4 Classification techni	Niques –	ACHINE LEARN	ING METHO	DDS FOR BCI assification Multi	class C	lassif	icatio	9 n Evaluat		
Unit 4 Classification technic of classification pe	iques – erforma	ACHINE LEARN Binary classification nce. Regression -	ING METHO , Ensemble cl Linear, Polyr	DDS FOR BCI assification, Multi nomial, RBF's, P	class C erceptro	lassif on's,	icatio Mult	<b>9</b> on, Evaluat tilaver neu		
Unit 4 Classification techni of classification per networks, Support v	iques – erforma ector m	ACHINE LEARN Binary classification nce, Regression - nachine, Graph theore	ING METHO , Ensemble cl Linear, Polyn etical function	DDS FOR BCI assification, Multi nomial, RBF's, P al connectivity ana	class C erceptro lysis.	lassif on's,	icatio Mult	9 m, Evaluat tilayer net		
Unit 4 Classification techni of classification pe networks, Support v Unit 5	iques – erforma ector m	ACHINE LEARN Binary classification nce, Regression - nachine, Graph theore APPLICATIONS O	ING METHO I, Ensemble cl Linear, Polyr etical function F BCI	DDS FOR BCI assification, Multi nomial, RBF's, P al connectivity and	class C erceptro lysis.	lassif on's,	icatio Mult	9 m, Evaluat tilayer ner 9		
Unit 4 Classification techni of classification per networks, Support v Unit 5 Case Studies - Invas	I N iques – erforma ector m A ive BC	ACHINE LEARN Binary classification nce, Regression - nachine, Graph theore APPLICATIONS O Is: decoding and trac	ING METHO a, Ensemble cl Linear, Polynetical function F BCI cking arm (har	DDS FOR BCI assification, Multi nomial, RBF's, P al connectivity and nd) position, contro	class C erceptro lysis.	lassif on's,	icatio Mult	9 en, Evaluat tilayer neu 9 evices sucl		
Unit 4 Classification techni of classification per networks, Support v Unit 5 Case Studies - Invas orthotic hands, Curs	iques – erforma ector m ive BC sor and	ACHINE LEARN Binary classification nce, Regression - hachine, Graph theore APPLICATIONS OF Is: decoding and trac robotic control using	ING METHO , Ensemble cl Linear, Polyr etical function F BCI cking arm (har g multi electro	DDS FOR BCI assification, Multi nomial, RBF's, P al connectivity ana nd) position, contro ode array implant,	class C erceptro lysis. olling pr Cortica	lassif on's, costhe	icatio Mult etic de trol o	9 m, Evaluat tilayer ner 9 evices such f muscles		
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	Trends and Applications", Springer, 2015.
4	Bernhard Graimann, Brendan Allison, GertPfurtscheller, "Brain-Computer
	Interfaces: Revolutionizing Human-Computer Interaction", Springer, 2010
REFERENCES	
1	Ali Bashashati, MehrdadFatourechi, 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
2	Arnon Kohen, "Biomedical Signal Processing Vol I and II, CRC Press Inc, Boca
	Rato, Florida

COURSE OUT At the end of th	COMES: ne course, learners will be able to	Bloom's Taxonomy Level
CO1	Comprehend and appreciate the significance and role of this course in the present contemporary world.	K1
CO2	K1	
CO3	Allocate functions appropriately to the human and to the machine.	K1
CO4	Select appropriate for feature extraction methods.	K1
CO5	Design a system using machine learning algorithms for translation.	К2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	3	1	-	-	-	-	-	-	1	1	2	1
CO2	3	-	-	3	3	-	-	-	-	-	-	1	1	2	1
CO3	3	-	-	3	3	-	-	-	-	-	-	1	1	2	1
CO4	3	-	-	3	3	-	-	-	-	-	-	1	1	2	1
CO5	3	-	-	3	3	-	-	-	-	-	-	1	1	2	1



AIT531 DATA AUGMENTATION AND VIRTUAL REALITY										
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С			
			PE	3	0	0	3			
To Implement Data Augmentation Technique										
To Develop Virtual Reality Applications										
Preamble	Preamble > To Learn Integrate Data Augmentation with VR									
	To Analyze and Optin	nize Pe	rformance							
	To Conduct Research	and De	velopment							
Unit 1	INTRODUCTION	IMBO	Min 2				9			
Introduction to Augmen	nted-Virtual and Mixed Rea	lity, Tax	konomy, technology	and	featu	ires c	of augmented			
reality, difference betwe	en AR, VR and MR, Challen	nges wit	h AR, AR systems an	nd fu	inctio	nality	v, Augmented			
reality methods, visualization techniques for augmented reality.										
Unit 2	VR SYSTEMS						9			
56										

w.e.f.2024-2025 Jeppiaar Institute of Technology, Sriperumbudur VR as a discipline, Basic features of VR systems, Architecture of VR systems, VR hardware : VR input hardware: tracking systems, motion capture systems, data gloves, VR output hardware: visual displays. Unit 3 **STEREOSCOPIC VISION** & HAPTIC RENDERING Fundamentals of the human visual system, Depth cues, Stereopsis, Retinal disparity, Haptic sense, Haptic devices, Algorithms for haptic rendering and parallax, Synthesis of stereo pairs, Pipeline for stereo images. Unit 4 **VR SOFTWARE DEVELOPMENT** Challenges in VR software development, Master/slave and Client/server architectures, Cluster rendering, Game Engines and available sdk to develop VR applications for different hardware (HTC VIVE, Oculus, Google VR). **3D INTERACTION TECHNIQUES & AR SOFTWARE** Unit 5 9 DEVELOPMENT 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** 1 George Mather, Foundations of Sensation and Perception: Psychology Press; 2 edition, 2009. 2. The VR Book: Human-Centered Design for Virtual Reality, by Jason Jerald 3. 2 Learning Virtual Reality by Tony Parisi, O' Reilly 3 Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition.Wiley-IEEE Press, 2003/2006. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan 4 Kaufmann, 2013. REFERENCES Augmented Reality and Virtual Reality: Empowering Human, Place and Business 1 edited by Timothy Jung and M. Claudia tom Dieck (2017) 2 Virtual Reality and Augmented Reality: Foundations and Applications edited by Z. Y. Zhang, M. T. Bailey, and R. Y. P. Lau (2021) **COURSE OUTCOMES: Bloom's Taxonomy** At the end of the course, learners will be able to Level Identify, examine, and develop software that reflects K2 CO1 fundamental techniques for the design and deployment of VR and AR experiences. CO2 K2 Describe how VR and AR systems work. Choose, develop, explain, and defend the use of particular CO3 K2 designs for AR and VR experiences. Evaluate the benefits and drawbacks of specific AR and VR K5 CO4 techniques on the human body.

						1 A A			e	1.1					
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
CO2	3	2	2	1	3	201	DFR		3	2	2	3	3	1	2
CO3	3	3	2	2	3	20	1	-	3	2	> 1	2	3	2	2
CO4	3	3	3	2	3	5		). <u>2</u> 0	3	2	2	3	3	2	2
CO5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3

K1

Identify and examine state-of-the-art AR and VR design

problems and solutions from the industry and academia.

CO5

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
			PE	3	0	0	3
Preamble	<ul> <li>To learn language mo</li> <li>To learn text preproce</li> <li>To understand the lev</li> <li>To develop NLP appl</li> <li>To apply traditional log</li> </ul>	dels essing techni els of know ications. earning and	ques edge in language deep learning for	proces	ssing	ations	
Unit 1	TEXTPRE-PROCESSIN	NG AND LA	ANGUAGE				9
	MODELLING						
Knowledge in langu Corpora –Text Norn language models RNN Unit 2	age processing – NLP nalization –Minimum I N s as language models. WORD LEVEL AND SY	application Edit distan	is; – Regular H ce– N-gram la CANALYSIS	Expres	sions ge m	odels	Words – s–Neural 9
Word Level Analysi	s: Word classes – Part-	of-Speech	Tagging: HMN	1 POS	S tag	ging	Named
Entities(NE): NE Ta Constituency –Contex up –Ambiguity CKY Unit 3	agging – Conditional Ra kt-free grammar–Gramma Parsing–Shallow parsing SEMANTIC ANALYSIS	andom Fie ar rules– Tr –Dependen S	ld NE recogniz ree banks; Parsin cy parsing.	er; S ng: To	yntac op-do	vtic A wn –	Analysis: Bottom- 9
Vector Semantics – V	Vords and Vectors – $Cost$	ne similari	ty – 11-1df – Pos	sitive .	PMI ·	- W (	ord2vec—
Word Net Word Set	of embeddings; Lexical So	emantics: v	vord Senses – R	leiatio	ns de	etwee	in senses
$\frac{-\text{word Net} - \text{word Ser}}{\text{IInit 4}}$	CORFFERENCE RESC	LUTION A	ND MACHINE				9
	TRANSLATION						,
architecture: RNNs for	or sequence labeling and	omena – classificati	Mention dete on – Stacked ar	ection	_ direct	Men tiona	tion-pair   RNN –
architecture; RNNs fo Machine Tra MTEvaluation.	or sequence labeling and anslation(MT):Lexicaldiv	omena – classificati ergenceand	Mention dete on – Stacked an ltypology–Enco	ection d Bi- der-D	direct	Men tiona erwit	tion-pair l RNN – hRNNs–
architecture; RNNs fo Machine Tra MTEvaluation. Unit 5	or sequence labeling and anslation(MT):Lexicaldiv	omena – classificati rergenceand	Mention dete on – Stacked an Itypology–Enco	ection d Bi-o der-D		Men tiona erwit	tion-pair l RNN – hRNNs– 9
architecture; RNNs fe Machine Tra MTEvaluation. Unit 5 Sentiment Classifica Evaluation; Informati Question Answering:	Initial Correlevence pherical pherical pherical sequence labeling and anslation(MT):Lexicaldiv         NLP APPLICATIONS         tion: Naive Bayes class         on Extraction: Relation end         IR-based QA Datasets	oomena – classificati rergenceand ssifier – C extraction; Answer spa	Mention dete on – Stacked an ltypology–Enco Dptimizing for Information Ret n extraction.	ection Id Bi- der-D Senti rieval	direct ecode ment ; IR-l	Men tiona erwit An basec	tion-pair l RNN – hRNNs– 9 alysis – l Factoid
architecture; RNNs for Machine Tra MTEvaluation. Unit 5 Sentiment Classifica Evaluation; Informati Question Answering:	Initial Corecerctor preference pref	oomena – classificati ergenceand ssifier – ( extraction; Answer spa	Mention dete on – Stacked an ltypology–Enco Dptimizing for Information Ret n extraction.	ection d Bi- der-D Senti rieval	direct ecode ment ; IR-l	Men tiona erwit An oasec	tion-pair l RNN – hRNNs– 9 alysis – l Factoid TOTAL: 4
architecture; RNNs fe Machine Tr MTEvaluation. Unit 5 Sentiment Classifica Evaluation; Informati Question Answering: TEXTBOOKS 1 Danie introo Reco	NLP APPLICATIONS tion: Naive Bayes class on Extraction: Relation e IR-based QA Datasets - A el Jurafsky and James duction to Natural Langu gnition", 2nd Edition, Pre	aomena – classificati rergenceand ssifier – ( extraction; Answer spa H Martin, age Process entice Hall,	Mention dete on – Stacked an ltypology–Enco Dptimizing for Information Ret n extraction.	cection d Bi- der-D Senti rieval Lang onal L	direct ecode ment ; IR-l uage	Men tiona erwit An pased Proo	tion-pair l RNN – hRNNs– 9 alysis – l Factoid TOTAL: 4 cessing: A and Speed
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architecture; RNNs fe Machine Tr MTEvaluation. Unit 5 Sentiment Classifica Evaluation; Informati Question Answering: TEXTBOOKS 1 Dani- introo Reco REFERENCES 1 Cristop Proce 2 Steve with 3 Nitin Editi- 4 Yoav Syntl publi 5 LiDer	Itoh.       Coreference       pher         or sequence labeling and       anslation(MT):Lexicaldiv         NLP APPLICATIONS       tion: Naive Bayes class         tion:       Naive Bayes class         on Extraction:       Relation end         IR-based QA Datasets-       A         el Jurafsky and James       duction to Natural Langu         gnition", 2nd Edition, Proceed       Proceed         oher D Manning, Hinrich       Proceed         essing",MIT Press,1999.       Press, 1999.         en Bird, Ewan Klien       Python,O'Reilly,2009.         Indurkhya, FredJ Dame       On,CRC Press, 2010.         Ør Goldberg,"Neural Net       Netsis Lectures on Hun         shers,2017.       ng, Yang Liu,"DeepLearnin	aomena – classificati ergenceand ssifier – ( extraction; Answer spa H Martin, age Process entice Hall, Schutze, ' and Edwa rau, "Hand work Met nan Langu ginNaturalL	Mention dete on – Stacked an htypology–Enco Dptimizing for Information Ret n extraction. "Speech and sing, Computation 2008. Foundations of rd Loper, Nat book of Natural hods for Natural hods for Natural age Technolog	cetion d Bi-d der-D Senti rieval Lang onal L Statist ural 1 Lang cal La ies, 1 ng",Sp	direct ecode ment ; IR-l uage ingu ical Lang uage angua Morg	Men tiona erwit An pased Prod istics Natur uage Prod	tion-pair l RNN – hRNNs– 9 alysis – l Factoid TOTAL: cessing: <i>A</i> and Spee al Langua Processing cessing", 2 Processing & Claypo 8.

2018.

