

Pimpri Chinchwad Education Trust's

Pimpri Chinchwad University

SCHOOL OF ENGINEERING AND TECHNOLOGY

(Established under Maharashtra Act No V of 2023) Sate, Pune - 412 106. Maharashtra, India

B. TECH

Computer Science and Engineering (Artificial Intelligence and Data Science)

(PATTERN 2024-2028)





Pimpri Chinchwad Education Trust's Pimpri Chinchwad University

Sathe, Pune - 412106



Learn | Grow | Achieve

Curriculum Structure

B. TECH

Computer Science and Engineering

(ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)
(Batch-2024-2028)

School of Engineering and Technology



Effective from Academic Year 2024-25



Program Structure

Preamble:

The curriculum of B.Tech. Computer Science and Engineering program offered by the Department of Computer Science Engineering under Academic Regulation of NEP 2020 is prepared in accordance with the curriculum framework of AICTE, UGC and Maharashtra State Council of Higher Education, National Higher Education Qualifications Framework (NHEQF) and National Credit.

Framework (NCrF). Further this Outcome Based Curriculum (OBC) is designed with Choice Based Credit and Semester System (CBCSS) enabling the learners to gain professional competency with multi-disciplinary approach catering the minimum requirement (Program Specific Criteria) of Lead Societies like AICTE, ACM and other Professional Bodies as per the Engineering Accreditation Commission (EAC) of ABET and NBA. In addition, the curriculum and syllabi are designed in a structured approach by deploying Feedback Mechanism on Curriculum from various stakeholders viz. Industry, Potential Employers, Alumni, Academia, Professional Bodies, Research Organizations and Parents to capture their voice of the respective stakeholders. The Curriculum design, delivery, and assessment, the three major pillars of academic system is completely aligned in line with Outcome Based Education (OBE) to assess and evaluate the learning outcomes to facilitate the learners to achieve their Professional and Career Accomplishments.

After due deliberations, the scheme and syllabus have been formulated. Salient features of this model curriculum are enumerated as under:

- Reduced number of credits.
- 2. Well defined learning objectives & outcomes for each course.
- 3. Inclusion of courses on socially relevant topics.
- 4. Built-in flexibility to the students in terms of professional elective and open elective courses and minor course.
- 5. Mandatory internship to equip the students with practical knowledge and provide them exposure to real time industrial environments.
- 6. Mapping of Courses to its equivalent NPTEL/SWAYAM Course.

Vision and Mission of Program

Vision:

To develop engineers well versed with Critical Theory and Practical's (problem solving ability) and sensitive to National and Global challenges from Inter-disciplinary perspective. To create Industry ready socially and ethically strong professionals.

Mission:

To develop Computer Professionals by imparting computer engineering knowledge with professional ethics. To provide the service to the communities to which we belong at local and national levels, combined with a deep awareness of our ethical responsibilities to our profession and to society.



Program Educational Objectives:

Program Educational Objectives (PEOs) for a BTECH in Computer Science and Engineering in artificial intelligence and data science program are as follows:

PEO 1: To provide students with knowledge and skills to become leading experts in the field of computer science engineering.

PEO 2: To provide an innovative and comprehensive curriculum that integrates theoretical knowledge with practical experience, research opportunities, and professional development

PEO 3: To groom the student's overall personality for professional growth.

PEO 4: To inculcate values and ethics among the students and making them aware about their social commitments.

Program Outcome:

Program Outcomes (POs) At the end of program, students should be able to

PO 1	Engineering knowledge: 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.

Pimpri Chinchwad University	
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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and
3	norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in
	diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the
	engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive
	clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the
	engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Object

Program Specific Outcomes (PSOs) At the end of program, students should be able to

PSO1	Use knowledge to write programs and integrate them with the hardware/software products in the domains of artificial Intelligent systems, data Science, networking and web technology.
PSO2	Participate in planning and implement solutions to cater to business specific requirements, displaying team dynamics and professional ethics.



INDEX

Sr. No.	Content	Pg. No.
1.	Curriculum Framework	
2.	Tentative list of Electives. Open Electives, Life Skill Courses, Proficiency Foundation Courses, HSMC Courses, Minor courses	
3.	Course Code Nomenclature	

Sr. No.	Type of course	Abbreviations				
1	Basic Science Course (BSC)	BSC				
2	Engineering Science Course(ESC)	ESC				
3	Programme Core Course (PCC)	PCC				
4	Programme Elective Course (PEC)	PEC				
5	Multidisciplinary Minor (MD M)	MIN				
6	Open Elective (OE) Other than a particular program	OE				
7	"Vocational and Skill Enhancement Course (VSEC)"	VSEC				
8	8 Ability Enhancement Course (AEC -01, AEC-02)					
9	Entrepreneurship/Economics/ Management Courses					
10	Indian Knowledge System (IKS)	IKS				
11	Value Education Course (VEC)	VEC				
12	Research Methodology	RM				
13	Comm. Engg. Project (CEP)/Field Project (FP)	CEP/FP				
14	Project	PROJ				
15	15 Internship/ OJT					
16	.6 Co-curricular Courses (CC)					
17	17 Massive Open Online Courses (MOOC)					



Sr. No.	Type of course	No. of Courses	Total Credits			
		Courses	No	%		
1	Basic Science Course (BSC)	04	16	9.93		
2	Engineering Science Course(ESC)	05	14	8.69		
3	Programme Core Course (PCC)	29	62	38.5		
4	Programme Elective Course (PEC)	10	25	15.5		
5	Multidisciplinary Minor (MD M)	05	11	6.83		
6	Open Elective (OE) Other than a particular program		08	4.96		
7	"Vocational and Skill Enhancement Course (VSEC)"		03	1.86		
8	Ability Enhancement Course (AEC -01, AEC-02)/ Co-curricular Courses (CC)		04	2.48		
9	Indian Knowledge System (IKS)	02				
10	Value Education Course (VEC)	02				
11	Research Methodology	01	02	1.24		
12	Comm. Engg. Project (CEP)/Field Project (FP)	02	03	1.86		
13	Project	03	05	3.10		
14	Internship/ OJT	01	06	3.72		
15	Massive Open Online Courses (MOOC)		03	1.86		
-	Total	72	161			



CREDIT DISTRIBUTION: SEMESTER WISE

Sr.	Type of course	No. of Credits/Semester			Total					
No.	-),	1	2	3	4	5	6	7	8	
1	Basic Science Course (BSC)	08	08							16
2	Engineering Science Course(ESC)	07	07			10				14
3	Programme Core Course (PCC)	03	03	14	11	13	10	4	4	62
4	Programme Elective Course (PEC)			8		4	8	4	8	25
	Multidisciplinary Minor (MD M)				02	2	2	2	2	11
6	Open Elective (OE) Other than a particular program			04	04					08
7	"Vocational and Skill Enhancement Course (VSEC)"	01	01		01					03
8	Ability Enhancement Course (AEC -01, AEC-02)/Co-curricular Courses (CC)	02	02							04
9	Indian Knowledge System (IKS)									AC
10	Value Education Course (VEC)			**						AC
11	Research Methodology					,			2	02
12	Comm. Engg. Project (CEP)/Field Project (FP)		-	02	01					03
13	Project					01		2	2	05
14	Internship/ OJT				gc.			6		06
15	Massive Open Online Courses (MOOC)		0				01	01	01	03
	Total	21	21	20	19	20	21	19	19	161





Pimpri Chinchwad University

Established under Govt. of Maharashtra Act No. V of 2023 Sate, Maval (PMRDA) Dist - Pune, Maharashtra - 412 106.





PCET'S

PIMPRI CHINCHWAD UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLLOGY
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

AS PER GUIDELINES OF NEP-2020 TO BE IMPLEMENTED SECOND -YEAR B. TECH SYLLABUS

W.E.F. FROM ACADEMIC YEAR 2024-25 CHOICE BASED CREDIT SYSTEM (CBCS) (2024 PATTERN)

SEMESTER - III



Course	Cours	Course Name	TEACHING SCHEME					1	ASSES	SSME	NT
Code	Туре	Course Name	TH Y	PR	TU	CRE DIT S	HRS.	CIA	ESA	PR /OR	Total
UBTCE201	PCC	Data Structures and Algorithms	3	=	1.5	3	3	40	60	·	100
UBTCE202	PCC	Data Structures and Algorithms Laboratory	-	1	-	1	2	25	4 5	25	50
UBTCE203	PCC	Python Programming	3	=	-	3	3	40	60		100
UBTCE204	PCC	Python Programming Laboratory	-	1	:-	1	2	25	8 	25	50
UBTCE205	OE	Open Elective-I	3	-	1. 	3	3	40	60	2 2	100
UBTCE206	OE	OpenElective-I Lab	-	1	3 	1	2	25		25	50
UBTCE207	PCC	Discrete Mathematics	2		1	3	3	40	60	-	100
UBTCE208	PCC	Operating System	3	-	1=	3	3	40	60	1=1	100
UBTCE209	CEP	Community Engineering Project	-	2		2	4	25	% - □	25	50
UFL201	AEC	International Language I	2	-	10=1	-	2	50	17 3 1	9 4 9	50
ACUHV20 1/ ACCOI 201	AC	UHV II :Understanding Harmony/ Constitution of India	2	-	-	-	2	50	:=	(- 1	50
		Total	18	5	1	20	29	400	300	100	800

Course Code	Elective-A	CourseCode	Elective-B						
	UBTCE205 OE-Op	en Elective-I							
UBTCE205 A	Digital Electronics & Logic Design	UBTCE205 B	Signals and Systems						
UBTCE206 OE-Open Elective-I Lab									
UBTCE206 A	Digital Electronics and Logic Design Laboratory	UBTCE206 B	Signals and Systems Lab						

List of Open Elective I : Semester-III



Foreign Language-I for Semester-III

Course Code	International Language 1							
UFL201 FL-I								
UFL201 A	Foreign Language-I: German							
UFL201 B	Foreign Language-I : Japanese							

SEMESTER - IV

	Cours		TEACHING SCHEME							ASSESSMENT				
Course Code	e Type	Course Name	TH Y	PR	TU	CRE DIT S	HRS.		CIA	ESA	PR /OR	Total		
UBTCE210	PCC	Database Management System	3	. en	:=:	3	3		40	60	n=	100		
UBTCE211	PCC	Database Management System Laboratory	1. -	1	850	1	2		25		25	50		
UBTCE212	PCC	Java Programining	2	.	:=:	2	2		20	30	33=0	50		
UBTCE213	PCC	Computer Organisation	2	 0	s = :	2	2		20	30	25-	50		
UBTCE214	PCC	Applied Mathematics	2		1	3	3		40	60	8 -	100		
UBTCE215	OE	Open Elective-II	3	-0	3=3	3	3		40	60	7-	100		
UBTCE216	OE	Open Elective-II Lab	-	1	828	1	2	i	25	-	25	50		
UBTCE217	VSEC	Java Programining Laboratory		1	0=0	1	2		25	-	25	50		
UFL202	AEC	International Language II	2	203	-	<u> </u>	2		50	-	-	50		
	MIN	Minor 1	2	<u>12</u> 0	6 2 5	2	2		20	30	842	50		
ACUHV201/ ACCOI 201	AC	UHV: Understanding Harmony/ Constitution of India	2		3	=	2		50		æ	50		
UBTCE219	СЕР	Project Based on Digital and Technological Solutions.	22	1	_	1	2		25	-	25	50		
		Total	18	4	1	19	27		380	270	100	750		

List of Open Elective II: Semester-IV

Course Pimpri Odbinchwad Wersity	Elective-A	CourseCode	Elective-B							
UBTCE205 OE-OPEN ELECTIVE-II										
UBTCE215 A	Communication System	UBTCE215 B	Digital Signal Processing							
	UBTCE206 OF	AB								
UBTCE216 A	Communication System Laboratory	UBTCE216 B	Digital Signal ProcessingLab							

Foreign Language –II for Semester-IV

Course Code	International Language II
UF	FL201 FL-I
UFL202 A	Foreign Language-II: German
UFL202 B	Foreign Language-II: Japanese

SEMESTER - V

	Cours		TE.	ACHI	NG S	CHEN	Æ		2	ASSE	SSME	ENT
Course Code		Course Name	THY	PR	TU	CRE DIT S	HRS.		CIA	ESA	PR /OR	TOTAL
UBTCE301	PCC	Theory of Computation	2	- S	1	3	3		40	60	0.4	100
UBTCE310	PCC	Computer Network	3	-	t . 744	3	3		40	60	.74	100
UBTCE311	PCC	Computer Network Lab	. 	1	174	1	2		25	174	25	50
UBTDS301	PCC	Data Science	3		-	3	3		40	60		100
UBTDS302	PCC	Data Science Lab	-	1		1	2		25	1=1	25	50
UBTML303 / UBTDS 303	PEC	Programme Elective I	3		-:	3	3		40	60	-	100
UBTML304 / UBTDS 304	PEC	Programme Elective I Lab	-	1	.	1	2	8	25	-	25	50
	MIN	Minor-2	2	-	-	2	2		20	30	-	50
UBTCE308	PCC	Applied Statistical Techniques	2	-	-	2	2		20	30	.=	50



UBTDS309	PROJ	Technical Seminar- AIDS	-	-	1	1	1		25	3.=	25	50
UFL301	VSEC	International Language III	2	-		-	2	*	50	1-1	n -	50
ACALR301/ ACCEVS30 1	AEC	Aptitude and logical Reasoning /Environmental Studies	2	-	-	-	2	1	50		y -	50
		Total	19	3	2	20	27		400	300	100	800

Course Code	Programme Elective Courses	CourseCode	Programme Elective Courses
	PROGRAM ELEC	TIVE COURSES I:THE	EORY
UBTML303 A	Advanced Web Technology	UBTDS 303 B	Applied Data Science with Python
	PROGRAM ELE	CTIVE COURSES I : 1	LAB
UBTML304 A	Advanced Web Technology Laboratory	UBTDS 304 B	Applied Data Science with PythonLab

List of Programme Elective Course I : Semester-V

Foreign Languages -III for Semester-V

Course Code	International Language III
UFL2	201 FL-I
UFL301 A	Foreign Language-III: German
UFL301 B	Foreign Language-III- Japanese

SEMESTER - VI

	TEACHING S						ИE	ASSESSMENT					
Course Code	Course Type	Course Name	TH Y	PR	TU	CRE DIT S	HRS.	CIA	ESA	PR /OR	TOT AL		
UBTDS305	PCC	Data Science and Analytics	3	-	:-	3	3	40	60	_	100		
UBTDS306	PCC	Data Science and AnalyticsLab	_	1	:-	1	2	25	-	25	50		
UBTCE312	PCC	Software Engineering and	2	-	:=	2	2	20	30	-	50		

PCET's		Project Management									
UBTCE313	PCC	Design and Analysis of Algorithms	3	-	-	3	3	40	60	-	100
UBTCE314	PCC	Design and Analysis of Algorithms Lab	Ŧ.	1	0-	1	2	25	-	25	50
UBTML307/ UBTML301	PEC	Programme Elective II	3	-	Œ	3	3	40	60	<u>141</u>	100
UBTML308/ UBTML302	PEC	Programme Elective II Lab	ä	1	-	1	2	25	-	25	50
UBTDS309/ UBTML309	PEC	Programme Elective III	3	-	-	3	3	40	60	<u> </u>	100
UBTDS310/ UBTML310	PEC	Programme Elective III Lab	2	1	25	1	2	25	-	25	50
	MIN	Minor 3	2		-	2	2	20	30	<u> </u>	50
VSE302	VSEC	International Language IV	2	5.78		2	2	50	-	Ti-	50
MOOCDS30	MOOC	MOOC II (Data Visualization using R programming/Advanced Full stack development/PHP)	-		1	1	2	25	-	-	25
ACALR301/ ACCEVS30 1	AC	Aptitude and logical Reasoning /Environmental Studies	2	-		-	2	50	: -	-	50
		Total	20	4	1	21	30	425	300	100	825

List of Program Elective Course II & III : Semester-VI

Course Code	Programme Elective Courses	CourseCode	Programme Elective Courses
University Laure (Grow) Arhiese	Program Elective C	ourse-II: PEC Theor	у
UBTML307	Pattern Recognition and Optimization	UBTML301	Artificial Intelligence
	Program Elective	Course-II: PECLab	
UBTML308	Pattern Recognition and Optimization Laboratory	UBTML302	Artificial Intelligence Lab
	Program Elective C	ourse-II: PEC Theor	у
UBTDS309	Data Visualization Techniques	UBTML309	Image processing
UBTDS310	Data Visualization Techniques lab	UBTML310	Image processing lab

Foreign Languages –IV for Semester-VI

Course Code	International Language Level IV							
,	UFL201 FL-I							
UFL302 A	Foreign Language-IV: German							
UFL302 B	Foreign Language-IV: Japanese							

SEMESTER - VII

- Sit			TE	ACH	ING S	SCHEN	ME		AS	ASSESSMENT					
Course Code	Cours e Type	Course Name	TH Y	PR	TU	CRE DIT S	HRS.		CIA	ESA	PR /OR	TOT AL			
UBTML305	PCC	Machine Learning	3	8 -	.	3	3	d) N	40	60	3-	100			
UBTML306	PCC	Machine LearningLab	.	1	50.0	1	2	Ų į	25	-	25	50			
UBTDS309 /UBTML40 5	PEC	Programme Elective IV	3	.=	=1	3	3		20	30	-	50			
UBTDS310/ UBTML406	PEC	Programme Elective IV Lab		1	-	1	2		25	.=:	25	50			
	MIN	Minor 4	2	X 	. 	2	2		20	30	X. 	50			
UBTCE404	INT/O JT	Industry/International/Resea rch INTERNSHIP	-	6	-	6	12		100	:	150	250			
UBTDS405	PROJ	Major Project – I AIDS	-	2	-	2	4		25	-	100	125			
MOOCDS4 01	MOO C	MOOC III(Networking and Cyber Security/ARVR Certification)			1	1	2		25	-	-	25			



Course Code	Programme Elective Courses	C	Course	Code	•	Progra	e Cour	rses				
1	Program Elective C	Course	e-IV: I	PEC T	heor	У						
UBTDS309 A	Data Visualization Techniques UBTML405 B Generative AI											
	Program Elective	Cour	se-IV:	PEC	Lab							
UBTDS310 A	Data Visualization TechniquesLaboratory	U	BTML	.406 I	3	Generative AI Lab						
	Total	8	10	1	19	30	280	120	300	700		

List of Program Elective Course IV: Semester-VII

SEMESTER - VIII

			TE	ACHI	NG S	CHE	ME		A	ASSESSMENT				
Course Code	Course Type	Course Name	TH Y	PR	TU	CRE DIT S	HRS.		CIA	ESA	PR /OR	TOT AL		
UBTML40	PCC	Deep Learning	3			3	3		40	60		100		
UBTML40 2	PCC	Deep Learning Lab		1	-	1	2		25	_	25	50		
UBTDS311 / UBTDS312	PEC	Programme Elective V	3		-	3	3		40	60		100		
UBTDS313 / UBTDS314	PEC	Programme Elective VI	3		-	3	3		40	60		100		
UBTCE409	PEC	Programme Elective VII	2			2	2	(%	20	30		50		
UBTCE410	RM	Research Methodology & IPR	2		-	2	2	.0	20	30		50		
	MIN	Minor 5	2			2	2		20	30		50		
UBTCE411	PROJ	Major Project - II		2	224	2	4		100	20	125	225		



		ne of the BTECH CSE ogram:			Semester : III			Level: UG							
	Code Programme Elective Courses				Cour	seCod	le	Programme Elective Courses				ırses			
	Program Elective Courses-V:PEC Theory														
UBT	DS311		Fin	ancial Analytics			BTI	S312			Bu	siness	s Anal	ytics	
				Program Electiv	ve C	ours	se-VI:	PEC	Theor	у					
UBT	DS313			Blockchain			UBTDS314 Robotic Process Automati				tion				
		Prog	gram Ì	Elective Course-VII:	PEC	C A	dvanc	es in C	Compi	ıter Eı	ngin	eering	3		
	CE413 A		Pro	mpt Engineering		Ţ	JBTC	E413	В	Big Data Analytics					
	CE413 C		Gan	ne Programming											
MOO 02	September 21	MOOC		OC 3 Virtual Reality Data Mining/ UAV	/			1	1	2		25			25
				Total		15	3	1	19	23		255	270	150	750

List of Program Elective Course V, VI & VII : Semester-VIII

Internship Schemes

	Scheme A	Scheme B	Scheme C
Semester	6 Sem Summer	7 Sem	8 Sem
Mode	Offline	Online /Offline	Online /Offline
Duration	3-4 Months	3-4 Months	3-4 Months
Outcome	Project	Project	Project
Online Course	Not Required	50% Online MOOC Courses and remaining courses to be completed offline	50% Online MOOC Courses and remaining courses to be completed offline

Course Name PCET'S Pimpri Chinchwad University Course Pattern		DATA STRUCTURES AND ALGORITHMS		Course Code/Course Type Version		UBTCE201/PCC		
Course	A CONSTRUCTOR SEED AND AND A CONSTRUCTOR				In .	2001	00000	
	Tea	ching Sche	eme		A	ssessment Sche	me	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Ora l	
3	72	9 4 0	3	3	40	60	-	
		Pre-F	Requisite:	Knowledge	e of C Program	ming		
				To gain the knowledge about the concept of stack, queue and linked list. To categorize the use of searching and sorting techniques To learn programming methodology for capability building. To apply programming concepts to solve real life problem. To implement Non Linear Data Structures like Trees and graphs using programming language.				
Course	Learning C	outcomes (CLO):	2. App 3. 1 t 4. A	oply and analyze u with oly and analyze us wit Handle operations raversing mechan Apply advanced da	would be able to: use of stacks, queue th their applications. the of searching and she their applications like searching, insetting etc. on various at a structure strategit world problems. used in various domes compiler	s and linked lists sorting techniques ertion, deletion, data structures. tes to solve real	

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Data structures: Introduction to data structures, Representing stacks and queues in C using arrays, linked lists: operations Stack and Queue implementation using Linked list, infix to post fix conversion, postfix expression evaluation, doubly linked	CLO 1	9

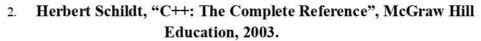
lists, circular lists, polynomial representation & operations.	

UNIT II		
Searching and Sorting: Linear and binary search methods, sorting — Bubble sort, Selection sort, Insertion sort, Quick sort and Merge Sort. Input and output — concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations.	CLO 2	9
UNIT III		
Linear Data Structure Array: Representation of arrays, Applications of arrays, sparse matrix and its representation, Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue, Linked List: Singly Linked List, Doubly Linked list, Circular linked list, Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.	CLO 3	9
UNIT IV		
Nonlinear Data Structure: Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance, Graph-Matrix Representation Of Graphs, Elementary Graph operations, (Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree).	CLO 4	9
UNITV		
Hashing And File Structures: Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques. File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.	CLO 5	9
Total Hours		45

Learning resources

Text Books:

1. John R. Hubbard, "Data Structures with C++", Schaum's Outlines, Tata McGraw Hill Education, 2000.



Reference Books:

- Michael T. Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", Wiley India Pvt. Ltd., 2004.
 - 2. Seymour Lipschutz, "Data Structures", Schaum's Outlines, Tata McGraw Hill Education, 2006

Online Resources/E-Learning Resources:

- 1. https://nptel.ac.in/courses/106102064
- 2. https://nptel.ac.in/courses/106103069



Vame	e of the	BTEC	H CSE	Seme	ester : III	Level: UG		
	Program:				Ster . III			
Cours	Course Name		DATA STRUCTURES AND ALGORITHMS LAB		Course Code/Course Type		2/PCC	
Course	e Pattern	20	24	Ve	ersion	1.0		
	Те	aching Sch	eme	L	Ass	essment Schem	e	
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
	1		1	2	25		25	
		Pre-R	equisite: I	Knowledge (of C Programm	ning		
	Course Obje			1. To 2. 3. To 4. T	Lab o gain the knowle queu To categorize the o learn programm o apply programm implement Non I and graphs usin	dge about the conce e and linked list. use of searching an techniques. ing methodology fo building. ning concepts to sol problem. inear Data Structur ig programming lar	ept of stack, and sorting ar capability we real life es like Trees	
Course	e Learning	Outcomes	(CLO):	2. 4 3. Hai trav 4. App	oply and analyze u lists with Apply and analyze techniques andle operations lil versing mechanism oply advanced data wo Apply concepts le	uld be able to: use of stacks, queue th their applications. e use of searching a with their applicatio ke searching, inserti m etc. on various da structure strategies orld problems. arned in various do MS, compiler.	nd sorting ons. on, deletion, ta structures. to solve real	

Assign	Assignment/Practical	Week	Details	CLO	Hour
ractical	/Activity Title	Number/Turn			S
/Activit					
y Numbe					
r					
1	Practical 1:	Week 1	WAP to demonstrate push, pop, traverse operations performed on stack.	CLO1	2
2	Practical 2:	Week 2	WAP to implement linear / circular queue using array.	CLO1	2
3	Practical 3:	Week 3	WAP to perform insertion and deletion in a single and double linked list	CLO2	2
4	Practical 4:	Week 4/ Week 5	WAP to sort an array of N elements using Selection sort.	CLO 2	4
5	Practical 5:	Week 6	WAP to sort an array of N elements using Insertion sort	CLO3	2
6	Practical 6:	Week 7	WAP to sort an array of N elements using Quick sort	CLO3	2
7	Practical 7:	Week 8	WAP to sort an array of N elements using Merge sort.	CLO4	2
8	Practical 8:	Week 9	Write a program that uses both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:	CLO4	2
			i. Linear searchii. Binary search		
9	Practical 9:	Week 10	Write a program to perform the following operations: 1. Insert an element into a binary search tree. 2. Delete an element	CLO5	2
			from a binary search tree.		

