

Faculty of Engineering and Technology (Exclusively for Women) Department of Computer Science and Engineering B. Tech 2nd year (III and IV Semester) Scheme of Teaching and Examination



Outcome Based Education (OBE) & Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

Vision and Mission of Faculty of Engineering and

Technology (Exclusively for Women)

VISION OF FACULTY OF ENGINEERING AND TECHNOLOGY (EXCLUSIVELY FOR WOMEN)

We aspire to become global model for women professional through quality education and ethical values in the field of Engineering and Technology.

MISSION OF FACULTY OF ENGINEERING AND TECHNOLOGY(EXCLUSIVELY FOR WOMEN)

- To inspire a research culture, encourage entrepreneurial efforts and empower globally to be great leaders.
- To create technical women's power to meet the current and future demand of the industry.
- To develop women professionals with good academic knowledge, technical skills, strong ethics and above all good human being.

VISION OF DEPARTMENT

Aspire to become a centre of excellence for quality technical education and research by keeping pace with new technologies to empower girl students to lead and excel in the field of Computer Science and Engineering along with ethical principles and a sense of social responsibility.

MISSION OF DEPARTMENT

- M1: To impart academic excellence, encourage research and innovation in Computer science and engineering.
- M2: To educate the students with knowledge and skills, encourage students to address societal problems through IT solutions.
- M3: To prepare students to develop entrepreneurship skills with proper ethical values and desire to pursue life-long learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

PEO1	Graduates will possess a strong foundation in Computer Science and Engineering that
	are required for problem solving to excel and succeed in their profession.
PEO2	Graduates will have scientific and engineering breadth to comprehend, analyse, design
	and solve real life problems using the acquired skills and lifelong learning.
PEO3	Graduates will have exposure to emerging cutting-edge technologies and adequate
	training with opportunity to work on multidisciplinary projects.
PEO4	Graduates will be professional with Ethical attitude, Effective communication skills,
	teamwork capability, and relate engineering issues to broader social context.

PROGRAM OUTCOMES (PO'S)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and computing to solve Computer Science and Engineering related problems.

PO2: Problem Analysis : Identify, formulate, 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 public health and safety, and cultural ,societal

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.

P05: Modern tool usage :Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Computer Science and Engineering 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.

P07: 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 norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader to diverse teams, and in multidisciplinary settings.

P010: 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 report and design documentation, make effective presentations, and give and receive clear instructions.

P011: 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.

P012: 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 OUTCOME(PSO'S)

Graduates of the Computer Science and Engineering program will be able to

PSO1: Apply principles of basic sciences and Engineering fundamentals in the field of Computer Science and Engineering

PSO2: Apply computational, algorithmic, and programming skills to implement solutions for real-life problems in diverse domain adapting to emerging technologies through lifelong learning

PSO3: Develop practical abilities, ethical understanding, effective communication and leadership skills for successful careers in industry or academia

Sharnbasva University, Kalaburagi Scheme of Teaching and Examination 2022-23 [As Per NEP, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scho (Effective from the academic year 2022-23) Programme: B.Tech: Computer Science and Engineering III SEMESTER

SI. No.		Course Code	Course Title		Teaching Hours/ week	f 9	
				eaching epartment	Theory Lecture	Tutorial	Practical/ Drawing
		1		FA	L	T	P
1	BS	22MATS31	Mathematics For CSS-III	Mathematics	3	<u> </u>	-
2	PCC	22CS32	Digital Design and Computer Organization	CSE	3		2
3	PCC	22CS33	Data Structures and Applications	CSE	3		
4	PCC	22CS34	Operating System	CSE	3		
5	PCC	22CS35	Object Oriented Programming with Java	CSE	3		
6	PCC	22CSL36	Data Structures and Applications Lab	CSE			2
7	PCC	22CSL37	Operating System Lab	CSE			2
8	PCC	22CSL38	Object Oriented Programming with Java Lab	CSE			2
9	PW	22PRJ39	Project-III	CSE			2
10	HSS	22HSM310A	Soft Skills and Personality Development	Humanities	1		
11	AEC	22AEC311X	Ability Enhancement Course-III				2
		Total			16		12
Note: E	S-Basic	Science, PCC- Pro	ogramme Core Course, PW-Project Work, AEC- Ab	ility Enhancement	Course, HSS	S-Hurr	nanity a

1

Non Credit Mandatory Course

Project(PRJ): A Batch of 4 students (Same Branch or Different Branches with a Guide, May undertake one project.

	Ability Enhancement Course-III
Course code under 22AEC311X	Course Title
22AEC311A	Unix and Shell Programming
22AEC311B	Data Analytics with Excel
Courses prescribed to lateral en	try Diploma holders admitted to III semester of Engineering programs
12 NCMC 22MATDIP31 Additional Mathe	ematics–I Mathematics 3 1 - 3 00 100 100 00
1) Non Credit Mandatory Courses (NCMC) Additional	Mathematics-I and II prescribed for III and IV semesters respectively, to the lateral entry
Diploma holders admitted to III semester of B. Tech. p	rograms, shall attend the classes during the respective semesters to complete all the formalities
of the course and appear for the university examination	on. In case any student fails to register for the said course/fails to secure the minimum 50% of
the prescribed CIE marks, he/she shall be deemed to	have secured F grade. In such a case, the students have to fulfill the requirements during
subsequent semester/s to appear for SEE.	
2) These courses shall not be mandatory for vertical progr	ression, but completion of the courses shall be mandatory for the award of degree.
Courses prescribed to lateral entr	y B.Sc. degree holders admitted to III semester of Engineering programs
Lateral entry students from B.Sc. stream, shall clear the no	on credit courses Computer Aided Engineering Drawing, Elements of Civil Engineering of
First Year Engineering Programme. These Courses shall	not be considered for vertical progression, but completion of the courses shall be
mandatory for the award of degree.	
AICTE Activity Points to be earned by students admitted	to B.Tech. programme(For more details refer to Chapter 6,AICTE Activity Point
Programme, Model Internship Guidelines):	
Over and above the academic grades, every regular stu-	dent admitted to the 4 years Degree programme and every student entering 4 years Degree
programme through lateral entry, shall earn 100 and 75 A	ctivity points respectively for the award of degree through AICTE Activity Point Programme.
Students transferred from other universities to fifth seme	ester are required to earn 50 activity points from the year of entry to Sharnbasva University.
The-Activity Points earned shall be reflected on the stude	ents eighth semester Grade card.
The activities can be spread over the years, anytime duri	ng the semester weekends holidays, as per the liking and convenience of the student from the
year of entry to the programme. However, minimum hou	rs requirement should be fulfilled. Activity Points(non credit) have no effect on SGPA/CGPA
and shall not be considered for vertical progression.	
In case students fail to earn the prescribed activity points,	Eighth semester Grade Card shall be issued only after earning the required activity points.
Student shall be admitted for the award of the degree only	after the release of the Eighth semester Grade Card.

			Sharnbasva University, Kalab [As Per NEP, Outcome Based Educati (Effective	uragi Scheme of Teachin on (OBE) and Choice Ba from the academic year 2	g and Exan sed Credit 8 2022-23)	ninatio Systen	on 2022-2 n (CBCS)	23) Schemo	e]			
			Programme: B.T	ech: Computer Science a	nd Enginee	ring						
				IV SEMESTER								
SI.	Sl. Course Code Course Title No.		Course Title	Course Title		Teaching Hours/ week			Examination			
No.				Teaching Departmet	Theory Lecture	Tutorial	Practica 1/ Drawing	ıration in Hours	E Marks	JE Marks	Total Marks	Credi ts
					L	Т	Р	D	C	S		
1	BS	22MATS41	Mathematics For CSS-IV	Mathematics	3			3	50	50	100	03
2	PCC	22CS42	Analysis and Design of Algorithms	CSE	3			3	50	50	100	03
3	PCC	22CS43	Database Management System	CSE	3			3	50	50	100	03
4	PCC	22CS44	Python Application Programming	CSE	3			3	50	50	100	03
5	PCC	22CS45	Automata Theory and Computability	CSE	2	1		3	50	50	100	03
6	PCC	22CSL46	Algorithms Lab	CSE			2	3	50	50	100	01
7	PCC	22CSL47	Database Management System Lab	CSE			2	3	50	50	100	01
8	PCC	22CSL48	Python Lab	CSE			2	3	50	50	100	01
9	PW	22PRJ49	Project-IV	CSE			2	3	50	50	100	01
10	HSS	22UHV410	Universal Human Values	Humanities	3			3	50	50	100	03
11	AEC	22ACS411X	Ability Enhancement Course-IV				2	3	50	50	100	01
		Tota	al		17	1	10	33	550	550	1100	23
Note: Non (BS-Bas Credit M	ic Science, PCC andatory Course	2- Programme Core Course, PW-Project Work, e	AEC- Ability Enhancemen	nt Course, H	ŚS-Ηι	imanity a	nd Socia	l Scienc	e, NCM	C-	
Project	(PKJ): A	A Batch of 4 stud	ents (Same Branch or Different Branches with a	Guide, May undertake one	e project.							

			Ability Enha	ncement Course-	-IV							
Cour	se code un	der 22ACS411X		Course Title								
22AC	CS411A			Responsive Web	Design	with H	Bootstra	p 5.0				
22AC	CS411B			Scripting Langua	ages							
	1	Courses	prescribed to lateral entry Diploma hol	ders admitted to H	I semes	ster of	Engine	ering pro	ograms			
1 0	NCMC	22MATDIP41	Additional Mathematics – II	Mathematics	3	1	-	3	00	100	100	00
3) N	on Credit	Mandatory Course	s (NCMC) Additional Mathematics-	I and II prescribe	d for Il	I and	IV sen	nesters r	respecti	vely, to	o the later	al entry
D	iploma ho	lders admitted to	III semester of B. Tech. programs,	shall attend the c	lasses	during	the re	spective	e semes	sters to	complete	all the
fo	rmalities o	of the course and	appear for the university examination	n. In case any stu	dent fa	ils to	registe	r for the	e said c	ourse/f	fails to sec	ure the
m	inimum 50)% of the prescrib	ed CIE marks, he/she shall be deem	ed to have secure	ed F gi	ade. I	n such	a case.	the stu	dents l	have to fu	lfill the
re	auirements	s during subsequer	t semester/s to appear for SEE.		0			,				
4) TI	hese course	es shall not be man	datory for vertical progression, but co	mpletion of the co	ourses s	shall b	e mand	latory fo	r the av	vard of	degree	
Cours	es prescrib	ed to lateral entry	Sc degree holders admitted to III sen	nester of Engineeri	ng nroe	Jrams	• mana	<i>atory</i> 10	1 110 41	uiu oi	acgree	
Cours	es preserio	cu to later al chtry l	sist. degree norders admitted to in sen	lester of Engineer	ing prog	51 41113						
Later	ral entry st	udents from B.Sc.	stream, shall clear the non credit cour	ses Computer Aid	led Eng	ineeri	ng Dra	wing, El	ements	of Civ	il Enginee	ring of
First	Year Engi	neering Programm	e. These Courses shall not be consider	red for vertical pro	ogressi	on, bu	t comp	letion of	the cou	urses sł	nall be mar	ndatory
for th	ne award o	f degree.										
AIC	FE Activity	Points to be earne	d by students admitted to B.Tech. prog	gramme (For more	e details	s refer	to Cha	pter 6,A	ICTE A	ctivity	Point	
Prog	ramme, M	odel Internship Gu	idelines):									
Over	and above	e the academic gra	ides, every regular student admitted t	to the 4 years Deg	gree pro	ogram	me and	l every s	student	enterin	ng 4 years	Degree
prog	ramme thr	ough lateral entry	r, shall earn 100 and 75 Activity p	oints respectively	for th	e awa	ard of	degree	through	AICT	E Activit	y Point
Prog	ramme. St	udents transferred	from other universities to fifth semest	ter are required to	earn 50) activ	ity poin	nts from	the year	ar of en	try to Sha	rnbasva
Univ	ersity. The	e Activity Points ea	arned shall be reflected on the student	s eighth semester	Grade	card.			-		-	
The	The activities can be spread over the years, anytime during the semester weekends holidays, as per the liking and convenience of the student from					nt from						
the year of entry to the programme. However, minimum hours requirement should be fulfilled. Activity Points (noncredit) have no effect of						fect on						
SGP	A/CGPA a	and shall not be con	sidered for vertical progression.							,		
In ca	se students	s fail to earn the pr	escribed activity points, Eighth semes	ster Grade Card sł	hall be i	issued	only a	fter earn	ing the	require	ed activity	points.
Stud	ent shall be	e admitted for the	award of the degree only after the rele	ase of the Eighth	semest	er Gra	de Caro	1.			-	