COURSE OUTC	OMES:	<b>Bloom's Taxonomy</b>					
At the end of the	course, learners will be able to	Level					
CO1	CO1 Apply text pre-processing techniques and build the language models						
CO2	CO2 Apply basic levels of knowledge at word level and syntax level in language processing						
CO3	Apply computational methods in lexical and vector semantics	К3					
CO4	Explain discourse processing and machine translation systems	K2					
CO5	Apply learning algorithms for various NLP applications	К3					

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	3	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	3	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	3	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	-	3	-	-	-	-	-	-	-	-	2	-	-
CO5	3	3	-	2	-	-	-	-	-	-	-	-	3	-	-

AIT533 COMPUTATIONAL NEUROSCIENCE								
			-					
Programme &	B.Tech & IT	Sem.	Category	L	Т	Р	С	
Branch	INSTITUTE	E TECHNOLO						
			PE	3	0	0	3	
<b>Preamble</b>								
Unit 1	INTRODUCTION						9	
Domains in Compu	tational Neuroscience -	Brain me	etaphors-compute	er ai	nd t	orain	- Basic	
neuroscience - Basic	neuroscience - Basic synaptic mechanisms and the generation of action potentials - Nernst							
Potential - Hodgkin-H	Iuxley equations - The prop	pagation o	f action potentia	ls.				
Unit 2	SPIKING NEURONS A	ND RES	PONSE				9	
	VARIABILITY	GY &						
Spiking neurons- conce	pt neurons- the neural code	e - Spike t	rains- cable theo	ry- S	pike	time	variability -	
Post synaptic potential(	PSP) - firing threshold and	action po	tential - Neuron	s in a	ı Net	work	- Population	
Dynamics - Rate code a	and Information in spike tra	ains - Pop	ulation coding a	nd de	codi	ng- si	ingle neuron	
models - Hodgkin-Hux	cley Model, spiking neuro	on models	s - Integrate and	1 firi	ng r	nodel	- Noise in	
spiking neuron models-	compartmental modelling.							
Unit 3	FEED-FORWARD MA	PPING N	ETWORKS				9	
From artificial neural r	network to realistic neural	networks	- Perception, fu	inctio	on re	prese	entation, and	
look-up tables - The	sigma node as percepti	ion - Mu	ılti-layer mappi	ng r	netwo	orks	- Learning,	
generalization and bio	logical interpretations -	Self-orgai	nizing network	arch	itect	ures	and genetic	
algorithms - Mapping networks with context units - Probabilistic mapping networks - Associators and								
59								
	55							

synaptic plastic	city - Associative memory and Hebbian learning - Hebian Hebbian learning	plasticity- features of
Unit 4	AUTO-ASSOCIATIVE MEMORY AND NETWO	RK 0
	DYNAMICS	
Associative me memory and a attractor neural networks - Con	mory networks- Short-term memory and reverberating networ uto-associators - Point attractor networks - The Grossberg-He l networks - Chaotic networks, biologically more realistic tinuous attractor and competitive networks.	rk activity - Long-term opfield model - Sparse variations of attractor
Unit 5	SUPERVISED LEARNING AND REWARDS	9
	SYSTEMS	
Motor learning delta rules, plas System level ar memory - Atter	and control, supervised learning - The delta rule and back pro- ticity and coding - Reward learning, System level organization natomy of the brain, Modular mapping networks - Coupled attra- tive vision, an interconnecting workspace hypothesis.	opagation - Generalized and coupled networks - actor networks, working
		TOTAL: 45
TEXTBOOKS		
1	Thomas Trappenberg, Fundamentals of Computational University Press June 2002	Neuroscience, oxford
2	Lytton, William W, From Computer to Brain - Foundat Neuroscience, Springer publications, 2002.	ions of Computational
REFERENCE	S S	
1	Gerstner and Kistler, Spiking Neuron Models. Single Plasticity -Cambridge University Press, 2002.	Neurons, Populations,
2	Eric L. Schwartz, Computational Neuroscience, MIT Press, 1	993
COURSE OUT	COMES:	Bloom's Taxonomy
At the end of t	he course, learners will be able to	Level
CO1	to create models of neural processes, including differential equations, statistical methods, and machine learning algorithms.	K2
CO2	Analyze, and interpret neural data using computational tools, effectively applying data analysis techniques to draw meaningful conclusions from experimental results	K2
CO3	Assess the accuracy and predictive power of different neural models.	К2
CO4	Demonstrate a deep understanding of neurobiological processes such as neural coding, synaptic plasticity, and neural dynamics, and model these processes computationally.	K2
CO5	Understand the practical applications of computational neuroscience in neuro engineering, artificial intelligence, and medicine.	K2

					100	the second second	ALC D		ALC: NO.						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	5	EST	0. <del>2</del> 0	11-1	≥ <sup>1</sup> ſ	1	2	2	2	1
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	2	1

w.e.f.2024-2025

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



#### **PROFESSIONAL ELECTIVE 7**

#### **AIT535 AI TECHNIQUES FOR GAME DEVELOPMENT Programme & Branch** B.Tech & IT Sem. Category Т Р С L PE 3 0 0 3 $\succ$ To have an introduction into the Game programming and rendering. $\geq$ To learn the principles, mechanics and logics of Game Design. Preamble To learn the various Game Development process and its design attributes. $\triangleright$ To gain working knowledge in various game platforms. $\triangleright$ To learn to design games using python. UNIT I **INTRODUCTION** Q Elements of Game Play — Artificial Intelligence — Getting Input from the Player - Sprite Programming Sprite Animation - Multithreading - Importance of Game Design - Game Loop, Software and Hardware Rendering. GAME DESIGN PRINCIPLES 0 Unit 2 Digital Crime - Substantive Criminal Law - General Conditions - Offenses - Investigation Methods for Collecting Digital Evidence – International Cooperation to Collect Digital Evidence 0 **DIGITAL FORENSIC READINESS** Unit 3 Game development: Developing 2D and 3D interactive games using OpenGL, DirectX — Puzzle games, Single /Multi-player games-Games using HTML and Java Script, Scratch 2.0, Unity 3D - Introduction, Creating games and Designing and Coding game play systems 9 GAMING PLATFORMS AND FRAMEWORKS Unit 4 Mobile Hardware and Operating Systems - iOS Fundamentals - Jailbreaking - File System - Hardware - iPhone Security - iOS Forensics - Procedures and Processes - Tools - Oxygen Forensics - MobilEdit - iCloud Unit 5 **GAME PROGRAMMING USING PYTHON** 9 Android basics - Key Codes - ADB - Rooting Android - Boot Process - File Systems - Security - Tools -Android Forensics - Forensic Procedures - ADB - Android Only Tools - Dual Use Tools - Oxygen Forensics -MobilEdit - Android App Decompiling TOTAL: 45 TEXTBOOKS Jeannie Novak, Game Development Essentials, Third Edition, Delmar Cengage Learning, 1 ISBN-13:978-1111307653, 2011. 2 Jim Thompson, Barnaby Berbank-Green, and Nic Cusworth, Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game, Designer, First edition, Wiley, ISBN 0471968943, 2007. Joseph Howse, Alejandro Rodas de Paz, Python Game Programming by Example, Packt 3 Publishing, First edition, 2015. **REFERENCES** 1 Jeremy Gibson, "Introduction to Game Design, Prototyping, and Development: From 1 Concept to Playable Game with Unity and C#", Addison-Wesley Professional, 3rd edition 2016. John Horton, -Learning Java by Building Android Games, Packt Publishing Limited, 1st 2 edition, 2015. 3 Jorge Palacios, -Unity 5.x Game AI Programming Cookbook, Packt Publishing Limited, 1st edition, 2016 **COURSEOUTCOMES: Bloom's Taxonomy** At the end of the course, learners will be able to Level CO1 Identify the need for Game programming. K2 62

w.e.f.2024-2025

CO2	Have knowledge on the concepts and techniques used in Game design.	K2
CO3	Design and model interactive game.	K2
CO4	Understand the need for advanced game development platforms.	K2
CO5	Design and develop games with open source components	К2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	-	-	-	-	-	-	2	2	-
CO5	2	2	-	3	3	-	1	2	3	2	1	3	2	3	-

	AIT536 SOFT C	OMPUT	ING				
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	Р	С
8			PE	3	0	0	3
Preamble	<ul> <li>To introduce the ideas human experience.</li> <li>To provide the mather associated with neural r</li> <li>To learn various evolut</li> <li>To become familiar with and generalize to form a</li> <li>To introduce case stubehavior of programs b</li> </ul>	of fuzzy ematical network ionary A th neural appropri- udies uti ased on	v sets, fuzzy logic an background for car learning lgorithms. networks that can le ate rules for inference lizing the above an soft computing	rrying arn f e syst nd i	e of l g out from a tems.	the the availa	tics based on optimization able examples ne Intelligent
UNIT I	INTRODUCTION TO SO	FT CO	MPUTING AND FU	JZZ	Y		9
	LOGIC						
Introduction - Fuzzy Lo Relations, Operations on	gic - Fuzzy Sets, Fuzzy Me Fuzzy Relations, Fuzzy Rules	embersh and Fuz	ip Functions, Operat zzy Reasoning, Fuzzy	tions / Infe	on l	Fuzzy e Syst	y Sets, Fuzzy tems
Unit 2	NEURAL NETWORKS					5	9
Supervised Learning Neu Learning Neural Network	ral Networks – Perceptrons - s – Kohonen Self-Organizing	Backpro Networ	pagation -Multilayer ks	Perc	eptro	ons –	Unsupervised
Unit 3	GENETIC ALGORITHM	IS	.37				9
Chromosome Encoding Genetic operators- Cross	Schemes -Population initial over – Mutation - Fitness Fur	ization ction – l	and selection metho Maximizing function	ods -	Eva	luatic	on function -
Unit 4	NEURO FUZZY MODEL	ING					9
ANFIS architecture – hyl Framework – Neuron fun Capability	brid learning – ANFIS as un ctions for adaptive networks	iversal a – Neuro	pproximator – Coact fuzzy spectrum - Ar	ive l nalys	Veuro is of	fuzz Adap	y modeling – tive Learning
Unit 5	APPLICATIONS						9
Modeling a two input sin	e function - Printed Characte	er Recog	nition – Fuzzy filtere	ed ne	ural	netwo	orks – Plasma
		63					

t

## Spectrum Analysis - Hand written neural recognition - Soft Computing for Color Recipe Prediction

on	
TOTAL: 45	

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TEXTBOOKS	
1	Sa JANG, JS. R., SUN, CT., & MIZUTANI, E. (1997). Neuro-fuzzy and soft computing:
	A computational approach to learning and machine intelligence. Upper Saddle River, NJ,
	Prentice Hall,1997
2	Himanshu Singh, Yunis Ahmad Lone, Deep Neuro-Fuzzy Systems with Python
3	With Case Studies and Applications from the Industry, Apress, 2020
REFERENCES	
1	Roj Kaushik and Sunita Tiwari, Soft Computing-Fundamentals Techniques and
	Applications, 1st Edition, McGraw Hill, 2018.
2	S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms",
	PHI, 2003.
3	Samir Roy, Udit Chakraborthy, Introduction to Soft Computing, Neuro Fuzzy and Genetic
	Algorithms, Pearson Education, 2013.
4	S.N. Sivanandam, S.N. Deepa, Principles of Soft Computing, Third Edition, Wiley India Pvt
	Ltd, 2019.
5	R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP
	Professional, Boston, 1996

COURSEOUTCO At the end of the	DMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Understand the fundamentals of fuzzy logic operators and inference mechanisms	K2
CO2	Understand neural network architecture for AI applications such as classification and clustering	K2
CO3	Learn the functionality of Genetic Algorithms in Optimization problems	К2
CO4	Use hybrid techniques involving Neural networks and Fuzzy logic	K2
CO5	Apply soft computing techniques in real world applications	К2

#### INSTITUTE OF TECHNOLOG

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	-	-	-	3	1	3	2	3	1	2
CO2	2	3	3	2	3	-	-	-	3	2	3	2	2	1	3
CO3	1	3	2	2	1		-	_	3	1	1	2	1	3	2
CO4	1	2	1	3	2	-		E	3	3	1	1	2	1	1
CO5	2	3	1	2	1	-	-	GY.	3	3	3	2	1	2	3

			-				
Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С
			PE	3	0	0	3
Preamble	<ul> <li>To understand the basi</li> <li>To understand the basi</li> </ul>	cs in deep cs of assoc	neural networks	d unsu	pervi	sed lea	rning
Jeppiaar Institute of Technology, Sriperumbudur							
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	SHITCHUMDOUUR	
	Programming Techniques", Addison Wesley, 2003.	
9	James A Freeman, David M S Kapura, "Neural Networks Al	gorithms, Applications, and
8	Pro Deep Learning with TensorFlow, Santanu Pattanayak, Apres	s,2017
7	S Rajasekaran, G A Vijayalakshmi Pai, "Neural Networks Algorithm Synthesis and Applications" PHI Learning 2017	, FuzzyLogic and Genetic
6	Deep Learning with Python, FRANÇOIS CHOLLET, ISLAND 2017	MANNING SHELTEI
5	Deep Learning Projects Using Tensor Flow 2, Vinita Silaparaset	ty, A press, 2020
4	Learn Keras for Deep Neural Networks, Jojo Moolayil, Apress,2	018
3	Charu C. Aggarwal, "Neural Networks and Deep Learnin International Publishing, 1st Edition, 2018.	g: A Textbook", Spring
2	Oreilly, 2018. Josh Patterson, Adam Gibson, "Deep Learning: A Practition Media 2017	ner's Approach", O'Reil
1	Aurelien Geron, "Hands-On Machine Learning with Scikit	Learn and Tensor Flow
REFERENCES		
2	Francois Chollet, "Deep Learning with Python", Second Edit	tion, Manning Publication
1	Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learni	ng", MIT Press, 2016.
TEXTBOOKS		101AL. 4
encoder, Regulari	zed Autoencoder, Stochastic Encoders and Decoders, Contractive I	Encoders TOTAL • 4
Networks – Appli	cations: Image Generation, Image Compression, Natural Language	Processing. Complete Aut
Unit 5 Recurrent Neurol	KECUKKENI NEUKAL NETWORKS	nal RNNs - Deen Recurren
Dropout - batch n	ormalization- VC Dimension and Neural Nets.	•
Backpropagation	- Regularization: Dataset Augmentation – Noise Robustness -Ea	arly Stopping, Bagging an
Unit 4 History of Deen	DEEP FEEDFORWARD NETWORKS	9 Jearning Chain Pule or
Neuroscientific B	asis – Applications: Computer Vision, Image Generation, Image Co	ompression.
of the basic Conv	volution Function – Structured Outputs – Data Types – Efficient	Convolution Algorithms
Spiking Neural N Machine Model-(	letworks-Convolutional Neural Networks-Deep Learning Neural 1 Convolutional Neural Networks: The Convolution Operation – Mot	Networks-Extreme Learnin ivation – Pooling – Varian
Unit 3	THIRD-GENERATION NEURAL NETWORKS	9
Network-Bidirect Networks-Tempo Feature Maps-Le Network.	ral Associative Memory (BAM)-Hopfield Networks-Iterative ral Associative Memory Network-Fixed Weight Competitive Net earning Vector Quantization-Counter propagation Networks-Ad	e Autoassociative Memor ts-Kohonen Self-Organizin daptive Resonance Theor
Training Algorith	mms for Pattern Association-Autoassociative Memory Network	Heteroassociative Memor
Unit 2	LEARNING NETWORKS	9
Rendering.	ASSOCIATIVE MEMODY AND UNSUDEDVISED	0
Sprite Animation	- Multithreading — Importance of Game Design — Game Lo	op, Software and Hardwar
UNIT I Elements of Gam	INTRODUCTION Artificial Intelligence — Getting Input from the Play	9 Pr Sprite Programming
	To apply autoencoders and generative models for suit	table applications.
	build and train deep neural networks for various tasks	S.
	$\rightarrow$ 10 analyze the key computations underlying deep lea	rning then lise them to
		•

CO1	Apply Convolution Neural Network for image processing.	K2
CO2	Understand the basics of associative memory and unsupervised learning networks.	K2
CO3	Apply CNN and its variants for suitable applications.	K2
CO4	Analyze the key computations underlying deep learning and use them to build and train deep neural networks for various tasks.	K2
CO5	Apply auto encoders and generative models for suitable applications.	К2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	-	-	2	1	-	-	2	2	1
CO2	3	1	2	1	-	-	-	-	-	1	2	2	-	1	-
CO3	3	3	3	3	3	1	-	-	2	1	-	-	2	2	1
CO4	3	3	3	3	3	-	-	-	2	-	2	3	2	2	2
CO5	1	1	3	2	3	-	-	-	2	-	-	-	1	1	-