PCUP PCET's Pimpri Chinchwad University			3. Search for a key element in a binary search tree.		
10	Practical 10:	Week 11/ Week 12	To implement Depth First Search / Breadth First Search Algorithm	CLO5	4
11	Mini Project /Task	Week 13/14/15		CLO1 /2/3/4/ 5	6
		Total Hour	S		30

Learning resources

Text Books:

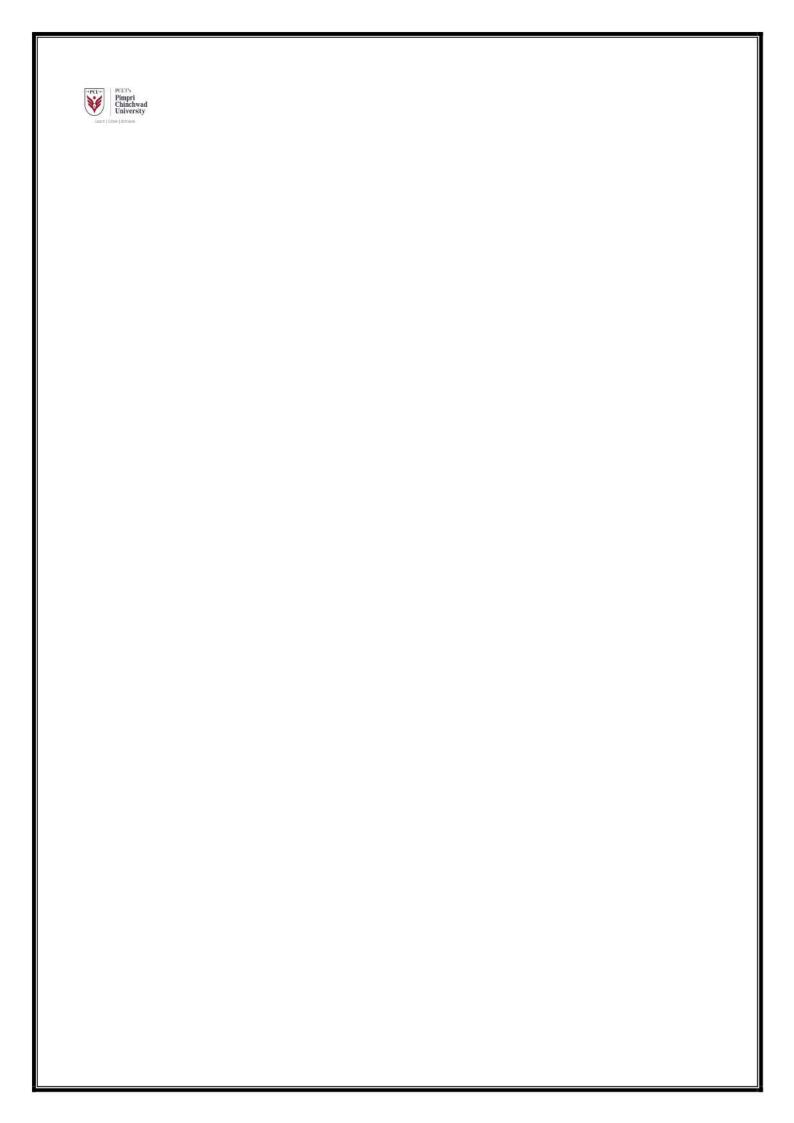
Herbert Schildt, "C++: The Complete Reference", McGraw Hill Education, 2003. John R. Hubbard, "Data Structures with C++", Schaum's Outlines, Tata McGraw Hill Education, 2000.

Reference Books:

- Michael T. Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", Wiley India Pvt. Ltd., 2004.
 - 2. Seymour Lipschutz, "Data Structures", Schaum's Outlines, Tata McGraw Hill Education, 2006

Online Resources/E-Learning Resources:

- 1. https://nptel.ac.in/courses/106102064
- 2. https://nptel.ac.in/courses/106103069





Name of the Program:		BTECH CSE			Semester: 3	Level: UG		
Course Name		Python Programming			Course Code/ Course Type	UBTCE203/Major		
Course	e Pattern		2024		Version	1	.0	
	Teac	hing Schen	ne		Ass	essment Schei	ne	
Theor y	Practical	Tutorial	Total Credit s	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral	
3	### N		3	3	40	60		
		Pre-Requis	ite: Basi	c knowle	edge of Program	ning in C		
					 To learn the fundamentals of the Python programming language. To create Python lists, tuples to represent compound data. To write and execute simple as well as complex Python programs. To analyze the concepts of procedural as we as object-oriented Python programs. To perform files handling operations and handle exceptions using Python. 			
Co	urse Learni	ng Outcome	es (CLO)		1. Elob 2. Apply the c 3. Use the n 4. Analyze concep 5. Apply t	arate the features programming language conditional and locusing python nultidimensional apperations using perations using perations using perations using perations using python properties using python properties using python properties using python programming page 100 pt python programming python programming python programming page 100 pt python	of Python guage. oping constructs array and string ython. oject oriented cogramming. and exception	

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		

Introduction to Python:	CLO 1	9
Pimpri Chinch Withon Introduction- Features, Identifiers, Reserved words,		
Indentation, Comments, Built-in Data types and their Methods:		
Strings, List, Tuples, Dictionary, and Set - Type Conversion-		
Operators. Execution of a Python, Program, Writing Our First		
Python Program, Statements Precedence of Operators.		
UNIT II		
Decision Making and looping: Conditional (if), Alternative (if-	CLO 2	9
else), Chained Conditional (if-elif-else); Iteration: state, while,		
for, break, continue, pass; Math and Random number functions.		
UNIT III		
Array and String :	CLO 3	9
Arrays in Python, Strings and Characters. Strings: String Slices,		
Immutability, String Functions and Methods, String Module; Lists		
as Arrays, Sum an Array of Numbers, Linear Search, Binary Search.		
as Arrays, Sum an Array of Numbers, Emear Scarch, Binary Scarch.		
UNIT IV		
Function and OOPs concept:	CLO 4	9
User defined functions - function arguments & its types, OOPs		
Concepts -Class and Objects, Constructors – Data hiding- Data		
Abstraction- Inheritance.		
UNIT V		
Files and Exception:	CLO 5	9
Text Files, Reading and Writing Files, Format Operator; Command		
Line Arguments, Errors and Exceptions, Handling Exceptions,		
Modules, Packages; Illustrative Programs: Word Count, Copy File.		
Total Hours	1	45

Learning resources

Textbooks:

- 1. Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
- Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Python", O'Reilly, 2nd Edition, 2018.

Reference Books:

- 1. Wesley J. Chun, "Core Python Programming", Prentice Hall, 2006
 - 2. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009

Online Resources/E-Learning Resources:



1. https://www.w3schools.com/python/

Name of the	BTECH CSE	Semester: 3	Level: UG
Program:			

- 2. https://www.learnpython.org/
- 3. https://www.udemy.com/course/complete-python-bootcamp/?couponCode=ST8MT40924
 - 4. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

openia PCET's	Course Name PCET's Pimpri Chinchwad University		n Progra Laborato		Course Code/ Course Type	UBTCE2	204/Major
Manager and the Control of the Contr	Pattern	2024			Version	1	.0
	Teac	hing Sch	eme		Ass	essment Schei	me
Theor y	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral
-	1		1	2	25	(#	25
		Pre-Requ	uisite: B	asic knowl	edge of Programm	ning in C	
					and e 2. To create 3. To write s 4. To analyze as obje 5. To perfor	ne python graphic editors to impleme programming lang Python lists, tupl compound dat imple as well as c programs. the concepts of pro- ect-oriented Pytho cm files handling le exceptions usin	ent Python guage. es to represent ia. complex Python rocedural as well in programs. operations and
Co	urse Learni	ng Outco	mes (CL	O):	1. Create 2. Apply the concept 4. Analyze concept 5. Apply t	e data structures us programming lang conditional and lo using python nultidimensional a operations using p e and apply the ob- ts using python pro- the file handling and using python pro-	sing Python guage. oping constructs . urray and string ython. oject oriented rogramming. nd exception

COURSE CURRICULUM

Practical Plan:

Assignm	Assignment/	Week	Details	CLO	Hours
ent/Pract	Practical/Acti	Number			
ical/Acti	vity Title	/ Turn			
vity	18				
Number					
100000000000000000000000000000000000000					



Japan I Grow Lachiuse					
1	Practical 1: Command Line Argument	Week 1/Turn 1	To write a python program that takes in command line arguments as input and print the number of arguments.	CLO1	2
2	Practical 2: Data structure	Week 2/Turn 1 Week 3/Turn 1 Week 4/Turn 1	To write a python program to perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, and Set.	CLO1	6
3	Practical 3: Control Statements	Week 5/Turn 1 Week 6/Turn 1	To write a python program to Solve problems using decision and looping statements.	CLO2	4
4	Practical 4: Linear Search	Week 7/Turn 1	To write a python program to perform linear search.	CLO2	2
5	Practical 5: Binary Search	Week 8/Turn 1	To write a python program to perform Binary search using strings.	CLO3	2
6	Practical 6: Numerical Operations	Week 9/Turn 1	To write a python program to handle numerical operations using math and random number functions.	CLO3	2
7	Practical 7: User Defined Functions	Week 10 /Turn 1, Week 11 /Turn 1	To write a python program to Create user-defined functions with different types of function arguments.	CLO4	4
8	Practical 8: Packages and Modules	Week 12 /Turn 1	To write a python program to Create packages and import modules from packages.	CLO4	2
9	Practical 9: File Handling	Week 13	To write a python program to perform File manipulations- open, close, read, write, append and copy from one file to	CLO5	2



10

Learning resources

Textbooks:

- Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
- Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Python", O'Reilly, 2nd Edition, 2018.

Reference Books:

- Wesley J. Chun, "Core Python Programming", Prentice Hall, 2006
 - 2. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009

Online Resources/E-Learning Resources:

- 1. https://www.w3schools.com/python/
 - 2. https://www.learnpython.org/
- 3. https://www.udemy.com/course/complete-python-bootcamp/?couponCode=ST8MT40924
 - 4. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview



Laure (Grow) Achieve								
	e of the gram:	BTECH CSE				Semester: 3	Leve	el: UG
Cours	e Name		al Electro ogic Des	ectronics & Design		Course Code/Course Type	UBTCI	E205/OE
Course	e Pattern	Ť	2023			Version	1	.0
	Teac	hing Sch	eme			Asse	essment Schen	me
Theor y	Practical -	Tutori al	A PER SUCCESSION PROPERTY AND STREET AND STR		2000	CIA (Continuous Internal Assessment) 40	ESA (End Semester Assessment)	Practical/Or al
	Course Ob			IIII Sc		e /Diploma (Eng The objective of I		.: 0 T :
	•					fundamentals, and combin 2. Study, analysis 3. To get acquain Sequential Ci 4. To introduc 5. To implement	PLA.	tis applications cuits in digital ocked sequential he asynchronous of Hazard free Basic memory 1. gic circuits using
Course Learning Outcomes (CLO):					 Use digital contemporar Design var circuits usin Do the anal 	ry world. ious combina g logic gates. lysis and desigonous and ircuits. miconductor inology.	n the present ational digital gn procedures asynchronous memories and	



Descriptors/Topics	CLO	Hours
UNIT I		
Digital Fundamentals :	CLO 1	9
Number Systems –Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes –Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine.		
UNIT II		
Combinational Circuit Design	CLO 2	9
Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder –Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.		
UNIT III		
Synchronous Sequential Circuits: Flip flops –SR, JK, T, D, Master/Slave FF –operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits –Design –Moore/Mealy models, state minimization, state assignment, circuit implementation –Design of Counters-Ripple Counters, Ring Counters, Shift registers, Universal Shift Register	CLO 3	10
UNIT IV		
Asynchronous Sequential Circuits: Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.	CLO 4	9
UNIT V		
Memory Devices and Digital Integrated Circuits: Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in, noise margin, logic families and their characteristics-RTL, TTL, ECL, CMOS Basic memory structure –ROM -PROM –EPROM –EEPROM – EAPROM, RAM –Static and dynamic RAM –Programmable Logic Devices –Programmable Logic Array (PLA) –Programmable Array Logic (PAL) –Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL.	CLO 5	8
Total Hours		45



Learning Resources:-

Text Books:

- 1. Digital Logic And Computer Design By M. Morris Mano (2nd Edition), PHI
- 2. Modern Digital Electronics By R.P. Jain, Mc Graw Hill
- 3. Digital Electronics By Malvino Leach, Mc Graw Hill

Reference Books:

- 1. Thomas. L. Floyd, "Digital Fundamentals", Pearson, 11th Edition.
- 2. Digital Systems: Principles and Applications, Book by Ronald J Toc Online Resources/E-Learning Resources:
- 1. https://www.udemy.com/topic/digital-electronic/ dated 16/04/24
- 2. https://www.classcentral.com/course/youtube-digital-electronics-48205 dated 16/04/24



Name of the Program:	B.Tech	Semester : 2	Level: UG
Course Name	Signals and	Course Code/ Course	UBTCE205 B

PCUP PCET's				370905					
Contract County	Course Pattern		2024	Ver	Version 1.0				
	Teaching	Schem	ie	Assessment Scheme					
Theor y	Practical	Tuto rial	Total Credits	Hours	CIA (Continuou s Internal Assessmen t)	ESA (End Semester Assessment)	Practical/ Oral		
3	-		3	3	40	60	=		
]	Pre-Red	quisite: Fou	rier transform	& Laplace tra	ansform.	1		
		The objectives of Signals and are: 1. To recall the basic knowled of sig 2. To recognize the system and 3. To apply the knowledge transfe 4. To analyze correlation 5. To evaluate probability, rar					lifferent type ency domain. d Laplace density.		
Course Learning Outcomes (CLO):				2. Eloa 3. App 4.	. To identify dabrate the system by knowledge of Analyze correl	ald be able to: ifferent type of sign analysis in frequen Fourier and Laplace ation and spectral d ity, random variable	cy domain. e transform. ensity		

Type

Systems

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Signals and Systems: Definition of signals and systems, communication and control systems as examples, Classification of signals: Continuous time and discrete time, even, odd, periodic and non-periodic, deterministic and non-deterministic, energy and power. Operations on signals: Amplitude scaling, addition, multiplication, differentiation, integration (accumulator for DT), time scaling, time shifting and folding, precedence rule. Elementary signals: exponential, sine, step, impulse and its properties, ramp, rectangular, triangular, signum, sinc. Systems: Definition, Classification: linear and non linear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible.	CLO 1	9
UNIT II		

System Analysis: System modelling, Input output relation, impulse proposes, block diagram, integro-differential equation and state-space representation. Definition of impulse response, convolution integral, convolution sum, computation of convolution integral using graphical method for unit step to unit step to rectangular, rectangular to rectangular only. Computation of convolution sum by all methods. Properties of convolution, system interconnection, system properties in terms of impulse response, step response in terms of impulse response. UNIT III System Analysis in Frequency Domain using Fourier Transform & Laplace Transform: Definition and necessity of CT and DT Fourier series and Fourier transforms. Analogy between CTFS, DTFS and CTFT, DTFT. CT Fourier series, CT Fourier transform and its properties, problem solving using properties, amplitude spectrum, phase spectrum of the signal and system. Interplay between time and frequency domain using sine and rectangular signals. Limitations of FT and need of LT and ZT, , ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT. UNIT IV Correlation and Spectral Density: Definition of Correlation and Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation and spectral density, inter relation between correlation and spectral density. UNIT V Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive function, Probability density function, properties			
System Analysis in Frequency Domain using Fourier Transform & Laplace Transform: Definition and necessity of CT and DT Fourier series and Fourier transforms. Analogy between CTFS, DTFS and CTFT, DTFT. CT Fourier series, CT Fourier transform and its properties, problem solving using properties, amplitude spectrum, phase spectrum of the signal and system. Interplay between time and frequency domain using sinc and rectangular signals. Limitations of FT and need of LT and ZT, , ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT. UNIT IV Correlation and Spectral Density: Definition of Correlation and Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation and spectral density. UNIT V Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	processionse, block diagram, integro-differential equation and state- processionse, block diagram, integro-differential equation and state- processionse, convolution integral of convolution integral using graphical method for unit step to unit step, unit step to exponential, exponential to exponential and unit step to rectangular, rectangular to rectangular only. Computation of convolution sum by all methods. Properties of convolution, system interconnection, system properties in terms of impulse response, step response in	CLO 2	9
& Laplace Transform: Definition and necessity of CT and DT Fourier series and Fourier transforms. Analogy between CTFS, DTFS and CTFT, DTFT. CT Fourier series, CT Fourier transform and its properties, problem solving using properties, amplitude spectrum, phase spectrum of the signal and system. Interplay between time and frequency domain using sinc and rectangular signals. Limitations of FT and need of LT and ZT, , ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT. UNIT IV Correlation and Spectral Density: Definition of Correlation and Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation and spectral density. UNIT V Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	UNIT III		
Correlation and Spectral Density: Definition of Correlation and Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation and spectral density. UNIT V Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	& Laplace Transform: Definition and necessity of CT and DT Fourier series and Fourier transforms. Analogy between CTFS, DTFS and CTFT, DTFT. CT Fourier series, CT Fourier transform and its properties, problem solving using properties, amplitude spectrum, phase spectrum of the signal and system. Interplay between time and frequency domain using sinc and rectangular signals. Limitations of FT and need of LT and ZT, , ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT.	CLO 3	10
Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation and spectral density. UNIT V Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	UNIT IV		
Probability, Random Variables and Random Signals: Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	Spectral Density, correlogrm, analogy between correlation, covariance and convolution, conceptual basis, auto-correlation, cross correlation, energy/power spectral density, properties of correlation and spectral density, inter relation between correlation	CLO 4	9
Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive	UNIT V		
Statistical averages, mean, moments and expectations, standard deviation and variance. Probability models: Uniform, Gaussian, Binomial. Evolution and definition of random signal through probability via random variable.	Experiment, sample space, event, probability, conditional probability and statistical independence. Random variables: Continuous and Discrete random variables, cumulative distributive function, Probability density function, properties of CDF and PDF. Statistical averages, mean, moments and expectations, standard deviation and variance. Probability models: Uniform, Gaussian, Binomial. Evolution and definition of random signal through	CLO 5	8
Total Hours 45	Total Hours		45

Learning resources

Textbooks:

Simon Haykins and Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley India.

PCET'S P.	Haykins, "Introduction	to Analog and Digital Communic	cations", Wiley India.
Name of the Program:	B.Tech	Semester : III	Level: UG

Reference Books:

- 1. B.P. Lathi, "Linear Systems and Signals", 2nd Edition, Oxford University Press, 2004.
- 2. Charles Phillips, "Signals, Systems and Transforms", 3rd Edition, Pearson Education.
- 3. Peyton Peebles, "Probability, Random Variable, Random Processes", 4th Edition, Tata Mc Graw Hill.

Online Resources/E-Learning Resources:

1.https://onlinecourses.nptel.ac.in/noc21_ee28/preview.

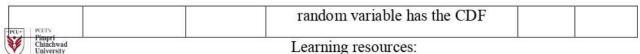
2.https://www.udemy.com/course/undergraduate-course-on-signals-systems.

Cours PCUT's Pimpri Chinchwad University	se Name	Signals and Systems Laboratory		Course Code/ Course Type		UBTCE206 B	
Cours	e Pattern		2024	Ver	sion	1.0	
	Teaching	Schem	e		Assessme	nt Scheme	
Theor y	Practical	Tuto rial	Total Credits	Hours	CIA (Continuou s Internal Assessmen t)	ESA (End Semester Assessment)	Practical/ Oral
27 —	1	2 0	1	2	25	-	25
]	Pre-Red	quisite: Fou	rier transform	& Laplace tra	nsform.	I.
	ourse Obje			1. To re 2. To rec 3. To	call the basic know cognize the syste apply the know To analyze corre valuate probabili	s and Systems Lare: owledge about the dof signals m analysis in frequent and transform. lation and spectral of ty, random variable	lifferent type ency domain. d Laplace density.
Course Learning Outcomes (CLO):			4	To identify Elobarate the Apply knowle Analyze corr	ald be able to: y different type of si system analysis in f domain. edge of Fourier and transform. relation and spectral obability, random v signals.	requency Laplace I density	
				Practical Pla	nn.		

Practical Plan

Assignm	Assignment/	Week	Details	CLO	Hours
ent/Pract	Practical/Acti	Number/			
ical/Acti	vity Title	Turn			
vity					
Number					
1	Practical 1:	Week 1	Sketchandwritedefiningmathematica lexpression for the following signals in CTand DT using MATLAB- Unit step, rectangular, exponential, signum, sine, sinC, triangular, unit impulse, unit ramp.	CLO1	2

		ı			
PCEPS Pimpri Chinchwad University 4aurt [Cross] Achieve					
2.	Practical 2:	Week 2	Take any two CT and DT signals and perform the following operation Amplitude scaling, addition, multiplication, differentiation, integration (accumulator for DT), time scaling, time shifting and folding	CLO1	2
3.	Practical 3:	Week 3	Express any two system mathematical expressions in input output relation form and determine whether each one of them is, Memory less, Causal, Linear, Stable, Time in variant, Invertible	CLO3	2
4.	Practical 4:	Week 4	Express any two system mathematical expressions in impulse response form and determine whether each one of them is, Memory less, Causal, Linear, Stable, Time in variant, Invertible	CLO 3	2
5.	Practical 5:	Week 5	State and prove the properties of Fourier Transform. Take rectangular and sinc signal as examples and demonstrate the applications of CTFT properties. And also demonstrate the interplay between the time and frequency domain.	CLO 4	2
6.	Practical 6:	Week 6	State and prove the properties of Lapalce Transform. Take any example of a system in time domain and demonstrate the application of LT in system analysis	CLO 4	1
7.	Practical 7:	Week 7	Find the following for the given energy signal- Autocorrelation, Energy from Autocorrelation, Energy from definition, Energy Spectral Density directly	CLO 5	2
8.	Practical 8:	Week 8	List and Explain the properties of CDF & PDF, Suppose a certain	CLO 5	2



Learning re

- Textbook
- 1. Simon Haykins and Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley India.
- 2. Simon Haykins, "Introduction to Analog and Digital Communications", Wiley India.

Reference Books:

- 1. B.P. Lathi, "Linear Systems and Signals", 2nd Edition, Oxford University Press, 2004.
- 2. Charles Phillips, "Signals, Systems and Transforms", 3rd Edition, Pearson Education.
- 3. Peyton Peebles, "Probability, Random Variable, Random Processes", 4th Edition, Tata Mc Graw Hill.

Online Resources/E-Learning Resources:

1.https://onlinecourses.nptel.ac.in/noc21_ee28/preview

2.https://www.udemy.com/course/undergraduate-course-on-signals-systems



University Graw Azhave							
	e of the gram:		CSE		Semester: 3	Leve	l: UG
Cours	Course Name		ete Math	thematics Course Code/Course Type		UBTCE207	
Course	e Pattern		2024		Version	.1	.0
	Teac	hing Sch	eme		Asse	essment Schen	me
Theor y	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Or al
3	<u></u>	1	3	3	40	60	120
	Pre-R	equisite:	Linear A	lgebra and	Univariate Calcu	ılus is essentia	1.
Co	urse Object	ives (CO)):	The o	objectives of Disc	crete Mathema	tics are:
Con	rsa I aarnin	a Outoo			Studente wee	practical interpre oper terminology. 2. To learn technic mathem 3. To inter graph the services precise preci	to understand l examples and the associated rations and ogies in context. logic and proof questo expand atical maturity. The preticular problems ely, solve the roblems. It is and explain the ning clearly.
Cou	rse Learnin (CLO		nes	 A Sol Id U Co 	ning the course, to after learning the couvereal world problem lentify various types Just the concept of gr	arse, students will ms logically usin and logic. of relations, func- properties. raphs, trees and re- s for problem sol- results of group a	I be able to: 1. g appropriate set etions and their elated discrete ving. and ring theory.

	Descriptors/Topics	CLO	Hours
PCU	PODETS - Pimper		
W	Chinchwad University		

Case Crose Athuse		
Logic: Propositions and Connectives, Truth table, laws of Propositions, Logical Equivalence, Normal Forms: DNF, CNF, PCNF &,PDNF Logical implication, Rules of Inference, Validity and satisfiability, Compactness and resolution,Quantifiers, Application of Propositional logic.	CLO 1	6
UNIT II		
Relation and Functions:- Relation, representation of relation, types, n- array relation and their application, Equivalence relation, Equivalence class, Partitions, Partial ordering relation, Hasse diagram, Lattice, chain and antichain, Function and types of Functions.	CLO 2	6
UNIT III	CLO 3	
Algebraic structures : Algebraic structures, Semi group, Monod, Group, abelian group, cyclic group, Coding Theory.		6
UNIT IV		
Graph and Applications: Introduction, Graph models, Hand shaking lemma, Types of graphs, Matrix representation of Graphs, adjacency and incidence Matrix, Isomorphism, Connectivity, Eulerian and Hamiltonian Graphs, Shortest path, Travelling Salesman Problem, Dijkstra's algorithm, Planar graph and Euler formula, coloring of graph, Chromatic number –Dual of Graph, Clique number	CLO 4	6
UNIT V		
Trees: Introduction, properties, Rooted tree, Tree Traversal, path length, weighted tree, prefix code, Huffman coding, Binary search tree, spanning tree, Minimal spanning tree, Kruskal algorithm, prims algorithm, Cut set, The Max flow- Min cut Theorem (Transport Network) Application of tree	CLO 5	6
Total Hours		30

Learning Resource:

Text Books:

 C. L. Liu, "Elements of Discrete Mathematics", Tata McGraw-Hill, 4th Edition, 2017, ISBN 978-1259006395.

Reference Books:

 Kennet H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw-Hill, 8th Edition, 2018, ISBN 978-1259676512.



 Dr. K. D. Joshi, "Foundations of Discrete Mathematics", New Age International Limited Publishers, 2nd Edition, January 2014, ISBN-13: 978-8122435986

Online Resources/E-Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc21_ee28/preview dated 19/4/2024

2. https://www.coursera.org/courses?query=signals%20and%20systems dated 19/4/2024

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3.5	Chinchwad
V	University

ame	Ope	rating Sy	ystem	Course	UBTO	3E208
				Code/Course Type		SE200
ttern	i .	2024		Version	1	.0
Teacl	hing Scheme			Ass	Assessment Scheme	
actical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Or al
250		3	3	40	60	æs
_	Teac	Teaching School	Teaching Scheme actical Tutori Total al Credi ts	Teaching Scheme Actical Tutori Total Hours al Credi ts 3 3	Teaching Scheme Associated Tutori Total Hours CIA al Credits (Continuous Internal Assessment)	Teaching Scheme Assessment Scheme Citical Tutori Total Hours al Credi ts Credi ts Continuous Internal Assessment Assessment Assessment Assessment Assessment Continuous Assessment Assessment Assessment Continuous Assessment Assessment Continuous Assessment Continuous Assessment Assessment Continuous Asse

Pre-Requisite:

- 1. Computer Organization and Architecture
 - 2. Fundamentals of Data Structures

Course Objectives (CO):	This course will enable the students to:
	To introduce basic concepts and functions of modern operating systems. To comprehend the concept of process, thread management and scheduling. To learn the concept of concurrency control. To study various Memory Management techniques. To know the concept of I/O and File management
Course Learning Outcomes (CLO):	Student will be able to:
	Comprehend the role of Modern Operating Systems. Apply the concepts of process and thread scheduling. Apply the concept of process synchronization, mutual exclusion and the deadlock. Comprehend and apply the concepts of various memory management techniques. Make use of concept of I/O management and File system. Understand Important of System software.

Pimpri Pimpri		
Chinichwad University Descriptors/Topics	CLO	Hours
UNIT I		
OVERVIEW OF OPERATING SYSTEM	CLO 1	9
Operating System Objectives and Functions, The Evolution of Operating Systems, Developments Leading to Modern Operating Systems, Virtual Machines, Introduction to Linux OS, BASH Shell scripting: Basic shell commands		
UNIT II		
PROCESS MANAGEMENT:	CLO 2	9
Process: Concept of a Process, Process States, Process Description, Process Control Threads: Processes and Threads, Concept of Multithreading, Types of Threads, Threadprogramming Using Pthreads. Scheduling: Types of Scheduling, Scheduling Algorithms, First Come First Served, Shortest Job First, Priority, Round Robin		
UNIT III		
CONCURRENCY CONTROL:	CLO 3	9
Process/thread Synchronization and Mutual Exclusion: Principles of Concurrency, Requirements for Mutual Exclusion, Mutual Exclusion: Operating System Support (Semaphores and Mutex). Classical synchronization problems: Readers/Writers Problem, Producer and Consumer problem, Inter-process communication (Pipes, Shared Memory). Deadlock: Principles of Deadlock, Deadlock Modeling, and Strategies to deal with deadlock: Prevention, Avoidance, Detection and Recovery. Example: Dining Philosophers Problem / Banker's Algorithm.		
UNIT IV		
MEMORY MANAGEMENT: Memory Management: Memory Management Requirements, Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy System, Relocation, Paging, Page table structure, Segmentation Virtual Memory: Background, Demand Paging, Page Replacement (FIFO, LRU, Optimal),	CLO 4	9



Allocation of frames, Thrashing

UNIT V

INPUT/OUTPUT AND FILE MANAGEMENT:

CLO₅

Text Books:

1. W
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S

I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, I/O Buffering, Disk Scheduling (FIFO, SSTF, SCAN, C-SCAN, LOOK, C-LOOK). File Management: Overview-Files and File Systems, File structure. File Organization and Access, File Directories, File Sharing, Record Blocking, Secondary Storage Management.