MATHEMATICS FOR CSS-III [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024) SEMESTER -III					
Course Code	22MATS31	CIE Marks	50		
Number of Lecture Hours/Week	03	SEE Marks	50		
Total Number of Lecture Hours	40	Exam Hours	03		
	CR	EDITS – 03			
 Course Objectives: Familiarize the importance science engineering. Analyze computer science understand co-variance o Understand the vector sp Understand the basic con Develop the knowledge o 	ce of Random var e engineering pro f two variables an ace and associate cepts of set theor f solving Mechani	iable and Probability distrib blems applying Statistical n nd its correlation coefficient d results. y, relations, functions cal engineering problems n	oution essential for Co nethods to fit a curve a umerically.	mputer and	
	Modi	ıles		Hours	
		1. T			
Probability Distribution: Random variables (discrete and continuous) probability mass/density functions. Binomial distribution, Poisson distribution. Exponential and Normal distributions. Problems. Self Stacker Definition of probability addition and markfullication makes the problems.				08	
_	N	Aodule II	<u> </u>		
Basic Statistics: Measures of deviation, mean deviation, stand problems. Statistical Methods: Correla Regression analysis lines of regr Curve Fitting: Curve fitting form $y = ax + b$, $y = ax^2 + bx$ Self-study: Center and circle of	f central tenden lard deviation, continued tender ression, Rank corression, Rank correspondent by the method of $+ c \& y = ae^{b}$ curvature, evolution	befficient of variation, Skew on's co-efficient of correlation (without proof)-pro of least square. Fitting of <i>x</i> . tes and involutes.	ion, range quartile wness and Kurtosis, relation problems. oblems. I the curves of the	08	
	Ν	Iodule III			
Change of Basis, Range and Ke Non-singular Linear Transforma Self Study : Vector space basis	rnel of linear tran tion, Eigen value	nsformation, Rank and Nul e and Eigen vector of Linea	lity of a matrix, r Transformation.	08	
	Ν	Iodule IV			
Functions: Cartesian Products Bijective Functions. The Pigeon Relations: Definition and differ Introduction to logic: Basic Co Logic, Logical Implication – Ru Self Study : Properties of set the	and Relations, F -hole Principle, I ent types of relat onnectives and T les of Inference. eory.	unctions – into, many one Function Composition and T ions ruth Tables, Logic Equival	One-to-One, Onto, Inverse functions. ence – The Laws of	08	

Module V	
CGraph Theory: introduction to graph theory, definitions of finite and null graphs, loops, multigraphs, pseudo graph, simple graph, degree of a vertex, isolated vertices, connectedness and complete graph, minimum and maximum degree, regular graphs, subgraphs, walk, trial, paths, Euler and Hamilton graphs. Self Study : Set theoretical operations and basic number theory concepts	08

CO#	Course Outcomes
CO1	Learn to solve the random variable in both discrete and continuous and their probability distribution,
	Mass on various engineering problems.
CO2	Apply the concept of correlation and regression lines for solving the problems and numerical techniques
	to solve engineering problems.
CO3	Understand the knowledge of Linear Algebra to solve problems on Linear Transformation.
CO4	Understand the concept of relations, functions and to learn the law of logical Equivalence and
	Implications.
CO5	Make the use of the models using advanced concept of graphs in the real world applications

Text Books

- 1. **B.S. Grewal**: "Higher Engineering Mathematics ", Khanna publishers, 44th Ed., 2021.
- 2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10thEd., 2018. **Reference Books**
 - 1. V.Ramana:"Higher Engineering Mathematics "McGraw-Hill Education,11th Ed.,2017
 - Srimanta Pal & SubodhC.Bhunia: "Engineering Mathematics "Oxford University Press, 3rdEd., 2016.
 - 3. **N.PBali and Manish Goyal:** "A textbook of Engineering Mathematics" Laxmi Publications,10th Ed.,2022.
 - 4. **C.RayWylie,LouisC.Barrett:** "Advanced Engineering Mathematics "McGraw–Hill BookCo., Newyork, 6thEd., 2017.
 - 5. **GuptaC.B,SingS.RandMukeshKumar:**"Engineering Mathematic for Semester I and II ",Mc- Graw Hill Education(India)Pvt.Ltd 2015.
 - H.K.Dass and Er.RajnishVerma: "Higher Engineering Mathematics "S.Chand Publication, 3rdEd., 2014.
 - 7. James Stewart:"Calculus" CengagePublications, 7th Ed., 2019.
 - 8. David CLay: "Linear Algebra and its Applications ",Pearson Publishers,4th Ed.,2018.
 - 9. Gareth Williams: "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6thEd., 2017.

Web links and Video Lectures:

- 1. <u>http://nptel.ac.in/courses.php?disciplineID=111</u>
- 2. http://www.class-central.com/subject/math
- 3. <u>http://academicearth.org</u>.

DIGITAL DESIGN AND COMPUTER ORGANIZATION [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024) SEMESTER -III

Course Code	22CS32	CIE Marks	50	
Number of Lecture Hours/Week	04	SEE Marks	50	
Total Number of Lecture Hours	50	Exam Hours	03	
CREDITS – 04				

Course Objectives:

1. Describe, Illustrate and Analyze Combinational Logic circuits, Simplification of Algebraic equations using Karnaugh Maps and Quine McClusky Techniques.

2. Describe, Design and Analyze Encoders, Digital Multiplexers, Master-Slave Flip-Flops, Synchronous and Asynchronous Sequential.

3. How Computer System works & the Basic Principles, Instruction Level Architecture and Instruction Execution.

4. The Current state of art in Memory system design How I/O devices are accessed and its principles.

5. To provide the knowledge on Instruction Level Parallelism and Understand Concepts of advanced pipelining techniques, Computer Arithmetic and parallel Processing.

Modules	Hours
Module I	
Basic of Gates: Review of Basic Logic Gates, Positive and Negative Logic, Combinational	
Logic Circuits :Sum-of-Products Method, Truth Table to Karnaugh Map, Pairs Quads, and	10
Octets, Karnaugh Simplifications, Don't-care Conditions, Product-of-sums Method, Product-	
of-sums simplifications, Simplification by Quine-McClusky Method, Data-Processing	
Circuits: Multiplexers, Demultiplexers, 1-of-16 Decoder, Encoders,	
Exclusive-or Gates, Parity Generators and Checkers.	
DEMONSTRATION:1)Design and implement Half adder, Full Adder, Half Substractor, Full Substractor using basic gates.	
2) Given a 4-Variable logic expression, simplify it using Entered Variable Map and realize	
the simplified logic expression using 8:1 multiplexer IC.	
Module II	
Flip-Flops : RS Flip-Flops Gated Flip-Flops, Edge-Triggered Flip-Flops, Flip-Flop Timings, JK Master-Slave Flip-Flop, and Various Representations of Flip-flops. Registers : Types of	10
Registers, Application of Shift Registers. Counters: Asynchronous Counters, Synchronous	
Counters, Decade Counters, Counter Design as a Synthesis problem, A Digital Clock.	
Design of Synchronous Sequential Circuit: Model Selection, State Transition Diagram.	

State Synthesis Table, Design Equations and Circuit Diagram, State Reduction Technique.	
DEMONSTRATION: 1) Realize a J-K Master/Slave Flip-Flop using NAND gates and	
verify its truth table.	
2)Design and implement code converter	
I)Binary to Grey	
II)Grey to Binary Code using Basic Gates	
Module III	
Basic Structure of Computers: Functional Units, Basic Operational Concepts, Bus	
Structures, Performance. Machine instructions and Programs: Memory locations and	
addresses, Memory operations, Instructions and instruction sequencing, Addressing modes,	10
Assembly language, basic input output operations.	
Input output Organization: Accessing I/O devices, Interrupts, DMA.	
Module IV	
Memory Hierarchy: Introduction, Cache Performance, Six basic cache optimization,	
Virtual memory, And Memory hierarchy design: 10 advanced optimizations of cache	10
performances	
Module V	
Basic Processing Unit: Single bus organization, Multiple bus organization, Hardwired and	
micro-programmed design approaches.	10
Pipelining: Introduction, Major hurdles of Pipelining, How is pipelining implemented?,	
Instruction level Parallelism: Concepts and Challenges.	

CO1	Design and Develop digital Logic circuits using Boolean algebra and logic gates.
CO2	Implement and test combinational and sequential logic circuits using HDLs like Verilog or VHDL.
CO3	Identify basic structure of computer and its performance measures.
CO4	Describe memory hierarchy and virtual memory management, interrupt handling and DMA.
CO5	Optimize and evaluate computer system performance using various benchmarks and metrics.

Text Books:

- 1. Digital principles and applications, Donald P Leech,7th edition, Tata McGrawHill .
- M. Morris Mano & Michael D. Ciletti, Digital Design With an Introduction to Verilog Design, 5e,Pearson Education. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization,5th
- 3. Edition, Tata McGrawHill

Reference Books:

1. Computer System Architecture-by M. Morris Mano

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module
- Marks scored by the student shall be proportionally scaled down to 50 Marks

E-books and Online course materials:

- 1. <u>https://onlinecourses.nptel.ac.in/noc21_ee39/preview</u>
- 2. https://archive.nptel.ac.in/courses/106/105/106105163

DATA STRUCTURES AND APPLICATIONS				
[As per Choice Based Credit System (CBCS)scheme]				
(Effective from the academic year 2023-2024) SEMESTER – III				
Course Code22CS33CIE Marks50				
Number of Lecture Hours/Week	03	SEE Marks	50	
Total Number of Lecture Hours	40	Exam Hours	03	
	CREI	DITS - 03		
Course Objectives: Th	nis course will enable s	students to		
• To impart the ba	sic concepts of data str	ructures.		
To understand co	oncepts about searchin	g and sorting technique	s.	
• To discuss the co	oncepts of linear data s	tructure.		
To understand th	e applications of non-	linear data structure in	problem solving.	
To study different	nt sorting techniques.			
	Me	odule I		Hours
Introduction : Data Structures, Classifications (Primitive & Non Primitive), Data structure operations, Representation of Linear Arrays in Memory, Dynamically allocated arrays .Structures, Self-Referential Structures, and Unions. Pointers and			08	
Array Onerations: Traversing inserting deleting Searching: Linear Search				
Binary Search and Sorting: Bubble Sort Multidimensional Arrays Polynomials:				
Polynomial Representation, Polynomial Addition, Sparse Matrices: Sparse Matrix				
Representation, Transposing Matrix.				
Strings: Basic Terminology, Operations and Pattern Matching algorithm: Naïve				
String Matching algorithm. Programming Examples.				
Module II				
Stacks: Definition, S	Stack Operations, A	rray Representation	of Stacks and	
Stack Applications:	Infix to postfix	conversion. evaluation	on of postfix	
expression. Recursion:	Factorial. Fibonacci	Sequence. Tower of I	Hanoi. Oueues:	08
Definition Array Penracentation Queue Operations Circular Queues				
Demando, Array Representation. Queue Operations, Cheural Queues,				
Dequeue, Fhority Queues. Frogramming Examples.				
Linked Lists: Definition Representation of linked lists in Memory Memory				
allocation and Linked list operations: Traversing, Searching, Insertion, and Deletion. Doubly Linked lists. Linked Stacks and Queues. Programming Examples.				08
Module IV				
Trees: Terminology, Binary Trees, Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, postorder, preorder; Additional Binary tree operations-copying binary tree, testing equality. Threaded binary trees, Binary Search Trees – Definition, Insertion, Deletion (An empty left sub tree and nonempty right sub tree and vice-versa), Traversal, Searching, Application of Trees-Evaluation of Expression, Programming			08	
Linampies.	Module	V		
	mount	•		

Graphs: Definitions, Terminologies, Matrix and Adjacency List Representation	08
of Graphs, Elementary Graph operations, Traversal methods: Breadth First Search	
and Depth First Search.	
Sorting Techniques: Insertion Sort, Radix sort, selection sort. Hashing: Collision	
concept, Linear Probing, quadratic probing, double hashing examples.	

CO1	Acquire the fundamental knowledge on various data structures operations.
CO2	Apply stack and queue data structures in problem solving.
CO3	Analyze linked list for different applications.
CO4	Develop solutions using trees to model the real-world problem.
CO5	Analyse graph structures and hashing techniques to map the data.

Text Books:

1 .EllisHorowitzandSartajSahni, FundamentalsofDataStructuresinC,2ndEd, Universities Press, 2014,ISBN

0-7167-8250-2.

2.Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014, ISBN 978-1259029967.