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С					
			PE	3	0	0	3					
	Formulate and solve	linear progra	mming problems	(LPP)								
Ducomble	<ul> <li>Evaluate Integer Programming Problems, Transportation and Assignment Problems.</li> </ul>											
ricalilole	> Obtain a solution to	network prob	lems using CPM	and PH	ERT t	echnie	ques.					
	> Able to optimize the function subject to the constraints.											
	Identify and solve p	roblems unde	r Markovian queu	ing me	odels							
UNIT I	LINEAR MODELS						9					
Introduction of Operatio	ns Research - mathemati	cal formulation	on of LPP- Grap	hical	Meth	ods to	solve LI					
Simplex Method- Two-Pl	hase method											
Unit 2	INTEGER PROGRAM	IMING AND	TRANSPORT	ATIO	N		9					
	PROBLEMS											
	I KODLEMIS											
Integer programming: E	Branch and bound metho	od- Transport	ation and Assig	nment	prol	olems	- Travel					
Integer programming: E salesman problem	Branch and bound metho	od- Transport	ation and Assig	ment	prol	olems	- Travel					
Integer programming: E salesman problem Unit 3	Branch and bound metho PROJECT SCHEDUL	od- Transport	ation and Assig	nment	prol	olems	- Travel					
Integer programming: E salesman problem Unit 3 Project network -Diagram	Branch and bound metho PROJECT SCHEDUL n representation – Floats -	od- Transport ING Critical path	ation and Assig method (CPM) –	nment	prol	olems	- Travel 9 siderations					
Integer programming: E salesman problem Unit 3 Project network -Diagran PERT and CPM	Branch and bound metho PROJECT SCHEDUL n representation – Floats -	od- Transport ING Critical path	ation and Assig method (CPM) –	nment PERT	prol	olems	- Travel 9 siderations					
Integer programming: E salesman problem Unit 3 Project network -Diagran PERT and CPM Unit 4	PROJECT SCHEDUL n representation – Floats -	od- Transport ING Critical path ZATION TH	ation and Assig method (CPM) – IEORY	pment	prol	olems	- Travel 9 siderations 9					
Integer programming: E salesman problem Unit 3 Project network -Diagran PERT and CPM Unit 4 Unconstrained problems -	<b>PROJECT SCHEDUL</b> n representation – Floats - <b>CLASSICAL OPTIMI</b> – necessary and sufficient	od- Transport ING Critical path ZATION TH conditions - N	ation and Assig method (CPM) – IEORY Jewton-Raphson	PERT	prol	olems st cons	- Travel 9 siderations 9 ned proble					
Integer programming: E salesman problem Unit 3 Project network -Diagran PERT and CPM Unit 4 Unconstrained problems - – equality constraints – in	<b>PROJECT SCHEDUL</b> n representation – Floats - <b>CLASSICAL OPTIMI</b> – necessary and sufficient         nequality constraints - Kuh	od- Transport ING Critical path ZATION TH conditions - N n-Tucker con	ation and Assig method (CPM) – EORY lewton-Raphson ditions.	PERT method	prol	olems st cons	- Travel 9 siderations 9 ned proble					
Integer programming: E salesman problem Unit 3 Project network -Diagran PERT and CPM Unit 4 Unconstrained problems - – equality constraints – ir Unit 5	<b>PROJECT SCHEDUL</b> n representation – Floats - <b>CLASSICAL OPTIMI</b> – necessary and sufficient         nequality constraints - Kuh <b>QUEUING MODELS</b>	od- Transport ING Critical path ZATION TH conditions - N n-Tucker con	ation and Assig method (CPM) – IEORY Jewton-Raphson ditions.	PERT methoo	prol	olems st cons nstraii	- Travel 9 siderations 9 ned proble 9					

#### Service facility, Queue discipline, Single channel models, multiple service channels.

Total: 45

TEXTBOOKS	
1	Hamdy A Taha, Operations Research: An Introduction, Pearson, 10th Edition, 2017.
REFERENCES	
1	ND Vohra, Quantitative Techniques in Management, Tata McGraw Hill, 4th Edition, 2011.
2	J. K. Sharma, Operations Research Theory and Applications, Macmillan, 5th Edition, 2012.
3	Hiller F.S, Liberman G.J, Introduction to Operations Research, 10th Edition McGraw Hill,
	2017.
4	Jit. S. Chandran, Mahendran P. Kawatra, KiHoKim, Essentials of Linear Programming,
	Vikas Publishing House Pvt.Ltd. New Delhi, 1994.
5	Ravindran A., Philip D.T., and Solberg J.J., Operations Research, John Wiley, 2nd Edition,
	2007

COURSEOUTCO	OMES: course learners will be able to	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	Formulate and solve linear programming problems (LPP)	K2
CO2	Evaluate Integer Programming Problems, Transportation and Assignment Problems.	K2
CO3	Obtain a solution to network problems using CPM and PERT techniques.	К2
CO4	Able to optimize the function subject to the constraints.	К2
CO5	Identify and solve problems under Markovian queuing models	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO1	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	- 100	TINIT	NE TOPS	2	1	1	2	3	3	3
CO2	3	1	2	2	3	-	-	-	3	2	3	1	2	1	1
CO3	2	3	3	2	2	-	-	-	3	3	1	3	1	3	1
CO4	2	2	1	1	3	-	-	-	2	1	3	1	2	1	2
CO5	2	1	1	3	2	-	-	-	3	3	1	3	3	2	1

		6. 18								
Programme & Branch	B.Tech & IT	Sem. Category	L	Т	P	С				
		PE	3	0	0	3				
	Introduce the different	basic elements of Reinfo	rcement l	Learni	ing (RL	<i>.</i> ).				
Droomblo	Study about Tabular methods and Q-networks.									
ricallible	Study about policy optimized	imization.								
	Learn current advancer	nents and applications in	RL.							
UNIT I	<b>BASICS OF REINFORC</b>	EMENT LEARNING (	RL)			9				

9

TOTAL: 45

Elements of RL- I	RL framework-	Markov j	property-	Partially	Observable	Markov	Decision	Process-	policies
value functions and	l Bellman equati	ons.							

Unit 2	TABULAR METHODS	9
Planning with dynamic P	rogramming- Monte Carlo control- and Temporal-Difference lea	arning methods - TD
(0), SARSA, and Q-Learn	ing.	
Unit 3	Q-NETWORKS	9

**Q-NETWORKS** Deep Q-networks - DQN, DDQN, Dueling DQN, Prioritized Experience Replay

**POLICY OPTIMIZATIONS** Unit 4

Optimal policies and optimal value functions- Bellman optimality equations- Vanilla Policy Gradient-REINFORCE algorithm and stochastic policy search- Actor-critic methods - A2C and A3C- Advanced policy gradient - PPO, TRPO, DDPG. Unit 5 9

#### **RECENT ADVANCEMENTS AND APPLICATIONS**

Meta-learning, Multi-Agent RL, Model-based RL approach, Code Standards and Python Libraries used in RL: SuperSuit, Stable Baselines3, Pistonball and MAgent. RL for real-world problems: Autonomous Driving- Train an RL agent to navigate a self-driving car through complex urban environments, obeying traffic rules, and making safe decisions.

#### TEXTBOOKS

TEATBOOKS	
1	Richard S. Sutton and Andrew G. Barto, "Reinforcement Learning: An Introduction", MIT
	Press, 2nd edition, 2018.
REFERENCES	
1	Russell, Stuart J., and Peter Norvig. "Artificial intelligence: a modern approach. "Pearson
	Education Limited, 2022.
2	Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective",2012.
3	Csaba Szepesvari, "Algorithms for Reinforcement learning",2009.
4	Wiering, Marco, and Martijn Van Otterlo. "Reinforcement learning." Adaptation, learning,
	and optimization 12 (2012).
5	Li, Yuxi. "Deep reinforcement learning." arXiv preprint arXiv:1810.06339 (2018).
	Goodfellow Ian Voshua Bengio and Aaron Courville "Deen learning" MIT press 2016

<b>COURSEOUTCO</b> At the end of the	OMES: course, learners will be able to	Bloom's Taxonomy Level
CO1	Explain the elements of reinforcement learning.	K2
CO2	Apply tabular methods and Q-networks to solve classical problems.	K2
CO3	Interpret policy gradient methods from vanilla to more complex cases.	К2
CO4	Implement real-world problems applying code standards.	К2
CO5		

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-		scipv	2	1	1	2	3	3	3
CO2	3	1	2	2	3				3	2	3	1	2	1	1
CO3	2	3	3	2	2				3	3	1	3	1	3	1
CO4	2	2	1	1	3	R	EST	020	2	1	3	1	2	1	2
CO5	2	1	1	3	2	-	-	-	3	3	1	3	3	2	1

# **OPEN ELECTIVES**

Programme & Branch Preamble	BE & MECH	Sem.	Category	L	Т	р	C
Preamble					1	r	С
Preamble	1		OE	3	0	0	3
	To understand the basics	s of drone	e concepts.			1 1	
	<ul> <li>To learn and understand drone.</li> <li>To impart the knowledge</li> <li>To know about the vario</li> <li>To understand the safety</li> </ul>	d the fun e of a flyi ous applic y risks and	daments of design, f ing and operation of c ations of drone. d guidelines of fly saf	àbricat Irone. Yelv.	ion a	nd pro	ogramming of
Unit 1	INTRODUCTION TO DRON	E TECH	NOLOGY				9
Drone Concept their method entrepreneurship	- Vocabulary Terminology- Histo of propulsion- Drone technolo p- Opportunities/applications for en	ory of dro ogy impa ntreprene	one - Types of curren act on the busines surship and employab	t gener ses- I ility	ration Drone	of dr busi	ones based on iness through
Unit 2	DRONE DESIGN, FABRICAT	FION AN	ND PROGRAMMIN	G			9
components -As of programming stabilization- Fl:	sembling a drone- The energy sou g drone- Download program -Insight modes -Wi-Fi connection.	stall prog	recommended even of autonomy- Drog gram on computer- 1	nes cor Runnin	ifigur g Pro	ations	-The methods s- Multi rotor
Unit 3	DRONE FLYING AND OPER	RATION					9
Concept of ope controls Flight ( Linked mobile of	pration for drone -Flight modes- operations –management tool –Ser levices and applications.	Operate nsors-On	a small drone in a board storage capacit	contro zy - Re	lled ( mova	enviro ble ste	nment. Drone orage devices-
Unit 4	DRONE COMMERCIAL APP	PLICAT	IONS				9
Choosing a dron and other cargo Drones in filmin	ne based on the application -Dron - Drones in agriculture- Drones ng and panoramic picturing.	nes in the in inspec	insurance sector- Dr ction of transmission	ones in lines	n deli and j	vering	g mail, parcels distribution -
Unit 5	FUTURE DRONES AND SAF	TETY					9
The safety risks Miniaturization	s- Guidelines to fly safely - Spec of drones- Increasing autonomy of	cific avia f drones -	ation regulation and The use of drones in	standa swarm	rdizat s.	ion- I	Drone license-
							Total: 45
TEXTBOOKS           1         Dani           Strat         Inc, 2	el Tal and John Altschuld, "Drone egic Guide to Unmanned Aerial V 2021.	e Technol Vehicle (	ogy in Architecture, l Dperation and Impler	Engine	ering on", J	and C John V	onstruction: A Wiley & Sons,
2 Terry 2016	/ Kilby and Belinda Kilby, "Mak	ce: Gettir	ng Started with Dron	es ", N	/laker	Medi	ia, 1 <sup>st</sup> Edition,
REFERENCES	5	1	100				
1 John Publ	Baichtal, "Building Your Own Dr ishing, 2016	rones: A	Beginners' Guide to I	Drones,	UAV	/s, and	d ROVs", Que
2 Zavr	snik, "Drones and Unmanned Ae eillance", Springer, 2018.	erial Syste	ems: Legal and Socia	al Impl	icatio	ons for	r Security and
Surv							
	TCOMES			RI		s Taxa	nomv Level

At the en	d of the course, learners will be able to	
CO1	Know about a various type of drone technology, drone fabrication and programming.	K2
CO2	Execute the suitable operating procedures for functioning a drone.	К3
CO3	Select appropriate sensors and actuators for Drones.	К3
CO4	Develop a drone mechanism for specific applications.	K4
CO5	Create the programs for various drones.	K6

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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 - ADD	ITIVE N	IANUFACTURING				
Programme	BE & MECH	Sem.	Category		Т	P	С
& Branch							
			OE	3	0	0	3
Preamble	> To introduce the devel	opment, o	capabilities, application	s, of	Add	itive	Manufacturing
	(AM), and its business of	opportuni	ties.				
	To be acquainted with v	at polym	erization and material e	xtrus	ion p	rocess	ses
	To be familiar with pow	vder bed f	usion and binder jetting	proc	esses	•	
	To gain knowledge on	applicati	ons of direct energy de	eposi	tion,	and r	naterial jetting
	processes.						
	To impart knowledge or	n sheet la	mination and direct writ	e tec	hnolc	gies.	
Unit 1	INTRODUCTION						9
Overview - Nee	ed - Development of Additive M	Manufactu	uring (AM) Technology	/: Ra	npid I	Protot	yping - Rapid
Tooling - Rapid	Manufacturing - Additive Manuf	àcturing.	AM Process Chain - AS	STM/	ISO :	52900	) Classification
- Benefits - AM	File formats: STL, AMF – Applie	cations - H	Business Opportunities i	n Al	М.		
Unit 2	VAT POLYMERIZATION A	ND MAT	<b>FERIAL EXTRUSION</b>	[			9
Photo polymeri	zation: Stereolithography Appar	atus (SL	A)- Materials -Process	- to	op da	wn a	and bottom-up
approach - Adva	antages - Limitations - Applicati	ons. Digi	tal Light Processing (D	LP)	- Pro	cess ·	- Advantages -
Applications. M	laterial Extrusion: Fused Deposi	tion Mod	leling (FDM) - Process	s-Ma	terial	s -Ap	plications and
Limitations.		< c					
Unit 3	POWDER BED FUSION ANI	D BINDE	<b>R JETTING</b>				9
Powder Bed Fu	sion: Selective Laser Sintering	(SLS): Pr	ocess - Powder Fusion	n Me	chani	sm -	Materials and
Application. Sel	ective Laser Melting (SLM), Ele	ctron Bea	m Melting (EBM): Ma	teria	ls - P	roces	s - Advantages
and Application	s. Binder Jetting: Three-Dimensi	ional Prir	ting - Materials - Proc	ess -	Ben	efits -	- Limitations -
Applications.	Sam						
Unit 4	MATERIAL JETTING AND	DIRECT	ED ENERGY				9
Unit 4	DEPOSITION		~				
Material Jetting:	Multijet Modeling- Materials - I	Process -	Benefits - Applications	. Dir	ected	Ener	gy Deposition:
		70					

Laser Engineered Net Shaping (LENS) - Process - Material Delivery - Materials -Benefits -Applications. SHEET LAMINATION AND DIRECT WRITE TECHNOLOGY Unit 5 9

Sheet Lamination: Laminated Object Manufacturing (LOM)- Basic Principle- Mechanism: Gluing or Adhesive Bonding - Thermal Bonding - Materials - Application and Limitation. Ink-Based Direct Writing (DW): Nozzle Dispensing Processes, Inkjet Printing Processes, Aerosol DW - Applications of DW.