Total Hours

tallings, Operating System: Internals and Design Principles, Prentice Hall, 8th Edition, 2014, ISBN-10: 0133805913 • ISBN-13: 9780133805918

- Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons, Inc., 9th Edition, 2012, ISBN 978-1-118-06333-0
- 3. Das, Sumitabha, UNIX Concepts and Applications, TMH, ISBN-10: 0070635463, ISBN-13: 978-0070635463, 4th Edition.

Reference Books:

- Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, ISBN-10: 0596009526, ISBN-13: 978-0596009526
- Andrew S. Tanenbaum & Herbert Bos, Modern Operating System, Pearson, ISBN-13: 9780133592221, 4th Edition.

Online Resources/E-Learning Resources:

- https://www.geeksforgeeks.org/operating-systems/
- 2. https://www.tutorialspoint.com/operating_system/index.htm



team (Cram American C. 41	CCE(AIDC)	Composton , III	Larval, LIC
Name of the	CSE(AIDS)	Semester : III	Level: UG
Program:			

PCET's	e Name	Comm	ınity Eng Project	gineering	Course Code/ UBTCE209/ CEP Course Type			
Pimpri Chinchwad University	e Pattern		2024	:	Version	1	.0	
		1. i C - 1.						
	Teaching Scheme					essment Scher		
Theor	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Or al	
-	2	-	2	4	25		25	
	Į ė	Pre-Re	quisite:	1. Basi	ic knowledge of I	English		
C	ourse Objec	tives (CC	D):	Т	his course will en	nable the stude	ents to:	
					 Develop an understanding of the role of engineering in addressing community needs and promoting sustainable development. Apply engineering design processes and methodologies to identify, analyze, and prioritize community challenges. Collaborate with community stakeholders to co-create solutions that are culturally sensitive, socially equitable, and environmentally sustainable. Gain practical experience in project management, budgeting, and resource allocation for community engineering projects. Communicate effectively with diverse audiences through written reports, oral presentations, and multimedia platforms. 			
Course Learning Outcomes (CLO):				2. A	Develop an understar addressing communication sustain apply engineering de to identify, analy Collaborate with com- solutions that are equitable, and e Gain practical experience budgeting, and resse- enginging	munity needs and nable developments sign processes and prioritize challenges. Inmunity stakehold eculturally sensitive environmentally serience in project purce allocation for neering projects. Ectively with dive	of engineering in promoting at. Id methodologies community ders to co-create ive, socially ustainable. management, for community rse audiences attations, and	

Descriptors/Topics	CLO	Hours

	1. Introduction to Community Engineering	CLO1	60
PCET's Pimpri	 Overview of course objectives, expectations, and project 	to	
Chinchwad University	guidelines	CLO5	
n (Grow) Achieve	 Introduction to community-based participatory research and 	CLOS	
	design principles		
	 Case studies of successful community engineering projects 		
	Needs Assessment and Stakeholder Engagement		
	 Methods for conducting community needs assessments and 		
	asset mapping		
	 Techniques for engaging diverse stakeholders in the design 		
	process		
	 Ethical considerations in working with communities 		
	Project Planning and Design		
	 Project scoping, goal setting, and defining success criteria 		
	 Engineering design processes and methodologies 		
	 Incorporating sustainability principles into project design 		
	 Implementation and Collaboration 		
	 Project management techniques, including scheduling, 		
	budgeting, and resource allocation		
	 Interdisciplinary collaboration and team dynamics 		
	 Effective communication with community partners and project 		
	stakeholders		
	Project Execution and Monitoring		
	 Prototyping and testing of project solutions 		
	 Monitoring project progress and making adjustments as needed 		
	 Documentation and record-keeping for project evaluation 		
	6. Impact Evaluation and Reflection		
		1 1	

Assessment:

Methods for assessing the social, economic, and environmental impact of community engineering projects

• Reflective practices and peer feedback

- 1. Project Proposal: Written proposal outlining the project scope, objectives, and methodology (20%)
 - 2. Project Implementation: Development and implementation of the digital solution, including documentation and code repository (30%)
- 3. Final Report: Written report summarizing the project process, outcomes, and impact assessment (30%)

Presentation: Oral presentation of project findings and demonstration of the digital



Chińchwad University							
Name of the Program:	CSE(AIDS)	Seme	ester : III	L	evel: U	G/PG
Course Name	Germa	n A1.1	2015	Course Code/ Course Type		UFL201A/AEC	
Course Pattern	Course Pattern 2024			ersion		1.0)
	Teaching Sch	neme	,	Ass	essment	Schen	ne
Theor Practic	al Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	Sem	(End ester sment)	Practical/ Oral
2 -	-		2	20	3	0	8
L	-		Pre-Requisi	te:			
Course C	Objectives (CO	O):	1.	To remember ne 2. To underst o apply the basic 4. To underst 5. To creat basi	w words a and the ne vocab and tand the G	and their ew conce d gramm German te	spellings. pts. ar concepts. ext.
Course Learni	ng Outcomes	3. Abl	Students wo 1. Spell simple. Can understandle to frame simple 4. Can introduce Can answer qu	ole words and everyda sentences themselv	in Germa ny expres s in Germ ves and o	sions. nan language. thers.	
	De	scriptors/T	opics		(CLO	Hours

Descriptors/Topics	CLO	Hours
UNIT I		
Guten Tag	CLO 1	6
Speak about yourself and others, Speak about Countries and		
Languages		
Grammar – Sentence formation and verbs usage		
UNIT II		
Freunde, Kollegen und Ich	CLO 2	6
Speak about your Hobbys, To fix a meeting, Speak about work and		
Profession, To creat a profile on Internet		
Grammar - How to use 'The' in german, Singular and plural forms		

of Nouns	



UNIT III		
In der Stadt	CLO3	6
To get to know about Cities and Places, how to find way and		
understand directions, learn international words		
Grammar – Negations (how to use NO in german),		
Definite articles, indefinite articles		
UNIT IV		
Guten Appetit	CLO4	6
To speak about food and food habits, to have a discussion about		
shopping		
Grammar – introduction of cases		
UNIT V		
Tag für Tag & Zeit mit Freunden	CLO5	6
Clock timings, To speak about family and friends, Daily routine To		
speak about free time activity, to understand the specific information		
from the text, to order and to pay in a restaurant		
Grammar – Possessivarticle, Modalverbs, use of on, at, fromtill,		
Seprable verbs and past tence		
Total Hours		30

Textbooks:

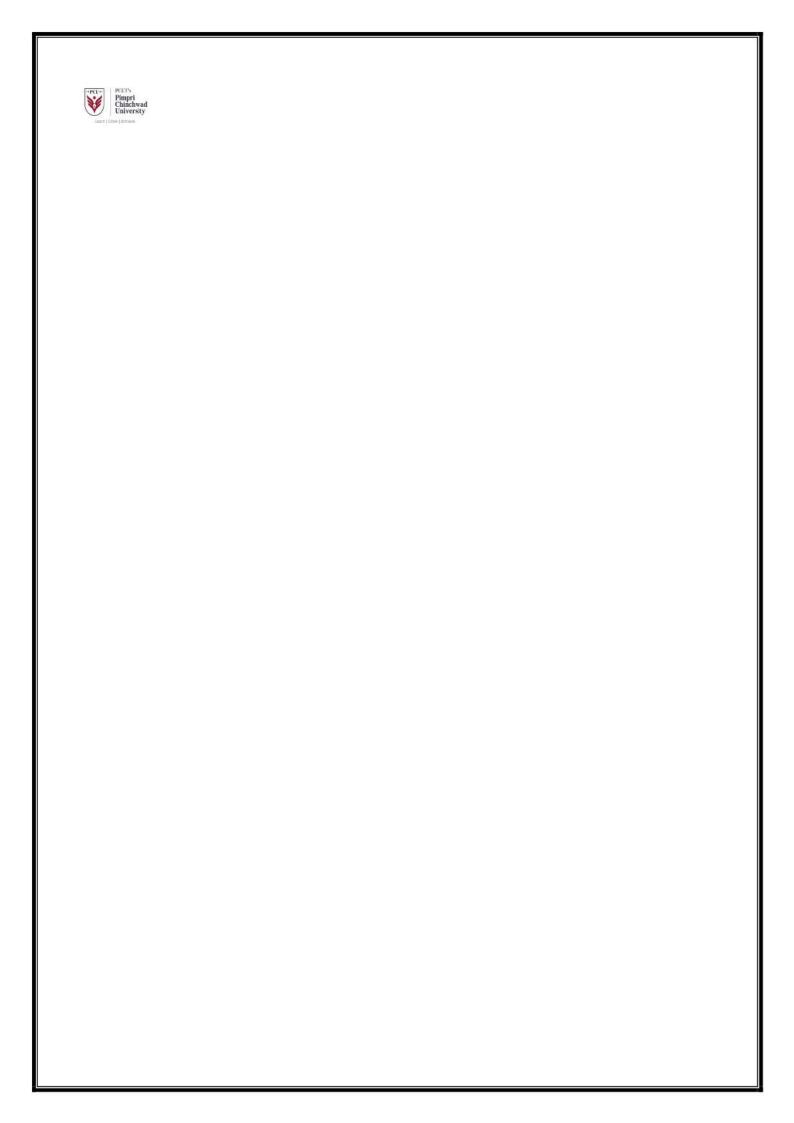
- 1. Netzwerk A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, Cornelesen Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 3. Netzwerk Neu A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- 1. Hallo Deutsch A1, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Ltd
 - 2. Themen Aktuell 1, Hueber verlag
 - 3. Maximal Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.

Online Resources/E-Learning Resources:

- 1. Youtube: https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr
 - 2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ
 - 3. Instagram: instagram.com/learngermanwithanja



COURSE CURRICULUM



Name of the CSE(AIDS) Program:		Semester : III		Level: UG/PG				
Course Name Basic Japanese language skill			Course Code/Course		B/AEC			
		ianguaş	ge skiii	1	ype			
Cours	Course Pattern 2024		Version		1.	0		
	Teaching Scheme Assessment Sch		ssessment Schen	me				
Γheor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment) Practical Oral		
2		::	2	30	50			
× 1100.00.00.00.00.00.00.00.00.00.00.00.00	quisite: I Course Obje			The objectives of Basic Japanese language skill are: 1. To meet the needs of ever growing industry, with respect to language support.				
				2. To get introduced to Japanese society and culture through language.				
				3. To acquire competitive edge in career choices.4. To participate effectively & responsibly in a multi cultural world.				
				5. To enable learners to communicate effectively in Japanese language.				
Course Learning Outcomes (CLO):			Students Will be able to: 1. After learning the course, the students will be able to: 2. Read and Write Hiragana script. 3. Write and Speak basic sentences. 4. Comprehend and speak about time, hobbies, likes and dislikes. 5. Write basic kanji.Use the Hiragana script in discussion					

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Japanese Language — Introduction of script, culture, History of script, Speaking: Self introduction, listening: short video skit on self-introduction	CLO 1	6
UNIT II		

	1 7272 727 227	5/2/
Introduction of Hiragana Script -	CLO 2	6
Whiting: Hiragana script, Speak: Basic sentences, General		
vocabulary: Months, Days of the week, Basic numbers, colours		
UNIT III		
Basic Sentence formation -	CLO 3	6
Basic sentence structure: Affirmative and Negative, General vocabulary: about family,		
UNIT IV		
Time and verbs –	CLO 4	6
Speaking: Talking about routine, Writing: routine using verbs and		
time, reading : A clock		
UNIT V		
Introduction of Katakana and basic kanji –	CLO 5	6
Reading: English words, country names		
Writing: Basic Kanji		
Total Hours		30

Textbook:

 Minna no Nihongo , "Japanese for everyone" ,Elementary Main Textbook , Goyal Publishers & Distributors Pvt. Ltd.

Reference books:

- 1. Shyoho Volume 1.
 - 2. Genki Japan
- 3. Haru Vol. 1 & 2

Online Resources/E-Learning Resources:

- 1. https://www.youtube.com/watch?v=shdlEapDsP4
- 2. https://youtu.be/K-nw5EUxDz0?feature=shared
- 3. https://youtu.be/o9sP-vaCEa0?si=l8yOvVKaItBQWXNu
- 4. https://youtu.be/JnoZE51WZg4?si=9uq68USOz5plBk2n
- 5. https://youtu.be/shdlEapDsP4?si=tC6RGaMtwDJgVu2d
- 6. https://youtu.be/9paXgC2U8L0?si=btS1G4mvrkG5C9zi



Name of the	CSE(AIDS)	Semester : III/ IV	Level: UG
Program:	881 85		

A) Learn Japanese - Hiragana APP available on Google play.

B) Hiragana Pro

PCET's	Course Name UHV-II: Understanding Understanding Harmony		tanding	Course Code/ Course Type		ACUHV201/AC	
Course	Course Pattern 2024			Ve	ersion	1.0	
	Teaching Scheme			L.	Ass	essment Scheme	e
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	140	2	=	2	221	-	**
	L.		Pre-Requ	isite: Basic	s of History		
	Course Objectives (CO):				o train the student perspective base themselves (huma nat understand (or detuman being, famil 3. To streng infuse a sense of punderstand Holis	g Harmony are: for Development of don self-exploration being), family, so the done of the following the harmony, society and naturation self-reflection commitment and control of the following the self-restanding of the self-exploration of the following the self-reflection commitment and control of the self-restanding of the self-exploration of the self-reflection that the self-reflection commitment and control of the self-exploration	on about ciety and rmony in the e/existence ourage to act
Course Learning Outcomes (CLO):				 Appl Analy Deve 	ze the most impor y correct appraisa. Prosp ze salient values in Empathy lop holistic percep e ply the Holistic U	tant requirement for being I of Physical needs, erity in detail a relationship, Frien y, False Prestige, btion of harmony at existence inderstanding of Harssional Ethics	meaning of ds and Foes, all levels of

COURSE CURRICULUM

Descriptors/Topics	CLO	Hours
UNIT I	-	
Course Introduction - Need, Basic Guidelines, Content and Process for Value EducationPurpose and motivation for the course, recapitulation from Universal Human Values-I	CLO 1	6
1. Self-Exploration—what is it? - Its content and process; Personality Traits-		

Self Excellence, "Natural Acceptance" and Experiential Validation- as		
the process for self-exploration, Adaptability, Belief and Understanding- Chinichwad University Self discipline		
2. Continuous Happiness and Prosperity- A look at basic Human Aspirations		
3. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority		
Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	•	
5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.		
UNIT II		
Understanding Harmony in the Human Being - Harmony in Myself:	CLO 2	6
Understanding human being as a co-existence of the sentient "I" and the material "Body"		
2. Understanding the needs of Self ("I") and "Body" - happiness and physical facility		
3. Understanding the Body as an instrument of "I" (I being the doer, seer and enjoyer)- Habits and Hobbies, SWOT Analysis (Activity)		
 Understanding the characteristics and activities of "I" and harmony in "I" - Dalai Lamas" Tibetan Personality Test – Dr. Menninger"s Psychometric Test. 		
5. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail		
UNIT III		
	CLO 3	6
Understanding Harmony in the Family and Society- Harmony	CLO 3	6
	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes,	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes,	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige.	CLO 3	6
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige. UNIT IV		
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige. UNIT IV Understanding Harmony in the Nature and Existence - Whole	CLO 4	
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige. UNIT IV Understanding Harmony in the Nature and Existence - Whole existence as Coexistence: 1. Understanding the harmony in the Nature and its Equanimity, Respect	CLO 4	
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship 1. Understanding the meaning of Trust; Difference between intention and competence 2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foes, Empathy, False Prestige. UNIT IV Understanding Harmony in the Nature and Existence - Whole existence as Coexistence: 1. Understanding the harmony in the Nature and its Equanimity, Respect for all, Nature as Teacher 2. Interconnectedness and mutual fulfillment among the four orders of	CLO 4	



UNIT V		
Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values 2. Definitiveness of Ethical Human Conduct 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Vision for the Holistic alternatives, UHVs for entrepreneurship	CLO 5	6
Total Hours		30

Textbooks:

- 1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
- 2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
 - 3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. Reference Books:
 - 1. The Story of Stuff (Book).
 - 2. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi
 - 3. Small is Beautiful E. F Schumacher
 - 4. Slow is Beautiful Cecile Andrews

Online Resources/E-Learning Resources:

1. https://www.studocu.com/in/document/jss-science-and-technology-university/human-values/uhv-handout-2-

harmony-in-the-human-being/

- 2. https://vvce.ac.in/wp-content/uploads/2021/04/Realising-Aspirations-of-NEP2020-UHV.pdf
 - 3. https://vemu.org/uploads/lecture notes/22 12 2022 1850871704.pdf



CSE(AIDS)	Semester: 3/4	Level: UG
	CSE(AIDS)	CSE(AIDS) Semester: 3/4

Cours	se Name	Constitu	ution of	Course C	ode/ Course	ACCOI20	1/AC
PCET's	E PETS T 1:		Type		ACCOIZO	I/AC	
Pimpri Chinchwad University					0.00		
Course	e Pattern	20	24	Ve	ersion	1.0	
	Te	aching Sch	eme		Ass	essment Schem	e
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	840	받	<u></u>	2	50	2 <u>8</u> 2	_
-	I]	Pre-Requisit	e:		
Course Objectives (CO):			 To To To 	familiarize the st the In- To enable studen provis To acquaint the s functions of vario make students un In	nstitution of Indudents with the key dian constitution. Its to grasp the constitutions and values. It tudents with the popular constitutional of institutions. Inderstand the basic dian politics. It decided measures in a decided measurement measur	elements of titutional wers and fices and premises of	
Course Learning Outcomes (CLO):			2. R 3. 4. Con 5. Aco	nalyze the basic stemember their Fur Fundamental Duti know about our U structure of mprehend our State cess the Amendm	ructure of Indian C ndamental Rights, I es (FD's) of our con Union Government, & codes, procedures te Executive & Elec of India. ents and Emergency issions given by the	OPSP's and astitution. political s. etions system	

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Indian Constitution:	CLO 1	6
The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly. The Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of India Constitution.		
UNIT II		

FR's, FD's and DPSP's: CLO 2 6 Findamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building UNIT III Governance and Constitution: Federalism in India - Features , Local Government -Panchayats - Powers and functions; 73rd and 74th amendments, Election Commission - Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures - RTI and PIL - Provisions and significance UNIT IV Union Executive: Parliamentary System, Union Executive - President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions. Hours 30			
UNIT III Governance and Constitution: CLO 3 Federalism in India - Features , Local Government -Panchayats — Powers and functions; 73rd and 74th amendments, Election Commission — Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures — RTI and PIL — Provisions and significance UNIT IV Union Executive: CLO 4 6 Parliamentary System, Union Executive — President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental	CLO 2	6
Governance and Constitution: Federalism in India - Features , Local Government -Panchayats – Powers and functions; 73rd and 74th amendments, Election Commission – Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures – RTI and PIL – Provisions and significance UNIT IV Union Executive: CLO 4 6 Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.			
Federalism in India - Features , Local Government -Panchayats — Powers and functions; 73rd and 74th amendments, Election Commission — Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures — RTI and PIL — Provisions and significance UNIT IV Union Executive: CLO 4 6 Parliamentary System, Union Executive — President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	UNIT III		
Powers and functions; 73rd and 74th amendments, Election Commission – Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures – RTI and PIL – Provisions and significance UNIT IV Union Executive: CLO 4 6 Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	Governance and Constitution:	CLO 3	6
Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	Powers and functions; 73rd and 74th amendments, Election Commission – Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures – RTI and PIL – Provisions and		
Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. UNIT V State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	UNIT IV		
State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India,	CLO 4	6
Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	UNIT V		
Hours 30	Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important	CLO 5	6
	Hours		30

Text Books

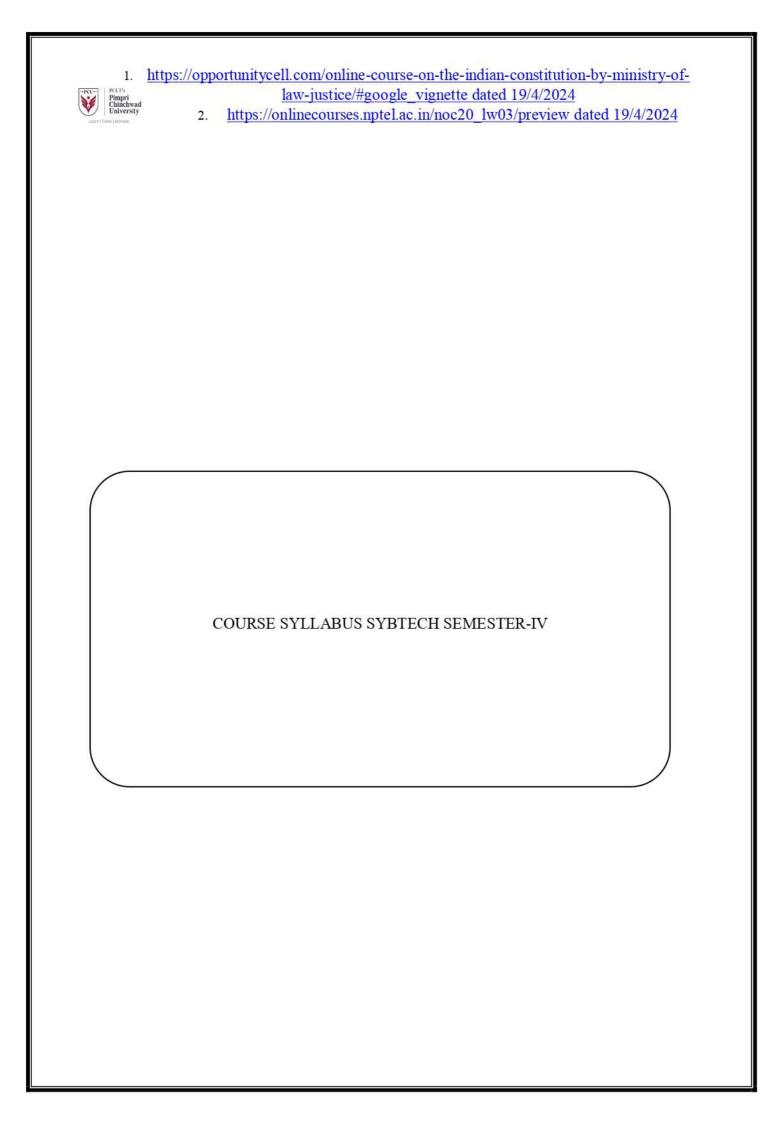
- 1. "Constitution of India" (for Competitive Exams) Published by Naidhruva Edutech Learning Solutions, Bengaluru. 2022.
 - 2. "Engineering Ethics", M.Govindarajan, S.Natarajan, V.S.Senthilkumar, Prentice -Hall, 2004

Reference Books:

- 1. "SamvidhanaOdu" for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.
- 2. "Constitution of India, Professional Ethics and Human Rights" by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition 2019.
- "Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu (DD Basu):Prentice Hall, 2008.
 - 4. "The Constitution of India" by Merunandan K B: published by Merugu Publication,

Second Edition, Bengaluru.

Online Resources/E-Learning Resources:





Name of the Program:	CSE(AIDS)	Semester : IV	Level: UG
Course Name	DATABASE MANAGEMENT SYSTEM	Course Code/Course Type	UBTCE210/ PCC

Course	Course Pattern		2024		ersion	1.0	
Pimpri Chinchwad University	Pimpri Chinchwad University Tes		eme	Assessment Scheme			e
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	829	판	3	3	40	60	_
	1	re-Requis	site: Knov	wledge of C	Programminga	and DSA	
	Course Objectives (CO):			1. T 2. 3. 4. To	To develop underst Database desi To demonstrate ef Transa To apply normaliz applic ability to design entity relationship formulate SQL to ability to identif	tanding concepts of ign and query language fective Query processing tection Processing teation for the development of the development of the development of the death of the diagrams into RDI queries on the respect of the data models for problems	Relational ages. essing and opment of and convert BMS and ect data
Course	Course Learning Outcomes (CLO):			2. Decc 3. C 4. Un 5. write	ability To design I compose any Schen Construct SQL qua derstand the Quer pr Trigger, Cursor ,P	uld be able to: ER Model for any appear and by applying norm eries for any requirity Evaluation and Erocesses. EL/SQL Programs are tended relational scl	nal forms . ement. xecution nd to design

COURSE CURRICULUM

Descriptors/Topics	CLO	Hours
UNIT I		
INTRODUCTION: Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models –Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base Architecture – Storage Manager – the Query Processor Data base design and ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships	CLO 1	9

and Relationship sets – ER Design Issues – Concept Design – Conceptual Design for University Enterprise. Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams		
UNIT II		
Relational Query Languages, Relational Operations.	CLO 2	9
Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus.		
Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers.		
UNIT III		
Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyee/Codd normal form. Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form	CLO 3	9
UNIT IV		
Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity. Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.	CLO 4	9
UNITV		
File organization:— File organization — various kinds of indexes. Query Processing — Measures of query cost - Selection operation — Projection operation, - Join operation — set operation and aggregate operation — Relational Query Optimization — Transacting SQL queries — Estimating the cost — Equivalence Rules	CLO 5	9
Total Hours		45

Text Books:

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "Database Systems: The Complete Book" - Pearson Education, 2002.

Reference Books:

Pimpri Chinchwid Silberscha	tz, H. Korth and S. Sudars	han, "Database System Concep	ots", 4rth Edition, McGraw-Hill
Name of the	CSE(AIDS)	Semester : IV	Level: UG
Program:			

International, 2002.

2. R. Elmasri and Shamakant B. Navathe, "Fundamentals of Database Systems", 3rd Edition, Addision Wesley , 2000.

Online Resources/E-Learning Resources:

- 1. http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html
 - 2. http://infolab.stanford.edu/~ullman/dscb.html
 - 3. http://cs.nyu.edu/courses/spring06/G22.2433-001/
 - 4. https://www.scaler.com/topics/course/dbms/

Course Name		DATA		Course Code/Course		UBTCE211	
Pimpri Chinchwad University		MANAG SYSTE	EMENT M LAB	Type			
GERT (CON JAthure STSTE)		WI LIE			PCC		
Course	Course Pattern 2024		Version		1.0		
Teaching Scheme			<u>-</u>	Assessment Scheme			
Theory	Practica 1	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
	1		1	2			25
	Pr	e-Requisi	te: Kno	wledge of C	Programming	and DSA	
Course Objectives (CO):				The objectives of Database Management System Lab are: 1. Develop understanding concepts of Relational Database design and query languages. 2. Demonstrate effective Query processing and Transaction Processing. 3. Apply normalization for the development of application software's 4. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data 5. Ability to identify the data models for relevant problems			
Course Learning Outcomes (CLO):				Students would be able to: 1. An ability To design ER Model for any application 2. To Decompose any Schema by applying normal forms 3. To construct SQL queries for any requirement. 4. To Understand the Query Evaluation and Execution processes. 5. To write Trigger, Cursor, PL/SQL Programs and to design object oriented, extended relational schemas			
				Practical P	lan		

Practical Plan

Assign	Assignment/Practical	Week	Details	CLO	Hours
ment/P	/Activity Title	Number/Turn			
ractical					
/Activit					
у					
Numbe					
r					

1	Dragtical 1. Analysis	Wash 1	CI O1	2
PCET's Pimpri Chinchwad University	Practical 1: Analyze the problem and come with the entities in it. Identify what Data has to be persisted in the databases.	Week 1	CL01	2
2	Practical 2: Installation of MySQL and practicing DDL & DML commands.	Week 2	CLO1	2
3	Practical3: Practice queries using ANY, ALL, IN, EXISTS, UNION, INTERSECT Union: The union operator returns all distinct rows selected by two or more queries.	Week 3	CLO2	2
4	Practical 4: Practice Queries using Aggregate functions, Group By, Having Clause and Order Clause.	Week 4 / Week 5	CLO 2	4
5	Practical5: Implement Indexes: An index is an ordered list of the contents of a column, (or a group of columns) of a table.	Week 6	CLO3	2
6	Practical6: Implement Exception handling	Week 7	CLO3	2
7	Practical 7: Implement Triggers	Week 8	CLO4	2
8	Practical 8: Implement Cursors	Week 9	CLO4	2
Si .				