Reference Books:

- 1. Gilberg&Forouzan, Data Structures: A Pseudo-code approach with C, 2nd Ed, Cengage Learning,2014,ISBN,978-8131503140.
- 2. Reema Thareja, Data Structures using C, 3rd Ed, Oxford press, 2012, ISBN-13: 978-0-19-809930-7
- Jean-Paul Tremblay & Paul G. Sorenson, An Introduction to Data Structures with Applications, 2 nd Ed, McGraw Hill, 2013, ISBN 978-0074624715.
- 4. A M Tenenbaum, Data Structures using C, PHI, 1989, ISBN 978-0131997462.
- 5. Robert Kruse, Data Structures and Program Design in C, 2nd Ed, PHI, 1996,ISBN978-8177584233.

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics under that module**.
- The students have to answer 5 full questions, selecting one full question from each module

• Marks scored by the student shall be proportionally scaled down to 50 Marks

E-books and Online course materials

1. <u>https://caucse.club/wp-content/uploads/2022/05/Fundamentals-of-Data-Structures-in-C-Ellis-Horowitz-Sartaj-Sahni-etc.-.pdf</u>

2. https://pdfcoffee.com/data-structures-with-c-by-schaum-lipschutz-pdf-free.html.

Online Courses and Video Lectures 1.https://nptel.ac.in/courses/106102064.

	OPERATING SYSTEM				
[A	s per Choice Based Cree	lit System (CBCS)schen	ne]		
	(Effective from the academic year 2023-2024)				
	SEMESTER – III				
Course Code	Course Code22CS34CIE Marks50				
Number of Lecture Hours/Week	03	SEE Marks	50		
Total Number of Lecture Hours	40	Exam Hours	03		
	CRED	TS - 03			
Course Objectives: Th	is course will enable stud	ents to			
 To Study the concepts and terminology used in OS To Discuss suitable techniques for management of different resource"s. To Illustrate process synchronization and concept of Deadlock To understand Memory management. To study the concepts of file 					
	Ma	dule I		Hours	
Introduction to operating systems: What operating systems do Computer System organization, Computer System architecture, Operating System structure, Operating System operations, Process management, Memory management, Storage management, Protection and Security, Distributed system, Special-purpose systems, and Computing environments? System structures: Operating System Services, User Operating System interface, System calls, Types of system calls, System programs, Operating system design and implementation, Operating System structure, Virtual machines, Operating System generation. System boot			08		
Module II					
Process Management: Process concept, Process scheduling, Operations on processes, Inter process communication. -threaded Programming: Overview, Multithreading models, Thread Libraries, Threading issues .Process Scheduling : Basic concepts, Scheduling Criteria, Scheduling Algorithms, Thread scheduling, Multiple-processor scheduling				08	
	Modu	ıle III			
Process Synchronization: The critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization. Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock			08		
Module IV					
Memory Management: Background, Swapping, Contiguous memory allocation, Paging, Structure of page table, Segmentation. Virtual Memory Management :Background ,Demand paging, Copy-on-write, Page replacement, Allocation of frames.				08	
Module V					
File System: File concept, Access methods, Directory structure, File system mounting, File sharing. Implementing File system: File system structure, File system implementation, Directory implementation, Allocation methods. Secondary Storage Structures: Overview of Mass storage structures, Disk structure, Disk attachment, Disk scheduling-FCFS Scheduling, SSTF Scheduling SCANN Scheduling, LOOK Scheduling.				08	

CO1	Investigate and evaluate the fundamental concepts and functions of operating systems,
	including their structure, operations, and various computing environments.
CO2	Analyze process management and multi-threaded programming, and evaluate different
	process scheduling algorithms.
CO3	Experiment with process synchronization techniques and develop methods to handle
	deadlocks in an operating system.
CO4	Research memory management concepts including paging, segmentation, and virtual
	memory management.
CO5	Design file system structures and implement secondary storage structures and protection
	mechanisms.

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics under that module**.
- The students have to answer 5 full questions, selecting one full question from each module.

Marks scored by the student shall be proportionally scaled down to 50 Marks.

Text Books:

1.Operating System Concepts, by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 9th Edition, Wiley India, 2012.

Reference Books:

- 1. Operating Systems, A Concept-Based Approach, by DM Dhamdhere, 3rd Edition, Tata Mcgraw-Hill, 2012.
- 2. Modern Operating Systems, by Andrew S. Tanenbaum and Herbert Bos, 4th Edition, Pearson, 2014.
- 3. Ann McHoes Ida M Fylnn, Understanding Operating System, Cengage Learning, 6th Editi
- 4. D.M Dhamdhere, Operating Systems: A Concept Based Approach 3rd Ed, McGraw-Hill, 2013.
- 5. P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.
- 6. William Stallings Operating Systems: Internals and Design Principles, 6th Edition,
 Pearson.

E-books and Online course materials

1. https://deepakdvallur.weebly.com/uploads/8/9/7/5/89758787/18cs43-os-module1.pdf https://de https://deepakdvallur.weebly.com/uploads/8/9/7/5/89758787/18cs43-osmodule1.pdfepakdvallur.weebly.com/uploads/8/9/7/5/89758787/module 2.pdf

Object Oriented Programming with JAVA					
As per Choice Based Credit System (CBCS)scheme]					
(Effective from the academic year 2023-2024) SEMESTER – III					
Course Code22CS35CIE Marks50					
Number of	03	SEE Marks	50		
Lecture	Lecture				
Hours/Week					
Total Number of	40	Exam Hours	03		
Lecture Hours	CR	EDITS -03			
Course Objective	es: This course will enal	ble students to			
1. To Learn the pri	inciples of object-orient	ted programming.			
2. To Understand p	programming features of	of Java.			
3. To gain knowled	dge on: Inheritance, exc	ception handling, Package	es& interface		
5. To understand e	vent driven Graphical U	User Interface (GUI) prog	ra. gramming using	applets.	
Module I					
Introduction to (Object Oriented Con	antas Duo o duno Oriente	d and Object	110015	
Oriented Program	ming System, Princip	les of Object Oriented 1	Programming		
Differences betwe	en C , C++ and Java,	Console I/O, variables	and reference		
variables, Functio	n Prototyping, Function	on Overloading. Class	and Objects:	08	
Introduction, member functions and data, objects and functions.					
	Ν	Alodule II			
Introduction to J	ava: Bytecode, Feature	es of Java, Java Applicati	ions, Building		
and Running Java	a Program, Java Toker	ns, Data Types, Variable	es, Operators,		
Classes: Classes f	und Casting, Allays, Au	g objects. Constructors.	this keyword.	08	
garbage collection		8 - J,	j,		
	N	Iodule III			
Inheritance & E	Exception Handling:	Inheritance: inheritance	basics, using	08	
super, creating mu	super, creating multi level hierarchy, method overriding. Exception Handling:				
Exception handling in Java.					
Packages & Interfac	Packages & Interfaces: Defining and Implementing Interfaces. Nested Interfaces				
Tackages, incritaces. Defining and implementing incritaces, ivested incritaces.					
Iviouule-LV Multi Threaded Programming: Multi Threaded Programming: What are threaded How					
to make the classes threadable ; Extending threads; Implementing runnable;					
ynchronization; Changing state of the thread; Bounded buffer problems, producer 08					
consumer problems.					
classes; Sources of events; Event listener interfaces; Using the delegation event model;					
	Module-V				

Applets:Applet basics, Applet Skeleton, Simple Applet Display Methods, Repaint
method, Simple Banner Applet, HTML Applet Tag, Passing Parameters to Applet, get
Document Base and get Code Base methods, Applet Context Interface.Java Input/Output:Stream classes, Byte Streams, Input Stream, Output Stream, File08Input Stream, File Output Stream, Print Stream, Data Input Stream, Data Output Stream

Course Outcomes (COs):

CO1	Use the concepts of object-oriented programming.
CO2	Demonstrate the ability to develop Java applications for a variety of use cases.
CO3	Apply the concepts of inheritance and exceptions for solving in real world problems
CO4	Illustrates the concepts of Multi Threaded Programming and event handling
CO5	Use the concepts of Applet to create Simple web applications.

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.

Marks scored by the student shall be proportionally scaled down to 50 Marks.

Text Books:

- Sourav Sahay, Object Oriented Programming with C++, 2nd Ed, Oxford University Press, New Delhi, 2012.
- 2. Herbert Schildt, Java the Complete Reference, 7th Edition, Tata McGraw Hill, 2007.

Reference Books:

- 1. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN:9788131720806.
- 2. Rajkumar Buyya,SThamarasiselvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.
- 3. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.
- 4. Anita Seth and B L Juneja, JAVA One step Ahead, Oxford University Press, 2017.

E-books and Online course materials/videos:

- <u>https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/</u>.
 - <u>https://freecomputerbooks.com/OOP-Learn-Object-Oriented-Thinking-and-Programming.html</u>
 - https://freecomputerbooks.com/javaBasicBooks.html
- https://archive.nptel.ac.in/courses/106/105/106105191/

DATA STRUCTURES AND APLICATIONS LAB				
[As per Choice Based Credit System (CBCS)scheme]				
(Effective from the academic year 2023-2024) SEMESTER – III				
Coui	rse Code	22CSL36	CIE Marks	50
Num	ber of Contact Hours/Week	02	SEE Marks	50
lota	I Number of Lab Contact Hours	50 Cradits 01	Exam Hours	03
Cou	rse Objectives:	Cicuits - 01		
1	. To demonstrate Dynamic memor	y managemen	nt.	
2	. To design and implement various	s linear data s	tructures.	
3	. To solve various real-world prob	lems using No	on-Linear data struct	ures.
4	. To apply hashing technique for g	iven problem		
Desc	riptions :			
•	Implement all the programs in "C	C "Programm	ning Language and L	inux OS.
Prog	rams List:	C	0 0 0	
1	Develop a Program in C for the fol	lowing:		
	a) Declare a calendar as an a	rray of 7 eler	nents (A dynamical	ly Created array) to
	represent 7 days of a wee	k. Each Eler	nent of the array is	a structure having
	three fields. The first field	l is the name	e of the Day (A dy	namically allocated
	String). The second field is	the date of t	he Day (A integer).	the third field is the
	description of the activity f	or a particula	r dav (A dvnamicall	v allocated String).
	b) Write functions create(), re	ad() and disp	lav(): to create the c	calendar, to read the
	data from the keyboard and	to print wee	ks activity details re	port on screen.
	Develop a Program in C for the f		ntions on Strings	r
2	Bead a main String (STP)	a Pattern Str	ing (PAT) and a Rev	lace String (REP)
	a. Read a main String (STR)	, a l'allerii Su Operation: E	ing (IAI) and a Rep	Diace String (KEI)
	b. Ferform Pattern Matching	Operation: r	Den ent suitable un	
	doog not ovist in STD	exists in STR	. Report suitable me	essages in case PAT
	Goes not exist in STR	ma for each a	f the charge emeration	ng Don't use Duilt
	in functions	ons for each o	i the above operatio	ons. Don't use Built-
3	Develop a many driven Broanen	n C fan tha fa	11 arrin a an anation a	TACK of
5	Late game (A max Jum lane entation of	$n \in 1$ or the 10	nowing operations c	STACK 01
	Integers (Array Implementation of	of Stack with I	maximum size MAZ	x)
	a. I ush an Element from Stac	CK Iz		
	b. Pop an Element from Stack			
	c. Demonstrate now Stack ca			
	d. Demonstrate Overflow and Underflow situations on Stack			
e. Display the status of Stack				
-	Support the program with appropriate functions for each of the above operations			
4	Develop a Program in C for conv	erting an Infix	Expression to Post	tix Expression.
Program should support for both parenthesized and free parenthesized				
	expressions with the operators: +, -, *, /, % (Remainder), $^{(Power)}$ and alphanumeric			
	operands.			

12	Given a File of N employee records with a set K of Keys (4-digit) which uniquely
	determine the records in file F. Assume that file F is maintained in memory by a Hash
	Table (HT) of m memory locations with L as the set of memory addresses (2-digit) of
	locations in HT. Let the keys in K and addresses in L are Integers. Develop a Program in C
	that uses Hash function H:
	$K \rightarrow L$ as H(K)=K mod m (remainder method), and implement hashing
	technique to map a given key K to the address space L. Resolve the collision (if any) using
	linear probing

CO1	Demonstrate theoretical concepts of Arrays, Queues, stack, Linked list, graphs & trees data structures through series of experiments.
CO2	Implement various data structures using C/C++
CO3	Debug syntactical errors, and troubleshoot the problems issues effectively
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized Data Structures laboratory report.