		Total: 45
TEXTBO	DOKS	
1	Ian Gibson, David Rosen, Brent Stucker, Mahyar Khorasani, "Additive	manufacturing technologies",
	Springer Cham, 3rd edition, 2021.	
2	Andreas Gebhardt and Jan-Steffen Hotter "Additive Manufacturing: 3I	Printing for Prototyping and
	Manufacturing", Hanser publications, 2016.	
REFERI	ENCES	
1	Andreas Gebhardt, "Understanding Additive Manufacturing:	Rapid Prototyping, Rapid
	Manufacturing", Hanser Gardner Publication, 1 <sup>st</sup> Edition, 2012.	
2	Milan Brandt, "Laser Additive Manufacturing: Materials, Design, Tec	hnologies, and Applications",
	Woodhead Publishing, 1 <sup>st</sup> Edition, 2016.	
3	Amit Bandyopadhyay and Susmita Bose, "Additive Manufacturing", 2 <sup>nd</sup>	<sup>1</sup> Edition, CRC Press, 2021.
4	Kamrani A.K. and Nasr E.A, "Rapid Prototyping: Theory and practice"	, Springer, 2006.
5	Liou, L.W. and Liou, F.W., "Rapid Prototyping and Engineering	applications: A toolbox for
	prototype development", CRC Press, 2019.	
	•	
COURS	E OUTCOMES:	<b>Bloom's Taxonomy Level</b>
At the en	d of the course, learners will be able to	
CO1	Recognize the development of AM technology and how AM	K2
	technology propagated into various businesses and developing	
	opportunities.	
CO2	Acquire knowledge on process vat polymerization and material	K2
	extrusion processes and its applications.	

CO3	Elaborate the process and applications of powder bed fusion and binder jetting.	K2
CO4	Evaluate the advantages, limitations, applications of material jetting and directed energy deposition processes.	K2
CO5	Acquire knowledge on sheet lamination and direct write technology.	K2

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2			-				2	2	2	2
CO2	2	2	2	2	2	N	X			1/14		2	2	2	2
CO3	2	2	2	2	2					181		2	2	2	2
CO4	2	2	2	2	2		$\sim$	ě,	1	£.		2	2	2	2
CO5	2	2	2	2	2							2	2	2	2

	AME703 - ELECTRIC AN	D HYBRID	VEHICLE TECI	HNOL	OGY		
	< ann						
Programme & Branch	BE & MECH	Sem.	Category	L	T	P	С
			OE	3	0	0	3
		71					

Pream	ble > To introduce the concept of hybrid and electric drive train	ns.
	To elaborate on the types and utilisation of hybrid and ele	ectric drive trains.
	To expose on different types of AC and DC drives for ele	ectric vehicles.
	To learn and utilise different types of energy storage system	ems.
	To introduce concept of energy management strategies and	nd drive sizing.
Unit	1 INTRODUCTION	9
Basics of	f vehicle performance, vehicle power source characterization, transmissi	on characteristics, History
nybrid an	nd electric vehicles, social and environmental importance of hybrid and	d electric vehicles, impact
nodern d	rivetrains on energy supplies.	
Unit	2 HYBRID ELECTRIC DRIVE TRAINS	9
Basic cor	ncept of hybrid traction, introduction to various hybrid drive-train topol	logies, power flow control
whrid dr	ive-train topologies, fuel efficiency analysis, Electric Drivetrains: Basic	concent of electric traction
ntroducti	ion to various electric drive-train topologies, power flow control in electr	ric drive-train topologies fi
officiency	analysis	The drive-train topologies, it
Unit	CONTROL OF AC & DC DRIVES	0
Unit (mtmo du oti	5 CONTROL OF AC & DC DRIVES	tion and control DC Ma
	ion to electric components used in hybrid and electric venicles, Compute	allon, and control - DC Mo
arives, in	duction Motor drives, Permanent Magnet Motor drive, and Switch Re	eluctance Motor drives, dri
system ef	Therency.	
Unit	4 ENERGY STORAGE	9
Introducti	ion to Energy Storage Requirements in Hybrid and Electric Vehicles, End	ergy storage and its analysi
Battery ba	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe	ent energy storage devices.
Battery ba Unit	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe 5 DRIVE SIZING AND ENERGY MANAGEMENT STRATEG	GIES9
Battery ba Unit Sizing the propulsion Managem	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies. Implementation issues</li> </ul>	GIES       9         tion engine (ICE), Sizing to storage technology, Energie vehicles, classification, and storage technology.
Battery ba Unit Sizing the propulsion Managem comparise	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe         5       DRIVE SIZING AND ENERGY MANAGEMENT STRATEGOR         e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.	GIES       9         tion engine (ICE), Sizing to storage technology, Energic vehicles, classification, a         Total:
Battery ba Unit Sizing the propulsion Managem comparise	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe         5       DRIVE SIZING AND ENERGY MANAGEMENT STRATEG         e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.         DOKS	GIES 9 tion engine (ICE), Sizing to storage technology, Ener to vehicles, classification, a Total:
Battery ba Unit Sizing the propulsion Managem comparise TEXTBC 1	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe         5       DRIVE SIZING AND ENERGY MANAGEMENT STRATEG         e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.         DOKS         Igbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals",	GIES       9         tion engine (ICE), Sizing to storage technology, Energies vehicles, classification, a         Total:         Routledge publications,
Battery ba Unit Sizing the propulsion Managem compariso TEXTBC 1	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe         5       DRIVE SIZING AND ENERGY MANAGEMENT STRATEG         e drive system: Matching the electric machine and the internal combustors motor, sizing the power electronics, selection of appropriate energy thent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.         DOKS         Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021	GIES       9         tion engine (ICE), Sizing to storage technology, Energy storage techn
Battery ba Unit Sizing the propulsion Managem compariso TEXTBC 1	ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe         5       DRIVE SIZING AND ENERGY MANAGEMENT STRATEG         e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.         DOKS         Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021         James Larminie and John Lowry "Electric Vehicle Technology Ext	GIES       9         tion engine (ICE), Sizing to storage technology, Energies vehicles, classification, a         Total:         Routledge publications,
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Battery ba Unit Dizing the propulsion Managem comparise TEXTBC 1 2 REFERE	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electri on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> </ul>	GIES       9         tion engine (ICE), Sizing to storage technology, Energies vehicles, classification, a         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition
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Battery ba Unit Dizing the propulsion Managem compariso 1 1 2 REFERF 1	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li>ENCES</li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Evel Cell Vehicles: Fundamentals Theory and Design" CRC Press. 3<sup>rd</sup></li> </ul>	ent energy storage devices.         GIES       9         tion engine (ICE), Sizing to storage technology, Energy stora
Battery ba Unit Sizing the propulsion Managem compariso TEXTBO 1 2 REFERE 1	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li><b>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</b></li> <li>e drive system: Matching the electric machine and the internal combuston motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.</li> <li><b>DOKS</b></li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li><b>ENCES</b></li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup></li> <li>Pand D. A. L. Waeds, P. &amp; Poreld Dell, "Patteries for Electric vehicles"</li> </ul>	GIES       9         tion engine (ICE), Sizing to         y storage technology, Energies         tic vehicles, classification, a         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         Lohn Wiley, & Sons, 1998
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Battery ba Unit Sizing the propulsion Managem compariso TEXTBO 1 2 REFERE 1 2 3	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li><b>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</b></li> <li>e drive system: Matching the electric machine and the internal combust on motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electri on of energy management strategies, Implementation issues.</li> <li><b>DOKS</b></li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li><b>ENCES</b></li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup> Rand D.A.J, Woods, R &amp; Ronald Dell, "Batteries for Electric vehicles", Jack Erjavec, "Hybrid, Electric and Fuel-Cell Vehicles", Delmar Ce 2012</li> </ul>	GIES       9         tion engine (ICE), Sizing to         y storage technology, Energie         tic vehicles, classification, a         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         John Wiley & Sons, 1998.         engage Learning, 2 <sup>nd</sup> Edition
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Battery ba Unit Sizing the propulsion Managem compariso TEXTBO 1 2 REFERE 1 2 3 4 5	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combustion motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li>CNCES</li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup></li> <li>Rand D.A.J, Woods, R &amp; Ronald Dell, "Batteries for Electric vehicles", Jack Erjavec, "Hybrid, Electric and Fuel-Cell Vehicles", Delmar Ce 2012.</li> <li>Christian Paar, "Energy Management in Hybrid Electric Vehicles u Verlag, 2011.</li> <li>Yangsheng Xu, Jingyu Yan, Huihuan Qian and Tin Lun Lam, "Hybrid Control and the internal combustion of the later with the later is a full based.</li> </ul>	cent energy storage devices.         GIES       9         tion engine (ICE), Sizing to         v storage technology, Energies         to vehicles, classification, a         Total:         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         John Wiley & Sons, 1998.         engage Learning, 2 <sup>nd</sup> Edition         using Co-Simulation", VE         H Electric Vehicle Design a         1 <sup>N</sup> E Winner 2014
Battery ba Unit Sizing the propulsion Management comparise TEXTBC 1 2 REFERE 1 2 3 4 5	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combust n motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electri on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li>CNCES</li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup> Rand D.A.J, Woods, R &amp; Ronald Dell, "Batteries for Electric vehicles", Jack Erjavec, "Hybrid, Electric and Fuel-Cell Vehicles", Delmar Ce 2012.</li> <li>Christian Paar, "Energy Management in Hybrid Electric Vehicles u Verlag, 2011.</li> <li>Yangsheng Xu, Jingyu Yan, Huihuan Qian and Tin Lun Lam, "Hybrid Control: Intelligent Omnidirectional Hybrids", McGraw Hill Eductaion,</li> </ul>	GIES       9         tion engine (ICE), Sizing to         y storage technology, Energies         tic vehicles, classification, a         Total:         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         John Wiley & Sons, 1998.         mgage Learning, 2 <sup>nd</sup> Edition         using Co-Simulation", VE         I Electric Vehicle Design a         1 <sup>st</sup> Edition, 2014.
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Battery ba Unit Sizing the propulsion Management comparise TEXTBO 1 2 REFERE 1 2 3 4 5 COURS	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combust n motor, sizing the power electronics, selection of appropriate energy nent Strategies: Energy management strategies used in hybrid and electri on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Exp 2012.</li> <li>ENCES</li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup> Rand D.A.J, Woods, R &amp; Ronald Dell, "Batteries for Electric vehicles", Jack Erjavec, "Hybrid, Electric and Fuel-Cell Vehicles", Delmar Ce 2012.</li> <li>Christian Paar, "Energy Management in Hybrid Electric Vehicles u Verlag, 2011.</li> <li>Yangsheng Xu, Jingyu Yan, Huihuan Qian and Tin Lun Lam, "Hybrid Control: Intelligent Omnidirectional Hybrids", McGraw Hill Eductaion,</li> </ul>	GIES       9         tion engine (ICE), Sizing to         y storage technology, Energies         tic vehicles, classification, a         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         John Wiley & Sons, 1998.         mgage Learning, 2 <sup>nd</sup> Edition         using Co-Simulation", VE         H Electric Vehicle Design a         1 <sup>st</sup> Edition, 2014.
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Battery ba Unit Sizing the propulsion Managem compariso TEXTBO 1 2 REFERE 1 2 3 4 5 COURS At the en CO1	<ul> <li>ased, Fuel Cell based, and Super Capacitor based, Hybridization of differe</li> <li>DRIVE SIZING AND ENERGY MANAGEMENT STRATEG</li> <li>e drive system: Matching the electric machine and the internal combusion motor, sizing the power electronics, selection of appropriate energy the system: Energy management strategies used in hybrid and electric on of energy management strategies, Implementation issues.</li> <li>DOKS</li> <li>Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals", Edition, 2021</li> <li>James Larminie and John Lowry, "Electric Vehicle Technology Explored.</li> <li>ENCES</li> <li>Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 3<sup>rd</sup></li> <li>Rand D.A.J, Woods, R &amp; Ronald Dell, "Batteries for Electric vehicles", Jack Erjavec, "Hybrid, Electric and Fuel-Cell Vehicles", Delmar Ce 2012.</li> <li>Christian Paar, "Energy Management in Hybrid Electric Vehicles uverlag, 2011.</li> <li>Yangsheng Xu, Jingyu Yan, Huihuan Qian and Tin Lun Lam, "Hybrid Control: Intelligent Omnidirectional Hybrids", McGraw Hill Eductaion, EOUTCOMES:</li> <li>d of the course, learners will be able to</li> <li>Discuss, categorize and configure hybrid drivetrains requirement for a</li> </ul>	GIES       9         tion engine (ICE), Sizing to storage technology, Energies vehicles, classification, a         Total:         Total:         Routledge publications,         plained", Wiley, 2 <sup>nd</sup> Edition         Electric, Hybrid Electric a         Edition 2018.         John Wiley & Sons, 1998.         engage Learning, 2 <sup>nd</sup> Edition         using Co-Simulation", VE         H Electric Vehicle Design a         1 <sup>st</sup> Edition, 2014.         K2

Jeppiaar Institute of Technology, Sriperumbudur w.e.f.2024-2025 CO2 Design and apply appropriate hybrid and electric drive trains in a K5 vehicle. Design and install suitable AC and DC drives for electric vehicles. K5 CO3 CO4 Discuss arrive at a suitable energy storage system for a hybrid / K2 electric vehicle. CO5 Apply energy management strategies to ensure better economy and K3 efficiency.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	1		2						1	2	3
CO5	3	2	1	1	1		2						1	2	3

	AEC701 - SENSORS AN	ND ACTU	ATORS				
Programme &		Sem.	Category	L	Т	Р	С
Branch	BE & ECE	0	0	3			
Preamble	The course is to make the studen	ts to list co	mmon types o	of ser	nsor ai	nd actu	ators
	used in automotive vehicles.						
Unit – I	INTRODUCTION TO MEAS	SUREMEN	NTS AND			9	
	SENSORS						
Sensors: Functions-	Classifications- Main technical	requirement	nt and trends	uni Uni	its and	d stand	dards
Calibration methods-	- Classification of errors- Erro	or analysis	s- Limiting	error	- Pro	bable	error
Propagation of erro	r- Odds and uncertainty- pri	nciple of	transduction	-Clas	sificat	tion. S	Static
characteristics- math	ematical model of transducers-	- Zero, Fi	rst and Secc	ond o	order	transdu	ucers
Dynamic characteristi	ics of first and second order trans	ducers for s	standard test				
Unit – II	VARIABLE RESISTANCE A	AND INDU	TANCE			9	
	SENSORS						
Principle of operat	ion- Construction details- Ch	naracteristic	s and appl	icatio	ons c	of resi	stive
potentiometer- Strain	gauges- Resistive thermometers-	- Thermisto	ors- Piezoresis	stive	sensor	rs Indu	ctive
potentiometer- Variab	ole reluctance transducers: - EI pie	ck up and I	LVDT				
Unit – III	VARIABLE AND OTHER SPI	ECIAL SE	NSORS			9	
Variable air gap typ	e, variable area type and varia	able permi	ttivity type-	capa	citor 1	microp	hone
Piezoelectric, Magne	to strictive, Hall Effect, semico	onductor se	ensor- digital	trans	sducer	s-Hum	idity
Sensor. Rain sensor, c	elimatic condition sensor, solar, li	ght sensor,	antiglare sen	sor.			
Unit – IV	AUTOMOTIVE ACTUATOR	RS				9	
Electromechanical a	ctuators- Fluid-mechanical act	uators- El	ectrical mac	hines	s- Di	rect-cu	irrent
machines- Three-phas	se machines- Single-phase alterna	ating-curre	nt Machines -	- Dut	y-type	rating	s for
electrical machines. V	Working principles, construction	and location	on of actuator	s viz	. Sole	noid, r	elay,
stepper motor etc.							
	73						