9	Practical 9: Implementing Operations on relations using PL / SQL.	Week 10	CLO5	2	
10	Practical 10:	Week 11/week12	CLO5	4	
11	Mini Project /Task	Week 13/14/15	CLO1/2/3/4/5	6	
Total Hours					

Text Books:

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "Database Systems: The Complete Book" - Pearson Education, 2002.

Reference Books:

1. Silberschatz, H. Korth and S. Sudarshan, "Database System Concepts", 4rth Edition, McGraw-Hill

International, 2002.

2. R. Elmasri and Shamakant B. Navathe, "Fundamentals of Database Systems", 3rd Edition, Addision Wesley, 2000.

Online Resources/E-Learning Resources:

- 1. http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html
 - 2. http://infolab.stanford.edu/~ullman/dscb.html
 - 3. http://cs.nyu.edu/courses/spring06/G22.2433-001/
 - 4. https://www.scaler.com/topics/course/dbms/
- 5. https://onlinecourses.nptel.ac.in/noc22 cs91/preview





Learn Grow Achieve	CSE		Semester : IV	: IV Level: UG				
Name of the Program:								
Course Name		Core Java			Course Code/ Course Type	UBTCE212/Major		/Major
Course	e Pattern	2024		Version	1.0			
	Teach	ning Sche	me		Assessment Scheme			
Theor y	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Oral Assessment)		Practical/ Oral
2	:=:	(=))	2	2	40	60		2 2
	Pre-Re	equisite:	Basi	c knowled	lge of Programmin	ng in C an	nd C++	
				programming language. 2. To learn object oriented principles like abstraction, encapsulation, inheritance, and polymorphism and apply them in solving problems using java. 3. To apply the concepts of exception handling, multithreading and collection classes using java. 4. To develop software applications using JDBC connectivity. 5. To design the Graphical User Interface using applets and swing controls.				
Course Learning Outcomes (CLO):				Students would be able to: 1. To grasp the fundamentals programming concepts of Java programming language. 2. To apply object oriented principles like abstraction, encapsulation, inheritance, polymorphism in solving problems using java. 3. To perform exception handling, multithreading code using java. 4. To develop software applications using JDBC connectivity. 5. To design the Graphical User Interface using event handling.				
Descriptors/Topics						CLO	Hours	

OTHIT I		
Chinchwad University		
Introduction to Java Programming: Java Programming- History of Java, comments, Java Buzz words, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java standalone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploring string class, garbage collection.	CLO 1	6
UNIT II		
Inheritance: Inheritance – Inheritance types, super keyword, preventing inheritance: final classes and methods Polymorphism – method overloading and method overriding, abstract classes and methods. Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class. Packages-Defining, creating and accessing a package, importing packages.	CLO 2	6
UNIT III		
Exception Handling and Multithreading: Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses. Multithreading – Differences between multiple processes and multiple threads, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer problem	CLO 3	6
UNIT IV		
Database Management: Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions. Files- Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class. Connecting to Database – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC, Data Access Object (DAO).	CLO 4	6
UNIT V		
Event Handling: GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types – border, grid and flow Event Handling-	CLO 5	6

UNIT I

	Events, Event sources, Event classes, Event	
PCET'S Pimpri Chinchwad University		
sure (Grow) Archive	Total Hours	 30

Textbooks:

- 1. "Java Fundamentals a Comprehensive Introduction" HerbertSchildt and DaleSkrien,TMH
- 2. "Head First Java: Your Brain on Java A Learner's Guide", 1st Edition, by Bert Bates, Kathy Sierra

Reference Books:

- 1. "Java: the complete reference" by Herbert Schildt and DaleSkrien, TMH
- 2. "Java For Dummies (For Dummies" (Computer/Tech)) 8th Edition by Barry Burd.

Online Resources/E-learning Resources:

- 1. https://onlinecourses.nptel.ac.in/noc20_cs58/preview Programming in Java By Prof. Debasis Samanta | IIT Kharagpur
 - 2. https://onlinecourses.nptel.ac.in/noc



University	a af tha	CCE	(IDC)	Com	acton IV	T aval. 1	IIC	
Name of the Program:		CSE(AIDS)		Semester: IV		Level: UG		
Cours	se Name	Com		Course C	Code/ Course	UBTCE	213	
			Organisation		Гуре			
Cours	e Pattern	20	24	Version		1.0		
	Te	Teaching Scheme Assessment Scheme			e			
Theor	Practical	Tutorial	Total	Hours	CIA	ESA (End	Practical/	
У			Credits		(Continuous	Semester	Oral	
					Internal	Assessment)		
					Assessment			
)			
2	1=1	-	2	2	40	60		
		Pre	e-Requisit	e: Digital	logical Design		1	
(Course Obje	ectives (CC)):	The obj	jectives of Con	nputer Organisati	ion are:	
				1. To r	ecognize the co	omponents of Co	mputer	
				2. To articulate the principles of computer				
				organization and the basic architectural concepts.				
				3. To learn simple register transfer language to				
				specify various computer operations.				
				4. To interpret and summarize the pipelining concept and multiprocessor systems				
				5. To		ogram a simple o LU operation.	ligital	
NEV NEV								
Cours	e Learning	Outcomes	(CLO):	Students would be able to:				
				1. Student will learn the concepts of computer organization for several engineering applications.				
				2. Student will develop the ability and confidence to use the fundamentals of computer organization as				
				a tool in the engineering of digital systems.				
3. An ability to identify, formulate, and solve hardware and software computer engineering problems using								
sound con						ngineering princ	iple	
				4. To imp	art the knowled	lge on micro pro	gramming	
				5. Compre		epts of advanced niques.	pipelining	



Descriptors/Topics	CLO	Hours
UNIT I		
FUNDAMENTALS OF COMPUTERS:	CLO 1	6
Basic Functional units of Computers: Types and generation of computers, Functional units, basic Operational concepts, Bus structures. Software, Performance, Architecture: Von Neumann and Harvard arc hitectureData Representation: Signed number representation, fixed and floating point representations. Computer Arithmetic: Addition and subtraction, multiplication. Booth's Algorithm, Division Restoring Algorithm, Non Restoring algorithm		
UNIT II		
THE MEMORY SYSTEM	CLO 2	6
Basic concepts of semiconductor RAM memories, Memory Hierarchy; Primary memory, Secondary Memory: Magnetic Tape, Magnetic Disk, Optical disk, magnet-optical disk; Concepts of auxiliary, Associative, Cache Cache coherence and Virtual Memory. Paging Replacement algorithmIntroduction to RAID and JBOD, DMA, DMA Transfer modes, sequential access, and direct access storage devices.		
UNIT III		
REGISTER TRANSFER LANGUAGE AND MICRO- OPERATIONS:	CLO3	6
Register Transfer Language and Micro Operations: RTL- Registers, Register transfers, Bus and memory transfers.		
Micro operations: Arithmetic, Logic, and Shift micro-operations,		
Arithmetic logic shift unit.		
Instructions and Instructiontypes and Instruction Cycle		
Computer instructions, Instruction cycle,Instruction codes, Timing and Control, Types of Instructions: Memory Reference Instructions, Input—Output and Interrupt		
UNIT IV		

CENTRAL PROCESSING UNIT ORGANIZATION: General Register Organization, Stack organization, Addressing modes, Data Transfer and Manipulation, Program Control, CISC and RISC processors Control unit design: Design approaches, Control memory, Address sequencing, Micro Programmed Control.Input—Output Organization: Peripheral devices, Input-output subsystems, I/O device interface, I/O Processor, I/O transfers—Program controlled, Interrupt driven, and interrupts and exceptions. Instruction-level Parallelism Throughput and Speedup,	CLO4	6
UNIT V		
MULTI-PROCESSOR ORGANIZATION Input –Output Organization: Peripheral devices, Input-output subsystems, I/O device interface,I/O Processor, I/O transfers—Program controlled, Interrupt driven, and DMA Interrupts and exceptions. I/O device interfaces – SCII, USB Pipelining and Vector Processing: Basic concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. Time Space Diagram, Hazardsinstruction Pipelining, Arithmetic Pipelining	CLO 5	6
Total Hours		30

Text Books:

- 1. Computer Organization Carl Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGraw Hill.
- 2. Computer Organization and Architecture William Stallings Sixth Edition, Pearson/PHI **Reference Books:**
 - 1. Computer Systems Architecture M.Moris Mano, IIIrd Edition, Pearson/PHI
 - 2. Structured Computer Organization Andrew S. Tanenbaum, 4th Edition PHI/Pearson
- 3. Fundamentals or Computer Organization and Design, Sivaraama Dandamudi Springer Int. Edition.
- 4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier

Online Resources/E-Learning Resources:

NPTEL & MOOC courses titled Computer organization

1.https://nptel.ac.in/courses/106105163/

Pimpri Chinchwad Waame of the Program:		CSE(AIDS)		Semester: 4		Level: UG	
Course Name			olied Course ematics		Code/ Course Type	UBTCE214/PCC	
Course	e Pattern	2024		Version		1.0	
Teaching Scheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous	ESA (End Semester	Practical/ Oral

2.https://nptel.ac.in/courses/106103068/

Pimpri Chinchwad University					Internal Assessment)	Assessment)	
aura (Grow 3 shawe	0	0	3	3	40	60	
	Course Obje	ectives (CO):	degree The o	bjectives of Ap	plied Mathematic	es are:
	504250		,.	1. 7 2. To	To recall concepts o understand & app	and techniques in D Equations. ly fourierTransform	ifferential
3. To understand & apply Z-Transform techniques. 4. To apply statistical techniques to analyze data.							

Course Learning Outcomes (CLO):

Students would be able to:

1. Students will be able to identify higher order differential equations & solve them by using appropriate methods.

5. To familiarize the students with probability and its distribution.

- Explain the fourier transformation& integral equation.
 - 3. Apply knowledge of Z- transform and difference equations.
 - 4. Understand statistical data and its analysis.
- 5. understand the probability, its theorem & distribution.

COURSE CURRICULUM

Descriptors/Topics	CLO	Hours
UNIT I Higher order linear differential equations		
Introduction, LDE of nth order with constant coefficients, Complementary function, Particular integral, General method, Shortcut methods, Method of variation of parameters, Cauchy's & Legendre's DE.	CLO 1	12
UNIT II Fourier Transform and Z –Transform		
Fourier Transform:- Introduction, Complex exponential form of Fourier series, Fourier integral theorem, Fourier Sine & Cosine integrals, Fourier transform, Fourier Sine & Cosine transforms and their inverses Z-Transform: - Introduction, Definition, Standard properties, Z Transform of standard sequences and their inverses. Solution of difference equations.	CLO 2	12
UNIT III Statistics		
Introduction Measures of central tendency, Measures of dispersion, Coefficient of variation, Moments, Skewness and Kurtosis, Correlation and Regression, Multiple Correlation, Linear and Multiple egression, Reliability of Regression Estimates.	CLO 3	10



UNIT IV	Probability and Probability Distributions		
variables, Probab Mathematic	orems on Probability, Bayes theorem, Random ility mass function, Probability density function, cal expectation, variance and its properties istributions: - Binomial distribution, Poisson hal distribution. Geometric, Uniform distribution, Exponential distribution.	CLO 4	11
	Total Hours		45

Text Books:

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2014.
 - 2. Hugh Neill, Trigonometry: A complete Introduction, John Murray Learning, 2018.
- 3. George B. Thomas, Jr and Ross L. Finney, Calculus and Analytical Geometry, 9th Edition, 1998

Reference Book(s)

- 1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2010.
- 2. Ron Larson, Trigonometry, Brooks/Cole, 9th Edition, 2013.
 - 3. Robert E, Moyer, Trigonometry, Mc. Graw Hill, Addision-Wesely, 4th Edition, 2009.
 - 4. Online Resources/E-Learning Resources:



Name of the		CSE(AIDS)		Semester : IV		Level: UG/PG		
Program:								
Course Name		Commu	nication	Course C	ode/ Course	UBTCE215	5 A/ OE	
	Sys		tem]	Type			
Cours	e Pattern	20	24	Ve	ersion	1.0		
	Teaching Scheme				Ass	essment Schem	e	
Theor	Practical	Tutorial	Total	Hours	CIA	ESA (End	Practical/	
у			Credits		(Continuous Internal Assessment	Semester Assessment)	Oral	
3		2	3	3	40	60		
]	Pre-Requisit	ie:	l	Ji	
(Course Obje	ectives (CC)):	The objectives of Communication System are:				
				To describe the building blocks of communication systems. To recognize mathematical background for communication signal analysis. To analyze the signal flow in a digital communication system. To explore the concept of Data Communication To evaluate the error performance of a digital communication system in the presence of noise and other interferences multiple access techniques				
Cours	e Learning	Outcomes	(CLO):	2. E 3. I te 4. I	Signals and its frequency response 2. Explain the Amplitude modulation and frequency modulation with its real-world applications 3. Explore the Pulse modulation digital modulation techniques and their S/N ratio to better understand for mobile environment. 4. Model various line coding methods for TDMA, CDMA etc			



Descriptors/Topics	CLO	Hours
UNIT I .	CLO 1	09 Hrs
INTRODUCTION TO COMMUNICATION SYSTEM Introduction to communication system: Introduction To Communication System (Block diagram). Analog and Digital		
Messages, History of Communications. Signal Transmission through a linear system, Signal distortion over a communication channel, Fourier Transform (in brief) Amplitude Modulation: Modulation and demodulation Frequency modulation and its types: Modulation and demodulation		
UNIT II	CLO 2	09 Hrs
Sampling and pulse communication: Introduction To Communication System (Block diagram). Analog and Digital Messages, History of Communications. Signal Transmission through a linear system, Signal distortion over a communication channel, Fourier Transform (in brief) Amplitude Modulation: Modulation and demodulation Frequency modulation and its types: Modulation and demodulation		
UNIT III	CLO 3	9 Hrs
Data communication: History of Data Communication Standards Organizations for Data Communication Data Communication Circuits		
Data Communication Codes Data communication Hardware – serial and parallel interfaces.Multiple Access: TDMA, FDMA, CDMA and its comparison, Guided Media, Unguided Media, Transmission Impairments, Performance Shannon Capacity and Bandwidth		
UNIT IV	CLO 4	8 Hrs
Channel capacity, error detection and correction: Entropy ,Mutual Information,Source Encoding Theorem, Shannon Fano Coding, Huffman Coding, Types of Errors, Detection, Parity Check, Error Correction		
UNIT V	CLO5	10 Hrs
Digital Transmission And Digital Modulation TechniquesComponents of digital communication system,line coding, Eye Diagram,		

DIGITAL CARRIER SYSTEMS	
Modulation techniques for ASK,FSK, PSK, MSK, BPSK, QPSK	
Total Hours	45 Hrs

Text Books:

- 1. Digital and analog communication system by B.P.Lathi.
 - 2. Communication Systems by Simon Haykins.
- 3. Principles of Communication Systems by Taub and Schilling

Reference Books:

1. Electronic Communications Systems by Wayne Tomasi.

Online Resources/E-Learning Resources:

- 1. https://www.classcentral.com/course/swayam-principles-of-communication-systems-i-7963dated 16/04/2024
 - 2. https://onlinecourses.nptel.ac.in/noc22_ee05/preview dated 16/04/2024

COURSE CURRICULUM

Practical Plan



Name of the Program:		B Tech CSE		Semester : IV			Level: UG/PG	
Course Name		Communication System Laboratory		Course Code/ Course Type		rse I	UBTCE216 A/ OE	
Course	Course Pattern 2024			Ve	ersion		1.0	
	Teaching Scheme			†1		Assessme	ent Schem	ne
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continu Interna Assessm	ous Ass	SA (End emester essment)	Practical/ Oral
2 ⁰ 2 <u>- 1</u> 2.	1	<u> </u>	1	2	25		ge <u>a</u>	25
			F	Pre-Requisit	e:	M/		
				4. 5. 5. 1	To recogn commons. To analy to explore the To evaluate mmunication	systemize mathematication is syze the sign communication is the concept of the error pen is system in the system i	locks of comms. tical backgrosignal analystal flow in a don system. f Data Commrformance of	ound for is. ligital nunication f a digital of noise and
Course	Assignme		(CLO):	2. E 3. E te 4. 1	tudents will Signal xplain the A modulation explore the F chniques and f Model varion	s and its free implitude men with its real real real real real real real real	dentify Varior quency respondulation and al-world applation digital a atio to better vironment. g methods for a etc digital comme eir performatics.	onse d frequency lications modulation understand or TDMA,
ment/P ractical	ractical/A		umber/Turn	X14-5-X-18	.uIII	CLO		

/Activi	ty Title				- 07
Number	ty The				
1.	Practical 1: Amplitude Modulation: Modulation and demodulation	Week 1/Turn 1	Amplitude Modulation: Modulation and demodulation	CLO1,CL O1	2
2.	Practical 2: Frequency modulation and its types: Modulation and demodulation		Frequency modulation and its types: Modulation and demodulation	CLO2	2
3.	Practical 3: Sampling and Sampling Theorem & Aliasing		Sampling and Sampling Theorem & Aliasing	CLO3	2
4.	Practical 4: PAM, PPM, PWM pulse modulation and demodulation		PAM, PPM, PWM pulse modulation and demodulation	CLO 4	2
5.	Practical 5: PCM modulation and demodulation and calculation of S/Nq.		PCM modulation and demodulation and calculation of S/Nq.	CLO4	2
6.	Practical 6: DM, ADM, ADPCM modulation and demodulation.		DM, ADM, ADPCM modulation and demodulation.	CLO 4	2
7.	Practical 7: Data		Data Communication	CLO4	2

PCUT's Pimpri Chinchwad University	Communicati on kit for Multiple Access: TDMA, FDMA, CDMA and	kit for Multiple Access: TDMA, FDMA, CDMA and its comparison.		
	its comparison.			
8.	Practical 8:Data communicatio n Hardware – serial and parallel interfaces.	Data communication Hardware – serial and parallel interfaces.	CLO 4	2
9.	Practical 9: Line coding NRZ, RZ etc	Line coding NRZ, RZ etc	CLO5	2
10.	Practical 10: Modulation techniques for ASK,FSK,PS K,MSK,BPS K,QPSK,	Modulation techniques for ASK,FSK,PSK, MSK,BPSK,QPS K,	CLO5	2

Text Books:

- 1. Digital and analog communication system by B.P.Lathi.
 - 2. Communication Systems by Simon Haykins.
- 3. Principles of Communication Systems by Taub and Schilling

Reference Books:

- 1. Electronic Communications Systems by Wayne Tomasi.
 - 1. Online Resources/E-Learning Resources:
- 2. https://www.classcentral.com/course/swayam-principles-of-communication-systems-i-7963 dated 16/04/2024
 - 3. https://onlinecourses.nptel.ac.in/noc22_ee05/preview dated 16/04/2024



Name of the	B.Tech	Semester: 4	Level: UG
Program:			

Cours	e Name	Digital	Signal	Course C	ode/ Course	UBTCE2	15 B
PCET's	Processing Chinchwad			Type	OBTOL2	1.0.10	
University	D	20	2.		15.45°		
Course	e Pattern	20	24	Ve	ersion	1.0	
Teaching Scheme			eme		Ass	essment Schem	е
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	7 <u>4</u> 0	<u>e</u>	3	3	40	60	2
Course Objectives (CO):				1. T 3. Un	bjectives of Signorecall the basic ty 2. To recognize derstand how to p 4. To provide kn Fo discuss word le	gnals and System knowledge about the pe of signals signals mathematication signals. It is signals to signals. It is sowledge of Digital ength issues, multing and application.	e different cally. al operations filter.
Course Learning Outcomes (CLO): Students would be able to: 1. To identify different type of signals. 2. Explain the signals mathematically. 3. Apply knowledge of mathematical operations signals. 4. Analyze Digital filter. 5. Evaluate the multi rate signal processing an application.					ically. operations on		

Descriptors/Topics	CLO	Hours
UNIT I		
Basic elements of digital signal Processing: Concept of frequency in continuous time and discrete time signals —Sampling theorem Discrete time signals. Discrete time systems —Analysis of Linear time invariant systems —Z transform —Convolution and correlation.	CLO 1	9
UNIT II		

Introduction to DFT: Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 and Radix-4 FFT algorithms – Declination in Time – Decimation in Frequency algorithms – Use of FFT algorithms in Linear Filtering and correlation.	CLO 2	9
UNIT III		
Structure of IIR: System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance. Bilinear transformation – Approximation derivatives – Design of IIR filter in the Frequency domain.	CLO 3	10
UNIT IV		
Symmetric & Anti-symmetric FIR filters: Linear phase filter – Windowing techniques – rectangular, triangular, Blackman and Kaiser windows – Frequency sampling techniques – Structure for FIR systems.	CLO 4	9
UNIT V		
Finite word length effects in FIR and IIR digital filters: Quantization, round off errors and overflow errors. Multi rate digital signal processing: Concepts, design of practical sampling rate converters, Decimators, interpolators. Poly phase decompositions. Application of DSP – Model of Speech Wave Form – Vocoder.	CLO 5	8
Total Hours		45

Textbooks:

- 1. Oppenheim A V and Sehafer R W, "Discrete Time Signal Processing", Prentice Hall (1989).
 - 2. Proakis J G and Manolakis D G, "Digital Signal Processing", Pearson Education India.

Reference Books:

- 1. Oppenheim A V, Willsky A S and Young I T, "Signal & Systems", Prentice Hall, (1983).
 - 2. Ifeachor and Jervis, "Digital Signal Processing", Pearson Education India.
- 3. DeFatta D J, Lucas J G and Hodgkiss W S, "Digital Signal Processing", J Wiley and Sons, Singapore, 1988
 - 4. Sanjit K Mitra "Digital Signal Processing" TMH

PCEP's Pimpri Chinchwad University	Online Resources/E-Learning Resources:	
Chitchwad University	1. https://nptel.ac.in/courses/117102060	
	COURSE CURRICULUM	



Name of the	B.Tech	Semester : 4	Level: UG
Program:			
Course Name	Digital Signal Processing Laboratory	Course Code/ Course Type	UBTCE216 B
Course Pattern	2024	Version	1.0

Assessment Scheme

Theor	Practical	Tuto	Total	Hours	CIA	ESA (End	Practical/
У		rial	Credits		(Continuou s Internal Assessmen t)	Semester Assessment)	Oral
	1	2 0.	1	2	25	82	25

Pre-Requisite: Signal and system, Mathematics, particularly linear algebra, calculus, and complex analysis.

Course Objectives (CO):	The objectives of Signals and Systems Laboratory
	are:
	To implement Linear and Circular Convolution 2. To implement FIR and IIR filters 3. To Estimate power spectral densities using a variety of techniques 4. To Study the architecture of DSP processor 5. To learn programming of DSP hardware for real-time signal processing applications
Course Learning Outcomes (CLO):	Students would be able to:
	Calculate and Plot DFT / IDFT of given DT signal Analyze the frequency response of discrete time systems. Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques Demonstrate their abilities towards DSP Processor based implementation of systems

Practical Plan

Aggion	Assignment/P	Week	Details	CLO	Hours
Assign	ractical/Activi	Number/	Details	CLO	пошѕ
Chinchwad					
ractical	ty Title	Turn			
/Activi					
ty					
Numbe					
r					
1	Practical 1:	Week 1	To find DFT / IDFT of	CLO1	2
20			given DT signal		\$\$ \$.
2.	Practical 2:	Week 2	Program to obtain Linear	CLO1	2
100.000			Convolution of two finite		A-07
			length sequences		
	D :: 10	*** 1.0		GT C 2	
3.	Practical 3:	Week 3	Program for computing	CLO3	2
			Auto-correlation.		
4.	Practical 4:	Week 4	To find frequency response	CLO 3	2
220			of a given system (in) == ×
			Transfer Function/		
			Differential equation form).		
			* **		
5.	Practical 5:	Week 5	Implementation of FFT of	CLO 4	2
			given sequence		
6.	Practical 6:	Week 6	Implementation of LP FIR	CLO 4	1
7			filter for given sequence		
2.00				72000 500 52	
7.	Practical 7:	Week 7	Implementation of HP FIR	CLO 5	2
			filter for given sequence		
8.	Practical 8:	Week 8	Implementation of HP IIR	CLO 5	2
			filter for given sequence		
		1	3		27

Textbooks:

- 1. Oppenheim AV and Sehafer RW, "Discrete Time Signal Processing", Prentice Hall (1989).
 - 2. Proakis J G and Manolakis D G, "Digital Signal Processing", Pearson Education India. Reference **Books:**
 - 1. Oppenheim A V, Willsky A S and Young I T, "Signal & Systems", Prentice Hall, (1983).
 - 2. Ifeachor and Jervis, "Digital Signal Processing", Pearson Education India.
- 3. DeFatta D J, Lucas J G and Hodgkiss W S, "Digital Signal Processing", J Wiley and Sons, Singapore, 1988
 - 4. Sanjit K Mitra "Digital Signal Processing" TMH

Online Resources/E-Learning Resources



1. https://nptel.ac.in/courses/117102060

COURSE CURRICULUM



e of the gram:	ВТ	TECH C	SE	Semester : 4	: 4 Level: UG		
se Name	Java	Java Laboratory		Course Code/ Course Type	UBTCE2	17/VSEC	
e Pattern	<u> </u>	2024		Version	1.0		
Teaching Scheme Assessment Scheme			ie				
Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral	
1	-	1	2	25	72	25	
Pre-Re	equisite:	Basi	c knowled	lge of Programmir	ng in C and C+	+	
				2. To learn abstraction polymorp 3. To apply the multithrea 4. To devel 5. To design the polymorp abstraction polymorp abstraction polymorp abstraction polymorp.	programming langer object oriented properties, encapsulation, in this mand apply the problems using just concepts of exceeding and collection java. It is a pure the properties of the problems using just encaps of the problems using just encaps and collection just encaps and collection just encaps and collection just encaps and the problems are properties of the properties of the properties of the properties of the problems and the problems are problems and the problems are problems.	guage. rinciples like nheritance, and nem in solving ava. eption handling, on classes using acations using rity. r Interface using	
urse Learni	ng Outco	mes (CL	O):	Student 1. To gras 1. To apply abstraction polymorp 3. To create e 4. To deve	p the fundamental programming langly object oriented properties of the programming langly object oriented properties of the fundamental programming properties of the fundamental langle of the fundamen	e to: Is of the Java guage. Drinciples like a, inheritance, problems using a, multithreading a. Ications using arity. Tenterface using	
	e of the gram: e Name Pattern Teach Practical 1 Pre-Re Course C	e of the gram: Brane Pattern Teaching Scheit Practical Tutori al 1 - Pre-Requisite: Course Objectives	e of the gram: BECH Cstart BECH Cstart BECH Cstart BECH Cstart BECH Cstart BECH Cstart Basic Course Objectives (CO):	e of the gram: BY Pattern Practical Tutori al Credits 1 - 1 2 Pre-Requisite: Basic knowled	e of the gram: Te Name Pattern Java Laboratory Course Code/ Course Type Pattern Z024 Version Teaching Scheme Practical Tutori al Credi ts Pre-Requisite: Basic knowledge of Programmin Course Objectives (CO): The objectives 1. To learn abstraction polymory 3. To apply the multithrea 4. To deve 5. To design to apply the multiple of the polymory The objectives 1. To grass To apply the multiple of the polymory The objectives Student 1. To grass 2. To apply the multiple of the polymory The objectives 3. To create of the polymory All the polymory The objectives The objectives The objectives The objectives The objectives The objectives To deve The objectives To deve The objectives To deve The objectives The o	e of the gram: Re Name	

Practical Plan

Assign	Assignment/Pr	Week	Details	CLO	Hours
ment/P	actical/Activit	Number			
ractical	y Title	/ Turn			
	0.00	70			

/Activit					
1	Practical 1: Java control structures	Week 1/ Turn 1	Write a java program to define the data types, variable, operators, arrays and control structures.	CLO 1	2
2	Practical 2: Constructor Creation	Week 2 /Turn 1	Develop a Program to define class and constructors. Demonstrate constructors with method overloading.	CLO 1	2
3	Practical 3: Inheritance and interface	Week 3 /Turn 1 Week 4 /Turn 1	Develop a Program to define inheritance and show method overriding.	CLO 2	4
4	Practical 4: Exception Handling	Week 5 /Turn 1	Develop a Program to demonstrate Exception Handling.	CLO 3	2
5	Practical 5: Multithreading	Week 6 /Turn 1 Week 7 /Turn 1	Develop a Program to demonstrate Multithreading.	CLO 3	4
6	Practical 6: Input and output operations	Week 8 /Turn 1	Develop a Program to demonstrate I/O operations.	CLO 4	2
7	Practical 7: Database operations	Week 9 /Turn 1 Week 10 /Turn 1	Develop a Program to demonstrate Database handling.	CLO 4	4
8	Practical 8: Network Programming	Week 11 /Tum 1	Develop a Program to demonstrate Network Programming.	CLO 5	2
9	Practical 9: Event Handling	Week 12 /Turn 1	Develop a Program to demonstrate Applet structure and event handling.	CLO 5	2
10	Practical 10: Layout Creation	Week 13 /Turn 1	Develop a Program to demonstrate Layout managers.	CLO 5	2
11	Practical 11:	Week	Develop a Project using java.	CLO	4

	Mini Project	14		1-5	
PCUTS Pimpri Chinchwad University		/Turn 1			
Laure Grow Archieve		Week			
		15			
		/Turn 1			
	2		Total hours		30

Textbooks:

- 1. "Java Fundamentals a Comprehensive Introduction" HerbertSchildt and DaleSkrien,TMH
- 2. "Head First Java: Your Brain on Java A Learner's Guide", 1st Edition, by Bert Bates, Kathy Sierra

Reference Books:

- 1. "Java: the complete reference" by Herbert Schildt and DaleSkrien,TMH
- 2. "Java For Dummies (For Dummies" (Computer/Tech)) 8th Edition by Barry Burd.