Conduct of Practical Examination:

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero

- of the changed part only.
- Marks Distribution

OPERATING SYSTEM LAB [As per Choice Based Credit System (CBCS)scheme]							
(Effective from the academic year 2023 -2024) SEMESTER – III							
Сог	Course Code22CSL37CIE Marks50						
Nu Ho	Number of Lecture Hours/Week02SEE Marks50						
Tot Ho	Total Number of Lecture Hours30Exam Hours03						
Car	una Obiastivas	CREDIT	S-01				
	urse Objectives:						
1	. To Understand the nee	ed of system calls a	nd CPU Scheduling	in OS			
2	. To Identify the suitabl	e techniques for pro	cess synchronization	n problem.			
3	. To Understand the var	ious techniques for	deadlock handling.				
4	. To demonstrate the ne	ed of Page Replace	nent and disc sched	uling algorithms.			
Progr	ams List						
		PART	·-A				
	1						
1.	Develop a c program to implement the Process system calls (fork (), exec (), wait (), create process, terminate process)						
2.	 Simulate the following CPU scheduling algorithms to find turnaround time and waiting time a) FCFS b) SJF c) Round Robin d) Priority. 						
3.	Develop a C program to simulate Dining Philosophers problem using semaphores.						
4.	4. Develop a C program which demonstrates inter process communication between a reader process and a writer process. Use mkfifo, open, read, write and close APIs in your program.						
5. Develop a C program to simulate Bankers Algorithm for DeadLock Avoidance.							
 6. Develop a C program to simulate the following contiguous memory allocation Techniques: a) Worst fit b) Best fit c) First fit. 							
7.	7. Develop a C program to simulate page replacement algorithms: a) FIFO b) LRU						
8. Simulate following File Organization Techniques							
a) Single level directory b) Two level directory							
9.	9. Develop a C program to simulate the Linked file allocation strategies.						
10.	10. Develop a C program to simulate SCAN disk scheduling algorithm						

CO1	Demonstrate theoretical concepts of design and implementation of operating system through a series of experiments
CO2	Develop a program for Scheduling, Page replacement & system calls
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well organized laboratory report

Conduct of Practical Examination:

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Obje [As per 0 (Effe	ct Oriented Program Choice Based Credit S ctive from the academ	ming with Java Lab System (CBCS)scheme] nic year 2023 -2024)	
	SEMESTE	R–III	
Course Code	22CSL38	CIE Marks	50
Number of Lecture Hours /Week	02	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	03
CREDITS-01			

Course Objectives: This course will enable students to:

- 1. Learn basics of JAVA programs and its execution.
- 2. Understand the principles of Object oriented programming.
- 3. Understand the concept of exception handling mechanism.
- 4. Grasp the fundamentals of multithreading and concurrency in Java, which allows for the execution of multiple tasks simultaneously.
- 5. Understand life cycle of the applets and its functionality.

Implement the following problem statements using Java in Windows/Linux operating system.

Programs list

- 1. (a) Write a Java program to implement class mechanism and create object to access the members of class.
 - (b) Write a Java program to implement shift operators.
- 2. (a) Write a Java program to illustrate Type Casting of the data type and type conversion.
 - (b) Write a Java program to iterate over Arrays using for Each loop to compute average of n natural numbers using Scanner class.
- 3. (a) Write a program in Java to demonstrate method overloading using iterative statements.
 - (b) Write a program in Java to demonstrate constructor overloading using this keyword.
- 4. (a) Write a program in Java that implements multi-level inheritance.(b) Write a Java program to implement method overriding that shows use of super keyword.
- 5. (a) Write a Java program to illustrate Dynamic Method Dispatch using hierarchical inheritance.(b) Write a Java program for abstract class to find areas of different shapes.
- 6. Write a Java program that implements interface using extends keyword.
- 7. (a) Write a Java program that illustrates Exception handling mechanisms.

(b) Write a Java program to illustrates break and continue statements.

- 8.Write a Java program that creates threads by extending Thread class.
 - (a) First thread display "Good Morning "every 1 sec,
 - (b) Second thread displays "Hello "every 2 seconds
 - (c) Third display "Welcome" every 3 seconds.
- 9. Write a Java program for Producer and Consumer Problem using Threads.
- **10**. (a) Develop an applet that displays a simple message.
 - (b) Write a Java program to create a Banner using Applet.

CO1	Demonstrate theoretical concepts of constructor, inheritance, threads, Exception Handling and Applets through series of experiments.
CO2	Develop a program using basic programming constructs and standard libraries.
CO3	Apply advanced debugging techniques and utilize integrated development environment (IDEs) to efficiently identify, diagnose, and resolve software issues in java applications.
CO4	Employ advanced data analysis technique and utilize java libraries to process, analyze and interpret data effectively.
CO5	Develop comprehensive and well-structured laboratory reports.

Conduct of Practical Examination:

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero

of the changed part only.

Marks Distribution

PROJECT-III [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024) SEMESTER – III			
Course Code	22PRJ39	CIE Marks	50
Number of Lecture Hours/Week	02	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	03
CREDITS – 01			
Course Objectives: This course will enable students			
• Identify real-world problems across programming, domains and understand their business			
and technical implications.			
• Undetrstand systematic methodologies to design, implement, and optimize solutions.			
• Resolve technical challenges through debugging, research, and collaboration.			
• Take responsibility for specific roles in a team and collaborate effectively to achieve			
project goals.			
• Present project progress and findings clearly and confidently to both technical and non-			
technical audiences.			
Document the entire project in a structured, professional laboratory report.			
Project Guidelines:			
Project work sha	all preferably be batch	wise.	

- Evaluation is based on concept clarity, system design, implementation, testing, presentation, and documentation quality, with a focus on proper coding standards, teamwork, and effective communication.
- Viva-voce examination in project work shall be conducted batch-wise.
- Minimum requirement of CIE marks for Project work shall be 50% of the maximum marks.
- Students failing to secure a minimum of 50% of the CIE marks in Project work shall not be eligible for the SEE Project examination.
- For a pass in a Project/Viva-voce examination, a student shall secure a minimum of 40% of the maximum marks prescribed.

CO1	Identify the topic from various domains (example programming databases,
	networking) to real world problems.
CO2	Develop methodology for the problem.
CO3	Resolve issues that arise during the project.
CO4	Learn to assign and accept roles and responsibilities within a team and write a good technical reports.
CO5	Exhibit skills in presenting their project findings & progress orally

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023- 2024) SEMESTER III Course Code 22HSM310A CIEMarks 50 Number ofLecture Hours/Week 01 SEEMarks 50 TotalNumberof LectureHours 20 ExamHours 03 CREDITS - 01 Course Objectives: 1. Enhance learners" soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. 3. Preparing the qualities that are important in the competitive era. It is a comparison of the state of t	SC	OFT SKILLS AND PE	ERSONALITY DEVELOPMENT		
SEMESTER III Course Code 22HSM310A CIEMarks 50 Number of Lecture Hours/Week 01 SEEMarks 50 TotalNumberof LectureHours 20 ExamHours 03 CREDITS – 01 Course Objectives: 1. Enhance learners" soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.		[As per Choice Based	Credit System (CBCS) scheme]		
Course Code 22HSM310A CIEMarks 50 Number ofLecture Hours/Week 01 SEEMarks 50 TotalNumberof LectureHours 20 ExamHours 03 CREDITS – 01 Course Objectives: 1. Enhance learners" soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.		(Effective from the	MESTER III		
Number of Lecture Hours/Week01SEEMarks50TotalNumberof LectureHours20ExamHours03CREDITS – 01Course Objectives:1. Enhance learners'' soft skills by giving adequate exposure in the related subskills.2. To acquaint the learners with moral values and its necessity.3. Preparing the qualities that are important in the competitive era.	Course Code	22HSM310A	CIEMarks	50	
Hours/Week of SEleviands TotalNumberof LectureHours 20 ExamHours 03 CREDITS – 01 Course Objectives: 1. Enhance learners'' soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.	Number ofLecture	01	SFFMarks	50	
TotalNumberof LectureHours 20 ExamHours 03 CREDITS – 01 Course Objectives: 1. Enhance learners" soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.	Hours/Week	01			
LectureHours CREDITS – 01 Course Objectives: 1. Enhance learners ^{**} soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.	TotalNumberof	20	ExamHours	03	
CREDITS – 01 Course Objectives: 1. Enhance learners" soft skills by giving adequate exposure in the related subskills. 2. To acquaint the learners with moral values and its necessity. 3. Preparing the qualities that are important in the competitive era.	LectureHours				
 Enhance learners" soft skills by giving adequate exposure in the related subskills. To acquaint the learners with moral values and its necessity. Preparing the qualities that are important in the competitive era. 	Course Objectives:		CREDITS-01		
 Enhance learners" soft skills by giving adequate exposure in the related subskills. To acquaint the learners with moral values and its necessity. Preparing the qualities that are important in the competitive era. 	Course Objectives.				
 To acquaint the learners with moral values and its necessity. Preparing the qualities that are important in the competitive era. 	1. Enhance learners	s" soft skills by giving a	adequate exposure in the related sub	oskills.	
3. Preparing the qualities that are important in the competitive era.	2. To acquaint the	learners with moral valu	ues and its necessity.		
	3. Preparing the qu	alities that are importar	nt in the competitive era.		
Module I Hours		Modu	ıle I		Hours
Introduction to Soft Skills and Hard Skills Personality Development: Knowing	Introduction to Soft S	Skills and Hard Skills	Personality Development: Known	ng	04
Communication. Physical Fitness	Communication. Physi	ical Fitness	v, Communication Skins, Non-vero	'al	04
Emotional Intelligence : Meaning and Definition, Need for Emotional Intelligence,	Emotional Intelligenc	e: Meaning and Defini	tion, Need for Emotional Intelligen	ice,	
Intelligence Quotient versus Emotional Intelligence Quotient, Components of Emotional	Intelligence Quotient v	ersus Emotional Intelli	gence Quotient, Components of Em	notional	
Intelligence	Intelligence	ieres of Emotional me	ingence, skins to bevelop Emotion	lai	
Module II		Modu	le II	I	
Academia Skills Employment Communication, Introduction, Desume, Curriculum	Acadomia Skilla Em	nlovmont Communia	ation. Introduction Degume Cu		
Vitae Scannable Resume Developing an Impressive Resume Formats of Resume Job	Vitae Scannable Resu	me Developing an Im	pressive Resume Formats of Resu	inculuii ime Iob	
Application or Cover Letter Professional Presentation: Nature of Oral Presentation.	Application or Cover	Letter Professional P	Presentation: Nature of Oral Prese	entation.	04
Planning a Presentation, Preparing the Presentation, Delivering the Presentation Job	Planning a Presentation	on, Preparing the Pres	sentation, Delivering the Presentat	tion Job	
Interviews: Introduction, Importance of Resume, Definition of Interview, Background	Interviews: Introduction	on, Importance of Resu	ume, Definition of Interview, Back	kground	
Information, Types of Interviews, Preparatory Steps for Job Interviews,	Information, Types	of Interviews, Pre-	eparatory Steps for Job Inte	erviews,	
InterviewSkillTips,ChangesintheInterviewProcess,FAQDuringInterviews	InterviewSkillTips,Cha	angesintheInterviewProc	cess,FAQDuringInterviews		
Grou				Grou	
p Discussion: Introduction, Ambience/Seating Arrangement for Group Discussion,	p Discussion: Introdu	action, Ambience/Seat	ang Arrangement for Group Dis	cussion,	
Discussion and Debate Types of Group Discussions, topic based and Case based	Discussion and Deba	te Types of Group I	ence derween Group Discussion	i, Panel	
Group	Group	ie, Types of Gloup I	Jiseussions, topic based and Cas	e based	
Discussion, Individual Traits.	Discussion, Individual	Traits.			

Module III	
Communication Skills: Art of Listening-Art of Speaking-Art of Reading-Art of	04
Writing-Art of Writing E-mails: Email etiquette	
Professional Skills Creativity at Workplace: Introduction, Current Workplaces,	
Creativity, Motivation, Nurturing Hobbies at Work, The Six Thinking Hat Method Ethical	
Values: Ethics and Society, Theories of Ethics, Correlation between Values and Behavior,	
Nurturing Ethics, Importance of Work Ethics, Problems in the Absence of Work Ethics.	
Module IV	
Capacity Building: Learn, Unlearn and Relearn: Capacity Building, Elements of Capacity	0.4
Building, Zones of Learning, Ideas for Learning, Strategies for Capacity Building.	04
Corporate Skills : Working with others- Developing a proper body language-behavioral	
etiquettes and mannerism- Time Management –Stress Management.	
Module V	
Leadership and Team Building: Leader and Leadership, Leadership Traits, Culture and	0.4
Leadership, Leadership Styles and Trends , Team Building, Types of Teams, Decision	04
Making and Negotiation: Introduction to Decision Making, Steps for Decision Making,	
Decision Making Techniques, Negotiation Fundamentals, Negotiation Styles, Major	
Negotiation Concepts	
Job-hunting skills: Writing Resume/CV- Interview skills -Group discussion -Mock	
interview Mock GD-Goal Setting-Career Planning.	