Unit – V

9

#### \_\_\_\_\_

	ACTUATORS
Differe	nt types of actuators used in automatic temperature control- Fixed and variable displacement
temper	ature control- Semi Automatic- Controller design for Fixed and variable displacement type air
conditi	oning system.
	Total:45
TEX	FBOOK:
1.	Doebelin's Measurement Systems: 7th Edition (SIE), Ernest O. Doebelin DhaneshN.Manik McGraw Hill Publishers, 2019.
2.	Robert Brandy, "Automotive Electronics and Computer System", Prentice Hall, 2001
3.	William Kimberley," Bosch Automotive Handbook", 6th Edition, Robert Bosch GmbH, 2004.
4.	Bosch Automotive Electrics and Automotive Electronics Systems and Components, Networking and Hybrid Drive, 5th Edition, 2007, ISBN No: 978-3-658-01783-5
REFI	ERENCES:
1.	James D Halderman, "Automotive Electrical and Electronics", Prentice Hall, USA, 2013

AUTOMATIC TEMPERATURE CONTROL

## Tom Denton, "Automotive Electrical and Electronics Systems," Third Edition, 2004, SAE International.

- 3. Patranabis.D, "Sensors and Transducers", 2nd Edition, Prentice Hall India Ltd,2003
- 4. William Ribbens, "Understanding Automotive Electronics -An Engineering Perspective," 7th Edition, Elsevier Butterworth-Heinemann Publishers, 2012

C	DUI	RSE	OU	TCOM	IES:									Bl	oom's T	axonon	ny
A	the	enc	d of t	the cou	irse, le	arners	will b	e able	e to						Lev	vel	
CO	D1 List common types of sensor and actuators used in vehicles										K2						
C	)2	Desi	ign n	neasuri	ng equ	ipment	's for t	he m	easui	reme	nt of	pressu	re force	,	K4		
		temj	perat	ure and	l flow												
C	)3	Gen	erate	e new	ideas	in de	signing	g the	sen	sors	and	actua	tors for	r	K3		
		auto	moti	ve app	licatior	l <b>.</b>											
C	)4	Und	ersta	nd the	e opera	tion o	f the	sensc	ors, a	actua	tors	and e	lectronic	;	K2		
		cont	rol.														
CO	05	Desi	ign te	empera	ture co	ntrol a	ctuator	s for	vehic	cles.		1.*			K4		
<u> </u>								_		<u></u>							] ๅ
	CO	/PO	PO	PO2	PO	PO4	PO5 F	PO6 I	207	PO8	PO	PO10	PO11	PO12	PSO1	PSO2	

	1		3				12		9	8				
CO1	3	2	3	2	-		-	1		-	-	-	1	1
CO2	3	3	3	2	2		- D	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		1.	-	-	2	2

### AEC702 - APPLIED DESIGN THINKING

Programme	¢Å	F & FCF	Sem.	Category		Т	Р	C
Branch	D		-	OE	3	0	0	3
Preamble		> This course	aims to prov	vide to make	the	stude	nts Intro	oduce tools
		techniques of	design thinki	ng for innovat	tive p	roduc	t. develo	pment.
		$\succ$ Illustrate cust	omer-centric	product innov	ation	using	simple,	use cases.
		Demonstrate	developmen	t of Minim	um	usable	Protot	ypes, Outl
		principles of s	solution conce	epts & their ev	valuat	ion.		
		<ul> <li>Describe systematic</li> </ul>	em thinking p	rinciples as a	oplied	l to co	mplex s	ystems
Unit – I	D	<b>DESIGN THINKIN</b>	NG PRINCI	PLES				9
Exploring Hu	uman-cen	tered Design - Ur	nderstanding	the Innovatio	n pro	ocess,	discove	ring areas o
pportunity, I	Interviewi	ing & empathy-bui	Iding techniq	ues, Mitigate	valic	lation	risk wit	h FIR [Forg
nnovation rul	bric] - Ca	se studies	6					
Unit – II	E	NDUSER-CENT	RIC INNOV	ATION				9
mportance o	of custon	ner-centric innova	tion - Prob	lem Validatio	on ai	nd Ci	istomer	Discoverv
Jnderstanding	g problem	n significance and r	problem incid	lence - Custon	ner V	alidat	ion. Tar	get user, Use
ersona & use	er stories.	Activity: Custome	r developmer	nt process - Cu	istom	er inte	erviews a	and field vis
Unit – III	A	PPLIED DESIGN		GTOOLS				9
Concept of M	linimum	Usable Prototyne	[MI]P] - MI]	P challenge h	rief.	. Desi	oning &	Crafting th
	IIIIIIIII	osuble i lototype		i enanenge c	/101		Sinne a	cruiting th
value proposit	tion - Des	ioning and Testing	Value Propo	sition Design		mnell	ino valu	- nronosition
alue proposit	tion - Des	signing and Testing	Value Propo	sition; Design	a co	mpell	ing value	e proposition
value proposit Process, tools	tion - Des and tech	signing and Testing niques of Value Pro CONCEPT GENE	Value Propo position Des	sition; Design ign		mpell	ing value	e proposition
value proposit Process, tools <b>Unit – IV</b>	tion - Des and techn C	signing and Testing niques of Value Pro CONCEPT GENE	y Value Propo position Des RATION	ign			ing value	e proposition 9 tion concern
value proposit Process, tools Unit – IV Solution Expl	tion - Des and techn loration,	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generation	Value Propo oposition Des <b>RATION</b> on and MUP	ign design- Con	a co ceptu		the solu	9 tion concep
value proposit Process, tools <b>Unit – IV</b> Solution Expl explore, iterat	tion - Des and techn loration, te and le	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rig	Value Propo position Des <b>RATION</b> on and MUP ht prototype:	sition; Design ign design- Con Assess capa	ceptu bility	alize	the solution control of the solution of the so	e proposition 9 tion concep d feasibility
value proposit Process, tools <b>Unit – IV</b> Solution Expl explore, iterat Systematic con	tion - Des and techn loration, te and le oncept gen	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rigneration; evaluation	Value Propo position Des <b>RATION</b> on and MUP ht prototype; of technolog	sition; Design ign design- Con Assess capa y alternatives	ceptu bility	mpell alize , usal he sol	the solu bility an ution co	e proposition 9 tion concep d feasibility ncepts 9
value proposit Process, tools Unit - IV Solution Expl explore, iterate Systematic controls Unit - V	tion - Des and techn loration, te and le oncept gen S	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generati earn; build the rig neration; evaluation <b>YSTEM THINKI</b>	Value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b>	sition; Design ign design- Con Assess capa y alternatives	ceptu bility and t	alize , usa he sol	the solu bility an ution co	e proposition 9 tion concep id feasibility ncepts 9
value proposit Process, tools <b>Unit – IV</b> Solution Expl explore, iterat Systematic con <b>Unit – V</b> System Think	tion - Des and techn loration, te and le oncept gen S ting, Unde	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rigneration; evaluation YSTEM THINKI erstanding Systems	Value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples at	sition; Design ign design- Con Assess capa y alternatives	ceptu bility and t	mpell alize y, usal he sol	the solu bility an ution co	e proposition 9 tion concep d feasibility ncepts 9 tems.
value proposit Process, tools Unit - IV Solution Expl explore, iterat Systematic con Unit - V System Think	tion - Des and techn loration, te and le oncept gen S ing, Unde	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rigneration; evaluation <b>YSTEM THINKI</b> erstanding Systems	Value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples at	sition; Design ign design- Con Assess capa y alternatives nd Understanc	ceptu bility and t lings,	mpell alize 7, usal he sol	the solu bility an ution co plex Sys	e proposition 9 tion concepted feasibility ncepts 9 tems. Total:4
value proposit Process, tools <b>Unit – IV</b> Solution Expl Explore, iterat Systematic con <b>Unit – V</b> System Think	tion - Des and techn loration, te and le ncept ger S ing, Unde	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rigneration; evaluation YSTEM THINKI erstanding Systems	Value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples an	sition; Design ign design- Con Assess capa y alternatives nd Understanc	ceptu bility and t lings,	mpell alize , usal he sol Com	the solu bility an ution co	e proposition 9 tion concep ad feasibility ncepts 9 tems. <b>Total:4</b>
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ralue propositProcess, toolsUnit – IVSolution Explore, iterationSystematic controlUnit – VSystem ThinkTEXTBOOI1.	tion - Des and techn loration, te and le ncept gen S ing, Unde K: eve Blanl	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generati earn; build the rig neration; evaluation <b>YSTEM THINKI</b> erstanding Systems k, (2013), The fou	Value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples an ur steps to ep	ign design- Con Assess capa y alternatives nd Understand	ceptu bility and t lings,	mpell alize , usa he sol Com	the solu bility an ution co plex Sys	e proposition 9 tion concept d feasibility ncepts 9 tems. Total:4 r products the
value proposit       Process, tools       Unit – IV       Solution Explore, iteration       Systematic construction       Unit – V       System Think       TEXTBOOI       1.     Stewart	tion - Des and techn loration, C te and le oncept ger S ing, Undo K: eve Blanl in, Wiley.	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generative earn; build the rigneration; evaluation YSTEM THINKI erstanding Systems k, (2013), The four	value Propo position Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples an ur steps to ep	ign design- Con Assess capa y alternatives nd Understanc	ceptu bility and t lings,	mpell alize 7, usal he sol Com	the solu bility an ution co plex Sys	e proposition 9 tion concept d feasibility ncepts 9 tems. Total:4 r products the
value proposit         Process, tools         Unit – IV         Solution Explore, iterat         Systematic cor         Unit – V         System Think         TEXTBOOI         1.       Stewing         2.       Stewing	tion - Des and techn loration, te and le oncept gen s ing, Unde <b>K:</b> eve Blanl in, Wiley. eve Blanl	signing and Testing niques of Value Pro CONCEPT GENE Concepts Generati earn; build the rig neration; evaluation <b>YSTEM THINKI</b> erstanding Systems k, (2013), The fou k, (2013), The fou	value Propo oposition Des <b>RATION</b> on and MUP ht prototype; of technolog <b>NG</b> , Examples an ur steps to ep ar steps to ep	ign design- Con Assess capa y alternatives nd Understanc iphany: Succe	ceptu bility and t lings, essfu	mpell: alize , usal he sol Com	the solu bility an ution co plex Sys egies for	e proposition 9 tion concept d feasibility ncepts 9 tems. Total:4 r products th r products th
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- 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

COURS	COURSE OUTCOMES:										Bloo	m's Tax	onomy		
At the e	nd of	f the	course	e, lear	ners	will b	e able	e to						Level	
CO1	Defi	ne &	k test	vario	us hy	pothe	ses to	mitig	gate t	he inł	nerent	risks in	K2		
product innovations															
CO2 Design the solution concept based on the proposed value by exploring										5	K4				
	alter	nate	solutio	ns to	achie	ve val	ue-pri	ce fit.							
CO3	Deve	elop	skills i	n emj	pathiz	ing, ci	ritical	thinki	ing, aı	nalyzir	ıg, stor	ytelling		K4	
	& pi	tchir	ıg												
CO4	Deve	elop	skills i	n stor	ytelli	ng & p	oitchir	ng					К3		
CO5	App	ly sy	rstem th	ninkir	ıg in a	ı real-	world	scena	rio				К3		
CO/PO	) F	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	-	-	1	-	-	-	-	1	1
CO3	CO3 3 3 2 2 2 1											-	-	2	2
CO4	CO4 3 3 3 3 2 1										-	-	3	2	
CO5	CO5         3         2         3         3         2         -         1         -         -         -									-	-	2	2		

	AEC703 - PRC	JECT RE	PORT WRITIN	NG			
Programme &	DE & ECE	Sem.	Category	L	Т	Р	С
Branch	DE & ECE	IPDD	OE	3	0	0	3
		JEPP	IHHK I				·
Preamble	This course air	ms to provi	de essentials of	proje	ct writ	ting, P	erceive the
	difference betv	veen genera	l writing and tec	chnica	l writii	ıg.	
	➢ Assimilate the	e fundamer	ntal features of	f repo	ort wr	iting,	Learn the
	structure of a to	echnical and	l project report.	1		U,	
Unit – I			<u> </u>				9
			D ' XX '		. 1 /	~ 1	~ 1
Writing Skills – Ess	ential Grammar and V	ocabulary -	- Passive Voice	e, Rep	orted S	Speech	, Concord,
Signpost words, Cohe	esive Devices – Paragra	aph writing	- Technical Writ	ting vs	s. Gene	eral W1	riting.
Unit – II	**						9
Project Report – Def	inition. Structure, Type	es of Report	s. Purpose – Int	tended	Audie	ence –	Plagiarism
– Report Writing in S	TEM fields – Experim	ent – Statist	ical Analysis.				8
Unit – III							9
		×					
Structure of the Proje	ect Report: (Part 1) Fra	aming a Tit	le – Content –	Ackno	wledg	ement	<ul> <li>Funding</li> </ul>
Details -Abstract – Ir	ntroduction – Aim of th	he Study – I	Background - W	Vriting	the re	esearch	question -
Need of the Study/I	Project Significance, I	Relevance -	- Determining	the fe	easibili	ity – 1	Theoretical
Framework.							
Unit – IV	$\leq 1$	Grine.	1 1100	>			9
		₹\$10	2011				

Structure of the Project Report: (Part 2) – Literature Review, Research Design, Methods of Data Collection - Tools and Procedures - Data Analysis - Interpretation - Findings -Limitations -Recommendations – Conclusion – Bibliography. 9

#### Unit – V

Proof reading a report – Avoiding Typographical Errors – Bibliography in required Format – Font – Spacing – Checking Tables and Illustrations – Presenting a Report Orally – Techniques.

Total:45

REFERE	NCES:
1.	Gerson and Gerson - Technical Communication: Process and Product, 7th Edition, Prentice Hall(2012)
2.	Virendra K. Pamecha - Guide to Project Reports, Project Appraisals and Project Finance(2012)

Daniel Riordan - Technical Report Writing Today (1998) Darla-Jean Weatherford -3. Technical Writing for Engineering Professionals (2016) Penwell Publishers.