Online Resources/E-Learning Resources:

https://onlinecourses.nptel.ac.in/noc20_cs58/preview Programming in Java By Prof. Debasis
Samanta | IIT Kharagpur

COURSE CURRICULUM



29000	e of the gram:	C	SE (AID	OS)	Semester : IV	Leve	l: UG
Cours	Course Name Project Based on D and Technologic Solutions		ogical	Course Code/Course Type	UBTCE	219/VEC	
Course	e Pattern	Y.	2024		Version	1	.0
	Teac	hing Sch	eme		Asse	essment Schen	me
Theor y	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Or al
-	2	525 S	2	4	25	-	(3)
	e Learning (55%		This course will enable the students to: 1. Gain an understanding of emerging digitate technologies and their potential applications addressing societal challenges. 2. Apply design thinking methodologies to identification needs, define project requirements, and deven innovative solutions. 3. Develop technical skills in software developmedata analysis, and digital prototyping. 4. Collaborate effectively in interdisciplinary team design, implement, and evaluate digital solutions. 5. Demonstrate proficiency in project management techniques, including planning, budgeting, a resource allocation. O): Students would be able to: 1. Gain an understanding of emerging digitate technologies and their potential applications addressing societal challenges. 2. Apply design thinking methodologies to identifications and their potential applications addressing societal challenges. 3. Develop technical skills in software developmedata analysis, and digital prototyping. 4. Collaborate effectively in interdisciplinary team design, implement, and evaluate digital solutions. 5. Demonstrate proficiency in project management, and evaluate digital solutions.			
		De	scriptors	/Topics	res	CLO	Hours

	Introduction to Digital Innovation	CLO1	60	
PCET'S Pimpri	 Overview of course objectives, expectations, and project 	to		
Chińchwad University	guidelines	CLO5		
sorn Grow Achieve	 Introduction to design thinking and user-centered design principles 	CLOS		
	 Case studies of innovative digital solutions and their impact Needs Assessment and Solution Design 			
	 Methods for conducting user research and defining project requirements 			
	 Ideation and concept generation techniques for digital solutions 			
	 Prototyping and user testing methodologies 			
	3. Technology Selection and Development			
	 Overview of emerging digital technologies, including AI, IoT, and blockchain 			
	 Introduction to programming languages and development frameworks 			
	 Hands-on workshops on software development and digital prototyping tools 			
	4. Project Planning and Management			
	 Project scoping, goal setting, and stakeholder analysis 			
	Techniques for project planning, scheduling, and risk management			

Budgeting and resource allocation for digital innovation projects

Agile development methodologies and iterative prototyping Quality assurance and testing strategies for digital solutions Iterative feedback and refinement based on user testing

Methods for evaluating the usability, effectiveness, and scalability of digital solutions

Data analysis techniques for measuring project outcomes and impact

• Documentation and reporting of project findings and recommendations

5. Implementation and Testing

Evaluation and Impact Assessment

Assessment:

- 1. Project Proposal: Written proposal outlining the project scope, objectives, and methodology (20%)
 - 2. Project Implementation: Development and implementation of the digital solution, including documentation and code repository (30%)
- 3. Final Report: Written report summarizing the project process, outcomes, and impact assessment (30%)
 - 4. Presentation: Oral presentation of project findings and demonstration of the digital solution (20%)



Pimpri Chinchwad University								
	Name of the Program:		Foreign Language		Semester : 4		Level: UG/PG	
Course Name		Germa	n A1.2	L. Marian and S. A.	Course Code/Course Type		UFL 202 A/AEC	
Course	e Pattern	20	24	Ve	ersion	1.0		
	Te	aching Sch	eme	9	Ass	essment Schem	e	
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
2	-	2	_	2	20	30	-	
Pre-F	Requisite:				everyday expr ng specific need	essions and very ls.	y simple	
(Course Obje	ectives (CC)):	The objectives of German A1.2 are: 1. To get along with a basic vocab. 2. To understand German day to day culture. 3. Can communicate in routine situations. 4. To be able to have a direct exchange of information about familiar matters. 5. To describe own surroundings.				
Course	e Learning	Outcomes	(CLO):	3. 4. C	mmunicate in the Able to frame s c Translate simple s German lar onstruct a dialogu basic human inte	areas of immediate simple sentences in onversation. Sentences from Enginguage and vice-verie, in the German lateractions in a social interaction relating onversation.	formal lish to the sa. nguage, for context.	

Descriptors/Topics						CLO	Hours		
				UNIT I					
Kontakte								CLO 1	6
planning	of	letter	writing,	ramification	of	Letter,,writing	and		

understanding, discussion about language learning, find information		
Trombtexts, understand conversations on various topics, texts related to office life		
Grammar – Usage of Articles and Prepositions		
UNIT II		
MeineWohnung	CLO 2	6
Understand home advertisements, describe house, how to reply		
invitations, how to express 'likes and dislikes', speak about different		
forms of living, how to write a text on house		
Grammar – Adjectives		
UNIT III		
OINII III		
AllesArbeit?	CLO3	6
Talk about daily routine, talk about past, understand job advertisements,		
understand blogs on jobs, express opinions about jobs, prepare		
telephonic dialogues, speak about jobs		
Grammar – Past tense, Sentence connectors		
UNIT IV		
Kleidung und Mode	CLO4	6
Speak about cloths and shopping, lead a discussion during cloths		
shopping, discussion in departmental store, understand and research		
information about Berlin		
Grammar – Separable and non-separable verbs		
UNITV		
Gesund und munter&Ab in den Urlaub	CLO5	6
Learn body parts, Health related dialogue, City orientation, Travel		
reports, discussion regarding different travel destinations and weather		
Grammar – Imperative, Time adverbs		
Total Hours		30

Textbooks:

- 1. Netzwerk A1, Ernst klettVerlag&Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, CornelesenVerlag&Goyal Publishers & Distributors Pvt. Ltd.
- 3. NetzwerkNeu A1, Ernst klettVerlag&Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- 1. Hallo Deutsch A1, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Ltd
 - 2. ThemenAktuell 1, Hueberverlag

3. Maximal Ernst klettVerlag&Goyal Publishers & Distributors Pvt. Ltd.



Online Resources/E-Learning Resources:

1. Youtube: https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr

2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ

3. Instagram:instagram.com/learngermanwithanja



2900	e of the gram:	CSE(A)	IDS)	Sem	ester: 4	Level: U	G/PG
Course Name		Japanese language skill - L2		Course Code/Course Type		UFL201B/AEC	
Course	e Pattern	20	24	Ve	ersion	1.0	
	Teaching Scheme		L	Assessment Scheme			
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	<u>diele</u>	92020	2	2	20	30	
Hiragan	quisite: De a and Katal Course Obje	cana.		The objec 1. To 2. To 3. To 4. 5. L	tives ofBasic Ja o meet the needs of respect to get introduced to thro promote multiling diff Fostering respectations, memory, talent for contents of the cont	apanese language of ever growing industrial language support. It is a Japanese society a pugh language. It is gualism in exposing ferent cultures sect for linguistic divided language to develor problem solving, a concentrate.	e skill are: ustry, with and culture students to ersity. op a better
Course	e Learning	Outcomes	(CLO):	2. Con 4. 1	ad & write words oth hprehend and spea 3. Speak and Basic sentence pat ialogues indicatin co understand gram	will be able to: that have been born ner language. ak basic conversation particles write about Routin tterns incorporated in g how they are used onversation. matical structure, an unication abilities.	on with basic e into short l in actual

Descriptors/Topics	CLO	Hours
--------------------	-----	-------

UNIT I		
Chinchwad University		<u>-</u>
Katakana Script	CLO 1	6
Katakana Script / Writing Kanji		
UNIT II		×
System of demonstrative words:	CLO 2	6
Minna no Nihongo lesson no. 1,2 & 3		
UNIT III		2

Minna no Nihongo lesson no. 4

(Write and Speak basic sentences in correct tenses)

Learning resources

CLO₃

6

Textbooks:

Minna no Nihongo , "Japanese for everyone" ,Elementary Main Textbook , Goyal Publishers & Distributors
Pvt. Ltd.

Reference books:

- 1. Shyoho Volume 1
- Genki Japan
 Haru Vol. 1 & 2

Online Resources/E-Learning Resources:

- 1. https://youtu.be/1JephUxTHxg?si=ouCwTXZc fYgY9Kh
- 2. https://youtu.be/9EfbkBkF2ag?si=rLNzc55 REacMoGu
- 3. https://youtu.be/DpEolYasgyg?si=dya9ue-YMSHO3VOG
 - 4. https://youtu.be/itccOS1_LSk?si=hvPqILKlviuncMvA



Name of the Program:	CSE(AIDS)	Semester : V	Level: UG	
Course Name	Theory of Computation	Course Code/ Course Type	UBTCE301/PCC	
Course Pattern	2024	Version	1.0	
Teac	ching Scheme	Assessment Scheme		

Theor PUTY Minpri Chinchwad University CHAPT (Cross) Achieve	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral
2	_	1	3	3	40	60	6 <u>2</u> 0
]	Pre-Requ	isite:		
	Discrete Mathematics Digital Electronics & Logic Design						
Cou	rse Objecti	ves (CO):		The obj	ectives of Theory	of Computation	on are:
To give an overview of the theoretical foundations of computer science from the perspective of formal languages To illustrate finite state machines to solve problems in computing. To familiarize Regular grammars, context frees grammar. To propose computation solutions using Turing machines. To illustrate the decidability or undecidability of various problems.						nal languages problems in ees grammar. ing machines.	
	Students would be able to:						
	 Comprehend basic concepts of formal languages of finite automata techniques. Develop formal mathematical methods to prove properties of languages, grammars and automata. Able to construct context free grammar for various languages. Applying normal form techniques push down automata an Turing Machines for any language. Illustrate the decidability or undecidability of various problems. 				ove properties ata. or various automata and		

Descriptors/Topics	CLO	Hours
UNIT I		
FORMAL LANGUAGE THEORY AND FINITE AUTOMATA: Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA) - Definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion.	CLO 1	6
UNIT II		

REGULAR EXPRESSIONS (RE): Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions. REGULAR GRAMMARS (RG): Definition, regular grammar and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.	CLO 2	6
UNIT III		
CONTEXT FREE GRAMMER (CFG): Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL (Proof'somitted).	CLO 3	6
UNIT IV		
PUSHDOWN AUTOMATA: Definition, Model, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.	CLO 4	6
TURING MACHINES: Formal definition and behaviour, Languages of a TM, TM as accepters, and TM as a computer of integer functions, Types of TMs.		
UNIT V		
RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES: Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.	CLO 5	6
Total Hours		30

Text Books:

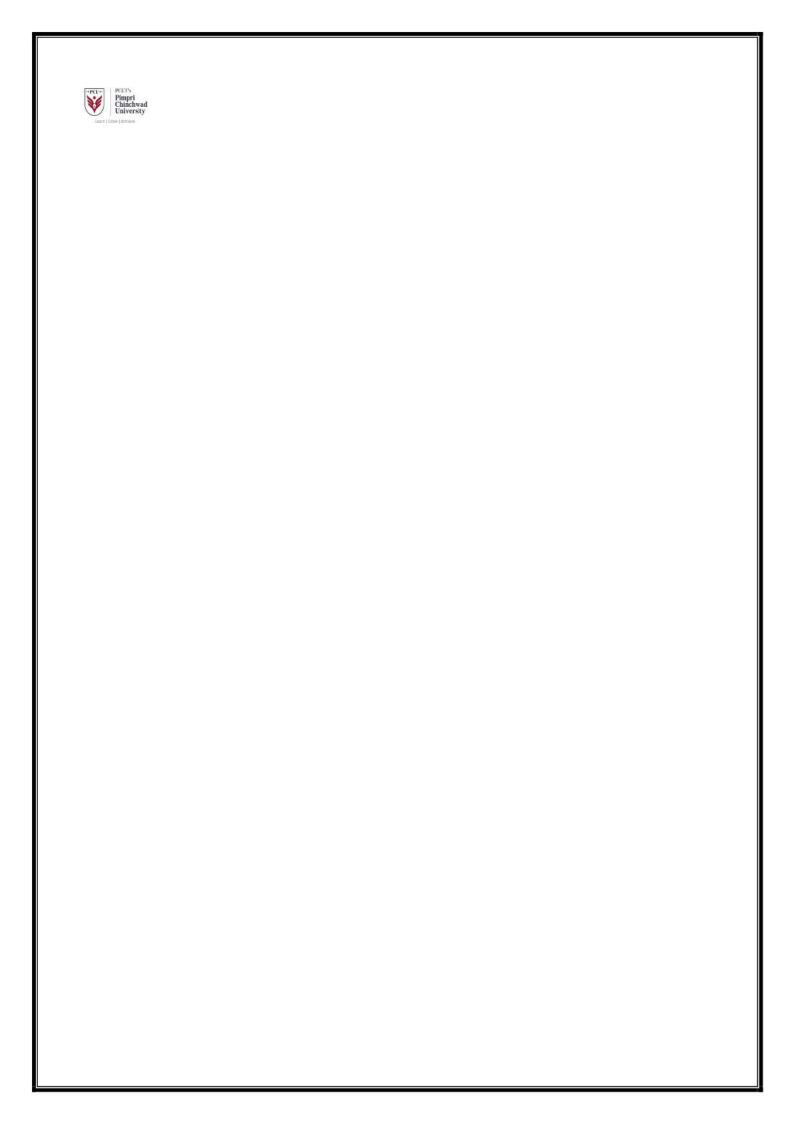
- John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and SComputation, 3rdedition, Pearson Education, India.
- 2. Micheal Sipser, —Introduction of the Theory and Computation, Thomson Brokecole, 3 rd Edition, 2013.

Reference Books:

- K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.
- 2. J.Martin, —Introduction to Languages and the Theory of Computation, Third Edition, TMH, 2007.

Online Resources/E-learning Resources:

https://www.udemy.com/course/the-complete-theory-of computation/?couponCode = ST8MT40924
 https://onlinecourses.nptel.ac.in/noc19 cs79/preview





Chinchwad University							
Name of the		CSE(AIDS)		Semester: V	Level: UG		
Program:							
Course Name		Computer Network		Course Code/ Course Type	UBTCE310/Major		
Course Pattern		2024		Version	1.0		
	Teac	hing Schen	me		Assessment Scheme		
Theor y	Practical	Tutorial	Total Credits	Hour s	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral
3		=	3	3	40	60	8
		Pre-R	equisite:	Fund	amental of Comp	outers	8
Course Objectives (CO):					2. To Learn Computer No. 1 3. To learn the its manage 4. To learn the Layer.	systems. n and understand Network and its eventely of service more evarious issues of ement and Routin Network layer he services offere Layer ne session layer and reprotocols; and it	the History of volution with the odels. If Network layer, g algorithms at r d by Transport and Applications s services.
Course Learning Outcomes (CLO):					Students would be able to: 1. Identify various data communication techniques along with types of networks. 2. Interpret OSI and TCP/IP Protocol suit. 3. Design routing algorithms to find the shortest path in network. 4. Compare TCP and UDP services. 5. Demonstrate application layer protocols		

Descriptors/Topics	CLO	Hours
UNIT I		

Introduction to Data Communication: Fundamentals of Data Communication, Type of Connections, Network Topologies, Types of Networks-LAN, WAN And MAN; Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance; Introduction to Digital to Digital, Analog to Digital, Digital to Analog, Analog to Analog Conversions; Transmission Modes.	CLO 1	9
UNIT II		
Introduction to Computer Networks: Introduction to OSI and TCP/IP Protocol Suite, Classification of Addressing Mechanisms, Guided Media: Twisted Pair Cable, Coaxial Cable and Fiber-Optic Cable, Unguided Media: Wireless, Radio Waves, Microwaves and Infrared; Introduction to Data Link Layer	CLO 2	9
UNIT III		
Network Layer and Routing Principles: Network Layer Services, Packet Switching: Datagram and Virtual Circuit Approach, Network Layer Performance: Delay, Throughput, Packet Loss, Congestion Control; IPv4: Datagram Format; Routing Algorithms: Distance Vector, Link-state, Path Vector Routing.	CLO 3	9
UNIT IV		
Transport Layer and its Services: Overview of Transport Layer, Transport Layer services, User Datagram Protocol (UDP): User Datagram, UDP Services, UDP Applications; Transmission Control Protocol (TCP): TCP Services, Features, TCP Segment, TCP Connection, TCP Congestion Control.	CLO 4	9
UNIT V		
Application Layer Protocols: Introduction to Application Layer, Client-Server Paradigm, Socket Interface, DHCP, FTP, TFTP, WWW & HTTP, Electronic Mail: SMTP, POP3, IMAP and MIME.	CLO 5	9
Total Hours		45

Textbooks:

- Behrouz A Forouzan, "Data Communications and Networking", 5th Ed, McGraw Hill Education India Edition 2013, ISBN-13: 9781259064753.
- 2. Behrouz A. Forouzan,"TCP-IP protocol suite ", Tata McGraw Hill Edition, 4th Edition 2010, ISBN-13: 9780070706521.

Reference Books:



- James F. Kurose, Keith W. Ross, "Computer Networking A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
- 2. S. Tanenbaum, "Computer, Networks", PHI Publication, 4th edition, ISBN: 8178087855.
- William Stallings, "Data and Computer Communications", Person Education, 8th Edition, ISBN:-9788131715369.

Online Resources/E-learning Resources:

- 1. Computer Networks and Internet Protocol By Prof. Soumya Kanti Ghosh, Prof. Sandip Chakraborty | IIT Kharagpur
 - 2. https://onlinecourses.nptel.ac.in/noc22_cs19/preview



Name of the Program:	CSE(AIDS)	Semester : V	Level: UG	
Course Name	Computer Network Laboratory	Course Code/ Course Type	UBTCE311/PCC	
Course Pattern	2024	Version	1.0	
Teach	ing Scheme	Assessment Scheme		

COURSE CURRICULUM

Theor Theor Winpri Chinchwad University Laure (Cow) Athere	Practical	Tutorial	Total Credits	Hour s	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral
82	1	<u>u</u>	1	2	25	.88°	25
	Pre	e-Requisite	e: Basi	knowle	edge of python Pr	rogramming	
Course (Objectives ((CO):	The ol	ojectives	of Computer Ne	twork Laborat	ory are:
	To establish communication among the computing nodes in various networking architectures. To configure the computing nodes with understanding of protocols and technologies. To use different communicating modes and standards for communication. To use modern tools for network traffic analysis. To learn network programming						
	rse Learnin	T .		S	tudents would be	able to:	
Outc	omes (CLC	<i>y</i> y:	 Comprehend working and architecture of college/ organization network. Design network application by using various concepts of layered architecture. Write program to analyze working of various protocols and packets. Demonstrate LAN and WAN protocol behavior using Modern Tools. Justify the working of error control and error detection mechanism using a program. 				

Practical Plan:

Assign ment/P ractical /Activit y Numbe r	Assignment/Pr actical/Activit y Title	Week Number / Turn	Details	CLO	Hours
1	Practical 1: Implement Regression models	Week 1/ Turn 1	Study the college/organization network, networking devices and its working in detail. Study the college/organization Server functioning and security parameters. (If possible, plan visit to the server room)	CLO1	2
2	Practical 2: Implement binary classification model	Week 2/ Turn 1	Study of Networking commands. 1. ping 2. ipconfig/ifconfig 3. Tracert 4. Netstat 5. NSLookup	CLO1	2

PCET's Pimpri Chinchwa Carx (Cose Jathure	Practical 3: Implement Neural Network based classifier	Week 3 /Turn 1	Setup a wired LAN using Layer 2 Switch and then IP switch of minimum four computers. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and preparing server to send file to client. Demonstrate the PING packets captured traces using Wireshark Packet Analyzer Tool.	CLO2	2
4	Practical 4: Implement GD	Week 4/ Turn 1	Write a program for error detection and correction for 7/8 bits ASCII codes using CRC.	CLO5	2
5	Practical 5: Implement KNN	Week 5 /Turn 1	Write a program to demonstrate subnetting and find the subnet masks.	CLO2	2
6	Practical 6: Implement clustering model	Week 6/ Turn 1	Write a program to prepare TCP and UDP packets using header files and send the packets to the destination machine in peer-to-peer mode	CLO3	2
7	Practical 7: Implement prediction model	Week 7 /Turn 1	Write a program using TCP sockets for wired network to implement peer to Peer Chat (Use JAVA/PYTHON)	CLO3	2
8	Practical 8: Prediction model using neural network	Week 8/ Turn 1	Write a program using UDP sockets for wired network to implement: a Peer to Peer Chat (Use JAVA/PYTHON)	CLO3	2
9	Practical 8: Prediction model using neural network	Week 9 /Turn 1	Write a program to simulate Go back N and Selective Repeat Modes of Sliding Window Protocol in peer-to peer mode.	CLO3	2
10	Practical 8: Prediction model using neural network	Week 10 / Turn 1	Write a program to capture and analyze following packet formats for wired network. 1. Ethernet 2. IP 3.TCP 4. UDP	CLO3	2
11	Practical 8: Prediction model using neural network	Week 11 /Turn 1 Week 12 /Turn 1	Configure RIP/OSPF/BGP using packet Tracer.	CLO4	4

12	Practical 8:	Week	Write a program for DNS lookup.	CLO4	2
PCET's Pimpri Chinchwad	Prediction	13/	Given an IP address input, it should		
University Laure [Grow] Arhive	model using	Turn 1	return URL and vice-versa.		
100 50	neural network				
13	Practical 8:	Week	Installing and configure DHCP server.	CLO4	2
	Prediction	14			
	model using	/Turn 1			
	neural network				
14	Practical 8:	Week	Write a program to simulate the	CLO3	2
	Prediction	15 /	behaviour of link state routing protocol		
	model using	Turn 1	to find suitable path for transmission.		
	neural network				
			Total Hours		30

Textbooks:

- Behrouz A Forouzan, "Data Communications and Networking", 5th Ed, McGraw Hill Education India Edition 2013, ISBN-13: 9781259064753.
- 2. Behrouz A. Forouzan, "TCP-IP protocol suite", Tata McGraw Hill Edition, 4th Edition 2010, ISBN-13: 9780070706521.

Reference Books:

- James F. Kurose, Keith W. Ross, "Computer Networking A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
 - 2. S. Tanenbaum, "Computer, Networks", PHI Publication, 4th edition, ISBN: 8178087855.
 - William Stallings, "Data and Computer Communications", Person Education, 8th Edition, ISBN:-9788131715369.

Online Resources/E-learning Resources:

1. Computer Networks and Internet Protocol By Prof. Soumya Kanti Ghosh, Prof. Sandip Chakraborty | IIT Kharagpur https://onlinecourses.nptel.ac.in/noc22_cs19/preview

COURSE CURRICULUM

Course Contents/Syllabus:



	e of the gram:	CSE(A	AIDS)	Sem	ester: V	Level	: UG
Cours	se Name	Data S	cience	Course Code/ Course Type		UBTDS3	01 / PCC
Course	e Pattern	20	24	Ve	ersion	1.	0
	Te	aching Sch	ieme		Ass	essment Scher	ne
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment	ESA (End Semester Assessment)	Practical/ Oral
3	-	-	3	3	40	60	-
Pre-Requis Course Objectives (CO):				1. To 2. To 4. To	ne objectives of o recall the concept o recognize the use	ots of probability of the hypothesi and statistics. of regression and an procedures for	and statistics. s's probability related topics. cryptography.
Course	e Learning	Outcomes	(CLO):	2. Ela 3.	techniques.		
		Desc	riptors/To	pics		CLO	Hours
			UNIT I				

Descriptors/Topics	CLO	Hours
UNIT I		7.
Correlation: Axioms of Probability (Joint Probability, Marginal Probability, Independent Events and Conditional Probability), Random Variables, Various Distributions, Sampling, Confidence Intervals and Hypothesis Testing, Correlation and Covariance.	CLO 1	9
UNIT II		

Regression Analysis: ANOVA, Detailed Simple and Multi-Linear	CLO 2	9
Pinpri Linear Regression, Time Series Analysis Algorithms.		
UNIT III		
Data preprocessing: Data preprocessing: Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies, Installing Weka 3 Data Mining System, Experiments with Weka - filters, discretization	CLO 3	9
UNIT IV		
Clustering: K-means, K-medoids, Hierarchical clustering, Graph Clustering including Spectral Clustering, Cluster Evaluation.	CLO 4	9
UNIT V		
Descriptive analytics: Data Modeling, Trend Analysis, Simple Linear Regression Analysis Forecasting models: Heuristic methods, predictive modeling, and pattern discovery.	CLO 5	9
Total Hours		45

Textbooks:

- Wes McKinney, "Python for Data Analysis", O'REILLY, ISBN:978-1-449-31979-3, 1st edition, October 2012.
 - 2. Rachel Schutt & O'neil, "Doing Data Science", O'REILLY, ISBN:978-1-449-35865-5, 1st edition, October 2013.
 - An Introduction to Statistical Learning: with Applications in R, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 1st edition, 2013.