CO1	Analyze and develop self-awareness and emotional intelligence skills.
CO2	Create and present impressive resumes, cover letters, and effectively prepare for job
	interviews and group discussions.
CO3	Implement effective communication skills, creativity, and ethical values in
	professional settings.
CO4	Design strategies for capacity building, time management, and stress management in
	corporate environments.
CO5	Optimize leadership and team-building skills and refine job-hunting techniques including
	resume writing and interview skills.

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub- questions), should have a mix of topics under that module.

The students have to answer 5 full questions, selecting one full question from each module. Marks scored by the student shall be proportionally scaled down to 50 Marks.

TextBooks:

1.Soft Skills: an Integrated Approach to Maximize Personality, Gajendra S. Chauhan, Sangeeta Sharma, Wiley India.

ReferenceBooks:

- 1. Personality Development and Soft Skills, Barun K. Mitra, Oxford Press
- 2. Business Communication, Shalini Kalia, Shailja Agrawal, Wiley India
- 3. Soft Skills- Enhancing Employability, M. S. Rao, I. K. International

Cornerstone: Developing Soft Skills, Sherfield, Pearson India

Online Courses and Video Lectures

1.Development by Vikas Divyakirti" || Drishti IAS || - YouTube

2.<u>https://onlinecourses.nptel.ac.in/noc19_hs32/previe w (</u>5967) How to Set Your Goal | Goal Setting in Your Life | Life Motivational Tips | Sonu Sharma - YouTube

Unix and Shell programming [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – III

Course Code	22AEC311A	CIE Marks	50
Teaching Hours/Week	02	SEE Marks	50
Total no .of lecture hours	30	Exam Hours	03
	CREDITS -01		

Course Objectives:

- 1. To mention the features of Unix
- 2. To understand the basic concepts of UNIX Architecture and basic Commands
- 3. To understand different types of Files, File system and basic file system commands.
- 4. To understand the concepts related to basic scripting language

Explore Unix

Introduction: operating System, objective, History, Features of UNIX, Kernel and Shell.

Unix File System: File and Common Commands, Shell, more about files, Directories, UNIX system, Basics of file directories.

Unix commands with syntax: Syntax and Unix commands,

Unix shells: History of Unix shells, Shell Command files, Shell programming on files .

Programs List

1	Basic	Commands
	a.	Use the ls command to list files in your home directory.
	b.	Use the pwd command to print the current working directory.
	c.	Use the cd command to navigate to different directories.
	d.	Use the mkdir command to create a new directory.
	e.	Use the touch command to create an empty file.
2	File M	Ianipulation
	a.	Create a file named "mytext.txt" and add some text to it using a text editor.
	b.	Use the cp command to make a copy of "mytext.txt" with a different name.
	c.	Use the mv command to rename the copied file.
	d.	Use the rm command to delete a file.
	e.	Use the cat command to display the contents of a file.
3	Text l	Processing
	а.	Use the echo command to print a message to the terminal.
	b.	Use the grep command to search for a specific word in a file.
	с.	Use the wc command to count the number of lines, words, and characters in a file.
	d.	Use the sort command to sort the lines of a file.
	e.	Use the head and tail commands to display the first and last few lines of a file.

4	Permissions
	a Use the Is -I command to view the permissions of files in a directory
	b. Use the chmod command to change the permissions of a file
	Use the chown command to change the owner of a file.
5	Variables
	a. Assign a value to a variable and use echo to display its content.
	b. Combine variables and text in a echo statement.
	c. Experiment with different types of quotes (single, double) and understand their effects on
	variable interpolation.
6	Scripting Basics
	a Write a simple script that prints a greeting message
	b Declare variables in a script and display their values
	c. Use user input in a script to personalize the output.
7	Control Structures
-	
	a. Write a script that uses an if statement to check if a number is positive or negative.
	b. Use a for loop to print numbers from 1 to 5.
	c. Implement a while loop that counts down from 3 to 1
8	Command Substitution
	a. Use command substitution to capture the output of a command and assign it to a variable.
	b. Incorporate command substitution into a script to dynamically obtain information.
9	Job Control
	a. Use the ns command to list running processes.
	b. Use the kill command to terminate a specific process.
10	Environment Variables
	a. Display the values of environment variables such as HOME. PATH, and USER.
	b. Experiment with modifying the value of an environment variable.

CO1	Utilize Basic UNIX commands effectively.
CO2	Write effective scripts using software tools
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

Conduct of Practical Examination:

- Experiment distribution
 - a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
 - b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Data Analytics with Excel						
[As per Choice Based Credit System(CBCS)scheme]						
(Effective from the academic year 2023-2024)						
		SEMESTER-III				
Cours	se Code	22AEC311B		CIE Marks	50	
Teach	ing Hours/Week	02		SEE Marks	50	
Total	No of teaching hours	30 CDEDITS A1		Exam Hours	03	
Cours	se Objectives.	CKEDI15-01				
1	To Apply analysis techniqu	ies to datasets in Excel				
1.	Learn how to use Pivot Tab	les and Pivot Charts to strea	mline vour wor	kflow in Excel		
3.	Understand and Identify the	e principles of data analysis	initia jour wor			
4.	Become adept at using Exc	el functions and techniques	for analysis			
5.	Build presentation ready da	shboards in Excel	·			
Drogra	me List					
rrogra						
1	Getting Started with Exce	I: Creation of spread sheets,	Insertion of row	vs and columns,	Drag&	
	Fill, use of Aggregate function	ons.			_	
2	Working with Data: Impor	rting data, Data Entry & Mai	nipulation, Sorti	ng & Filtering.		
3	Working with Data: Data	Validation, Pivot Tables & F	vivot Charts.			
4	Data Analysis Process: Conditional Formatting, What-If Analysis, Data Tables,					
	Charts & Graphs					
5						
	Cleaning Data with Text Functions: use of UPPER and LOWER, TRIM function,					
6	Concatenate.	Data and Time Values w		LIE for stion		
0	Cleaning Data Containing Date and Time values: use of DATEVALUE function,					
	DATEADD and DATEDIF	, HMEVALUE functions.		11.		
/	Conditional Formatting: 1	formatting, parsing, and high	hlighting data in	n spreadsheets		
	during data anarysis.					
8	Working with Multiple Sh	eets: work with multiple she	ets within a wo	orkbook is crucia	al	
	for organizing and managing data norform complay calculations and arrate conversions					
	for organizing and managing data, perform complex calculations and create comprehensive					
0				· D (DD) 7	г 11 [.]	
9	Allowerse(TA)	Ionowing Helds: Empro	o, Ename, Bas	$BIC Pay(BP), \Box$	ravelling	
Allowance(IA), Dearness Allowance(DA), House Kent Allowance(HKA), Income Tax(II), Drovident Eurod(DE), Not Day(ND), Use any complete formulas to calculate the allowance						
Provident Fund(PF), Net Pay(NP). Use appropriate formulas to calculate the above scenario.						
Analyse the data using appropriate chart and report the data.						
10	Dreate worksneet on Inv	MDD Coast - for 0/ 0 1	et snould conta	un Product cod	ie,	
	Productname, Product type	, MIKP, Cost after % of di	scount, Date of	i purchase. Use	eta alterra	
	appropriate formulas to calc	culate the above scenario. A	naryse the data	using appropria	ale chart	
	and report the data.					

CO1	Learn basic Excel functions to create, manage, and organize data in spreadsheets.
CO2	Design and develop basic programs to solve problems using appropriate logic and tools.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

Conduct of Practical Examination:

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

MATHEMATICS FOR CSS-IV [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – IV				
Course Code	22MATS41	CIE Marks	50	
Number of Lecture Hours/Week	03	SEE Marks	50	
Total Number of Lecture Hours	40	Exam Hours	03	
	CRED	<u>PITS - 03</u>		
 Understand the Able to Binary Understand the science in comp Understand the 	concept of Programming. tree concept in data stru concept of joint probability uter Engineering. concept of errors and Hypo	cture. v distribution and stochastic pothesis.	processes rising in	
Develop the know	wledge of complex variab	le and discuss various proper	ties of it.	
	Mo	dule I		Hours
Introduction of modular arithmetic and its applications in Computer Science and Engineering: Introduction to Congruences, Linear Congruences, The Chinese Remainder theorem, Solving Polynomials, Linear Diophantine Equation, System of Linear Congruences, Euler's Theorem, Wilson Theorem and Fermat's little theorem. Applications of Congruences-RSA algorithm.				08
Module II				
Definitions, Properties of trees and Examples, Routed trees, Weighted Trees and Prefix Codes.				
Self-Study: Sorting technique				08
	Mod	ule III		
Joint probability distribution: Joint Probability distribution for two discrete random variables, expectation, covariance, correlation coefficient. Stochastic process: Stochastic processes, probability vector, stochastic matrices, fixed points, regular stochastic matrices, Markov chains, higher transition probability-Simple problems. Applications of Joint probability distribution				08
Module IV				
 Sampling theory: Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, Type I and Type II errors, Level of significance, confidence limits for means, one tailed and two tailed tests, student's t-distribution, Chi - square distribution as a test of goodness of fit. Tracing of curves: Cartesian form - Strophoid, Leminscate, Parametric form - Cycloid, Astroid, 				08
Polarform- Cardioid, Leminscate. Self-Study: Types of samplings, Cartesian equations and their geometrical representation Applications of Sampling theory and curve tracing Module V				

Complex line Integrals: Cauchy's Integration theorem, Cauchy integral formula,	08
Laurent's Series, types of singularities. Residue, Poles, Cauchy's Residue theorem	
(without proof) and Problems.	
Transformations: Bilinear transformations and problems.	
Self-Study: Initial value and boundary value problems	

CO1	Apply the knowledge of Modular Arithmetic to understand RSA Algorithm.
CO2	Understand the models using advanced concepts of graphs in the real world applications
CO3	Learn to solve the problems on Joint probability distribution and stochastic processes and studying the examples on Markov's chains in discrete time
CO4	Understanding the Sampling Distribution to find the standard error for testing of hypothesis and learn to trace the Curve.
CO5	Learn Cauchys Integration theorem Residue to solve problems in engineering field

Question paper pattern:

- The question paper will have ten questions each question is set for 20 marks.
- There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored by the student shall be proportionally scaled down to 50 Marks.

Text Books:

- 1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
- 2. E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10thEd., 2018.

Reference Books:

- 1. V. Ramana: "Higher Engineering Mathematics" Mc Graw-Hill Education, 11th Ed., 2017
- 2. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press, 3rd E d., 2016.
- 3. **N.P. Bali and Manish Goyal:** "A text book of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
- 4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" Mc Graw–Hill Book Co., Newyork, 6th Ed., 2017.
- 5. Gupta C. B, Sing S. R and Mukesh Kumar: "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
- 6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
- 7. James Stewart: "Calculus" Cengage Publications, 7th Ed., 2019.
- 8. David CLay: "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
- 9. Gareth Williams: "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Course Outcomes (COs):

CO1 Apply the knowledge of Modular Arithmetic to understand RSA Algorithm

CO2 Able to code the messages

CO3 Learn to solve the problems on Joint probability distribution fortwo discrete random variables. Knowing the concept of stochastic processes, probability vector, Probability matrix and studying the examples on Markov''s chains in discrete time.