COURSE At the end	COUTCOMES: d of the course, learners will be able to	Bloom's Taxonomy Level
CO1	Write effective project reports.	K2
CO2	Use statistical tools with confidence	K2
CO3	Explain the purpose and intension of the proposed project coherently and with clarity.	К2
CO4	Create writing texts to suit achieve the intended purpose.	K2
CO5	Master the art of writing winning proposals and projects.	K2

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	3	2	2	3	3	3	3	-	-	
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								
				1			1	
Programme & Branch	B.E &CSE	Sem.	Category		Т	P	C	
			PE	3	0	0	3	
Broomble To introduce system engineering concepts to design the manufacturing system for								
Treamore	optimum utilization of sou	rce for effe	ctive functioning.					
UNIT I	INTRODUCTION	1	8 /			9	)	
<b>Definitions of Systems Eng</b>	gineering, Systems Engineeri	ng Knowled	lge, Life cycles, Life	e-cycle	phases	s, logic	al steps of	
systems engineering, Fram	e works for systems engineer	ing.						
Unit 2	SYSTEMS ENGINEERI	NG PROC	ESSES			9	)	
Formulation of issues with	a case study, Value system	design, Fun	ctional analysis, Bu	siness	Proces	s Reen	gineering,	
Quality function deployme	ent, System synthesis, Approa	ches for ger	eration of alternativ	ves.				
Unit 3 ANALYSIS OF ALTERNATIVES- I 9								
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.								
77								

Unit 4	ANALYSIS OF ALTERNATIVES-II	9
Reliability, Availa	bility, Maintainability, and Supportability models; Stochastic net	works and Markov models,
Queuing network	optimization, Time series and Regression models, Evaluation of large	scale models.
Unit 5	DECISION ASSESSMENT	9
Decision assessme	nt types, Five types of decision assessment efforts, Utility theory,	Group decision making and
Voting approaches	s, Social welfare function; Systems Engineering methods for Systems	Engineering Management.
		Total: 45
TEXTBOOKS		
1	Andrew P. Sage, James E. Armstrong Jr. "Introduction to S	ystems Engineering", John
	Wiley and Sons, Inc,2000.	
COURSEOUT	COMES:	Bloom's Taxonomy
At the end of the	course, learners will be able to	Level
CO1	The Student must be able to apply systems engineering	K2
	principles to make decision for optimization.	
CO2	Hence an understanding of the systems engineering discipline	K2
	and be able to use the core principles and processes for	
	designing effective system.	
CO3	Analyze the various method to impact on system engineering	K2
CO4	Decision capabilities identified with various analysis.	К2

CO4	Decision capabilities identified with various analysis.	K2
CO5	Management the system based on decision results.	K2

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	_	_		-	-	-	2	2	-
CO5	2	2	-	3	3	-	1	2	3	2	1	3	2	3	-

	A	CS702- GRE	EN COM	IPUTING							
Programme & Branch	B.E &	CSE	Sem.	Category	L	Т	Р	С			
	OE 3 0 0 3										
	To lease	arn the funda	mentals of	Green Computing.							
Draambla	To an	alyze the Gre	en compu	ting Grid Framewor	k.						
rieaniole	To un	nderstand the	issues rel	ated with Green com	npliar	nce.					
	To stu	udy and devel	lop variou	s case studies.							
UNIT I	FUNDAMEN	ITALS	1					9			
Green IT Fundamentals:	Business, IT, a	and the Envi	ronment -	- Green computing:	carb	on fo	ot pri	nt, scoop on			
power - Green IT Strat	egies: Drivers	, Dimension	s, and G	oals – Environmen	tally	Resp	onsib	le Business:			
Policies, Practices, and M	etrics.	-Int D									
Unit 2	GREEN ASS	ETS AND M	<b>IODELI</b>	NG				9			
Green Assets: Buildings	Green Assets: Buildings, Data Centers, Networks, and Devices - Green Business Process Management:										
Modeling, Optimization, and Collaboration - Green Enterprise Architecture - Environmental Intelligence -											
Green Supply Chains – Green Information Systems: Design and Development Models											

Unit 3	GRID F	<b>TRAMEWORK</b>	9
Virtualization of I'	systems – Role	of electric utilities, Telecommuting, teleconferencin	ng and teleporting – Materials
recycling – Best wa	rs for Green PC – G	Green Data center – Green Grid framework.	
Unit 4	GREEN	COMPLIANCE	9
Socio-cultural aspe	s of Green IT – G	reen Enterprise Transformation Roadmap – Green Co	ompliance: Protocols, Standards,
and Audits - Emerg	ent Carbon Issues:	Technologies and Future	
Unit 5	CASE S	TUDIES	9
The Environmental	y Responsible Bu	siness Strategies (ERBS) - Case Study Scenarios for	or Trial Runs – Case Studies –
Applying Green IT	trategies and App	lications to a Home, Hospital, Packaging Industry and	l Telecom Sector.
			Total: 45
TEXTBOOKS			
1	Bhuvan Unhe	elkar, "Green IT Strategies and Applica	tions-Using Environmental
	Intelligence", C	CRC Press, June 2014	
2	Woody Leonha	rd, Katherine Murray, "Green Home computing	for dummies", August 2012.
REFERENCES			
1	Alin Gales, Mi	ichael Schaefer, Mike Ebbers, "Green Data Ce	nter: steps for the Journey",
	Shroff/IBM reb	book, 2011.	
2	John Lamb, "T	he Greening of IT", Pearson Education, 2009.	
3	Jason Harris, "	Green Computing and Green IT- Best Practices	s on regulations & industry",
	Lulu.com, 2008	3	
4	.Carl speshocky	y, "Empowering Green Initiatives with IT", John	Wiley & Sons, 2010. 5. Wu
	Chun Feng (edi	tor), "Green computing: Large Scale energy efficient	ciency", CRC Press
COURSEOUT	OMES:		Bloom's Taxonomy
At the end of the	course, learners	will be able to	Level
CO1	Acquire knowle	edge to adopt green computing practices to	K2
	minimize negat	ive impacts on the environment	
CO2	Enhance the sl	xill in energy saving practices in their use of	K2
	hardware.	and in energy surving provinces in allow use of	
CO3	Evaluate techn	ology tools that can reduce paper waste and	K2
	carbon footprin	t by the stakeholders.	
<u> </u>	Understand th	a ways to minimize againment disposed	K.J
004		ic ways to minimize equipment disposal	IX.2
	Tequirements.		
CO5	Discuss briefly	about the use cases in various applications.	K2

POs/	DOI	DOD			DO5	DOG	DO7	DOP	DOO	<b>DO10</b>	DO11	DO12	DCO1	DSO2	DSO2
COs	PUI	PO2	POS	PO4	POS	PU0	P0/	PU8	P09	POIU	POII	POIZ	PS01	PS02	1303
CO1		2				24		2		2	11		2	2	
CO2		2		2	2	2	1.1						3	2	
CO3				2		2			Ň		20		3	2	3
CO4	3	2			2			2	2	2	2		3	2	3
CO5		2	3	2			1			)Ž		1		2	

	ACS703 - FINTECH REGULATION												
S CRIPERUMBUNIO Z													
Programme & Branch	B.E & CSE	Sem.	Category	L	Т	Р	С						
	S tan	. 2011	OE	3	0	0	3						
Preamble	To learn about Laws a	and Regul	ation										

	To acquire the knowledge of Regulations of Fint	ech firm and their role in
	Market	
UNIT I	INTRODUCTION	9
The Role of the	Regulators, Equal Treatment and Competition, Need for a	regulatory assessment of
Fintech, India R	Regulations, The Risks to Consider, Regtech and SupTech	n, The rise of TechFins,
Regulatory sandb	poxes, compliance and whistle blowing	
Unit 2	INNOVATION AND REGULATION	9
The technology,	market and the law, Regulation and Innovation in Banking	and Finance, Regulations
of Fintech Firm	s and their role in Market-Based Chains, Current Regula	atory Approach, Fintech
Innovations in	Banking, Asset Management, Insurance, Pensions and	d Healthcare Schemes,
Patentability of F	FinTech inventions.	
Unit 3	CROWDFUNDING AND DIGITAL ASSETS	9
Types of crowd f	funding, The Jobs Act, Regulation crowd funding, Regulation	A+, Regulation D crowd
funding, Intrasta	te offerings, Digital Assets - Three uses of Digital Asset	ts, A world of Altcoins,
Stablecoins, Digi	ital Asset Forks, Initial Coin Offerings, Regulatory Framewo	ork for Digital and Crypto
Assets, Central B	Bank Digital Currencies	
Unit 4	MARKETPLACE LENDING AND MOBILE	9
	PAYMENTS	
Online Lending	Business Models, Payday Loans, Consumer Protection Laws	s, Debt Collection, Equal
Credit Opportuni	ity Act, Contract Formation and the E-Sign Act, Military	Lending Act, Securities
11	tions, Mobile Devices, Payment Cards and the Law, Tru	uth in Lending Act and
Laws Considerat		
Laws Considerat Regulation Z, Ca	ard Act, Electronic Fund Transfer Act and Regulation E, Fa	air Credit Reporting Act,
Laws Considerat Regulation Z, Ca Federal Bank Sec	ard Act, Electronic Fund Transfer Act and Regulation E, Facrecy Act, State Money Transmitter Laws.	air Credit Reporting Act,
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	international transactions such as syndicated lending and international bond issues.	
CO3	Be able to critically engage with the major theoretical legal debates surrounding international financing, financial markets and financial technology.	K2
CO4	Be able to deal with policy arguments on international financing, financial markets and financial technology law	K2
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	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2						2		2			2	2	
CO2		2		2	2	2							3	2	
CO3				2		2							3	2	3
CO4	3	2			2			2	2	2	2		3	2	3
CO5		2	3	2			1					1		2	

Programme & Branch	MBA	Sem.	Category	L	Т	Р	С			
			OEC	3	0	0	3			
	> To understand the	conce	ots, need and	impo	tance	e of	Corporate			
	Governance.									
Draamhla	> To understand the relationship between Business, government and Society.									
Preamble	> To provide the learners with different organization structures.									
	> To provide the learner	s to inte	grate with busine	ss and	l soci	ety.				
	> To formulate and exec	ute the	plans at various le	vels	of ma	nage	ment.			
Unit 1	CORPORATE GOVER	NANC	E				9			
Unit 1 Corporate governance:	CORPORATE GOVER The concept, need and impo	NANC rtance o	E f corporate governa	ince, T	The ro	ole ar	9 Id purpose of			
Unit 1 Corporate governance: the corporation, separat	CORPORATE GOVER The concept, need and impo ion of ownership and con	NANC rtance o trol, be	E f corporate governa nefits of good co	ince, T	The ro te go	ole ar	9 Id purpose of ance, OECD			
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Unit 1 Corporate governance: the corporation, separat (Organization for econor corporate governance,	CORPORATE GOVER The concept, need and impo- ion of ownership and con- nic co-operation and develo- environmental Concerns at	NANC rtance o atrol, be opment) nd Cor	E f corporate governa nefits of good co on corporate gove porations, environ	nce, T orpora rnance menta	The ro te go e, Th 1 pro	ole ar overna eoreti eserva	9 ad purpose of ance, OECD cal basis for ation-role of			
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Business Ethics and Corporate Social Responsibility: Meaning of business ethics, need and purpose, importance, approaches to business ethics, roots of unethical behavior, ethical decision making some unethical issues, benefits from managing ethics at workplace. Nature of CSR, arguments for and against CSR, models of CSR, best practices of CSR-Indian examples.

against CDR, IIIC	dels of ester, best practices of esternitian examples.		
Unit 5	BOARD OF DIRECTORS		9
Role of Board o	f Directors in Corporate Governance, Corporate board of Ma	nagement, st	ructure and
composition of	the board, Types of board and directors, Size of the board,	Powers of th	ne board of
directors, respon	sibilities, functions of the board, code of conduct for board n	nembers, train	ning for the
board of director	rs, effectiveness of the board members, effectiveness and powe	ers of the boar	·d.
			Total: 45
<b>REFERENCE</b>	BOOK		
1	Corporate Governance: Principles, policies and Practices by Fer	rnando A.c. P	ub: Pearson,
	2014.		
2	Business and Government by Francis Cherunilam, Pub: Himalaya	n Publishing H	louse.
3	Corporate Governance, Ethics & Social Responsibility by Balach	andran C.H, F	Pub: PHI Pvt
	Ltd, 2015.		
4	Business Ethics and Corporate Governance: Ghosh B.N., TMH, 20	015	
COURSE OUT	COMES:	Bloom's T	axonomy
At	the end of the course, learners will be able to	Lev	vel
CO1	Understand to connect between the corporate, ethics and	K	1
	society.		
CO2	cide about the appropriateness of various business structures.	K	2
CO3	derstand the need for and importance of corporate governance	K	3
	with reference to Environment protection		
CO4	ke the students to understand the essence of business and how	K	4
	business could be mutually beneficial to the businessman and		
	the society.		
CO5	Decide on the role and functions of Board of Directors in an	K	5
	Organization.		

CO/	DO 1	DO 2	DO 3		РО	PO	DO 7	DO 8	POO	PO	РО	РО	DSO 1	DSO 2	DSO 3
PO	101	102	105	104	5	6	107	108	109	10	11	12	1501	1502	1505
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	2.0	1	2	1	2	2	1	1	2	1	1

Programme & Branch	MBA	Sem.	Category	L	Т	Р	С
			OE	3	0	0	3
		ESTD. 2011					

		> To understand the concepts of Digital Marketing.	
		> To understand the Online Advertising and SEO.	
Pream	nble	> To analyse the Social media and email Marketing.	
		> To evaluate the concepts of email marketing.	
		> To formulate mobile marketing and e-marketing strateg	gies.
Unit	t 1	OVERVIEW OF DIGITAL MARKETING	9
Digital ma	arketing o	overview and meaning- benefits - platform & strategies-	- comparing digital w
traditional	marketin	g- latest digital marketing trends- case studies of digital m	narketing trends. Cont
Marketing	, Handlin	g Traffic.	
Unit	t 2	ONLINE ADVERTISING AND SEO	9
Internet an	nd Search	Engine Basics, online Advertising, Importance of online Adv	vertising, Types of onl
Marketing	and adv	ertising Methods. Importance of Search Engines, How th	he search engine wor
Understand	ling the SE	ERP, Using Search Operators, Search Engine Algorithms.	
Unit	t 3	SOCIAL MEDIA AND EMAIL MARKETING	9
What is So	ocial Media	a, SMM Vs. SMO, Benefits of using SMM, Social Media Strat	tegy, and Impact of Soc
Media on	SEO. Mai	keting strategy, Benefits, Promotional tools for- Facebook, Y	ouTube, Twitter, Goog
Linkedn. E	mail Mark	keting- Email Marketing concept, Importance, Popular Email M	larketing Softwares, En
Marketing	Goals and	Strategies, Types of Email marketing campaigns, Creating an	Email Campaign, Wha
Newsletter,	, Design a	Rewsletter. Micro Blogging.	0
			9
Unit Ecommerc Promoting Marketing Selling, In	ce Busin g eComm g. Unders ntroduction	ess Planning, eCommerce Website, Product Placemen erce Website, Remarketing Products: Re-Marketing Flow tanding Coupon System, Appointing Affiliates for Pro- n to payment gateway- Application and Documentation.	nts, Product Groupi w, Email, Facebook I roducts, Cross/Up/Do
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w.e.f.2024-2025 Jeppiaar Institute of Technology, Sriperumbudur Explore the concepts of Remarketing strategies CO<sub>4</sub> K4 CO5 Develop various payment and billing gateways in digital marketing. K5 PO PO PO PO PO CO/ PO 2 PO 3 PO 9 PSO 1 PO1 PO<sub>4</sub> PO 7 PO 8 PSO 2 PSO 3 PO 5 6 10 11 12 2 1 2 2 3 1 1 2 1 1 2 CO1 1 3 2 1 2 CO2 1 1 1 1 2 1 1 2 2 1 1 CO3 3 2 1 1 1 1 2 1 2 2 1 1 2 2 2 3 2 2 2 2 2 CO4 1 1 1 1 1 1 1 1 2 2 2 3 1 2 1 2 2 1 1 1 1 1 CO5 AMB703- RURAL MARKETING **Programme &** MBA Sem. Category L Т Р С Branch OE 3 0 0 3 To understand the concepts of Rural Marketing ≻ To understand the types of Agricultural products for marketing. ⊳ To analyse the issues in Rural Marketing. ۶ Preamble 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. AGRICULTURAL MARKETING Unit 2 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** 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** 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). **INSTITUIONAL SUPPORT TO RURAL MARKETING** 9 Unit 5 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** Badi R.V. Badi N.V.Rural Marketing Himalaya Publishing House - 2010 1 84