Reference Books:

- 1. Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media, 2015.
- 2. Matt Harrison, "Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization, O'Reilly, 2016.
- 3. Data Science from Scratch: First Principles with Python, Joel Grus, O'Reilly, 1st edition, 2015.

Online Resources/E-Learning Resources:

- 1. https://onlinecourses.nptel.ac.in/noc21_cs69/preview By Prof. Ragunathan Rengasamy, Prof. Shankar Narasimhan | IIT Madras
- 2. https://onlinecourses.nptel.ac.in/noc22 cs32/preview By Prof. Ragunathan Rengasamy | IIT Madras
- 3. https://ocw.mit.edu/courses/6-0002-introduction-to-computational-thinking-and-data-science-
 - 4. fall-2016/video galleries/lecture-videos/



Name of the	CSE(AIDS)	Semester: V	Level: UG
Program:			

Cours PCU's Pimpri Chinchwad University	se Name	Data Scie	ence Lab	Course Code/ Course Type		UBTDS302/ PCC	
Course	e Pattern	20:	24	Ver	sion	1.0	
			Т	eaching Sche	me		
						Assessment	Scheme
Theor y	Practical	Tutoria 1	Total Credits	Hours	CIA (Continuou s Internal Assessmen t)	ESA (End Semester Assessment)	Practical/ Oral
82	1	82	1	2	25	8 8 <u>0</u>	25
		Pı	e-Requisi	te: Comp	uter Network		l.
C	ourse Obje	ctives (CC):	The objectives of Data Science Lab are: 1 To recall the concepts of probability and statistics. 2 To recognize the use of the hypothesis's probability and statistics. 3 To apply the concept of regression and related topics. 4 To analyze and design procedures for cryptography. 5 To evaluate network security models.			
Course	e Learning (Outcomes		2 Elab 3 Apply 4	prehend the basic corate the various x knowledge of various Analyze several raluate how to pro	and be able to: as of correlation and aspects of regressing arious preprocessing data clustering techniques.	on analysis. g techniques. niques.

COURSE CURRICULUM:

Practical Plan:

Assignm	Assignment/	Week	Details	CLO	Hours
ent/Pract	Practical/Acti	Number/Turn			
ical/Acti	vity Title				
vity	1.20				
Number					

1 PCLT'S Pimpri Chinchwad University Gazer Code Achieve	Practical 1: NumPy	Week 1/ Week 2	1.1 Creating a NumPy Array 1.2 The Shape and Reshaping of NumPy Array	CLO1	4		
2	Practical 2: NumPy	Week 3/Week 4	1.3 Expanding and Squeezing a NumPy Array 1.4 Indexing and Slicing of NumPy Array	CLO1	4		
3	Practical 3: Pandas	Week 5/Week 6	2.1 Perform following operations using pandas. 2.2 Perform following operations using pandas	CLO 2	4		
4	Practical 4: Pandas	Week 7/Week 8	2.3 Read the following file formats using pandas.2.4 Read the following file formats.	CLO 2	4		
5	Practical 5: Web Scraping	Week 9/Week10/ Week 11	Demonstrate web scraping using python	CLO 3	6		
6	Practical 6: Preprocessin g Techniques	Week 12/Week13	4.1 Feature Scaling and Feature Standardization	CLO 4	4		
7	Practical 7:	Week 14/Week 15	4.2 Label Encoding and One Hot	CLO 5	4		
Total Hours							

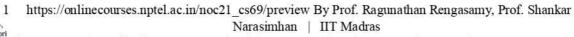
Textbooks:

- 1 Wes McKinney, "Python for Data Analysis", O'REILLY, ISBN:978-1-449-31979-3, 1st edition, October 2012.
 - 2 Rachel Schutt & O'neil, "Doing Data Science", O'REILLY, ISBN:978-1-449-35865-5, 1st edition, October 2013.
- 3 An Introduction to Statistical Learning: with Applications in R, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 1st edition, 2013.

Reference Books:

- 1 Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media, 2015.
- 2 Matt Harrison, "Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization, O'Reilly, 2016.
- Data Science from Scratch: First Principles with Python, Joel Grus, O'Reilly, 1st edition, 2015.

Online Resources/E-Learning Resources





- 2 https://onlinecourses.nptel.ac.in/noc22_cs32/preview By Prof. Ragunathan Rengasamy | IIT Madras
- https://ocw.mit.edu/courses/6-0002-introduction-to-computational-thinking-and-data-science-fall-2016/video_galleries/lecture-videos/\\



Name of the Program:		CSE(AIDS)		Semester: V		Level: UG		
Course Name		Advanced Web Programming		Course Code	Course Code/ Course Type		UBTML303A/PEC	
Course 1	Pattern	202	4	Vei	rsion		1.0	
		Teaching S	cheme		, A	Assessment Sch	neme	
Theory	Pract ical	Tutorial	Total Credit s	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Oral	
3	-	11 2	3	3	40	60	-	
*	Pre-F	Requisite: P	roficiency	in a programm	ning language, s	such as Python	or Java	
Cc	ourse Ob	ojectives (CC	0):	The objectives of Advanced Web Programming are: 1. To familiarize students with Web Programming basic concepts 2. To learn and understand Web scripting languages. 3. To explore the front-end & back-end web programming skills. 4. To understand and learn Mobile web development. 5. To understand and learn Web application deployment.				
Course Learning Outcomes (CLO):				Students would be able to: 1. Develop a Static and Dynamic website using technologies like HTML, CSS, and Bootstrap. 2. Demonstrate the use of web scripting languages. 3. Develop web applications with Front End & Back End Technologies 4. Develop a mobile website using JQuery Mobile. 5. Deploy web applications on the cloud using AWS.				

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hour
		S
UNIT I		



WEB SCRIPTING LANGUAGES:	CLO	09
JavaScript: Introduction to Scripting languages, Introduction to JavaScript (JS), JS Variables and Constants, JS Variable Scopes, JS Data Types, JS Functions, JS Array, JS Object, JS Events.	1	200
Advanced JavaScript: JSON - JSON Create, Key-Value Pair, JSON Access, JSON Array, JS Arrow Functions, JS Callback Functions, JS Promises, JS Async-Await Functions, JS Error Handling. AJAX: Why AJAX, Call HTTP Methods Using AJAX, Data Sending, Data Receiving, AJAX Error Handling. JQUERY: Why JQuery, How to Use, DOM Manipulation with JQuery, Dynamic Content Change with JQuery, UI Design Using JQuery.		
UNIT I I		
FRONT END TECHNOLOGIES	CLO	09
Front-End Frameworks: What is web framework? Why Web Framework? Web Framework Types. MVC: What is MVC, MVC Architecture, MVC in Practical, MVC in Web Frameworks.	2	
TypeScript: Introduction to TypeScript (TS), Variables and Constants, UNITs in TS.		
Angular Version 10+: Angular CLI, Angular Architecture, Angular Project Structure, Angular Lifecycle, Angular UNITs, Angular Components, Angular Data Binding, Directives and Pipes, Angular Services and Dependency Injections (DI), Angular Routers, Angular Forms.		
ReactJS: Introduction to ReactJS, React Components, Inter Components Communication, Components Styling, Routing, Redux- Architecture, Hooks- Basic hooks, useState() hook, useEffect() hook, useContext() hook.		
UNIT III		
BACK-END TECHNOLOGIES:	CLO	09
Node.JS: Introduction to Node.JS, Environment Setup, Node.JS Events, Node.JS Functions, Node.JS Built-in UNITs, File System, NPM, Install External UNITs, Handling Data I/O in Node.JS, Create HTTP Server, Create Socket Server, Microservices- PM2.	3	
ExpressJS : Introduction to ExpressJS, Configure Routes, Template Engines, ExpressJS as Middleware, Serving Static Files, REST HTTP Method APIs, Applying Basic HTTP Authentication, Implement Session Authentication.		
UNIT IV		



BACK-END WITH DATABASE:	CLO	09
MongoDB: NoSQL and MongoDB Basics, MongoDB-Node.JS Communication, CURD Operations using Node.JS, Mongoose ODM for Middleware, Advanced MongoDB.	4	
Big database Connectivity.		
UNIT V		3
MOBILE WEB DEVELOPMENT:	CLO	09
Mobile-First : What is Mobile-First? What is Mobile Web? Understanding Mobile Devices and Desktop.	5	
JQuery Mobile: Introduction to the jQuery Mobile Framework, Set-up jQuery Mobile, Pages, Icons, Transitions, Layouts Widgets, Events, Forms, Themes, Formatting Lists, Header and Footer, CSS Classes, Data Attributes, Building a Simple Mobile Webpage		
Total Hours		45

Text Books:

- Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
- Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.

Reference Books:

- 1. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition, 978-81-265-
- Dr.HirenJoshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93-5004-088-1
 - Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition, 978-81-265-1635-3
- Ivan Bayross,"Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,BPB Publications,4th Edition,ISBN:978-8183330084.
 - 5. URLs (Optional) List of Online Courses

Online Resources/E-Learning Resources

- 1 https://www.udemy.com/course/advanced-web-developer-course-beginner-to advanced/?couponCode=ST8MT40924
- 2 https://www.shiksha.com/online-courses/web-development-courses-certification-training-by-nptel-st644 3 https://onlinecourses.swayam2.ac.in/nou20_cs05/preview



Name of the Program:	CSE (AIDS)	Semester: V	Level: UG
Course Name	Advanced Web Programming LAB	Course Code/ Course Type	UBTML304 A

COURSE CURRICULUM

PCET's	Course Pattern 2024		Version		1.0		
Pimpr Chinc Unive	hwad rsity Tea	ching Sche	eme			Assessment Scho	eme
Theory	Practica 1	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
	1	20 20	1	30	25		25
	Pre-Rec	puisite: Pro	oficiency in	a progra	mming language	, such as Python	or Java
				3	2 To learn and to To explore the F 4 To understand a	skills. I and learn Mobile w and learn Web applic	ipting languages. I web programming web development. cation deployment.
Course Learning Outcomes (CLO):				1	Develop Static and I 2 Demonstrate 3 Develop web ap 4 Develop mo	Dynamic websites used TML, CSS, Bootst the use of web scrip oplications with From Technologies. Sobile website using application on clouds.	using technologies like rap. pting languages. nt End & Back End Query Mobile.

Practical plan

Assignm ent/Pract ical/Acti vity Number	Assignment/Pr actical/Activit y Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1: Working with HTML CSS	Week 1/ Week 2/ Week 3	 a. Create a responsive web page that shows the e-commerce/college/exam admin dashboard with a sidebar and statistics in cards using HTML, CSS and Bootstrap. b. Write a JavaScript Program to get the user registration data and push it to array/local storage with AJAX POST method and data list in a new page. 	CLO1	6



2	Practical 2: Working with GitHub, NVIDEIA Docker	Week 4/ Week 5/ Week 6	a. Create version control account on GitHub and using Git commands to create repository and push your code to GitHub. b. Create Docker Container Environment (NVIDEIA Docker or any other). c. Create an Angular application which will do following actions: Register User, Login User, Show User Data on Profile Component.	CLO1	6
3	Practical 3: Working with Node.JS, ExpressJS	Week 7/ Week 8/ Week 9	a. Create a Node.JS Application which serves a static website. b.Create four API using Node.JS, ExpressJS and MongoDB for CURD Operations on assignment.	CLO2	6
4	Practical 4: Working with AWS VPC or AWS Elastic	Week 10/ Week 11/ Week 12	a. Create a simple Mobile Website using jQuery Mobile. b. Deploy/Host Your web application on AWS VPC or AWS Elastic Beanstalk. Mini Project.	CLO5	6
5	Practical 5: Working With AJAX POST	Week 13/ Week 14/ Week 15	a.Create a responsive web page which shows the ecommerce/college/exam admin dashboard with sidebar and statistics in cards using HTML, CSS and Bootstrap. b. Write a JavaScript Program to get the user registration data and push to array/local storage with AJAX POST method and data list in new page.	CLO2	6
			Total Hours		30

Text Books:

- 1 Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
 - 2 Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.

Reference Books:

1 Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition, 978- 81- 265-1635-

Pimpri Chinchwad University

2 Dr.HirenJoshi, Web Technology and Application Development, DreamTech, First, ISBN:978-

Name of the	CSE (AIDS)	Semester : V	Level: UG
Program:			

93- 5004-088-1

Online Resources/E-Learning Resources

- 1. https://www.udemy.com/course/advanced-web-developer-course-beginner-to-advanced/?couponCode=ST8MT40924
- 2. https://www.shiksha.com/online-courses/web-development-courses-certification-training-by-nptel-st644
 - 3. https://onlinecourses.swayam2.ac.in/nou20_cs05

	NT.	A1*	1D.	C .	C C 1/	LIDEDOS	MAD/DEC
PCET's	se Name	17070	ed Data		Course Code/	OBIDS	303B/PEC
Pimpri Chinchwad University	Pimpri Chinchwad University		with Python		Course Type		
Cours	Course Pattern 2024			Version	1	.0	
	Teac	hing Sch	eme		Ass	essment Schen	me
Theor	Practical	Tutori	Total	Hours	CIA	ESA (End	Practical/
у		al	Credi ts		(Continuous Internal Assessment)	Semester Assessment	Oral
3	-	(=)	3	3	40	60	
	S	ļš s		Pre-Req	uisite:	J	
			Funda	amentals o	f Data science		
	Course C	bjectives	(CO):		The objectives of Applied Data Science with Python are:		
1. To gain the knowledge of panda li 2. To Learn data representation 3. To select appropriate machine lea model for data interpretation 4. To learn data mining process using language processing. 5. To learn social network mode					sentation chine learning pretation ss using natural sing.		
Co	urse Learni	ng Outco	mes (CL	O):	Students would be able to:		
					 Den Elaborate Explore of 	panda library nonstrate the data representation to the appropriate m model lata mining process language process e social network n	using data ools achine learning ss using natural sing.

applications.

Descriptors/Topics	CLO	Hours
Propri		
Chinchwad University		

UNIT I		
Introduction to Data Science with Python	CLO 1	9
Fundamentals of Data Manipulation with Python, Basic Data Processing with Pandas, More Data Processing with Pandas, statistical test knowledge on DataFrames in pandas. Recognize other kinds of structured data such as networks, graphs and natural language.		
UNIT II		
Applied Plotting, Charting & Data Representation in Python. Principles of Information Visualization, Basic Charting, Charting Fundamentals, Applied Visualizations.	CLO 2	9
UNIT III		
Applied Machine Learning in Python	CLO 3	9
Estimation and prediction in linear model-based supervised learning algorithms, strengths and weaknesses of supervised learning methods to choose the right algorithm for a task. Apply supervised machine learning algorithms in Python using scikit-learn and understand general principles, techniques such as regularization, feature scaling, and cross-validation to avoid overfitting or underfitting, evaluation metrics in machine learning, and how to interpret results when using them. Optimize machine learning algorithm by choosing appropriate evaluation metric for the task.		
UNIT IV		*
Applied Text Mining in Python:	CLO 4	9
Common problems with raw text and perform textual cleaning tasks in Python, regular expressions (RegEx) to find textual patterns. different natural language tasks and process free text through the NLTK toolkit to tag language constructs onto text. Classification of Text, Compare text classification to other classification approaches, including Naive Bayes and Support Vector Machine algorithms.		
UNIT V		

Applied Social Network Analysis in Python:	CLO 5	9
appropriate type of network to model real networked data. Construct and manipulate networks of different types using NetworkX, including bipartite graph and related algorithms such as graph projections, Degree distribution of a network and use NetworkX to visualize it. Recognize properties of real-world networks, such as power law degree distribution, high clustering and small average shortest paths. the mechanics of network generation models, such as Preferential Attachment and Small World Models and their properties, and use NetworkX for link prediction and node feature creation in real-world networks.		
Total Hours		45

Textbooks:

Applied Data Science with Python and Jupyter Paperback – 31 October 2018, by Alex Galea
 Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinney, Oreilly Publications.

Reference books:

- 1. Applied Data Science: Lessons Learned for the Data-Driven Business Hardcover 25 June 2019, by Martin Braschler, Thilo Stadelmann, Kurt Stockinger,
 - 2. Python Data Science Handbook by Jake VanderPlas, Oreilly Publications

Online Resources/E-learning Resources:

- 1. https://github.com/yonycherkos/Applied-Data-Science-with-Python-Specialization/tree/main
- 2. https://www.udemy.com/course/applied-data-science-with-python-specialization



University								
Name of the		CSE AIDS		Semester : V	Level: UG			
Program:			200 E	0.21020				
Cours	e Name		Data scie		Course Code/	UBTML3	304B/PEC	
		pyth	on Labora	atory	Course Type			
Course	e Pattern		2024		Version	1	.0	
	Teac	hing Sch	eme		Ass	essment Scher	ne	
Theor	Practical	Tutori	Total	Hours	CIA	ESA (End	Practical/	
У		al	Credits		(Continuous Internal Assessment)	Semester Assessment	Oral	
H	1	-	1	2	25	-	25	
	Pre	e-Requisit	te: Bas	sic knowle	edge of python P	rogramming		
Course (Objectives ((CO):	The obje	ectives of	Applied Data Sci	ience with Pyth	on lab are:	
				1. 3. To sele	To Learn dat an appropriate ma	a representation achine learning mo		
				4. To lear	rn the data mining proc	oretation rocess using natur essing. I network models	al language	
Cou	rse Learnin	ıσ		S	tudents would be			
	omes (CLC	~	40.					
1			1.	Analyze the data using the data knowledge of Panda Library.				
					onstrate the data usi			
I					aluate the appropriat re the data mining pr			
4. Explo					200 PM	essing.	ar ranguage	
				5. Recogn		nodels and their a	20 00	

Practical Plan

Assign	Assignmen	Week Number/	Details	CLO	Hours
ment/P	t/Practical/	Turn			
ractical	Activity				
/Activit	Title				
y					
Numbe					
r					

1 PET'S Pimpri Chincher University	Practical 1:	Week 1/ Turn 1 Week 2 / Turn 1 Week 3 / Turn 1	Data Processing with Pandas	CLO1	6
2	Practical 2:	Week 4/ Turn 1 Week 5 /Turn 1 Week 6 /Turn 1	Applied Plotting, Charting & Data Representation in Python	CLO2	6
3	Practical 3:	Week 7/ Turn 1 Week8 /Turn 1 Week 9 /Turn 1	Estimation and prediction in linear model-based supervised learning algorithms, Unsupervised models.	CLO3	6
4	Practical 4:	Week 10/ Turn 1 Week 11 /Turn 1 Week 12 /Turn 1	Implement Classification approaches, including Naive Bayes and Support Vector Machine algorithms.	CLO4	6
5	Practical 5:	Week 13/ Turn 1 Week 14/Turn 1 Week 15/Turn 1	Implement Social network models using Networkx.	CLO5	6
		Total	Hours		30

Textbooks:

- 1. Applied Data Science with Python and Jupyter Paperback 31 October 2018, by Alex Galea
 - 2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinney, Oreilly Publications.

Reference books:

- Applied Data Science: Lessons Learned for the Data-Driven Business Hardcover 25 June 2019, by Martin Braschler, Thilo Stadelmann, Kurt Stockinger,
 - 2. Python Data Science Handbook by Jake VanderPlas, Oreilly Publications

Online Resources/E-learning Resources:

- 1. https://github.com/yonycherkos/Applied-Data-Science-with-Python-Specialization/tree/main
 - 2. https://www.udemy.com/course/applied-data-science-with-python-specialization
 - 3. https://www.coursera.org/specializations/data-science-python



Course Contents/Syllabus:

Name of the Program:		CSE(AIDS)		Se	mester : V	Level: UG	
Course Name		Applied Statistical Techniques		Course	Code/ Course Type	UBTCE308	
Cours	se Pattern	2	2024		Version	1.0	
	Tea	aching Sche	eme		Asse	ssment Schem	e
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral
2	S=:	-	2	2	40	60	N=
	P	re-Requisit	e: Basic pro	obability a	and statistical co	ncepts.	
Course Objectives (CO):				2. 3. 4.	To familiarize techn To acquire knowle level of s To apply tests of l applications that we To learn the where non parametrice Compare parametrice	the students with a iques in Statistics dge of techniques ampling & estimate ampling ampling with the control of the control o	of advanced ion ques and its tical thinking parametric & cations.
Course Learning Outcomes (CLO):				3. 4. 5.	 Identify the ac Explain the es Apply knowledge 	and small samples. tric tests on practic	nniques. niques to test cal situations.

Descriptors/Topics	CLO	Hours
UNIT I		
Random sampling, Sampling from finite and infinite populations, with and without replacement, central limit theorem, Standard error of sampling, Sampling distribution of sample mean and proportion, stratified random sampling.	CLO 1	6
UNIT II		



Introduction, Types of estimation, Interval estimation, Point estimation: Maximum likelihood function, Method of moments, Criteria for good estimates: Unbiasedness, Consistency, Sufficiency by Neyman factorization theorem and Efficiency, MVBUE and their applications in estimation.	CLO 2	6
UNIT III		
Introduction, Hypothesis, Simple and composite hypothesis, Type I and Type II errors, Level of significance, Critical region, Students-t test, Z-test, Test of hypothesis for small & large sample by Chi-Square distribution, Students-t distributions, F-distributions. Degree of freedom, Analysis of variance (ANOVA): one-way, two-way (without interactions), P-Value.	CLO 3	6
UNIT IV		
Non-parametric Inference, Comparison with parametric inference, order statistics, Tolerance region, Sign test, Mann-Whitney test, Wilcoxon signed rank test, Run test, Kolmogorov-Smirnov test. Spearman's rank correlation test, Kendall's tau test, Chi-square test.	CLO 4	6
Total Hours		30

Textbooks

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2014.
 - 2. Hugh Neill, Trigonometry: A complete Introduction, John Murray Learning, 2018.
- 3. George B. Thomas, Jr and Ross L. Finney, Calculus and Analytical Geometry, 9th Edition, 1998

Reference Book(s)

- 1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2010.
 - 2. Ron Larson, Trigonometry, Brooks/Cole, 9th Edition, 2013.
- 3. Robert E, Moyer, Trigonometry, Mc. Graw Hill, Addision-Wesely, 4th Edition, 2009.

Course Contents/Syllabus:



University								
100000000000000000000000000000000000000	Name of the CSE(AIDS) Program:		Sem	ester : V	Lev	Level: UG		
Cours	se Name	Environmental Studies		Course Code/ Course Type		ACEVS301/AC		
Course	e Pattern	20	24	V	ersion	8	1.0	
	Te	aching Sch	neme	N.	Ass	essment Sch	eme	
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Oral	I/
2	8.70	=	1	2	50	8 5		
		Pre-Req	uisite: Bas	ic Knowled	ge of Social Sc	iences		
	Course Objectives (CO):			1. 7 2. To 3. 4.	To learn about t management To comprehend ab disas o impart knowledg	out multidisciple tudies and natur E waste and gload its control streethnics for Induand treatment poout interlinking ter managemen	inary nature of al resources. abal impacts of a ategies. astrial water processes g of rivers and t	
Course Learning Outcomes (CLO):				2. Id3. A4.5. Ev	Students would be able to: Comprehend the breadth and interdisciplinary nature of environmental issues, resources. Identify the sources, effects, and remedial measures for E waste and Air Pollution Analyze Industrial water management and treatment processes. Analyze about interlinking of rivers and disaster management. Evaluate existing environmental laws and legislations with case studies			s t
		Desc	riptors/To	pics		CLO	Hours	
	UNIT I							25

Multidisciplinary Nature of Environmental Studies: Definition, scope environment, and its relation to the branch. Introduction to children and basic terminologies. Sustainable development Goals, natural resources and associated problems- water, solar, mineral and energy, actual sustainability report study, Water conservation, rain water harvesting. Resettlement and rehabilitation of people; its problems, concerns and case studies.	CLO 1	6
UNIT II		
Solid Waste, E waste and Air Pollution: Sources and types of solid wastes, introduction to solid waste management. Introduction to E- waste, generation and case studies. Air Pollution Definition, sources, classification of air pollution. Air pollutants: CO, CO ₂ , SO ₂ , NO _x , hydrocarbons and aerosols. Specific phenomena related with air pollution- Greenhouse effect, Acid rain, Ozone layer depletion and Smog, Control of Air Pollution.	CLO 2	6
UNIT III		
Industrial wastewater treatment: Important terminologies related to waste water treatment process. Preliminary, primary, secondary, and tertiary wastewater treatment process. Waste water treatment process of (a) Paper and pulp (b) Oil refinery (c) Petrochemical (d) Sugar industries. Case studies.	CLO 3	6
UNIT IV		
Environmental priorities in India and sustainable development: Ganga Action plan, Interlinking of rivers, Natural disasters and their management. Disaster management: floods, earthquake, cyclone and landslides.	CLO 4	6
UNIT V		
Environmental Legislations and case studies: National: Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, International: Montreal protocol, Kyoto protocol, Rio summit and Paris agreement.	CLO 5	6
Total Hours		30

Textbooks:

- 1. Kaushik, A and Kaushik C.P. Perspective in Environmental studies. New Age International Publications
- 2. Iqbal H. Khan, Naved Ahsan. Textbook of Solid Wastes Management. CBS Publisher & Distributors P Ltd.

Reference Books:

- 1. S. K. Garg. Sewage Disposal and Air pollution Engineering. Khanna Publishers
 - 2. M. N. Roa, H. V. N. Rao. Air Pollution. Mc. Graw Hill.