CO4 Able to Analyze the errors and Hypothesis

CO5 Able to solve complex Integration Problems

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

Text Books:

- 1 **B.S. Grewal**: "Higher Engineering Mathematics ", Khanna publishers, 44th Ed., 2021.
- 2.E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10thEd., 2018

Reference Books:

- 1. V.Ramana:"Higher Engineering Mathematics "McGraw-Hill Education, 11th Ed., 2017
- 2. Srimanta Pal & SubodhC.Bhunia: "Engineering Mathematics "Oxford University Press,3rdEd., 2016.
- 3. **N.PBali and Manish Goyal:** "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
- 4. **C.RayWylie,LouisC.Barrett:** "Advanced Engineering Mathematics "McGraw–Hill BookCo., Newyork, 6thEd., 2017.
- 5. **GuptaC.B,SingS.RandMukeshKumar:**"Engineering Mathematic for Semester I and II ",Mc-Graw Hill Education(India)Pvt.Ltd 2015.
- 6. **H.K.Dass and Er.RajnishVerma:** "Higher Engineering Mathematics "S.Chand Publication,3rdEd.,2014.
- 7. James Stewart: "Calculus" CengagePublications, 7thEd., 2019.
- David CLay: "Linear Algebra and its Applications ",Pearson Publishers,4th Ed.,2018. Gareth Williams: "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6thEd., 2017

ANALYSIS AND DESIGN OF ALGORITHMS						
[As per Choice Based Credit System(CBCS)scheme]						
(Effective from the academic year 2023-2024)						
Course Code	22CS42	CIE Marks	50			
Number of Lecture Hours/Week	03	SEE Marks	50			
Total Number of Lecture Hours	40	Exam Hours	03			
	C	REDITS - 03				
Course Objectives:	This course will enable st	udents to				
• Expla	in various computational	problem-solving techniqu	les.			
Apply Decent	y appropriate method to so	olve a given problem.				
• Desci	ribe various methods of al	gorithm analysis.		TT		
		Module I		Hours		
Introduction: What is Algorithm? Notation of Algorithm, Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω) , Theta notation (Θ) with examples, Mathematical analysis of non-Recursive and recursive Algorithms with Examples. Brute force design technique: Selection Sort, Bubble Sort, Sequential Search and Brute Force String Matching. Advantages and Disadvantages of Brute force design.				08		
Module II						
Divide and Conquer: General method, Recurrence equation for divide and conquer, solving it using Master's theorem, Merge sort, Quick sort, Binary search, Strassen's matrix multiplication, Advantages and Disadvantages of divide and conquer. Decrease and Conquer Approach: Introduction Insertion Sort, Depth-First Search and Breadth-First Search, Topological Sorting						
Module III						
Space-Time Tradeof	fs: Introduction, Sorting l	by Counting, Input Enhar	ncement in String			
Matching Harspool"s	algorithm Dynamic Prog	gramming: Transitive C	Closure: Warshall"s			
Algorithm. All Pairs S	ShortestPaths: Flovd's Alg	orithm. Transform and	Conquer Approach:			
Introduction. Heaps ar	nd Heap Sort.	,,		08		
	<u></u>	Module IV				
Greedy Method: Mi	nimum cost spanning t	rees: Prim"s Algorithm.	Kruskal"s Algorithmwith			
performance analysis. Single source shortest naths: Diikstra's Algorithm Ontimal Tree						
problem: Huffman Ti	problem: Huffman Trees and Codes. Backtracking: General method, N-Queens problem					
Module V						
Backtracking: Sum o	Backtracking: Sum of subsets problem. Hamiltonian cycles					
Branch and Bound: Assignment Problem, Travelling Sales Person problem, 0/1 Knapsackproblem						
NP-Complete and NP-Hard problems: P, NP, NP-Complete and NP-Hard classes						

CO1	Analyze the asymptotic performance of both recursive and non-recursive algorithms and implement brute force design techniques
CO2	Apply divide and conquer and decrease and conquer strategies to develop efficient solutions for various algorithmic problems.
CO3	Utilize space-time tradeoff techniques, implement Dynamic Programming algorithms, and apply the Transform and Conquer approach to optimize problem- solving.
CO4	Evaluate the performance of greedy algorithms and use backtracking technique to solve N-Queens problem.
CO5	Develop efficient solutions to combinatorial problems using backtracking and branch and bound techniques.

Text Books:

1.Introduction to the Design and Analysis of Algorithms, Anany Levitin:, 2nd Edition, 2009.Pearson.

2.Computer Algorithms/C++, Ellis Horowitz, Satraj Sahni and Rajasekaran, 2nd Edition, 2014, Universities Press/

Reference Books:

1.Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, CliffordStein, 3rd Edition, PHI.

2. Design and Analysis of Algorithms, S. Sridhar, Oxford (Higher Education).

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

DATABASE MANAGEMENT SYSTEM [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024)

SEMESTER – IV					
Course Code	22CS43	CIE Marks	50		
Number of Lecture Hours/Week	03	SEE Marks	50		
Total Number of Lecture Hours 40 Exam Hours 03					
CREDI	TS – 03				
Course Objectives: This course will enable student	ts to:				
 Provide a strong foundation in database conc Practice SQL programming through a variet Demonstrate the use of concurrency and tran Design and build database applications for re Module I 	cepts, techno y of database asactions in eal world pr	ology, and practic e problems. database oblems.	e.	Hours	
Introduction to Databases: Introduction, Character of using the DBMS approach, History of database ap Overview of Database Languages and Archite Instances. Three schema architecture and data ir interfaces, The Database System environment.D Relationships: Entity types, Entity sets, attributes, entity types, ER diagrams, Examples.	istics of dataplications. ectures: Dataple adependence oata Mode roles, and	abase approach, ata Models, Scl ata Models, Scl e, database lang lling using Er structural constra	Advantages nemas, and uages, and ntities and aints, Weak	08	
Module I	Ι				
Relational Model : Relational Model Concepts, Rela database schemas, Update operations, transact violations. Relational Algebra : Unary and Binary re operations(aggregate, grouping, etc.) Examples of Conceptual Design into a Logical Design: Rela Relational mapping.	ational Mod tions, and lational ope Queries in r ational Data	el Constraints an dealing with rations, additions elational algebra abase Design us	d relational constraint al relational . Mapping iing ER-to-	08	
Modu	ıle III				
SQL : SQL data definition and data types, specifying SQL, INSERT, DELETE, and UPDATE statement Advances Queries : More complex SQL retriev assertionsand action triggers, Views in SQL, Schen Application Development : Accessing databases JDBC, JDBC classes and interfaces, SQLJ, Stored Bookshop.	s constraints s in SQL, A ral queries, na change s from applic l procedures	in SQL, retrieva Additional featur Specifying con tatements in SQI eations, An intro s, Case study: T	Il queries in es of SQL. Instraints as L. Database oduction to The internet	08	
Modu	ıle IV				
Normalization: Database Design Theory – Introdu and Multivalued Dependencies: Informal design gu Dependencies, Normal Forms based on Primary K Boyce-Codd Normal Form, Multivalued Depe JoinDependencies and Fifth Normal Form. Examp Algorithms: Inference Rules, Equivalence, and M Decompositions, Algorithms for Relational Datab tuples, and alternate Relational Designs, Further and 4NF, Other dependencies and Normal Forms	ction to No idelines for eys, Second ndency an ples on nor inimal Cov base Schem discussion	rmalization using relation schema, l and Third Nor d Fourth Nor mal forms. Nor er, Properties of a Design, Nulls ofMultivaluedde	gFunctional Functional mal Forms, mal Form, malization Relational s, Dangling ependencies	08	
Mod	ule V				

Transaction Processing: Introduction to Transaction Processing, Transaction and System	
concepts, Desirable properties of Transactions , Characterizing schedules based on	
recoverability, Characterizing schedules based on Serializability,	08
Transaction support in SQL.	
Concurrency Control in Databases: Two-phase locking techniques for Concurrency	
control, Concurrency control based on Timestamp ordering, Multiversion Concurrency	
control techniques, Validation Concurrency control techniques, Granularity of Data items	
and MultipleGranularity Locking.	

CO1	Design conceptual entity relationship diagrams for the real world applications.
CO2	Apply knowledge of relational databases to solve practical problems,
CO3	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation.
CO4	Implement normalization algorithms using database design theory for different applications
CO5	Analyze and implement transaction processing, concurrency control and database recovery protocols in databases.

Text Books:

- 1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe,7th Edition,2017, Pearson.
- 2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill

Reference Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan"s Database System Concepts 6th Edition Tata Mcgraw Hill Education Private Limited

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

PYTHON APPLICATION PROGRAMMING [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – IV

Course Code	22CS44	CIE Marks	50	
Number Lecture Hour/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
	CRED	ITS-03		
Course Objectives:				
• Learn the syntax and semanti	ics of Python pro	ogramming language.		
• Illustrate the process of struct	turing the data u	sing lists, tuples and	dictionaries.	
• Demonstrate the use of built-	in functions to r	navigate the file system	m.	
• Implement the Object-Orient	ed Programming	g concepts in Python.		
• Discuss the concepts of Num	Py, Pandas and	Data Visualization.		
	Module I			Hours
Python Basics: Entering Expression	ons into the Int	eractive Shell, The I	nteger, Floating-	
Point, and String Data Types, Strin	ng Concatenatio	n and Replication, S	storing Values in	
Variables, Your First Program, Diss	ecting Your Pro	gram. Flow control:	Boolean Values,	
Comparison Operators, Boolean Op	perators, Mixing	Boolean and Comp	arison Operators,	
Elements of Flow Control, Progra	im Execution,	Flow Control Stater	nents, Importing	08
Modules, Ending a Program Earl	y with sys.exit	t(). Functions: def	Statements with	
Parameters, Return Values and return	rn Statements, T	he None Value, Key	word Arguments	
and print(), Local and Global Scope, The global Statement, Exception Handling, A Short				
Program: Guess the Number.	Madula II			
Lister The List Date Trees West		A		
Methoda Example Program: Magi	ing with Lists	, Augmented Assign	nent Operators,	
Tuples Deferences Distionaries of	nd Structurin	a Lisi, Lisi-like Iy	pes. Sumgs and	
Pretty Printing Using Data Struc	tures to Mode	el Real-World Thin	as Maninulating	08
Strings: Working with Strings I	Useful String I	Methods Project P	assword Locker	00
Project: Adding Bullets to Wiki Markun				
	Module III			
Pattern Matching with Regular F	vnressions: Fin	ding Patterns of Text	Without Regular	
Expressions. Finding Patterns of Te	ext with Regular	Expressions. More	Pattern Matching	
with Regular Expressions. Greedy	and Non gree	dy Matching. The f	indall() Method.	
Character Classes, Making Your (Own Character	Classes. The Caret	and Dollar Sign	
Characters, The Wildcard Charac	ter. Review o	of Regex Symbols.	Case-Insensitive	
Matching, Substituting Stringswith	the sub() Me	thod, Managing Co	mplex Regexes,	08
Combining re .IGNORECASE, 1	e .DOTALL,	and re .VERBOSE,	Project: Phone	
Number and Email Address Extract	or. Reading an	d Writing Files: File	es and File Paths,	
The os.path Module, The File Readi	ng/Writing Pro	cess, Saving Variable	s with the shelve	
Module, Saving Variables with	the pprint.pfor	mat() Function, Pro	ject: Generating	
Random Quiz Files, Project: Mul	ticlipboard. Or	ganizing Files: The	e shutil Module,	
Walking a Directory Tree, Com	pressing Files	with the zipfile M	Module, Project:	
Renaming Files with American-Style	e Dates to Europ	pean-Style Dates,		

Module IV		
Classes and objects: Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying. Classes and functions: Time, Pure functions, Modifiers, Prototyping versus planning. Classes and methods: Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The_str_method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation. Inheritance: Card objects, Class attributes, Comparing cards, Decks, Printing the deck, Add, remove, shuffle and sort, Inheritance, Class diagrams, Data encapsulation.		
Module V		
Introduction to NumPy: Introduction, Array, NumPy Array, Indexing and slicing, Operations on Arrays, Concatenating Arrays, Reshaping Arrays, Splitting Arrays, Statistical operations on Arrays, Loading Arrays from files, saving NumPy Arrays in files on disk. Pandas and Data Visualization: Introduction to Python Libraries, Series, Data Frame, Importing and exporting data between CSV Files and Data Frames, Panda"s series Vs NumPy ndarray.	08	

CO1	Create basic programs using variables, conditionals, loops, and functions.
CO2	Use lists, tuples, and dictionaries in Python programs.
CO3	Use Python for regex pattern matching, file manipulation, efficient organization, and debugging to solve computational tasks.
CO4	Utilize the concepts of Object-Oriented Programming in Python.
CO5	Develop application python programs using Numpy and Pandas.

Text Books:

1. Al Sweigart, "Automate the Boring Stuff with Python", 1st Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/) (Chapters 1 to 18) 2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist, 2ndEdition, Green Tea Press, 2015. (http://greenteapress.com/thinkpython2/thinkpython2.pdf) (Chapters 15, 16, 17) (Download pdf files from the above links).