2	Rural Marketing- Gopalaswamy Vikas Publishing House, 2020.								
3	Kashyp Pradeep, Rant Siddhartha The Rural Marketing, Biztantra,	2015.							
4	Mishra and Puri Development Issues of Indian Economy Himalaya Publishing House, 2018								
COURSE	COURSE OUTCOMES: Bloom's Taxonomy								
	At the end of the course, learners will be able to	Level							
CO1	Understand the concepts of Rural Marketing	K1							
CO2	Understand the nature of Rural Consumer Behaviour	K2							
CO3	Analyse the nature of marketing rural products	К3							
CO4	CO4 Identify the problems and issues in Rural Marketing K4								
CO5	Formulate the marketing strategies to satisfy the rural consumers.	K5							

CO/	PO 1	DO 2	DO 3		РО	РО	PO 7	DO 8	DO 0	PO	PO	РО	PSO 1	DSO 2	DSO 3
PO	101	102	105	104	5	6	107	108	109	10	11	12	1501	1302	1505
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

	AIT701 - NETWOI	RKING	ESSENTIALS				
Programme & Branch	B.Tech & IT	Sem.	Category	L	T	P	С
			OE	3	0	0	3
Preamble	<ul> <li>Understand the divis</li> <li>Be familiar with the networks</li> <li>Be exposed to the reduction</li> </ul>	sion of ne he comp	etwork functionali onents required unctionality at eac	ities in to bu h lave	nto la ild d	iyers. liffere	ent types of
	> Learn the flow contr	ol and co	ongestion control	algori	thms	•	
	> Learn the Classify the	ne variou	s soft computing f	rame	work	s	
UNIT I	FUNDAMENTALS &	LINK L	AYER				9
Building a network – H software – Performance	Requirements – Layering	and pro ming – F	tocols – Internet	Arch	itect	ure –	- Network
Unit 2	MEDIA ACCESS & IN	TERNE	TWORKING	1 10 W		01	9
Media access control – bridging – Basic Internet	Ethernet (802.3) – Wirel working (IP, CIDR, ARP,	ess LAN DHCP,	Js – 802.11 – B1 ICMP)	uetoo	th –	Swit	ching and
Unit 3	ROUTING	A.F	1.*				9
Routing (RIP, OSPF, m addresses – multicast rou	etrics) – Switch basics – ting (DVMRP, PIM), Uni	- Global cast Rou	Internet (Areas, ting Algorithms	BGP,	IPv	5), M	lulticast –
Unit 4	TRANSPORT LAYER	ā. ` .	18				9
Overview of Transport 1 control – Retransmission Application requirement	ayer – UDP – Reliable by – TCP Congestion contro s	te stream ol – Cong	n (TCP) – Connec gestion avoidance	tion r (DEC	nana Cbit,	geme RED	ent – Flow 9) – QoS –
Unit 5	APPLICATION LAYE	R					9
Traditional applications – SNMP, Telnet –SSH	Electronic Mail (SMTP, F	POP3, IN	IAP, MIME) – H	TTP –	Wel	o Ser	vices – DNS
*							Total: 45
TEXTBOOKS							
		85					

protocols

1	Larry L. Peterson, Bruce S. Davie, "Computer Networks	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, 2009								
2	Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall								
	Publishers, 2010								
3	Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Compu	uter Networks: An Open							
	Source Approach", McGraw Hill Publisher, 2011								
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	К2							
0.01	of networks	112							
CO2	Choose the required functionality at each layer for given	K3							
02	application	K5							
CO2	Identify solution for each functionality a	<i>V</i> 1							
005	t each layer	KI							
	Trace the flow of information from one node to another								
CO4	node in the network.	K2							
	Design protocols for various functions in the network and								
005	Design protocols for various functions in the network and	W2							
005	understand the working of various application layer	KZ							

CO/	DO 1	DOD		DO 4	PO	PO	DO 7		DOO	PO	РО	PO			
PO	POT	PO 2	PO 3	PO4	5	6	PO /	PO 8	PO 9	10	11	12	PSO I	PSO 2	PSO 3
CO1	3	3	3	1	3	3	3	2	2	1	-	1			
CO2	3	3	2	-	-	-	1	1.05.15	DHEDU	- 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			

Programme & Branch	B.Tech & IT	Sem.	Category	L	Т	P	С
			OE	3	0	0	3
Preamble	<ul> <li>Classify the variation of t</li></ul>	h the desi h the desi ical backgro	nputing frame we gn of neural ne ound for optimiz	orks etworł ed ger nd its a	ks, fi netic applie	uzzy progr catior	logic and ramming
UNIT I	INTRODUCTION TO	SOFT CC	OMPUTING				9
Soft Computing Constitut Network: Introduction, ( Technologies - Applicat	ients-From Conventional Characteristics- Evolutio ions. Fuzzy Logic: Intro artesian Product Of Relat	AI To Con n Of Neur duction - Class	nputational Inte al Networks - H Crisp Sets- Fuz	lligen Basic zy Set	ce- A Mod ts - (	rtific els - Crisp	ial Neural Important Relations

	A Second Techniques Constin Desis Concents	inground fructional
Uptimization And	<u>I Search Techniques – Genetic Basic Concepts.</u>	0
Mcculloch-Pitts Perceptron Netw Associative Mer	Neuron - Linear Separability - Hebb Network - Supervis orks - Adaptive Linear Neuron, Multiple Adaptive Linear nory Network: Auto- Associative Memory Network, Hete	sed Learning Network: Neuron, BPN, RBF - ro-Associative Memory
Network, Hopfiel	d Networks, Iterative Auto Associative Memory Network –	Unsupervised Learning
Networks: Kohor	ien Self-Organizing Feature Maps, LVQ – CP Networks, ART	l'Network.
Unit 3	FUZZY LOGIC	9
Defuzzification: - Extension Prince And Approximate Decomposition C Overview Of Fuz	Lambda Cuts - Methods - Fuzzy Arithmetic And Fuzzy Meas- iple - Fuzzy Measures - Measures Of Fuzziness -Fuzzy Integ e Reasoning : Truth Values And Tables, Fuzzy Proposition Of Rules, Aggregation Of Fuzzy Rules, Fuzzy Reasoning-Fuzzy Expert System-Fuzzy Decision Making	sures: Fuzzy Arithmetic grals - Fuzzy Rule Base s, Formation Of Rules- uzzy Inference Systems
Unit 4	GENETIC ALGORITHM	9
Genetic Algorith	m- Operators - Encoding Scheme - Fitness Evaluation - C	Crossover - Mutation –
Classification Of	Gnetic Algorithms- Genetic Programming – Advances In GA	Α.
Unit 5	HYBRID SOFT COMPUTING TECHNIQUES &	x 9
	APPLICATIONS	
TEXTBOOKS		Total: 45
1	S.N.Sivanandam and S.N.Deepa, "Principles of Soft Con Ltd, 2011	muting" Wiley India Pyt
2		iputing, whey man i vi.
REFERENCES	J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof	t Computing", PHI
	J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof	t Computing", PHI
1	J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis & Applications", Prentice 2006.	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd.,
1 2	<ul> <li>J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof</li> <li>S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis &amp; Applications", Prentice 2006.</li> <li>George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T Applications" Prentice Hall, 1997.</li> </ul>	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and
1 2 3	<ul> <li>J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof</li> <li>S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis &amp; Applications", Prentice 2006.</li> <li>George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T Applications" Prentice Hall, 1997.</li> <li>David E. Goldberg, "Genetic Algorithm in Search Op Learning" Pearson Education India, 2013.</li> </ul>	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine
1 2 3 4	<ul> <li>J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof</li> <li>S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis &amp; Applications", Prentice 2006.</li> <li>George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T Applications" Prentice Hall, 1997.</li> <li>David E. Goldberg, "Genetic Algorithm in Search Op Learning" Pearson Education India, 2013.</li> <li>James A. Freeman, David M. Skapura, "Neural Networks and Programming Techniques, Pearson Education India, 19</li> </ul>	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine Algorithms, Applications, 991.
1 2 3 4 COURSEOUTC	<ul> <li>J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof</li> <li>S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis &amp; Applications", Prentice 2006.</li> <li>George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T Applications" Prentice Hall, 1997.</li> <li>David E. Goldberg, "Genetic Algorithm in Search Op Learning" Pearson Education India, 2013.</li> <li>James A. Freeman, David M. Skapura, "Neural Networks and Programming Techniques, Pearson Education India, 19</li> <li>OMES:</li> </ul>	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine Algorithms, Applications, 991.
1     2     3     4     COURSEOUTC     At the end of the	<ul> <li>J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof</li> <li>S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net Genetic Algorithm: Synthesis &amp; Applications", Prentice 2006.</li> <li>George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T Applications" Prentice Hall, 1997.</li> <li>David E. Goldberg, "Genetic Algorithm in Search Op Learning" Pearson Education India, 2013.</li> <li>James A. Freeman, David M. Skapura, "Neural Networks and Programming Techniques, Pearson Education India, 19</li> <li>OMES:</li> </ul>	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine Algorithms, Applications, 991. Bloom's Taxonomy Level
1     2     3     4     COURSEOUTC     At the end of the     CO1	J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof         S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net         Genetic Algorithm: Synthesis & Applications", Prentice         2006.         George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T         Applications" Prentice Hall, 1997.         David E. Goldberg, "Genetic Algorithm in Search Op         Learning" Pearson Education India, 2013.         James A. Freeman, David M. Skapura, "Neural Networks and Programming Techniques, Pearson Education India, 19         OMES:         e course, learners will be able to         Apply various soft computing concepts for practical applications	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine Algorithms, Applications, 991. Bloom's Taxonomy Level K2
1     2     3     4     COURSEOUTC     At the end of the     CO1     CO2	J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Sof         S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Net         Genetic Algorithm: Synthesis & Applications", Prentice         2006.         George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set T         Applications" Prentice Hall, 1997.         David E. Goldberg, "Genetic Algorithm in Search Op         Learning" Pearson Education India, 2013.         James A. Freeman, David M. Skapura, "Neural Networks and Programming Techniques, Pearson Education India, 19         OMES:         course, learners will be able to         Apply various soft computing concepts for practical applications         Choose and design suitable neural network for real time problems	t Computing", PHI works, Fuzzy Logic and -Hall of India Pvt. Ltd., Theory: Foundations and otimization and Machine Algorithms, Applications, 91. Bloom's Taxonomy Level K2 K2

CO4			Expl and	ain th geneti	e im c pro	oortar	nce of ming	optin	nizatio	on tec	chniqu	es			k	K2	
CO5			Revi appl	ew the y in rea	e vario al timo	ous hy e prob	brid so blems	oft cor	nputin	ig tech	nique	s and			k	K2	
CO/	PO 1	PO 2	PO 3	PO 4	PO	PO	PO 7	PO 8	PO 9	PO 10	PO 11	PO	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	3	2		2
CO3	3	2	3	2	-	2	-	-	-	-	2	2	2	2	1		2
CO4	3	3	3	2	3	2	-	-	-	-	2	2	4	2	3		1
COS	205 2 3 3 3 3 2 2 2								2		_	2		Z			
				A	<b>AIT70</b>	3 - KI	NOW	LEDC	GE EN	GINE	CERIN	IG					
Р	rogra	mme	&		B.Te	ch & 1	IT	S	em.	Ca	itegor	у	L	Т	Р		С
Branch											OF		3	0	0		3
				<sub>&gt;</sub> 7	Fo und	lersta	nd the	basics	s of K1	nowlea	dge Fi	Igine	ring		V		5
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Intro	duction	1 —	Abduc	tive r	reason	ing -	– Pro	<b>R UN</b> babili	Stic r	FAIN' easoni	<b>ΓΥ</b> ing: ]	Enum	erativ	ve F	roba	9 biliti	ies –
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	Engineering Building Cognitive Assistants for Evidence-based Reasoning,												
	Cambridge University Press, First Edition, 2016. (Unit 1 – Chapter 1 / Unit 2 –												
	Chapter 3,4 / Unit 3 – Chapter 5, 6 / Unit 4 - 7, Unit 5												
	Chapter 8, 9)												
2	Jiawei Han and MichelineKamber, "Data Mining Concepts and Techniques",												
	Third Edition, Elsevier, 2012.												
REFERENCES													
1	Ronald J. Brachman, Hector J. Levesque: Knowledge Representation and												
	Reasoning, Morgan Kaufmann, 2004.												
2	Ela Kumar, Knowledge Engineering, I K International Publisher House, 2018.												
3	Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata												
	McGraw – Hill, 2011.												
4	Jay Liebowitz, Knowledge Management Learning from Knowledge Engineering, 1st												
	Edition,2001												

#### **COURSEOUTCOMES:** At the end of the course, learners will be able to **Bloom's Taxonomy** Level Understand the basics of Knowledge Engineering. K2 CO1 Apply methodologies and modelling for Agent Design CO2 K3 and Development. Design and develop ontologies. CO3 K3 Apply reasoning with ontologies and rules. CO4 K3 Understand learning and rule learning. CO5 K2

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	1	1	1	1	1		_	1	2	1	2	1	1	1
CO2	3	2	3	2	2	_	121711		2	1	2	1	3	3	1
CO3	2	2	3	2	2	-	-	-	3	2	2	2	3	2	3
CO4	2	2	3	1	1	-	-	-	2	2	2	2	2	1	1
CO5	2	2	2	1	1	-	-	-	2	1	1	1	2	1	1

	ACB701 - BUSINESS	RESEAR	CH METHODS				
Programme & Branch	B.TECH & CSBS	Sem.	Category	L	Т	Р	С
Prerequisites		入乱	OE	3	0	0	3
Preamble	To make the students of tou in business enquiry, development	urism unde	erstand the princip	les of s	scientific search a	methe	odology
UNIT I	scientific business reports.	P Ouscipt					9
Business Research - causal Research – Research questions evolutionary perspe	- Definition and Significance – the r Theoretical and empirical Researc / Problems – Research objectives – ctive – the role of theory in research.	esearch pr h – Cross Research	ocess – Types of I s –Sectional and hypotheses – char	Researc time - acterist	ch – Exp - series tics – Re	lorator Resea search	y and rch – in an
UNIT II	RESEARCH DESIGN AND MEA	SUREMI	ENT				9
1	1	89					