Online Resources/E-Learning Resources

- 1. https://nitsri.ac.in/Department/CHEMISTRY/EVS_MATERIAL_2.pdf
 - 2. https://onlinecourses.swayam2.ac.in/cec19 bt03/preview
 - 3. https://onlinecourses.swayam2.ac.in/cec19 bt03/preview



	of the CSE(AIDS) gram:		Semester: V		Level: UG		
Cours	Course Name		Aptitude And Logical Reasoning		Code/ Course Cype	ourse ACALR301	
Course	Course Pattern		2024		Version		
	Te	eaching Sch	heme		Assessment Scheme		
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	-	-	_	2	50	-	-

Pre-Requisi	te: Basic Mathematics
Plupri Chinchwad Course Objectives (CO):	The objectives of Aptitude and Logical Reasoning are: 1. To Familiarize Students with Different Types of Mathematical Problems. 2. To learn and Strengthen Logical Reasoning Skills. 3. To Develop Critical Thinking Skills. 4. To Improve Quantitative and Numerical Skills. 5. To Prepare Students for Standardized Tests and build Confidence in Problem-Solving.
Course Learning Outcomes (CLO):	Students would be able to: 1. Develop enhanced problem-solving abilities through Exposure to various types of aptitude and logical reasoning problems. 2. Sharpen their analytical thinking skills by learning to analyze and interpret different types of data, patterns, and logical structures. 3. Cultivate critical thinking abilities by challenging students to evaluate and assess information, arguments, and scenarios using logical reasoning principles. 4. Apply different forms of logical reasoning, such as deductive reasoning, inductive reasoning, and critical reasoning, to solve problems and make decisions. 5. Develop soft skills and communication skills

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Quantitative Aptitude: Number System, Problems on Ages, Percentage, Average, Time and Work, Profit and Loss, Permutation and Combination	CLO 1	6
UNIT II		
Logical Reasoning: Number Series, Letter Series, Coding and Decoding, Calendars, Clocks	CLO 2	6
UNIT III		

Verbal Reasoning: Subject-Verb Agreement, Preposition and	CLO2,	6
Verbal Analogy, Closet test Chirchwad University Verbal Analogy, Closet test	3	
UNIT IV		
Personality Development: Resilience, Motivation and Listening skills, Self-confidence, Body language, Leadership, Goal setting, Emotional intelligence, Personal growth and development	CLO 4	6
UNIT V		
Soft Skills and Communication Skills: Introduction to Teamwork, Collaboration and Time Management, Communication Skills, Organization Skills, Introduction to Critical Thinking, Leadership, Negotiation and Presentation Skills, Time Management, Adaptability Skills, Actively listening in conversations, Public speaking, Effectively communicating ideas to others, Introduction to Career Development, Goal Setting, Emotional Intelligence Fundamentals, BuildingAdaptabilityandResilience	CLO 5	6
Total Hours		30

Textbooks:

- 1. Quantitative Aptitude for Competitive Examinations, R.S Agarwal, 2017
- $2.\ Quantitative\ Aptitude\ for\ All\ Competitive\ Examinations\ by\ Abhijit\ Guha, 6^{th}\ edition, 2016$
 - 3. Word Power Made Easy by Norman Lewis, 2023

Reference Books:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations by Dinesh khattar, 2nd Edition

COURSE SYLLABUS SYBTECH SEMESTER-VI



Name of the	CSE(AIDS)	Semester : VI	Level: UG/PG
Program:	A) &:		

COURSE CURRICULUM

Cours	se Name	Data Science and Analytics 2024 aching Scheme		Course Code/ Course Type Version Asse		UBTDS305/PCC 1.0 essment Scheme	
	e Pattern						
	Te						
Theor y	Practical	Tutorial -	Total Credits	Hours 3	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
				Pre-Requisit	te:		
	2000 10 10 10 10 10 10 10 10 10 10 10 10			1. An understanding of the acquisition and dimension of data with its various format extensions and its data operations. 2. To understand the statistical models and the basics of machine learning techniques of regression. 3. An understanding of good practices of data science 4. Skills in the use of tools such as Python, IDE and variance data science library 5. Understanding of the basics of the Supervised learning techniques of the Supervised			mension of ad its data e basics of ssion. ta science and various
Course Learning Outcomes (CLO):			2. Exp 3. 4. Ap	ibe what Data Sci to be a lain the significan (EDA) Ability to learn s oply basic machine R te the Machine lea	ence is and the skill a data scientist ce of exploratory data in data science supervised learning, the learning algorithm egression) rming model and trace and test the model	svM s (Linear nin with data	

Course content/syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
INTRODUCTION TO DATA SCIENCE: Data, Data Types, Sources of 1D to 7D data, Various data formats and their extensions, Data acquisition, and Data operations: Reading, selecting, filtering, manipulating, sorting, grouping, rearranging, ranking, and plotting. Python and its libraries, Python IDE	CLO 1	9
UNIT II		

STATISTICS FOR DATA SCIENCE: Descriptive statistics, data preparation. Exploratory Data Analysis data summarization, data distribution, measuring asymmetry. Sample and estimated mean, variance, and standard score. Statistical Inference frequency approach, variability of estimates, hypothesis testing using confidence intervals, using values, ANOVA	CLO 2	9
UNIT III		
DATA ANALYSIS AND VISUALIZATION: Data handling with python, Use data analysis tools in the pandas library to load, clean, transform, merge, and reshape data. Handle external files as well as exceptions. Analyze and manipulate time series data. Solve realworld data analysis problems.	CLO 3	9
Types of Charts : types of graphs: Introduction to Various types of visualization tools, e.g. Tablue, Dashboard, plotter, online platform etc plotely.		
UNIT IV		
MACHINE LEARNING FOR DATA SCIENCE	CLO 4	9
Supervised, Unsupervised and Reinforcement learning introduction with case studies Supervised Learning: First step, learning curves, training-validation and test. Learning models generalities, support vector machines, random forest. Examples		
UNIT V		
REGRESSION ANALYSIS: linear regression simple linear regression, multiple & Polynomial regression, Sparse model. Unsupervised learning, clustering, similarity and distances, quality measures of clustering, case study.	CLO5	9
Total Hours		45

Textbooks:

- Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L;Seghi', S. Springer, ISBN:978-3-319-50016-4
- 2. Data Analysis with Python A Modern Approach, David Taieb, Packt Publishing, ISBN-9781789950069

Reference Books:

1. Python Data Analysis, Second Ed., Armando Fandango, Packt Publishing, ISBN: 9781787127487

Online Resources:

- 1. https://onlinecourses.nptel.ac.in/noc22 cs32/preview Python for Data Science By Prof. Ragunathan Rengasamy | IIT Madras
- 2. https://onlinecourses.nptel.ac.in/noc21_cs45/preview Data Analytics with Python By Prof. A Ramesh | IIT Roorkee



CSE(AIDS)	Semester : VI	Level: UG/PG
49500 400-10		
	CSE(AIDS)	CSE(AIDS) Semester : VI

per a percy	e Name	Data Sci		Course Code/ Course Type		UBTDS305/PCC	
Pimpri Chinchwad University		Analytics Lab					
Course	e Pattern	2024		Version		1.0	
	Teaching Scheme Assessment			essment Schem	e		
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2 2 <u>= 1</u>	1	<u>45</u>	1	2	25		25
6]	 Pre-Requisit	e:		
Course Objectives (CO): The objectives of Data Science and A 1. An understanding of the acquisition and data with its various format extensions operations. 2. To understand the statistical models and machine learning techniques of reg 3. An understanding of good practices of 4. Skills in the use of tools such as Python, I new data science library 5. Understanding of the basics of the Super				e acquisition and di format extensions are perations. stical models and the techniques of regre good practices of da such as Python, IDE a science library	mension of and its data ne basics of ssion. Ita science and various		
Course Learning Outcomes (CLO):			2. Elabo 3. 4. Ap	be what Data Sciento be a to be a rate the significant (EDA) is Ability to learn surply basic machine Refer the Machine lear	ence is and the skill data scientist. ace of exploratory day in data science. apervised learning, selearning algorithm egression) ming model and trains and test the model.	ata analysis SVM. s (Linear	

COURSE CURRICULUM

Practical Plan

Assign Therital Chinchya Tractical Activit y Numbe r	Assignment/Pr actical/Activit y Title	Week Number/Turn	Details	CLO	Hours
1.	Practical 1:Working with Numpy arrays.	Week 1/Turn 1 Week 2/Turn 1	Working with Numpy arrays.	CLO1, CLO1	4
2	Practical 2: Working with Pandas data frames	Week 3/Turn 1 Week 4/Turn 1	Working with Pandas data frames	CLO2	4
3.	Practical 3:	Week 5/Turn 1 Week 6/Turn 1	Develop python program for Basic plots using Matplotlib	CLO3	4
4.	Practical 4:	Week 7/Turn 1	Develop python program for Normal Curves	CLO 4	2
5.	Practical 5:	Week 8/Turn 1	Develop python program for Frequency distributions	CLO4	2
6.	Practical 6:	Week 9/Turn 1	Develop python program for Correlation and scatter plots	CLO 4	2
7.	Practical 7:	Week 10/Turn 1	Develop python program for Correlation coefficient	CLO4	2
8.	Practical 8:	Week 11/Turn 1 Week 12/Turn 1	Develop python program for Simple Linear Regression	CLO 5	4
9.	Practical 9:	Week 13/Turn 1 Week 14/Turn 1	Conversion of one type of Data format to another Data Format using python	CLO5	4
10.	Practical 10:	Week 15/Turn 1	Project on Data Science	CLO5	2
		Total H	ours		30



Text Books:

- Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L;Seghi', S. Springer, ISBN:978-3-319-50016-4
- 2. Data Analysis with Python A Modern Approach, David Taieb, Packt Publishing, ISBN-9781789950069

Reference Books:

1. Python Data Analysis, Second Ed., Armando Fandango, Packt Publishing, ISBN: 9781787127487

Online Resources:

- 1. https://onlinecourses.nptel.ac.in/noc22 cs32/preview Python for Data Science By Prof. Ragunathan Rengasamy | IIT Madras
- 2. https://onlinecourses.nptel.ac.in/noc21_cs45/preview Data Analytics with Python By Prof. A Ramesh | IIT Roorkee



Name of the Program:		CSE(A	AIDS)	Semester: VI		Level: UG	
Course Name		Pro	ware ring and ject gement	Course Code/ Course Type		UBTCE312 / PCC	
Course	Pattern	20	24	V	rersion		1.0
	Tea	ching Sch	eme			Assessment S	cheme
Theor y	Practic al	Tutorial	Total Credits	Hour s	CIA (Continuo us Internal Assessme nt)	ESA (End Semester Assessment)	Practical/Oral
2	-	28	2	2	40	60	=
1)	Prereq	uisite: Pro	ficiency in	a progra	imming langu	ages like Pytho	n or Java
C	Course Objectives (CO):				1. To demon 2. To a To conceptual To Master P	Management are strate Software En- management Funda apply Project Life (lize the Software D (SDLC) mod	gineering & project amentals: Cycle Phases evelopment Life Cycle els. nd Team Leadership:
Course Learning Outcomes (CLO):			5	 Demons Devel Ef App 	ents would be abstrate a Fundamenta lop Comprehensive ffectively Lead Pro- oly Risk Management Inputs, Tools and Trequired outp	al Understanding Project Plans ject Teams ent Strategies Fechniques to get the	

Course content/Syllabus:



Descriptors/Topics	CLO	Hours
UNIT I		
INTRODUCTION TO SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	CLO 1	6
Definition and Importance Software Engineering & Project Management,		
The Software Product and Software Process Software Product and Process Characteristics, Three "R"-Reuse, Reengineering and Retooling, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics).		
UNIT II		
REQUIREMENT AND DESIGN ENGINEERING	CLO 2	6
Requirement Elicitation, Analysis, and Specification Functional and Non- functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development. System and Software Requirement Specifications, Requirement Validation, Traceability, Facilitated Application Specification Technique (FAST),		
Design Concepts and Principles Use case Modeling, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics.		
SRS Case Studies:		
Software Estimation: Size Estimation: Function Point (Numerical). Cost Estimation: COCOMO(Numerical), COCOMO-II (Numerical). Earned Value Management.		
UNIT III		
SOFTWARE ANALYSIS AND TESTING:	CLO 3	6
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging. Product metrics: Software quality, metrics for analysis model, metrics for		
design model, metrics for source code, metrics for testing, metrics for maintenance.		
UNIT IV		



University Lear's Cross Jachese	p:	
RISK MANAGEMENT AND QUALITY CONTROL: Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change	CLO 4	6
Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and		
Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.		
Case Studies:		
Project Risk Management in Action Quality Control and Process Improvement: Quality Control, Process improvement and activities		
Risk assessment simulation, Quality control exercises, Individual assignment on risk management, Group project on quality control.		
UNIT V		
PROJECT MONITORING AND CLOSURE:	CLO 5	6
Monitoring and Controlling Project Performance: Performance Measurement, Key Performance Indicators (KPIs), Status Reporting, Risk Monitoring, Change Control. Change Control and Configuration Management: Change Control, Configuration Management, Integration of Change Control and Configuration Management, Tools and Technologies.		
Project Closure and Evaluation: Project Evaluation, Performance Metrics, Stakeholder Feedback, Documentation Review, Benchmarking, Root Cause Analysis. Feedback to Team and Stakeholders, Closure of Evaluation Phase.		
Case Studies on:		
 Real-time project monitoring exercise Group project on project closure Final examination covering all topics 		
Presentation on a case study of a project closure		
Total Hours		30
I earning recourses:		

Text Books:

- 1. "Project Management: A Managerial Approach" by Jack R. Meredith and Samuel J. Mantel Jr.
 - 2. "Project Management: The Managerial Process" by Erik W. Larson and Clifford F. Gray.
 - 3. "Effective Project Management: Traditional, Agile, Extreme" by Robert K. Wysocki.

Reference Books:

1. "Project Management: A Systems Approach to Planning, Scheduling, and Controlling" " by

Harold Kerzner.



- "Effective Project Management: Traditional, Agile, Extreme" by Robert K. Wysocki.
 "The Art of Project Management "by Scott Berkun"
- 4. Software Engineering, 5th and 7th edition, by Roger S Pressman, McGraw Hill publication.
- 5. Managing Information Technology Project, 6edition, by Kathy Schwalbe, CengageLearning publication.
 - 6. Information Technology Project Management by Jack T Marchewka Wiley India publication.

Online Resources/E-Learning Resources

- 1 https://www.coursera.org/courses?query=software%20project%20management
 - 2 https://archive.nptel.ac.in/courses/106/105/106105218/3.
- 3 https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/



Name of the Program:	CSE(AIDS)	Semester: VI	Level: UG
Course Name	DESIGN AND ANALYSIS OF ALGORITHMS	Course Code/Course Type	UBTCE213/PCC

Course	e Pattern	20:	24	Ve	ersion	1.0	
Pimpri Chinchwad University	Te	aching Sch	eme	2	Ass	essment Scheme	e
Theor y	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	620	<u>u</u>	3	3	40	60	# <u>#</u>
	P	re-Requisi	te: Kno	wledge of C	Programming	and DSA	
Course Objectives (CO):				The objectives of Design and Analysis of AlgorithmsS are: 1. To describe and express performance analysis of various algorithms, Fundamentals of Data Structures and their applications. 2. To elaborate and demonstrate Divide and Conquer technique to provide solutions for well-known problems like searching, Sorting etc. 3. To discuss Greedy method and solve problems which are based on Greedy method such as Knapsack problem, Single-source Shortest Path, etc. 4. To use Dynamic Programming to solve problems like All Pairs Shortest paths, Travelling SalesPerson (TSP), etc. and also compare with Greedy method. 5. To choose Backtracking Algorithms for solving N- Queens, Sum of subsets Problems and compare /Contrast with Branch and Bound Technique.			
Course	e Learning	Outcomes	(CLO):	3. 4. 5. I	mpare worst-case escribe the fundam scribe and apply p s divide-and- conc prog Compare and con solve Elaborate and den Elaborate and den technique to provi	running time of alguental of algorithmic roblem solving techniquer, greedy method gramming, etc. trast among various ing techniques. nonstrate NP- companionstrate Divide and ide solutions for we be searching, Sorting	c problems. miques such d, dynamic s problem bleteness. d Conquer

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		

Foundations of Algorithm Analysis CLO 1 9 Foundations of Algorithm Analysis CLO 1 9 Foundations of Algorithm Analysis CLO 1 9 Foundation of twide and conquer technique: merge sort, quick sort, binary search and its performance analysis, Strassen's matrix multiplication UNIT II Divide and Conquer Algorithms Concept and applications of divide and conquer approach in algorithm design, Concept and detail description of Binary Search algorithms and its analysis, Finding Minimum and maximum element in a list of items(Min-Max algorithm) and their analysis, Concepts of Order statistics, Median order. Bruteforce approach for selection, Selection in Worst Case Linear Time algorithm and its complexity analysis. UNIT III Greedy Algorithms Concept of Optimization Problems and Optimal solution. Introduction of Greedy Strategy for algorithm design. Elements of Greedy, Concept of Knapsak problem, Algorithm for Fractional Knapsack Problem examples and analysis of its complexity, Kruskal's and Prim's algorithms for Minimum Spanning Tree, their examples and complexity analysis. Correctness Dijkastra Shortest Path Algorithms, example and its time complexityPurpose of Huffman Coding, Prefix Codes, Huffman Tree, Huffman Coding Algorithm, example and its Analysis. UNIT IV Dynamic Programming Concepts of Dynamic Programming approach for algorithm design, Greedy Algorithm vs Dynamic Programming, Recursion vs Dynamic Programming. Elements of Dynamic Programming, Reproach Concept of Matrix Chain Multiplication, its Algorithm, examples and complexity analysis, 0-1 Knapsack problem and its complexity analysis. Travelling Salesman Problem and its analysis. UNITV Backtracking and NP Completeness Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to Parallel algorithms; Stri			
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examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms; String matching algorithms; Introduction to NP-completeness.	UNITV		
examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms; String matching algorithms; Introduction to NP-completeness.	Backtracking and NP Completeness Backtracking concept and its	CLO 5	9
examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms; String matching algorithms; Introduction to NP-completeness.			
problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms; String matching algorithms; Introduction to NP-completeness.			
algebraic problem, introduction to parallel algorithms; String matching algorithms; Introduction to NP-completeness.			
matching algorithms; Introduction to NP-completeness.			
1 otal Hours 45			45
	Total Hours		45



Text Books:

- 1. Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
- 2. Analysis & Design of Algorithm. Horowitz & Sahani, Computer Science Press, Latest Edition.

Reference Books:

- 1. The Design and Analysis of Algorithm, Ullmann, Addison-Wesley, Latest Edition.
 - 2. Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

Online Resources/E-Learning Resources:

- 1. http://www.bu.edu/met/metropolitan college people/student/resources/conduct/code.html.
 - 2. https://nptel.ac.in/courses/106106131

	e of the gram:	B.TEC	H CSE	Semester : VI		Level: UG	
Course Name		Design Analys Algorith	sis Of	Course	Code/Course Type	UBTCE314/PCC	
Course	Course Pattern 2024		24	,	Version	1	1.0
Teaching Scheme				As	sessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
	1	82	1	2	25		25

Course Objectives (CO):	The objectives of Design and Analysis of
PCET'S Pinpri Chinchwad University	AlgorithmsS Lab are:
Status (Close) Achieve	 To describe and express performance analysis of various algorithms, Fundamentals of Data Structures and their applications. To elaborate and demonstrate Divide and Conquer technique to provide solutions for well-known problems like searching, Sorting etc. To discuss Greedy method and solve problems which are based on Greedy method such as Knapsack problem, Single-source Shortest Path, etc. To use Dynamic Programming to solve problems like All Pairs Shortest paths, Travelling SalesPerson (TSP), etc. and also compare with Greedy method. To choose Backtracking Algorithms for solving N-
	Queens, Sum of subsets Problems and compare /Contrast with Branch and Bound Technique.
Course Learning Outcomes (CLO):	Students would be able to:
Course Learning Outcomes (CLO).	 Compare worst-case running time of algorithms and describe the fundamental of algorithmic problems. Describe and apply problem solving techniques such as divide-and- conquer, greedy method, dynamic programming, etc. Apply problem solving Optimization techniques. Compare and contrast among various problem solving techniques. Elaborate and demonstrate NP- completeness.

Practical Plan

Assignment /Practical/A ctivity Number	Assignmen t/Practical/ Activity Title	Week Number/ Turn	Details	CLO	Hou rs
1	Practical 1:	Week 1	Basic iterative algorithms GCD algorithm, Fibonacci Sequences, Sequential and Binary Search.	CLO1	2
2	Practical 2:	Week 2	Basic iterative sorting algorithms: Bubble Sort, selection Sort, Insertion Sort.	CLO1	2
3	Practical3:	Week 3	Binary Search with Divide and conquer approach.	CLO2	2

PCET's Pimpri Chinchwad University Jean's Cross Achieve	Practical 4:	Week 4/ Week 5/ Week 6	Merge Sort, Heap sort, Quick Sort, Randomized Quick Sort.	CLO 2	6
5	Practical5:	Week 7	Selection Problem with divide and Conquer approach	CLO2	2
6	Practical6:	Week 8/ Week 9	Fractional Knapsack Problem, Job sequencing with deadline, Kruskal's algorithm, Prims algorithm, Dijkstra's Algorithm	CLO3	4
7	Practical 7:	Week 10	Implement the dynamic programming algorithms.	CLO4	2
8	Practical 8:	Week 11 / Week 13	Algorithms using Backtracking approach	CLO4	4
9	Practical 9:	Week 14	Implement an approximation Algorithm.	CLO5	2
10	Practical 10:	Week 15	Implement Backtracking and NP Completeness	CLO5	2
		Т	otal Hours		30

Text Books:

- 1. Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
- 2. Analysis & Design of Algorithm. Horowitz & Sahani, Computer Science Press, Latest Edition.

Reference Books:

- 1. The Design and Analysis of Algorithm, Ullmann, Addison-Wesley, Latest Edition.
 - 2. Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

URLs (Optional) - List of Online Courses

- $1. \quad \underline{http://www.bu.edu/met/metropolitan \ \ college \ \ people/student/resources/conduct/code.html}.$
 - 2. https://nptel.ac.in/courses/106106131



University			MA.		4			
Name of the Program:		CSE	Seme	ester: VI	Le	evel: UG		
Course Name		recognition timization		Code/ Course Cype	UBTML307 A/PEC			
Course Pattern	2	024	Version		1.0			
	Teaching	Scheme	L		Assessment Sc	heme		
Theor y cal	Tutoria 1	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
3 -	<u></u>	3	3	40	60	-		
		I.	Pre-	Requisite:		I		
		2. 3.	Proficiency	 knowledge of linear algebra. Proficiency in probability and statistics. Understanding of multivariate calculus. 				
			The objectives of Pattern recognition and Optimizationare: 1. To understand the concept of a pattern 2. To understand the basic approach to the development of pattern recognition and machine intelligence algorithms. 3. To apply the knowledge of feature extraction methods, feature evaluation, and data mining on real life. 4. To apply both supervised and unsupervised classification methods to detect and characterize patterns in real-world data. 5. To develop prototype pattern recognition algorithms that can be used to study algorithm behavior and performance against real-world multivariate data					
Course Learn	ng Outcom	es (CLO):	2	Stude	ents will be able to	D:		
			2. E 3. Des 4. Cor	in pattern re explore on supervision pattern recogn structured date apprehend the imparintelligent models. Apply various mactworks, Support V	cognition to solve reased learning algorithm solving problems ition models to extract ta like graph, syntactia act of dimensionality is and to apply the din techniques on data thine learning techniq	ns and to apply them for ct interesting patterns from c description etc. reduction on the design of nensionality reduction a. ues like artificial neural y inference engines etc.to		



Descriptors/Topics	CLO	Hours
UNITI		
INTRODUCTION TO PATTERN RECOGNITION	CLO 1	09
Classification: Overview of pattern recognition-Discriminant Functions-Supervised learning Parametric estimation- Maximum likelihood estimation. Pattern Classifier: Bayesian parameter estimation-perceptron algorithm-LMSE algorithm problems with Bayes Approach-Pattern classification by distance functions-Minimum distance pattern classifier.		
UNIT II		
UNSUPERVISED CLASSIFICATION	CLO 2	09
Unsupervised Classification: Clustering for unsupervised learning and classification Clustering concept-C-means algorithm-Hierarchical clustering procedures-Graph theoretic approach to pattern clustering- Validity of clustering solutions. Structural Pattern Recognition: Elements off or mal grammars-String generation as pattern Syntactic Description-Parsing-Stochastic grammars structural representation. Feature Extraction and Selection: Entropy minimization-Karhunen-Loevetrans formation Feature selection through Functions Approximation-Binary feature selection.		
UNIT III		
NEURAL NETWORKS AND KERNEL MACHINES: Neural Networks and Kernel Machines: Neural network structures for pattern recognition Neural network-based pattern associators—Self organizing networks-Support vector machines (SVM)-Kernel machines, Maximum margin classification, and generalizability and VC(Vapnik—Chervonenkis) dimension. Neuro Fuzzy and Genetic Algorithm classification: Fuzzy Logic-Fuzzy pattern classifiers Neuro-Fuzzy Systems-Pattern classification and optimization Using Genetic Algorithms, Recent Trends in pattern recognitions.	CLO 3	09
UNIT IV		
OPTIMIZATION TECHNIQUES:	CLO4	09
Introduction to Optimization: Historical Development, Engineering applications of Optimization, Design 04 vector and constraints, Constraint surface, Objective function, Classification of Optimization Problems		
UNIT V		



CLASSICAL OPTIMIZATION TECHNIQUES	CLO	09
Classical Optimization Techniques Single variable optimization, Constrained and unconstrained multi-variable 06 optimization, Direct substitution method, Lagrange's method of multipliers, Karush-Kuhn-Tucker conditions. Linear Programming Statement of an LP problem, Graphical Solution of an	5	
LP problem, Simplex 05 method, Dual simplex method. Non-linear Programming, Evolutionary Algorithms An overview of evolutionary algorithms		
Total Hours : 45		45

Text Books:

- 1. Duda R.O., and Hart.P.E., Pattern Classification and Scene Analysis, second edition, Wiley, 2001.
- Robert J.Schalkoff, Pattern Recognition: Statistical, Structural and Neural Approaches, JohnWiley& Sons Inc., New York, 2007.
- 3. Trevor H, Robert T, Jerome Friedman, The Elements of Statistical Learning, Springer Series, 2017.

Reference Book

- 1. Tou and Gonzales, Pattern Recognition Principles, Wesley Publication Company, London, 1974.
- Morton Nadier and Eric Smith P., Pattern Recognition Engineering, John Wiley & Sons, NewYork, 1993.
 - 3. Christopher M Bishop, Pattern Recognition and Machine Learning. Springer. 2011.

Online Resources/E-Learning Resources

- 1. https://www.researchgate.net/publication/216814160 Interactive ELearning System Using Pattern Recognition and Augmented Reality
 - 2. https://nptel.ac.in/courses/117105101
 - 3. https://www.youtube.com/watch?v=BROB96fXtPI



Name of the	AIDS	Seme	ester: VI	Level: UG
Program:				
Course Name	Pattern recognition and Optimization LAB	Course Code/ Course Type		UBTML308 A
Course Pattern	ourse Pattern 2024		ersion	1.0
	Teaching Scheme		è	Assessment Scheme

Theor	Practi Pr	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
11 m	1	72	1	2	25		25
			l	Pre-Requis	site:		I.
			1.	Programmin 2. Mat lab	g Languages. / Scilab		
	Course	Objectives (C	CO):	1.	To familiarize stud Progra To learn and un Opt: 3. To explo To understand a	recognition and Care: dents with MATLAE amming basic concepterstand Pattern Recimization techniques ore Open-Source Soft and learn Computation and learn Pattern Recimization techniques imization techniques	B/Scilab/Python ots. cognition and tware. conal facility. cognition and
Course Learning Outcomes (CLO):				2. D 4. I	Develop Pattern emonstrate the use 3. Develop Pettern rec	will be able to: recognition technique Pattern recognition a. techniques. optimization techniques cognition techniques Python/MATLAB. nition techniques usin	and optimization ques. algorithm using

Practical Plan;

assignm ent/Prac tical/Act ivity Number	Assignment/ Practical/ Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1: Working with Matlab	Week 1, 2,3,4	Implementation of Linear Regression using Gradient Descent	CLO1	8
2	Practical 2: Working with Matlab	Week 5,6,7 /Turn 1	Implementation of Unrestricted Search methods Implementation of Golden Section Method Optimization	CLO1	6



3	Practical 3: Working with MATLAB	Week 8,9,10 /Turn 1	Implementation of Fibonacci Method Implementation of Bacteria Foraging	CLO5	6
4	Practical 4: Working with Matlab	Week 11,12,13 /Turn 1	Particle Swarm Optimization Univariate methods Ant colony optimization	CLO2	6
5	Practical 5: Working with Matlab	Week 14,15 /Turn 1	Improving Fraud Detection in Financial Transactions through Pattern Recognition and Optimization	CLO4	4
		To	otal Hours		30

Text Books:

- 1. Duda R.O., and Hart.P.E., Pattern Classification and Scene Analysis, second edition, Wiley, 2001.
- Robert J.Schalkoff, Pattern Recognition: Statistical, Structural and Neural Approaches, JohnWiley& Sons Inc., New York, 2007.
- 3. Trevor H, Robert T, Jerome Friedman, The Elements of Statistical Learning, Springer Series, 2017.