Reference Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan's DataSystem Concepts 6th Edition Tata Mcgraw Hill Education Private Limited

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

AUTOMATA THEORY AND COMPUTABILITY				
[As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024)				
SEMESTER – IV				
Course Code	22CS45	CIE Marks	50	
Number of Lecture Hours/Week	03	SEE Marks	50	
Total Number of Lecture Hours	40	Exam Hours	03	
	CRE	DITS – 03		
Course Objectives:				
This course will enable stu	idents to:			
 Introduce the fundamental concepts of Automata Theory, Formal Languages and compiler design Principles Demonstrate Application of Automata Theory and Formal Languages in the fieldof compiler design Develop understanding of computation through Push Down Automata and Turing Machines Introduce activities carried out in different phases of Phases compiler Identify the undecidability problems. 			er design ieldof ines	
Module I Hours			Hours	
Why study the Theory of Computation, Languages and Strings: Strings, Languages. A Language Hierarchy, Computation, Finite State Machines (FSM): Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs, From FSMs to Operational Systems, Simulators for FSMs, Minimizing FSMs.			08	
Module II				
Regular Expressions (RE) : what is a RE?, Kleene"s theorem, Applications of REs, Manipulating and Simplifying REs. Regular Grammars: Definition, Regular Grammarsand Regular languages. Regular Languages (RL) and Non-regular Languages: How many RLs, To show that a language is regular, Closure properties of RLs, to show some languages are not RLs.			08	
	Module III			
Context-Free Grammars(CFG): Introduction to Rewrite Systems and Grammars, CFGs and languages, designing CFGs, simplifying CFGs, proving that a Grammar is correct, Derivation and Parse trees, Ambiguity, Normal Forms. Pushdown Automata (PDA): Definition of non-deterministic PDA, Deterministic and Non-deterministic PDAs, Nondeterminism and Halting, alternative equivalent definitions of a PDA, alternatives that are not equivalent to PDA.			08	
Module IV				
Algorithms and Decision Procedures for CFLs: Simplification of CFG, Elimination ofe- production and Unit Symbol, CFLs are closed under Union, Concatenation and Star- closure. CFLs are not closed under Intersection and complementation. ZM, Techniques for TM construction. Extension to the basic Turing Machine08			08	
	Module V			

Program techniques for Turing machine, The model of Linear Bounded automata, Multi-	
stack Machines, TM with semi-infinite tape.	
Decidability: Definition of an algorithm, decidability, decidable languages, Undecidable	
languages, halting problem of TM, Post correspondence problem. Complexity: Growth rateof	08
functions, the classes of P and NP, Quantum Computation: quantum computers, Church-	
Turing thesis. Applications: G.1 Defining syntax of programming language, Appendix J:	
Security	

CO1	Design a computational model Finite state machine with conversion between different types of FA and minimize the given FA for any regular language
CO2	Develop regular expressions , languages and apply it for designing compilers.
CO3	Develop context free grammar ,push down automata for the given language and conversion between PDA & CFG .
CO4	Simplify CFG & apply the concept of Turing machine for a given Language.
CO5	Analyze and understand decidability and undesirability of various problems with their complexity analysis.

Text Books:

1. Carl Hamacher, Z. Vranesic & S.Zaky, "Computer Organization",5th Edition, Tata McGrawHillPublishing Company Ltd. New Delhi, 2002.

2. John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach, 5thedition, Morgan Kaufmann Elseveir, 2013

Donald P Leach, Albert Paul Malvino & Goutham saha: Digital Priniciples and Applications, 8th Edition, Tata Mcgraw Hill, 2015.

Reference Books:

1. Morris Mano, "Computer System Architecture", PHI, 19862. William Stallings Computer Organization & Architecture, 7th Edition, PHI 2006.

2. Kai Hwang and Naresh Jotwani, Advanced Computer Architecture (SIE): Parallelism,

Scalability, Programmability, McGraw Hill Education 3/e. 2015.

3. R D Sudhakar Samuel: IIustrative approach to Logic Design, Sanguine-Pearson, 2010.

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of three sub questions) from each module
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

ALGORITHMS LAB [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – IV

Course Code	22CSL46	CIE Marks	50
Number Lecture Hour/Week	02	SEE Marks	50
Number of Lecture Hours	30	Exam Hours	03

CREDITS-01

Course Objectives: This course will enable students

• Design and implement various algorithms in C

• Employ various design strategies for proble solving.

• Measure and compare the performance of different algorithms

Programs List

PART-A

1. Design a program to search a key element of n integers using binary search algorithm and

computetime complexity

2. Design a program to Sort a given set of n integer elements using Quick Sort method and compute itstime complexity.

3. Design a program to sort set of n integer elements using Merge Sort method and compute its timecomplexity.

4. Implement the 0/1 Knapsack problem using Dynamic Programming method. Greedy method.

5. Design a program to print all the node reachable from a given starting node in a given digraph usingDFS method.

PART – B

6. Write a Program find shortest paths to other vertices using Dijkstra's algorithm.

7. (a) Write a program to find a Minimum Cost Spanning Tree of a given connected undirected graphusi udingg Kruskal's algorithm.

(b) Write a program to find Minimum Cost Spanning Tree of a given connected undirected graph using Prim"s algorithm.

- 8. Write a program to
- (a) Implement All-Pairs Shortest Paths problem using Floyd's

algorithm.(b) Implement transitive closure using warshall Algorithm.

- 9. Design and implement to find a subset of a given set.
- 10. Implement Travelling Salesman problem using Dynamic program

Course Outcomes (COs):

CO1	Understanding of algorithmic design paradigms and the techniques used for analyzing their efficiency
CO2	Implement programs using various design strategies
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well organized laboratory report

Conduct of Practical Examination:

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

DATABASE MANAGEMENT SYSTEM LAB [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024)			
SEMESTER – IV			
Course Code	22CSL47	CIE Marks	50
Number of Lecture Hours/Week	02	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	03
	CRED	ITS-01	
Course Objectives: This course	will enable studen	ts to:	
• Provide a strong founda	tion in database co	ncepts, technology, a	and practice
Practice SQL programm	ing through a vari	ety of database proble	ems.
 Provide skills in retrievi Design and havid database 	ng and manipulati	ng data stored in data	bases using SQLqueries.
• Design and build databa	se applications for	m databasas includi	ng thausa of
• Learn techniques for get	ing tools	m databases, includin	ng the use of
SQLquenesand report	ing tools.		
No. Title of the experiment			
10.1100 of the experimentConsider the follow Publisher_Name, PUBLISHER(Name, of_Copies) BOOK_LI LIBRARY_PROGRAT Write SQL queries to 1. Retrieve details of a of copies in each Progr 2. Get the particulars Jan 2017 to Jun 2017. 3. Delete a book in BC manipulation operation 4. Partition the BOOK 	ing schema for Pub_Year) Address, Phone) ENDING(Book_id MME(Programme Il books in the libr amme, etc. of borrowers whe OK table. Update table based on yea books and its num	a Library Databa BOOK_AUTHORS(I BOOK_COPIES(B , Programme_id, Ca _id, Programme_Nam ary – id, title, name o o have borrowed mo the contents of other ar of publication. Der ber of copies that are	ase: BOOK(Book_id, Title, Book_id, Author_Name) ook_id, Programme_id, No- rd_No, Date_Out, Due_Date) ne,Address) of publisher, authors,number ore than 3 books, butfrom tables to reflect thisdata nonstrate its workingwith a currently available in

2.	 Consider the following schema for Order Database: SALESMAN(Salesman_id, Name, City, Commission) CUSTOMER(Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS(Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) Write SQL queries to Count the customers with grades above Bangalore''s average. Find the name and numbers of all salesman who had more than one customer. List all the salesman and indicate those who have and don't have customers intheircities (Use UNION operation.) Create a view that finds the salesman who has the customer with the highestorderof a day. Demonstrate the DELETE operation by removing salesman with id 1000. All hisordersmust also be deleted.
3.	 Consider the schema for Movie Database: ACTOR(Act_id, Act_Name, Act_Gender)DIRECTOR(Dir_id, Dir_Name, Dir_Phone) MOVIES(Mov_id, Mov_Title, Mov_Year,Mov_Lang, Dir_id) MOVIE_CAST(Act_id, Mov_id, Role)RATING(Mov_id, Rev_Stars) Write SQL queries to List the titles of all movies directed by "Hitchcock". Find the movie names where one or more actors acted in two or more movies. List all actors who acted in a movie before 2000 and also in a movie after 2015(useJOIN operation). Find the title of movies and number of stars for each movie that has at least one ratingand find the highest number of stars that movie received. Sort the result by movie title. Update rating of all movies directed by "Steven Spielberg" to 5.
4.	 Consider the schema for College Database: STUDENT(USN, SName, Address, Phone, Gender) SEMSEC(SSID, Sem, Sec) CLASS(USN, SSID) COURSE(Subcode, Title, Sem, Credits) IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, Final IA)WriteSQL queries to List all the student details studying in fourth semester "C" section. Compute the total number of male and female students in each semester and in each section. Create a view of Test1 marks of student USN "1BI15CS101" in all Courses. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students. Categorize students based on the following criterion: If Final IA = 17 to 20 then CAT = "Outstanding" If FinalIA = 12 to 16 then CAT = "Average" If FinalIA

	Consider the schema for Company Database: EMPLOYEE(SSN, Name, Address, Sex,
5.	Salary, SuperSSN, DNo) DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
	DLOCATION(DNo,DLoc) PROJECT(PNo, PName, PLocation, DNo) WORKS ON(SSN,
	PNo, Hours)
	Write SQL queries to
	1. Make a list of all project numbers for projects that involve an employee whoselast name
	is "Scott", either as a worker or as a manager of the department that controls the
	project.
	2. Show the resulting salaries if every employee working on the "IoT" project is given a 10
	percent raise.
	3. Find the sum of the salaries of all employees of the "Accounts" department, as well as
	the maximum salary, the minimum salary, and the average salary in this department
	4. Retrieve the name of each employee who works on all the projects controlled by
	department number 5 (use NOT EXISTS operator).
	5. For each department that has more than five employees, retrieve the department
	number and the number of its employees who are making more than Rs.6,00,000.
	Develop PL/SQL program using PROCEDURE.
6.	
-	Develop PL/SQL program using FUNCTIONS.
7.	
0	Develop PL/SQL program using CURSOR.
8.	
0	Develop PL/SQL Programs using TRIGGERS.
9.	
10	Develop PL/SQL programs using PACKAGES.
10.	

CO1	Demonstrate database concepts through series of queries.
CO2	Develop a program using MySQL.
CO3	Effectively debug and troubleshoot issues in DBMS programs, ensuring stable and performant database operations.
CO4	Examine data and query outputs.
CO5	Prepare a well-organized laboratory report.

Conduct of Practical Examination:

• Experiment distribution

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- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero

of the changed part only.

Marks Distribution

Conduct of Practical Examination:

- Experiment distribution
 - a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
 - b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

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Marks Distribution

PYTHON LAB [As per Choice Based Credit System(CBCS)scheme] (Effective from the condemic year 2022, 2024)				
	(Effecti	SEMEST	ER – IV	
Course Co	ode	22CSL48	CIE Marks	50
Number Hours/We	of Lecture eek	02	SEE Marks	50
Total N Hours	umber of Lecture	30	Exam Hours	03
Course (Objectives:			
 Develop program to solve real world problems using python programming. Develop the programs using the concepts of control statements, data structures & files. Apply features of object-oriented and NumPy, pandas package to develop computationally intensive programming & interpret the data 				
	1	Part	t-A	
No.	Title of the experiment			
1.	 a. Develop a program to subjects. Display the sector of the sec	o read the stude student"s details, o read the name zen or not. m the console and d deviation with s	nt"s details like Name total marks, and percer and year of birth of a nd create a list. Develo suitable	e, USN, and Marks in three ntage with suitable messages. person. Display whether the op a program to print mean,
2.	 a. Write a program to de different arithmetic op b. Write a program to cr given string. c. Write a Python script "SunMay 29 02:26:23 d. Read a multi-digit num frequency of each di messages. a. Develop a program to 	monstrate differe beration onnumbe eate, concatenate to print the curren 0 IST 2017". nber (as char) fro git with suitable	nt numbered datatypes ers in Python. and print a string and ac nt date in the following m the console. Develop	in Python and perform a eccess a sub-string from a format ba programto print the
3.	 b. Develop a program to console. c. Write a program to ca the binomial coeffici R). 	generate a Fibor lculate the factori ent (Given N an	acci sequence of length al of a number. Develop d	n(N). Read Nfrom the
4.	a. Implementing program implementing a real-time. Voter''s age validity, stude	ns using Functior (technical applica ent mark range va	ns (Largest number in a tion using Exception ha lidation)	list, area ofshape) andling(Divide by Zero error,

	Using Regular expressions, develop a Python program to
5.	a. Identify a word with a sequence of one upper case letter followed by lower case letters.
	Find all the patterns of " $1(0+)1$ " in a given string.
6.	 a. SET1 and SET2 are two sets that contain unique integers. SET3 is to be created by taking the union or intersection of SET1 and SET2 using the user-defined function Operation (). Perform either union or intersection by reading the choice from the user. Do not use built-in function union () and intersection () and also the operators " " and "&". b The Dictionary "DICT1" contains N Elements and each element in the dictionary has the operator as the KEY and operands as VALUES. Perform the operations on operands using operators stored as keys. Display the results of all operations.
	Implementing programs using Strings. (Reverse, palindrome, character count, replacing
7.	characters)
8.	
	A. Develop a program to print the 10 most frequently appearing words in a text file. [Hint: Use
	a dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the
	reverse order of frequency and display dictionary slice of first 10 items]
	B.Develop a program to sort the contents of a text file and write the sorted contents into a
	separate text file. [Hint: String method strip(), list method sort(), append(), and file method
	open(), readlines(), and write()].
	C. Develop a program to backing up a given Folder (Folder in a current working directory) into
	a ZIP File by using relevant modules and suitable methods.