Research design – Definition – types of research design – exploratory and causal research design – 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 UNIT III 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 UNIT IV 9 Data Preparation – editing – Coding –Data entry – Validity of data – Qualitative Vs Quantitative data analyses - Applications of Bivariate and Multivariate statistical techniques, Factor analysis, Discriminant analysis, Cluster analysis, Multiple regression and Correlation, Multidimensional scaling - Conjoint Analysis -Application of statistical software for data analysis. **REPORT DESIGN, WRITING AND ETHICS IN BUSINESS RESEARCH** UNIT V 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:45 Periods TEXTBOOK:** Donald R. Cooper, Pamela S. Schindler and J K Sharma, Business Research methods, 11th Edition, Tata 1. 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, Wiley India, New Delhi, 2. 2012. William G Zikmund, Barry J Babin, Jon C.Carr, AtanuAdhikari, Mitch Griffin, Business Research 3 methods, A South Asian Perspective, 8th Edition, Cengage Learning, New Delhi, 2012. 4 Panneerselvam. R, Research Methodology, 2nd Edition, PHI Learning, 2014. **COURSE OUTCOMES: Bloom's Taxonomy** Upon successful completion of the course the student will be able to 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 K3 Analyze data and find solutions to the problems. CO5 Prepare research reports K4

CO/	DO 1	DO 2	DO 2	DO 4	PO	PO	DO 7	DOP	DOD	PO	PO	PO	DSO 1	DSO 2	DSO 2
PO	FUI	r02	103	FU4	5	6	FO /	100	109	10	11	12	1301	F30 2	130.3
CO1	2	3	2	2	2	2	2	1		110	1	2	3		
CO2	2	2	2	2	3	2	2		_	-11	2	2	3		
CO3	2	3	2	2	2	2	2	10.2	011	12		2	3		
CO4	2	3	2	2	3		2					2	3		
CO5		3	2	2	2		2	3				2	3		

Programme & Branch		011110	Ing IOOLS				
	B.TECH & CSBS	Sem.	Category	L	Т	Р	С
Prerequisites			OE	3	0	0	3
_	$\succ$ To understand the basics of set	oftware te	sting and test pla	nning			
Preamble	To build test cases and execu	te them					
	To focus on automation testin	ig using s	elenium				
	<ul> <li>To automate the testing using</li> <li>To get an insight about test at</li> </ul>	; Testing	using Cusumber				
	INTRODUCTION TO SOFTWAR	E TESTI	NG AND TEST	PL AN	NING		9
Why do we toot Sof	twore? Diack Day Tasting and Whit		ting Software T	acting			
of Software Testing	Program Correctness and Verific	e-dux les	iability versus S	afety	Ene Cycl Failures	Error	s and
Faults (Defects) So	ftware Testing Principles Program In	spections	Stages of Testin	arcty, or Uni	t Testing	Integ	ration
Testing. System Tes	ting-Performance Testing-The Goal	of Test Pl	anning. High Lev	vel Exp	ectations	. Inter	group
Responsibilities, Te	st Phases, Test Strategy, Resource Re	equiremer	ts, Tester Assign	ments.	Test Sch	nedule	, Test
Cases, Bug Reportin	g, Metrics and Statistics.						r
UNIT II	TEST DESIGN AND EXECUTION	N					9
Test Objective Ide	ntification Test Design Factors	Requirem	ent identification	n Tes	table Re	auiren	nents
Modeling a Test De	sign Process. Modeling Test Results.	Boundar	v Value Testing.	Eauiva	alence Cla	ass Te	sting.
Path Testing, Data I	Flow Testing, Test Design Prepared	less Metri	cs, Test Case De	esign E	ffectiven	ess, M	lodel-
Driven Test Design,	Test Procedures, Test Case Organiza	tion and 7	racking, Bug Re	porting	, Bug Lif	e Cycl	le.
UNIT III	SELENIUM						9
me browsers, Identi	ifying Web Elements using id, nam	ie, linkna	me, class, xpath	, tagna	ime- Han	dling	Input
box/buttons, list/sel	ection/drop down boxes, radio butt	ons, chec	k boxes- Extrac	ting li	nks and	other	Web-
Elements-Extracting	Data from WebTable-Capturing so	creenshots	-Handling pop-u	ips, fra	imes, and	1 Wind	lows-
Exceptions in Seler	num - Data driving from csv and e	excel usin	g Java APIS-De	buggin	g Tests-P	age C	bject
UNIT IV	TESTNG	ppn	IAR				9
UNIT IV Introduction to Test	<b>TESTNG</b> Ng-Advantages over Junit-Annotatior	ıs in Testl	Ig-Understand ar	nd Read	d TestNg		9
UNIT IV Introduction to Testl Reports-Testng and	<b>TESTNG</b> Ng-Advantages over Junit-Annotatior l its configuration-Grouping the	is in Testl testcases,	Ng-Understand ar Exclusion of	nd Read groups	d TestNg , Partial	Grou	<b>9</b> 1ps -
UNIT IV Introduction to Test1 Reports-Testng and TestSuite.xml/Suite	<b>TESTNG</b> Ng-Advantages over Junit-Annotatior l its configuration-Grouping the creation-Types of parameterization-F	ns in Testl testcases, Parameter	Ng-Understand ar Exclusion of from TestNg.xm	nd Read groups 1 ( pas	d TestNg , Partial s value a	Grou t Suite	9 aps - e and
UNIT IV Introduction to Testl Reports-Testng and TestSuite.xml/Suite Test level) - Assertio	<b>TESTNG</b> Ng-Advantages over Junit-Annotation l its configuration-Grouping the creation-Types of parameterization-F on, Verification	ns in Testl testcases, Parameter	Ng-Understand ar Exclusion of from TestNg.xm	nd Read groups 1 ( pas	d TestNg , Partial s value a	Grou t Suite	9 ups - and
UNIT IV Introduction to Testl Reports-Testng and TestSuite.xml/Suite Test level) - Assertio UNIT V	<b>TESTNG</b> Ng-Advantages over Junit-Annotation l its configuration-Grouping the creation-Types of parameterization-F on, Verification CUCUMBER	ns in Testl testcases, Parameter	Ng-Understand ar Exclusion of from TestNg.xm	nd Read groups 1 ( pas	d TestNg , Partial s value a	Grou t Suite	9 ups - e and 9
UNIT IV Introduction to Test Reports-Testng and TestSuite.xml/Suite Test level) - Assertio UNIT V Introduction to Beha	<b>TESTNG</b> Ng-Advantages over Junit-Annotation l its configuration-Grouping the creation-Types of parameterization-H on, Verification <b>CUCUMBER</b> vior Driven Development(BDD)-BD	ns in Testl testcases, Parameter D framew	Ng-Understand ar Exclusion of from TestNg.xm	nd Read groups 1 ( pas	d TestNg , Partial s value a eparing	Grou t Suite	9 ups - e and 9
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UNIT IV Introduction to Test Reports-Testng and TestSuite.xml/Suite Test level) - Assertio UNIT V Introduction to Beha selenium and cucur features and scenario	<b>TESTNG</b> Ng-Advantages over Junit-Annotation l its configuration-Grouping the creation-Types of parameterization-F on, Verification <b>CUCUMBER</b> wior Driven Development(BDD)-BD nber environment -creating a featu o, Given – When -Then structure -W	ns in Testl testcases, Parameter D framew re files u riting glu	Ng-Understand ar Exclusion of from TestNg.xm ork using Cucum sing Gherkins a e code -Cucumbe	nd Read groups I ( pas Iber-Pr nd Gh er and J	d TestNg s, Partial s value a eparing erkin syr Java step	Grou t Suite ntax-w defini	9 aps - and 9 riting tions-
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UNIT I		SOURCES OF WATER					9
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UNIT II	Ι	CONVEYANCE FROM THE SOURCE					9
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U <b>NIT I</b> I	Π	WATER TREATMENT					9
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w.e.f.2024-2025

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	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
Ī	CO1	2	3	2	2	2	2	2					2	3		
Ι	CO2	2	2	2	2	3	2	2					2	3		
	CO3	2	3	2	2	2	2	2					2	3		
Ι	CO4	2	3	2	2	3		2					2	3		
[	CO5		3	2	2	2		2	3				2	3		

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&Branch	B.TECH& AIDS	Sem.	Category	L	Т	P	C
Prerequisites			OE	3	0	0	3
Preamble	To impart the knowledge of Geographical Informat	e on basic com tion System. T	ponents, data p o build test case	reparations and exp	on and in Recute the	nplemer em	ntatio
JNIT I	FUNDAMENTALS OF GIS						9
ntroduction to GI	S - Basic spatial concepts - Coordin	nate Systems -	GIS and Inform	nation S	vstems –	Definit	ions
- History of GIS -	Components of a GIS – Hardware	, Software, D	ata, People, Met	hods – I	Proprieta	ry and o	open
ource Software -	Types of data – Spatial, Attribute d	ata- types of a	ttributes – scales	s/ levels	of measu	urement	s.
U <b>NIT II</b>	SPATIAL DATA MODELS						9
Database Structure		Entities _ FR	diagram - data	models	- concen	tual loo	rical
and physical mode	els - spatial data models – Raster I	Data Structure	s – Raster Data	Compre	ession -	Vector ]	Data
Structures - Raster	vs Vector Models- TIN and GRID	data models.	5 Ruster Dutt	compr	0001011	v eetor i	Duiu
	DATA INPUT AND TOPOLO	GY					9
ontainment – To External Database	pological Consistency – Non top s – GPS Data Integration	ological file f	tormats - Attrib	ute Dat	a linking	g – Lin	kıng
J <b>NIT IV</b>	DATA QUALITY AND STANI	DARDS					9
Data quality - Ba	asic aspects - completeness, logic	cal consistenc	y, positional ac	curacy,	tempora	al accur	acy,
hematic accuracy	and lineage - Metadata - GIS Stan	dards –Interop	perability - OGC	- Spatia	al Data Ir	nfrastruc	ctur
J <b>NIT V</b>	DATA MANAGEMENT AND	OUTPUT					
							9
mport/Export – D Map Compilation	ata Management functions- Raster – Chart/Graphs – Multimedia – Ent	to Vector and terprise Vs. De	Vector to Rasteresktop GISdistri	r Conve buted G	rsion - D IS.	ata Outj	<b>9</b> put -
mport/Export – D Map Compilation	ata Management functions- Raster – Chart/Graphs – Multimedia – Ent	to Vector and terprise Vs. De	Vector to Raste esktop GISdistri	r Conve buted G	rsion - D IS. To	ata Outj otal:45P	9 put - Perioc
mport/Export – D Map Compilation	ata Management functions- Raster – Chart/Graphs – Multimedia – Ent	to Vector and terprise Vs. De	Vector to Raste esktop GISdistri	r Conve buted G	rsion - D IS. To	ata Outj otal:45P	9 put - Period
mport/Export – D Map Compilation FEXTBOOK:	ung Chang Introduction to Geogra	to Vector and terprise Vs. De	Vector to Raste esktop GISdistri	r Conve buted G	rsion - D IS. To Hill Pub	ata Outj otal:45P	9 put - <b>Perio</b>
Import/Export – D         Map Compilation         Import/Export – D         Import – D         I	Pata Management functions- Raster – Chart/Graphs – Multimedia – Ent ung Chang, Introduction to Geogra )11.	to Vector and terprise Vs. De aphic Informa	Vector to Raste esktop GISdistri tion Systems, N	r Conve buted G lcGraw	rsion - D IS. To Hill Pub	ata Outj otal:45P	9 put - Perioc 2nd
mport/Export – D Map Compilation FEXTBOOK: . Kang - Ts Edition, 20 . Ian Heyw Informatio	ata Management functions- Raster – Chart/Graphs – Multimedia – Ent ung Chang, Introduction to Geogra )11. <sup>7</sup> ood, Sarah Cornelius, Steve Ca <sup>1</sup> n Systems, Pearson Education, 2nd	to Vector and terprise Vs. De aphic Informa arver, Sriniva I Edition,2007	Vector to Raste esktop GISdistri tion Systems, N asa Raju, "An	r Conve buted G IcGraw Introdu	rsion - D IS. To Hill Pub action G	ata Outj otal:45P lishing, Geograpl	9 put - <b>Perioo</b> 2nd

#### **REFERENCES:**

1.	Lo. C. P., Albert K.W. Yeung, Concepts and Techniques of Geogra Hall India Publishers, 2006	phic Information Systems, Prentice-
COUI On co	<b>RSEOUTCOMES:</b> mpletion of the course, the student is expected to	Bloom's Taxonomy Level
CO1	Have basic idea about the fundamentals of GIS.	K2
CO2	Understand the types of data models	К3
CO3	Get knowledge about data input and topology	К3
CO4	Gain knowledge on data quality and standards	K3
CO5	Understand data management functions and data output	К3

CO/ PO	PO 1	PO 2	PO 3	PO 4	РО 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 AC	GRICULTUR	AL SYSTEM				
Programme &Branch	B.TECH& AIDS	Sem.	Category	L	Т	Р	С
Prerequisites			OE	3	0	0	3
	$\succ$ To introduce the students	s to areas of a	gricultural system	ms in w	hich IT a	nd com	puters
Preamble	play a major role.						
	$\succ$ To also expose the stude	ents to IT app	olications in pre	cision fa	arming, e	nviron	mental
	control systems, agricultu	ural systems m	nanagement and	weather	predictio	n mode	els
UNIT I	PRECISION FARMING						9
Precision agricultu mapping software,	re and agricultural management - Yield mapping systems, Crop proc	- Ground base luction model	ed sensors, Ren ing.	note sen	sing, GP	S, GIS	and
UNIT II	ENVIRONMENT CONTROL	SYSTEMS					9
Artificial light sys greenhouses, on-li systems in horticul	stems, management of crop grow ne measurement of plant growth i ture.	wth in greenh in the greenho	ouses, simulation ouse, models of	on of C plant pr	O2 cons oduction	umptio and ex	n in kpert
UNIT III	AGRICULTURAL SYSTEMS	MANAGEM	ENT				9
Agricultural syster	ns - managerial overview, Reliabil	ity of agricult	ural systems, Sin	mulatior	n of crop	growth	and
field operations,	Optimizing the use of resource	es, Linear pr	ogramming, Pr	oject so	cheduling	, Artif	icial
intelligence and de	cision support systems.						
UNIT IV	WEATHER PREDICTION MO	ODELS					9
Importance of clin	nate variability and seasonal for	ecasting, Und	lerstanding and	predict	ing worl	d's cli	mate
system, Global clii	natic models and their potential for	or seasonal cli	mate forecasting	g, Gener	al system	ns appro	oach
to applying season	al climate forecasts.						
to applying season							

Expert systems, decision support systems, Agricultural and biological databases, e-commerce, business systems & applications, Technology enhanced learning systems and solutions, eLearning, Rural development and information society

**Total:45 Periods** 

#### **TEXTBOOK:**

1.	National Research Council, "Precision Agriculture in the 21st Century", National Academies Press, Canada, 1997.
2	H. Krug, Liebig, H.P. "International Symposium on Models for Plant Growth, Environmental Control

and Farm Management in Protected Cultivation", 1989.

#### **REFERENCES:**

1.	Peart, R.M., and Shoup, W. D., "Agricultural Systems Management", Marcel Dekker, New York, 2004.
2.	Hammer, G.L., Nicholls, N., and Mitchell, C., "Applications of Seasonal Climate", Springer, Germany, 2000.

COUI Upon	Bloom's Taxonomy 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.	K2
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