Reference Book

- 1. Tou and Gonzales, Pattern Recognition Principles, Wesley Publication Company, London, 1974.
- 2. Morton Nadier and Eric Smith P., Pattern Recognition Engineering, John Wiley & Sons, NewYork,
 - 3. Christopher M Bishop, Pattern Recognition and Machine Learning. Springer. 2011.

Online Resources/E-Learning Resources

- 1. https://www.researchgate.net/publication/216814160 Interactive ELearning System Using Pattern Re cognition and Augmented Reality
 - 2. https://nptel.ac.in/courses/117105101
 - 3. https://www.youtube.com/watch?v=BROB96fXtPI

Course content/ Syllabus:



	me of the CSE (AIDS) rogram:		Semester : VI		Level: UG		
Cours			IFICIAL LIGENCE	Course Code/ Course Type		UBTML301/PEC	
Course	Pattern	2	2024	Ve	ersion		1.0
	-	Teaching S	Scheme		83	Assessment	Scheme
Theor	Practic al	Tutoria 1	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessm ent)	Practical/Oral
3	8 <u>4</u>	2 0	3	45	40	60	-
	Pre-R	equisite: I	Proficiency in	a programm	ing language, s	uch as Pytho	on or Java
8	Course Ob	ojectives (CO):	2	1. To c To gain knowle 3. To gain pr To comprehence	omprehend of edge of Machin actical Skills in Neural Netwo concept	ne Learning Algorithms in AI Programming orks and Deep Learning
Cour	se Learnin	g Outcom	es (CLO):		 Compr Apply 3. Analy 	Machine Learn Implement AI ze and Evalua	nental Concepts sing Algorithms Models

Descriptors/Topics	CLO	Hours

UNIT I		
Introduction to Artificial Intelligence: History, AI models, Learning aspects, Intelligent Agents, Rational Agent, Environment types.	CLO 1	09
UNIT II		
Problem Solving and Search:	CLO 2	09
Problem space and search, Toy Problems, Uninformed search methods — Breadth First Search, Uniform Cost Search, Depth First Search, Depth Limited Search, Iterative Deepening Search, Bi-directional Search, Heuristic search methods - Best first, Greedy, A*, AO*, Hill Climbing, Local Search and optimization - Simulated Annealing, Local Beam Search, Adversarial search - Minimax, Alpha-Beta Pruning		
UNIT III		
Knowledge and reasoning	CLO 3	09
Knowledge Representation, Wumpus World, Propositional Logic, Predicate Logic, Unification and Lifting, Representing Knowledge using rules, Frame systems, Semantic networks, Uncertainty and methods, Bayesian Probability and belief network, Probabilistic reasoning, Forward and backward reasoning, Making simple decisions.		
UNIT IV		
Constraint Satisfaction Problem & Preparation	CLO 4	09
CSP as Search Problem, Backtracking Search for CSP, Forward checking, Constraint Propagation, Formulating Problem structure. Planning components, Blocks world, Goal Stack Planning, Planning as a state space search, Partial Order Planning, Multi-agent Planning		
UNIT V		
Machine Learning & Applications	CLO 5	09
Perceptron, Perceptron Learning, Introduction to Machine Learning, Supervised, unsupervised methods, classification, regression, Decision trees, basics of natural language processing, application areas of AI		
Total Hours		45

Textbooks:

- Stuart Russell and Peter Norvig (1995), "Artificial Intelligence: A Modern Approach", Third edition, Pearson, 2003.
 - 2. Elaine Rich and Kevin Knight "Artificial Intelligence", Tata McGraw Hill, 1991

Reference Books:



- 1. Patrick Henry Winston, "Artificial Intelligence", Addison-Wesley, 1992
- 2. Jiaweihan, MichelineKamber, "Data Mining: Concepts and systems", Morgan Kaufmann Publishers

Name of the	CSE(AIDS)	Semester: VI	Level: UG	
Program:				

3. Machine Learning, TomMitchell, McGraw Hill, 1997, ISBN: 978-0-070-42807-2

Online Resources/E-Learning Resources

- 1. https://www.edx.org/learn/artificial-intelligence
- 2. https://onlinecourses.nptel.ac.in/noc22_cs56/preview
 - 3. https://www.w3schools.com/ai/ai_whatis.asp

Course Name Artification of the Course Name Artification of the Course Name Intelligence of the Course Name Artification of the Course Name Artification of the Course Name Intelligence of the Course Name Artification of the Course Name Intelligence Output In				Code/ Course Type	UBTML3	308 A /PEC	
	Course Pattern 2024		Ve	ersion]	1.0	
Teaching Scheme					Assessment Sche	eme	
Theory	Practica 1	Tutoria 1	Total Credit s	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
177.75 (₩) (₩) (87.55	1	-	1	2	25	#	25
Course Objectives (CO):				1. 3. To 4. To	To implement and property of the property of t	rtificial Intelligen l evaluate AI algorith rogramming language ement basic algorith sets in implementing algorithms chine learning concep itable language of ch ropriate data sets to th	ms in and Python e. m in AI the machine learning pts and algorithms in noice.
Course Learning Outcomes (CLO):					 Apply AI Understan Design Jav Apply appr 	algorithms. a would be able to algorithms to solve red the implementation machine learning algorithms. algorithms. opriate data sets to the algorithms. d apply Machine Learning algorithms. d solve real world pro	eal world problems procedures for the corithms. or various Learning e Machine Learning urning algorithms to

COURSE CURRICULUM

Practical Plan:

Assignment/	Assignment/Practica	Week	Details	CLO	Hours
Practical/Act	1/Activity Title	Number			
ivity Number	*	/ Turn			
1	Practical 1: Implement A* Search algorithm	Week 1, 2/ Turn 1	Represents a node in the search space, containing the state, parent node, cost from the start node (g), and heuristic cost (h).	CLO1	4



2	Practical 2: Implement AO* Search algorithm	Week 3,4/ Turn 1	AO* (Adaptive A*) is an extension of the A* algorithm that dynamically updates the heuristic function during the search to provide a more informed search direction basic implementation of AO* in Python:	CLO1	4
3	Practical 3: Solve and implement the game of tic-tac-toe using mini-max	Week 4,5 /Turn 1	Implementing Tic-Tac-Toe using the Mini-Max algorithm involves creating a game tree where each node represents a game state, and then recursively evaluating each possible move to determine the best move for the current player.	CLO2	4
4	Practical 4: Implement and test hill climbing based search algorithms to solve Travelling Salesman Problem.	Week 5,6/ Turn 1	Hill climbing is a local search algorithm that starts with an arbitrary solution to a problem	CLO5	4
5	Practical 5: Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using any standard Heart Disease Data Set.	Week 6,7 /Turn 1	Python program that constructs a simple Bayesian network for diagnosing heart disease using the Cleveland Heart Disease dataset, one of the standard datasets used for heart disease diagnosis	CLO2	4
6	Practical 6: Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.	Week 8,9 / Turn 1	Python program to implement the k-Nearest Neighbor (k-NN) algorithm to classify the Iris dataset, and print both correct and wrong predictions	CLO3	4

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	7

7	Practical 7: Implement the non- parametric Locally Weighted Regression algorithm in order to fit data points.	Week 10, 11 ,12 /Turn 1	Below is a Python implementation of the Locally Weighted Regression (LWR) algorithm	CLO3	6		
8	Practical 8: Implement Decision Tree in Python?	Week 13,14,15 / Turn 1	basic implementation of a Decision Tree classifier in Python	CLO3	6		
	Total Hours						

Text Books:

- Duda R.O., and Hart.P.E., Pattern Classification and Scene Analysis, second edition, Wiley, 2001.
 - Robert J.Schalkoff, Pattern Recognition: Statistical, Structural and Neural Approaches, JohnWiley& Sons Inc., New York, 2007.
 - 3. Trevor H, Robert T, Jerome Friedman, The Elements of Statistical Learning, Springer Series, 2017.

Reference Books:

- George F. Luger, "Artificial Intelligence Structures and Strategies for Complex Problem Solving", 6th Edition, Addison Wesley Longman, Inc., MIT press, 2009.
- Ivan Bratko," Prolog Programming for Artificial Intelligence ", 4th Edition, Addison-Wesley Publishing Company, 2011.
- Stuart J. Russell and Peter Norvig, "Artificial Intelligence A Modern Approach", Third Edition, Prentice-Hall, Inc., 2010.
- 4. George F. Luger, "Artificial Intelligence Algorithms, Data structure, and Idioms in Prolog, Lisp, and java", Pearson Education, Inc., 2009.

Online Resources/E-Learning Resources

- 1. http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html.
- 2. Course materials for this class can be found at: people.bu.edu/madani. Assignments solutions and announcements will be available on Blackboard
 - 3. https://www.learnpython.org/
 - 4. https://onlinecourses.nptel.ac.in/

Course Contents/Syllabus



01111		
Chinchwad University		
Basic Plotting: Line plot - Bar plot - Pie Chart - Scatter Plot - Histogram - Stacked Bar Charts - Sub Plots - Matplotlib, Searborn, Plotly - Seaborn Styles	CLO 1	9
UNIT II	×	
Applied Visualizations: Box plot - Density Plot - Area Chart - Heat map - Tree map - Graph Networks	CLO 2	9
UNIT III		
Interactive Visualizations and Animations: Dynamic charts - Dynamic maps - Animation types - 2D, 3D, Motion Animation - Animation Principles - Altair Package - Statistical Visualizations	CLO 3	9
UNIT IV	*	0
Principles of Information Visualization: Visual Perception and Cognition - Gestalt's Principles - Tufte's Principles - Applications of Principles of Information Visualization - Dashboard Design.	CLO 4	9
UNIT V	_	
Data Aggregation and Group operations: Group by Mechanics, Data aggregation, General split-apply-combine, Pivot tables and cross tabulation.	CLO 5	9
Total Hours		45

UNIT I

Learning resources

Textbooks:

- 1. McKinney, W.(2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython. 2nd edition. O'Reilly Media.
 - 2. O'Neil, C., & Schutt, R. (2013). Doing Data Science: Straight Talk from the Frontline O'Reilly Media.
- 3. Tamara Munzner, Visualization Analysis and Design, A K Peters Visualization Series, CRC Press, 2014.

Reference Books:

- 1. Scott Murray, Interactive Data Visualization for the Web, O'Reilly, 2013.
- 2. Alberto Cairo, The Functional Art: An Introduction to Information Graphics and Visualization, New Riders, 2012.
- 3. Nathan Yau, Visualize This: The FlowingData Guide to Design, Visualization and Statistics, John Wiley & Sons, 2011.

Online Resources/E-Learning Resources

1. https://freevideolectures.com/course/4041/nptel-introduction-to-learning-analytics/11

2. https://nptel.ac.in/courses/111106415

Propri Primpri Chinchwa .https://elearn.nptel.ac.in/shop/iit-workshops/completed/data-visualization-with-

Name of the	B. Tech CSE	Semester: VI	Level: UG
Program:			

r/?v=c86ee0d9d7ed

Cours PCET's Pimpri Chinchwad University	e Name	Data Visualization Techniques Lab		Visualization Type		UBTDS310 / ProgramElective		
Course	e Pattern		2024	Vei	rsion	1.0		
		Tr.	Те	eaching Sche	me			
						Assessment	Scheme	
Theor y	Practical	Tuto rial	Total Credits	Hours	CIA (Continuou s Internal Assessmen t)	ESA (End Semester Assessment)	Practical/ Oral	
_	1	_	1	2		<u>-</u>	50	
	Pre-Requisite: Computer Network							
(Course Obje	ectives (CO):	The objectives of Data Visualization Techniques LAB are:				
				1. 2 3. 4. 5.	To recognize To apply the co	and explore pandas oncept data visualiz tableau. ad design features a techniques.	s libraries. ation using nimations	
Course	e Learning	Outcom	es (CLO):	Students would be able to:				
				4	2. Elaborate th visu 3. Apply kno Analyze data of t	techniques. techniques. techniques. te procedure of vari- talization methods. the various dashboat perform data visual tableau.	ous data aping. rd attributes.	

Practical Plan

Assign	Assignment/Pra	Week	Details	CLO	Hours
ment/P	ctical/Activity	Numbe			
ractical	Title	r/Turn			
/Activit					
y					
Numbe					
r					
				8	

1 PET'S Pimpri Chincheu University Gare Grow Achieve	Practical 1: Numpy and Pandas	Week 1, 2,3	Creating a NumPy Array The Shape and Reshaping of NumPy Array Expanding and Squeezing a NumPy Array Indexing and Slicing of NumPy Array	CLO1	6
2	Practical 2: Numpy and Pandas	Week 4,5,6	2.1 Perform following operations using pandas. 2.2 Perform following operations using pandas. 2.3 Read the following file formats using pandas. 2.4 Read the following file formats.	CLO 1	6
3	Practical 3: Discussion of workflow Exploratory Visualization	Week 7,8,9	3.1 Data Joins 3.2 Creating visualizations with Tableau.	CLO 2	6
4	Practical 4: Discussion of workflow Exploratory Visualization	Week 10,11	3.3 Sorting, Top N, bottom N 3.4 Filtering 3.5 Maps	CLO 2	4
5	Practical 5: Web Scraping	Week 12	Demonstrate web scraping using python	CLO 3	2
6	Practical 6: Dashboard development & Tableau	Week 13	4.1 Dashboard design principles 4.2 Dashboard interactivity 4.3 Connected "drill-down" dashboards	CLO 4	2
7	Practical 7: Dashboard development & Tableau	Week 14, 15	4.4 Datasets exploration using tableau.4.5Fiscal Year Calculations and Parameter explorations	CLO 5	4
			Total Hours		30

Textbooks:

1. McKinney, W. (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython. 2nd edition. O'Reilly Media.

Pimpri Chinchwad University

2. O'Neil, C., & Schutt, R. (2013). Doing Data Science: Straight Talk from the Frontline

Name of the	CSE (AIDS)	Semester : VI	Level: UG
Program:			

O'Reilly Media.

Reference Books:

- 1. Scott Murray, Interactive Data Visualization for the Web, O'Reilly, 2013.
- Alberto Cairo, The Functional Art: An Introduction to Information Graphics and Visualization, New Riders, 2012.
- Nathan Yau, Visualize This: The FlowingData Guide to Design, Visualization and Statistics, John Wiley & Sons, 2011.

Online Resources/E-Learning Resources

- 1. https://freevideolectures.com/course/4041/nptel-introduction-to-learning-analytics/11
 - 2. https://nptel.ac.in/courses/111106415

Cours	se Name	Ima	Image Processing		Course Code/	UBTML	.309/PEC	
Pimpri Chinchwad University	AN ARTHUR DESCRIPTION OF THE PROPERTY OF THE P				Course Type			
Course	e Pattern		2024		Version	1	.0	
	Teaching Scheme				Ass	essment Schen	me	
Theor	Practical	Tutori al	Total Credi ts	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/ Oral	
3	(-)	-	3	3	40	60	¥	
				Pre-Req	uisite:			
				3. Digit	al Signal Processing			
	Course Objectives (CO):					The objectives of Image Processing are: 1. To become familiar with digital image fundamentals 2. To get exposed to simple image enhancement techniques in the Spatial and Frequency domain. 3. To learn concepts of degradation function and restoration techniques. 4. To study image segmentation and representation techniques. 5. To become familiar with image compression and recognition methods		
Course Learning Outcomes (CLO):				O):	 Learn the beinage prosampling, Operate osmoothing Learn the imag Analyze the Explore the 	passics and fundant rocessing, such as quantization, and in images using the spatial Domai e basics of compa ge and their differ e restoration conc techniques. e basics of segment extraction techni	nentals of digital s Digitization, 2D-transforms. The techniques of enhancement in n. The ression digital ent types. The pets and filtering that ion & feature	

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		

Introduction to Digital Image Processing: The Processing Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Sampling and Quantization, Representing Digital Images (Data structure), Some Basic Relations, Human visual system, Sampling & quantization, Representing digital images, Spatial &graylevel resolution, Image file formats, Basic relationships between pixels, Distance Measures. Basic operations on images-image addition, subtraction, logical operations, scaling, translation, rotation. Image Histogram. Color fundamentals & models – RGB, HSI YIQ.	CLO 1	9
UNIT II		
Image Enhancement in Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations. Spatial domain enhancement: Point operations-Log transformation, Power-law transformation, Piecewise linear transformations, Histogram equalization. Filtering operations- Image smoothing, Image sharpening. Frequency domain enhancement: 2D DFT, Smoothing and Sharpening in frequency domain. Homomorphic filtering. Restoration: Noise models, Restoration using inverse filtering and Wiener filtering. Restoration using Inverse filtering and Wiener filtering.	CLO 2	9
UNIT III		
Image Compression: Types of redundancy, Fidelity criteria, Lossless compression – Runlength coding, Huffman coding, Bitplane coding, Arithmetic coding. Introduction to DCT, Wavelet transform. Lossy compression – DCT based compression, Wavelet based compression. Image and Video Compression Standards – JPEG,	CLO 3	9
MPEG	1 1	
MPEG UNIT IV		
Magazines ander	CLO 4	9

Image Restoration and Description:-	CLO 5	9
If the properties of the prope		
Total Hours		45

Textbooks:

- 1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson, Third Edition, 2010.
 - 2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002.

Reference Books:

- 1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
- 2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image
 - 3. Processusing MATLAB, Pearson Education, Inc., 2011

Online Resources/E-learning Resources:

- Digital Image Processing, IIT Kharagpur ,Prof. P.K. BiswasLink: https://nptel.ac.in/courses/117105079
 - NPTEL Video Course: NOC:Digital Image ProcessingLink: https://www.digimat.in/nptel/courses/video/117105135/L02.html



University (APP) COSE (ARABIE										
	e of the gram:	(CSE(AII	OS)	Semester : VI	Leve	l: UG			
Course Name In			age proce	5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Course Code/	UBTML310/PEC				
			Laborato	огу	Course Type					
Course	e Pattern		2024		Version	1	.0			
	Teac	hing Sch	eme		Asse	essment Schen	ne			
Theor	Practical	Tutori	Total	Hours	CIA	ESA (End	Practical/			
y		al	Credi		(Continuous	Semester	Oral			
			ts		Internal	Assessment				
					Assessment))				
1000	1	-	1	2	25	8 -	25			
	J.	Pre-	Requisi	te: Digi	ital signal Proces	sing				
Course	Objectives	(CO):		The obj	jectives of Image	Processing ar	e:			
			1. 2. 4 5.	To get expo	familiar with digital seed to simple image Spatial and Free concepts of degrada technimage segmentation are familiar with image methods.	enhancement techniquency domain. tion function and aques. and representation accompression and adds	hniques in the restoration techniques.			
	urse Learni	_			Students would b	e able to:				
Out	comes (CL0	0):	 2. 3. 	operations, s	pasics and fundament such as Digitization, transfer mages using the tech and enhancement in asics of compression	sampling, quantizorms. niques of smooth in spatial Domain digital image and	ration, and 2D- ing, sharpening			
					the restoration concersics of segmentation	epts and filtering				



Practical Plan

Assignm	Assignment/	Week	Details	CLO	Hours
ent/Pract	Practical/Acti	Number			
ical/Acti	vity Title	/ Turn			
vity Number					
	December 11	*** 1	62412	CT O	
1	Practical 1: Image	Week 1/ Turn	Conversion of 24 bit color image to 8 bit, 4 bit image.	CLO 1	2
	Creation	1	on, 4 on image.	1	
		Week 2			
		/Turn 1			
2	Practical 2:	Week	Perform Morphological operations –	CLO	4
	Implement morphologic	2,3 /Turn 1	Erosion, Dilation, Opening, Closing	1	
	al operations	/101111			
3	Practical 3:	Week 4	Apply image negation and power-law	CLO	2
3	Implement	/Turn 1	correction operations on image.	1	
	different				
	operations on				
	images				
4	Practical 4:	Week 5	Study of statistical properties- Mean,	CLO	2
		/Turn 1	Standard deviation, Variance &	1	
			histogram plotting.		
5	Practical 5:	Week	Enhance image using histogram	CLO	4
	Image	6,7	equalization and stretching.	2	
	Enhancement	/Turn 1			
6	Practical 6:	Week 8	To perform image filtering in spatial	CLO	2
	Use of Spatial	/Turn 1	domain.	2	
	Domain				
7	Practical 7:	Week 9	To perform image filtering in	CLO	2
	Use of	/Turn 1	frequency domain	4	
	Frequency	, 1 1111	noquoney demani		
	domain				
8	Practical 8:	Week	Perform image smoothing and	CLO	4
V-V-V	Image	10,11	sharpening operations	2	~
	smoothing	/Turn 1			
<u> </u>				l .	

9	Practical 9:	Week	Detect image edges using Sobel,	CLO	2
PCET'S Pimpri Chinchwad	Image edge	12	Prewitt and Roberts"s operator.	4	
University Learn Graw Achieve	detection	/Turn 1	**		
10	Practical 10:	Week	Compress image using DCT / Wavelet	CLO	2
	Image	13	transform.	3	
	Compression	/Turn 1			
11	Practical 11:	Week	Apply Global and adaptive	CLO	2
	Thresholding	14	thresholding to an image.	4	
	model	/Turn 1			
12	Practical 12:	Week	To perform image classification /	CLO	2
	Image	15	recognition	5	
	Classification	/Turn 1			
	1	Tota	al hours		30

Textbooks:

- 1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson, Third Edition, 2010.
 - 2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002.

Reference Books:

- 1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
- Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image Processing using MATLAB, Pearson Education, Inc., 2011

Online Resources/E-learning Resources:

- 1. Digital Image Processing, IIT Kharagpur ,Prof. P.K. BiswasLink: https://nptel.ac.in/courses/117105079
 - 2. NPTEL Video Course: NOC:Digital Image ProcessingLink: https://www.digimat.in/nptel/courses/video/117105135/L02.html



Name of the Program:	Foreign Language	Seme	ster : VI	Level: UG/PG
Course Name	German A2.2	202	ode/ Course Sype	UFL302 A/AEC
Course Pattern	2024	Version		1.0
Те		Ass	essment Scheme	

Theor Theor PETTY Winpri Chinchwad University Laure Crose Achieve	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
2	(=)	<u>=</u>	2	2	20	30	2	
Pre-l	Requisite: C	Can use sin	nple means	s to describe	the things rela	ted to immediate	e needs	
				The	e objectives of	(German A2.2) a	are:	
C	Course Obje	ectives (CC)):	10.	2. Describe 2. To implement 4. To deal with encounters 5. To Design	e main points when anguage is used. dreams, goals and he the acquired grammeth most situations tyed in the language rand create texts in the personal interest.	nopes. nar topics. pically egion.	
Students would be able to Course Learning Outcomes (CLO): 1. Understand advance vocabulary terms 2. Enhance expression skills in German language 3. Enhance professional speaking skills of German language 4. Construct short statements justifying own views and plans 5. Take parts in an interaction associated with the topic such as work, school, leisure time, travelling ex								

Course Contents/Syllabus:

Descriptors/Topics	CLO	Hours
UNIT I		
Gelernt ist gelernt	CLO 1	6
Different learning problems, exams and presentations		
Grammar – KII, Genetive		
UNIT II		,1

2 11 1 11 1	~~ ~ •	
Sportlich sportlich	CLO 2	6
Different sport activities, connection between sport and different emotions,		
Grammar – deshalb and trotzdem		
UNIT III		
Zusammen leben	CLO3	6
Conflicts in an apartment, living in different types and living with pets		
Grammar –Connectors (als and wenn)		
UNIT IV		
Gute unterhaltung	CLO4	6
Describe a picture, discussion on different music styles		
Grammar – Interrogative articles		
UNIT V		
Wie die Zeit vergeht! & Typisch, oder?	CLO5	6
Express different wishes, write a story, speak about proverbs, speak about cliche		
Grammar – Relative sentences		
Total Hours		30

Textbooks:

- 1. Netzwerk A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, Cornelesen Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 3. Netzwerk Neu A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- Hallo Deutsch A1, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Ltd
 Themen Aktuell 1, Hueber verlag
 - 3. Maximal Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.

Online Resources/E-Learning Resources:



1. Youtube: https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr

2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ

3. Instagram: instagram.com/learngermanwithanja

Course Exit Policy

UG Certificate in B Tech CSE AIDS: Students who opt to exit after completion of the first year and have scored required credits offered by the school in the program structure will be awarded a UG certificate in B Tech CSE, provided they must earn additional credits during the summer vacation of the first year.

	First Year												
Course Code			Teaching Scheme						I	Assess	ment	Schen	ne
	Course Name	Course Type			8				The	ory	OR	/PR	
			Th	Pr	T ut	Cred it	H rs		CI A	ES A	CI A	ES A	Total

In-house/ Sponsored/ Case Study/ Fieldwork

UG Diploma in B Tech CSE AIDS: Students who opt to exit after completion of the second year and have scored the required credits offered by the school in the program

structure will be awarded a UG diploma in B Tech CSE, provided they must earn additional credits during the summer vacation of the second year.

	Second Year												
				Геас	hing	Scheme	e		Assessment Scheme				ne
Course Code	Course Name	Course Type						200	The	ory	OR	/PR	
		J1	Th	Pr	T ut	Cred it	H rs		CI A	ES A	CI A	ES A	Total



Learn Grow Achieve											
UDEXCS201	Data Science and Analytics ./MOOCs- Data Visualization using R Programming	VSC	2		2	2	-	ī	50		50
UDEXCS202	Project/ Internship	VSC	-	4	4	8	-	-	50	50	100

*Project- In house/ Sponsored/ Case Study/ Field work

Applicable for 4 Year UG Program only

3-year UG Degree in BSc Engg CSE AIDS: Students who opt to exit after completion of the third year and have scored required credits offered by the school in the program structure will be awarded a UG degree in BSc Engg CSE, provided they must earn additional credits during the summer vacation of the third year

Third Year														
Course Code	Course Name	Course Type	Teaching Scheme						Assessment Scheme					
			Teaching Scheme						Theory		OR/PR			
			Th	Pr	T ut	Cred it	H rs		CI A	ES A	CI A	ESA	Tota 1	
UDEXCS301	Machine Learning /MOOCs- Data Visualization Tools	VSC	2			2	2			ī	50		50	
UDEXCS302	Project/ Internship	VSC	-	4		4	8		2	40	50	50	100	

*Project- In house/ Sponsored/ Case Study/ Field work