		Develop a program that uses class Students which prompts the User to enter marks in					
		three subjects and calculate total marks, Percentage and display the scorecard details.					
9.		[Hint: Use a list to store the marks in three subjects and total marks. Use_init() method to					
	•	initialize name, USN and the lists to store marks and total, Use getMarks() method to					
		read marks into the list, and display() method to display the scorecard details.]					
1	0.	Implementing program using modules and python Standard Libraries (pandas, Numpy, Matplotlib, Scipy)					

CO1	Demonstrate theoretical concepts of Python strings, lists, tuples, functions and file manipulation through series of programs
	unough series of programs.
CO2	Design and develop solutions to given problems using Python.
CO3	Debug syntactical errors, and troubleshoot programming issues effectively.
CO4	Analyze the programs and interpret the results
CO5	Prepare a well-organized Python programming laboratory report
Condu	et of Practical Examination.
Conuu	

• Experiment distribution

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Marks Distribution

UNIVERSAL HUMAN VALUES				
[As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024)				
Course Code	22UHV410	CIE Marks	50	
Number Lecture Hour/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
	CREDITS-(3		
 Course Objectives: Students will be taught to: 1. To help the students appreciate the essential complementarily between 'VALUES' an 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of a human beings. 2. To facilitate the development of a Holistic perspective among students towards life an profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universe Human Values and movement towards value-based living in a natural way. 				
3. To highlight plausible implicat conduct, trustful and mutually ful Nature	filling human behav	ior and mutually enriching interact	tion with	
	Module	I	Hours	
Introduction to Value Education: Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role ofEducation) Lecture 2: Understanding Value Education Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: Self-exploration as the Process for Value Education Lecture 4: Continuous Happiness and Prosperity – the Basic HumanAspirations Tutorial 2: Practice Session PS2 Exploring Human Consciousness Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance			08	
Module 2 – Harmony in the Hu session) Lecture 7: Understanding Human Lecture 8: Distinguishing between Practice Session PS4 Exploring the Lecture 9: The Body as an Instrum Lecture 10: Understanding Harmon Tutorial 5: Practice Session PS5 H 11: Harmony of the Self with the H Lecture 12: Programme to ensure Tutorial 6: Practice Session PS6 H	man Being (6 lectur n being as the Co-ex n the Needs of the Se e difference of Needs nent of the Self ony in the Self Exploring Sources of Body self-regulation and H Exploring Harmony o	res and 3 tutorials for practice istence of the Self andthe Body lf and the Body Tutorial 4: of Self andBody Imagination in the SelfLecture lealth f Self with the Body	08	
	Module II	[·	
Harmony in the Family and Soci Lecture 13: Harmony in the Famil Lecture 14: 'Trust' – the Foundation Practice Session PS7 Exploring the Lecture 15: 'Respect' – as the Rig Tutorial 8: Practice Session PS8 I	iety (6 lectures and 3 ly – the Basic Unit of onal Value in Relatio e Feeling of Trust ht Evaluation Exploring the Feeling	3 tutorials for practicesession) f Human Interaction nship Tutorial 7:	08	

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship	
Lecture 17: Understanding Harmony in the Society	
Lecture 18: Vision for the Universal Human Order	
Module IV	
Harmony in the Nature/Existence (4 lectures and 2 tutorials for practicesession)	08
Lecture 19: Understanding Harmony in the Nature	
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four	
Orders of Nature	
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature	
Lecture 21: Realizing Existence as Co-existence at All Levels	
Lecture 22: The Holistic Perception of Harmony in Existence	
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence	
e	
Module V	00
Implications of the Holistic Understanding – a Look at Professional Ethics(6 lectures and	08
3 tutorials for practice session)	
Lecture 23: Natural Acceptance of Human Values Lecture 24:	
Definitiveness of (Ethical) Human Conduct	
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct Lecture 25: A	
Basis for Humanistic Education, Humanistic Constitution and Universal Human Order	
Lecture 26: Competence in Professional Ethics	
Tutorial 13: Practice Session PS13 Exploring Humanistic Models inEducation	
Lecture 27: Holistic Technologies, Production Systems and ManagementModels-	
Typical Case Studies	
Lecture 28: Strategies for Transition towards Value-based Life and Profession Tutorial 14:	
Practice Session PS14 Exploring Steps of Transition towards Universal Human Order	

S

COURSE OUTCOMES

CO1	Present sustainable solutions to the problems in society and nature
CO2	See that these solutions are practicable and draw roadmaps to achieve them.
CO3	Grasp the right utilization of their knowledge in their streams of Technology/Engineering/Management/any other area of study to ensure mutual fulfilment. E.g. mutually enriching production system with rest of nature.
CO4	Sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant.
CO5	Make use of their understanding in the course for the happy and prosperous family and society.

Text Books:

- 1. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- 2. The Teacher's Manual- Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, RR Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53

Reference Books:

- 1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
- 2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
- 3. The Story of Stuff (Book).
- 4. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi
- 5. Small is Beautiful E. F Schumacher.
- 6. Slow is Beautiful Cecile Andrews
- 7. Economy of Permanence J C Kumarappa
- 8. Bharat Mein Angreji Raj Pandit Sunderlal
- 9. Rediscovering India by Dharampal
- 10. Hind Swaraj or Indian Home Rule by Mohandas K. Gandhi
- 11. India Wins Freedom Maulana Abdul Kalam Azad
- 12. Vivekananda Romain Rolland (English)

Gandhi - Romain Rolland (English).

RESPONSIVE WEB DESIGN WITH BOOTSTRAP 5.0 [As per Choice Based Credit System(CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – IV						
Cours	Course Code 22ACS411A CIE Marks 50					
Numb	er of Lecture Hours/ Week	02	SEE Marks	50		
Total Hours	Number of Lecture	30	Exam Hours	03		
Cour	se O bjectives: This course w	rill enable students t	0:			
To u	inderstand the use of Bootstrap	framework for desi	gning responsive we	b pages.		
To ga	ain hands-on experience in crea	ating layouts using l	Bootstrap component	ts		
To de	esign modern web interfaces us	sing Bootstrap utilit	ies such as typograpl	ny, tables, and menus.		
To de	evelop skills to build mobile-fr	iendly, interactive,	and accessible web a	pplications.		
No.	Title of the experiment					
1.	• Install bootstrap framework and understand various tags, attributes to built resposive web page					
2. Design web page that shows department name,college name at center of web page by using bootstrap framework and without using bootstrap framework			of web page by using			
3.	Display student information content on responsive web page by using container and container- fluid classes			container and container-		
4.	Use offset column,reorderinC given format	3 column, and nestir	ng column to create r	esponsive web page for		
5.	Create responsive web page of class time table by using bootstrap grid system 5.					
6.	Show atleast three to four co-curricular activities of student that includes responsive tableswith style such as hover state when mouse over, different color of each row, table with striped row etc					
7.	7. Use bootstrap typography to create resposive web page on given blog topic			topic		
8.	8. Design resposive web page for student registration form using bootstrap layout, form control and bootstrap buttons			ap layout,form control		
9.	Create various types of menu dropdown menu,drop up mer	s using bootstrap me u,adding headers of	enu componentssuch f each item etc.	as right aligned		

	Design responsive web page that shows odd(sem1,sem3,sem5) and even consider as
10.	menu, courses of each semester as submenu using button groups and button toolbar component

CO1	Learn the fundamentals of the Bootstrap framework and its components for building responsive web pages.
CO2	Design and develop responsive web applications using Bootstrap classes, grid systems, and User
	Interface(UI) components.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

Conduct of Practical Examination:

• Experiment distribution

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Marks Distribution

SCRIPTING LANGUAGES						
	[As per Choice Based Credit System(CBCS)scheme]					
	(Effective from the academic year 2023-2024)					
Course	Course Code22ACS411BCIE Marks50					
Numbe Hours/	r of Week	Lecture	02	SEE Marks	50	
Total	Number of	Lecture	30	Exam Hours	03	
Hours Cours	e O hiectives: 7	This course	will enable stud	lents to:		
Cours	Use JavaScri	nt for dyna	nic effects			
	To prepare P	PLIOLUYIIAI	fine effects			
•	Use JavaScri	pt & PHP to	o validate form ir	put entry		
Sl.No.	Title of the ex	periment				
1.	Write a JavaSc product, differe	ript to designed	gn a simple calcu otient	lator to perform the	following operations: sum,	
2.	Write a JavaSc outputs HTML	ript that cal	culates the squar isplays the resulti	es and cubes of the ng values in an HT	numbers from 0 to 10and ML table format.	
3.	 Write JavaScript to validate the following fields of the Registration page. a. First Name (Name should contains alphabets and the length should not be less than 6 characters). b. Password (Password should not be less than 6 characters length). c. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com) d. Mobile Number (Phone number should contain 10 digits only).e.Last 				ation page. should not be less than 6 gth). e standard pattern y).e.Last	
4.	Write an HTM the range of 0 alphabets and s	L page incl to 999 and special char	uding any require shows it in words acters	ed JavaScript that ta . It should not accep	kes a number from text field in pt four and above digits,	
5.	 Write a JavaScript code that displays text "TEXT-GROWING" with increasing fontsize in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt. 			" with increasing fontsize in the 50pt it displays "TEXT- 5pt.		
6.	 a. Install and configure PHP, web server, MYSQL b. Write a program to print "Welcome to PHP" c. Write a simple PHP program using expressions and operators. 			s.		
7.	Develop and de a) Write a PH b) Write a PH	emonstrate P Script to IP Script to	PHP Script for th find out the Sum check whether th	e following problen of the Individual D ne given number is	ns: igits. Palindrome or not	
8.	 8. Write a PHP program to keep track of the number of visitors visiting the web page andto display this count of visitors, with proper headings. 			isiting the web page andto display		
9.	Write a PHP Pr	rogram to d	isplay current Da	te, Time and Day.		

10.	Write the PHP programs to do the following:a. Implement simple calculator operations.b. Find the transpose of a matrix.c. Multiplication of two matrices.d. Addition of two matrices
11.	 Write a PHP program named states.py that declares a variable states with value"Mississippi Alabama Texas Massachusetts Kansas". write a PHP program that does the following: a. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named statesList. b. Search for a word in states that begins with k and ends in s. Perform a case insensitive comparison. Store this word in element1 of statesList. c. Search for a word in states that begins with M and ends in s. Store this word inelement 2 of the list. d. Search for a word in states that ends in a. Store this word in element 3 of the list.
12.	Write a PHP program to sort the student records which are stored in the databaseusing selection sort.
13.	Write a PHP program for sending and receiving plain text message (email).

CO1	Design and develop dynamic, interactive web applications using HTML, CSS, JavaScript, and form validation techniques.
CO2	Implement full-stack web applications by integrating client-side technologies with server-side logic using PHP.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

Conduct of Practical Examination:

- Experiment distribution
 - a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
 - b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

SEE are mentioned here, writeup-15%, Conduction procedure and result in -70%, Viva-voce 15% of maximum marks. SEE for practical shall be evaluated for 50 marks

Conduct of Practical Examination: • Experiment distribution

- g) For laboratories having only one part: Students are allowed to pick one experimentfrom the lot with equal opportunity.
- h) For laboratories having PART A and PART B: Students are allowed to pick oneexperiment from PART A and one experiment from PART B, with equal opportunity.
- Change of experiment is allowed only once and marks allotted for procedure to be made zeroofthe changed part only.
- Marks Distribution
 - i) For laboratories having only one part Procedure + Execution + Viva-Voce: 15+70+15 = 100 Marks

For laboratories having PART A and PART B i. Part A – Procedure + Execution + Viva = 6+28+6

= 40 Marks ii. Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks